

Міністерство освіти і науки України
Сумський державний університет

До друку і в світ
дозволяю на підставі
“Єдиних правил”,
п.2.6.14
Заступник першого проректора –
начальник організаційно-методичного
управління

В.Б. Юскаєв

МАТЕРІАЛИ
V СТУДЕНСЬКОЇ ЛІНГВІСТИЧНОЇ
КОНФЕРЕНЦІЇ ЛНМЦ
КАФЕДРИ ІНОЗЕМНИХ МОВ

«WHY INNOVATIONS IS SUCH A HUGE TOPIC TODAY»
«INFORMATION COMMUNICATIONS TECHNOLOGY»
«LABOUR-SAVING GADGETS»
«MODERN ENGINEERING»

Суми -2011

**Міністерство освіти і науки України
Сумський державний університет**

**The Ministry of Science and Education
Sumy State University**

**«Чому інновації так важливі сьогодні»
«Інформаційно-комунікаційні технології»
«Трудозберігаючі пристрої»
«Сучасна інженерія»**

**МАТЕРІАЛИ
V СТУДЕНСЬКОЇ КОНФЕРЕНЦІЇ
лінгвістичного науково-методичного центру
кафедри іноземних мов
(Суми, 26 травня, 2011)**

**«WHY INNOVATIONS IS SUCH A HUGE TOPIC
TODAY»
«INFORMATION COMMUNICATIONS
TECHNOLOGY»
«LABOUR-SAVING GADGETS»
«MODERN ENGINEERING»**

**Materials
of the fifth Student`s linguistic conference of LSNC
the department of foreign languages
(Sumy, May 26, 2011)**

**Суми
« Видавництво СумДУ»
2011**

Наукове видання

**«ЧОМУ ІННОВАЦІЇ ТАК ВАЖЛИВІ СЬОГОДНІ»
«ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНІ ТЕХНОЛОГІЇ»
«ТРУДОЗБЕРІГАЮЧІ ПРИСТРОЇ»
«СУЧАСНА ІЖЕНЕРІЯ»**

МАТЕРІАЛИ

V СТУДЕНСЬКОЇ КОНФЕРЕНЦІЇ

лінгвістичного науково-методичного центру
кафедри іноземних мов

(Суми, 26 травня 2011 року)

Відповідальний за випуск
Комп'ютерне верстання

Г.І.Литвиненко
С.В.Міхно

Підписано до друку поз.
Формат 60x84/16. Ум. друк. арк. Обл.- вид. арк. Тираж 40 пр. Зам. №
Собівартість видання грн. к.

Видавець і виготовлювач
Сумський державний університет,
вул. Римського-Корсакова, 2, м. Суми, 40007
Свідоцтво суб'єкта видавничої справи ДК № 3062 від 17.12.2007.

SECTION I WHY INNOVATIONS IS SUCH A HUGE TOPIC TODAY

THE GREEN OFFICE

H. I. Anokolova, M-82
ELA – A. M. Dyadechko

Greener homes are in the spotlight these days, but what about the other places where many of us spend huge chunks of our time--our offices? Some simple changes of habit can save energy and resources at work, and these small steps can be multiplied by persuading the powers-that-be at your workplace to adopt environmentally friendly (and often cost-effective) policies.

Many people don't realize that operating office equipment can cost much more than the equipment costs them in the first place. For example, a photocopier that costs you \$4,000 to buy, that is left on continuously for seven years over its two-million copies life, may consume \$1,500 of electricity, \$24,000 of paper and \$15,000 of toner. The greenhouse gas emissions from supplying energy from power stations and manufacturing and disposing of the paper you use could exceed 80 tonnes of carbon dioxide, which is equivalent to more than the total greenhouse gas emissions of a typical Australian home over that seven-year period.

Increasingly, leading edge organizations are considering operating costs as well as environmental impacts when they buy their office equipment. For example, they understand that if you buy an energy-efficient photocopier designed to work well with recycled paper and refilled toner cartridges, copy double-sided whenever you can, set up an effective paper recycling system, and set the photocopier to powersave when you're not using it, over its seven-year life you may: reduce the electricity you use by up to 80%; save up to 80% on your

electricity bill; halve your paper and toner bills; reduce greenhouse gas emissions from electricity, paper and toner by 75%; leave 50 trees in the ground which would otherwise have been chopped down to make paper; involve your staff in doing something for the environment; increase productivity through improved staff morale; enhance your company's profits.

Paper reduction and recycling schemes can reduce the costs and environmental impacts of paper use by 75–95%. To achieve such spectacular savings, effective staff training and feedback on performance are essential. A greener workplace can mean a lighter ecological footprint, a healthier and more productive place to work, and good news for the bottom line.

MY MAJOR IS ECOLOGY

D.S.Balabuha-group EK-91

L.P.Yarmak -EL Adviser

The combination of a rapidly growing industrialized economy, a high pollution growth rate have resulted in increasing air pollution in and around many cities. Old combustion technologies and out-of-date industrial premises, use of low quality fossil fuels, insufficient use of air pollution control devices, and insufficient insulation practices are some of the main causes of air pollution. Cities suffering from these problems need close monitoring on the part of specially trained people which are called ecologists. They are the professionals responsible to look at the impact of housing, recreational facilities, farming methods and urbanization on the environment.

Ecologists try to rectify imbalances caused to the environment by human beings. Nature was supposed to be self sustaining by maintaining the ecological balance itself and need for any kind of study or examination was never felt some

fifty years ago thereby diminishing the need of ecologists. How this ecological balance seems to be shattering.

An ecologist profession demands a lot of hard work and effort but at the same time it offers enormous scope for building one's career. It demands high perfection, hard work and high level of patience an ecologist should be confident in accepting challenges. He has to look into every minute detail to conclude as precisely as possible. To acquire these kinds of traits one can go for the course specially designed for the professionals who have decided to choose Ecology as a career. Young people with desire and capacity for hard work can get both money and satisfaction in this profession.

Most ecologists are scientists with back ground in chemistry, environmental science, geology, biology, climatology. The depth of knowledge in each field determines the special area each candidate works in; a master's degree in a science or ecology is becoming more and more common as the minimum requirement. Nearly all aspiring ecologists are expected to have some field experience.

LANGUAGE AND MEANING

T. Fedchenko student JT-72
S. V. Podolkova – E L Adviser

Words and language are a quite amazing - and unique - human attribute and invention. For a start, words don't just create meaning, they also create feeling. Meaning can be straightforward and literal (some people call this a word's denotation; or it can be quite 'deep' and 'hidden', that is, we can say that a word literally means one thing but somehow suggests quite another (this is also called a word's connotation).

This is the process of interpretation and this always relies on context. It is the effect of context that helps us towards a particular interpretation of a word; context means the

word's relationship to other things - for example, other words - around it: but also the social situation surrounding its use; even because we know what it is not (i.e. we understand the term 'coward' more because we hold the term 'hero' in such high regard rather than because of any meaning the word 'coward' itself contains).

Language has two key qualities that allow it create and shape meaning. It has content - that is, it contains meaning; and it has form - that is, it makes shapes and sounds. Form and content are two aspects of language you are expected to discuss in your essays as writers use them both to help make and shape meaning.

The formal aspects of language - sight and sound - are especially important in poetry as, unlike any other form of writing, its user is allowed to split sentences apart at will and be playful with sound and shape to help add to the meaning created.

A third important aspect of language is structure - the way its meaning unfolds in, for example, interesting, compelling and persuasive ways.

The human language faculty is thought to be fundamentally different from and of much higher complexity than those of other species. Human language is highly complex in that it is based on a set of rules relating symbols to their meanings, thereby forming an infinite number of possible utterances from a finite number of elements. The word "language" can also be used to describe the set of rules that makes this possible, or the set of utterances that can be produced from those rules.

Communicating direction occurs when we use language to cause or prevent an action. The simplest examples would be when we yell "Stop!" or "Come here!" Unlike the communication of information, commands can't be true or

false. On the other hand, the reasons for giving command may be true or false and hence be amenable to logical critique.

Language is a subtle and complex instrument used to communicate an incredible number of different things, but for our purposes here we can reduce the universe of communication to four basic categories: information, direction, emotion, and ceremony. The first two are often treated together because they express cognitive meaning while the latter two commonly express emotional meaning.

Deliberate use of emotional language can be seen in many political speeches and commercial advertisements — these are carefully constructed to get people to share an emotional reaction to something. In casual conversation, emotional language is likely less deliberate because the expression of emotion is a natural aspect of how we communicate with one another. Almost no one constructs normal arguments in a purely logical form. There is nothing inherently wrong with that, but it complicates the analysis of an argument.

Regardless of the motive, extracting the emotional language to leave just the raw propositions and inferences is important to ensure that you evaluate the right things. Sometimes we have to be careful because even a single word can have a literal meaning which is entirely neutral and fair, but which also carries emotional impact that affects how a person will react.

If you want to argue well and do a good job at evaluating the arguments of others, you need to learn how to use language well. The better you are at structuring your thoughts and ideas, the better you will be able to understand them.

ENVIRONMENTAL PROTECTION IN THE CONDITIONS OF COUNTRY DEVELOPMENT

I.R. Khakimova- group ED- 61

O. R. Gladchenko- EL Adviser

Environmental protection is one of the main problems nowadays. Technological progress improves people's life, but at the same time it causes numerous problems that were unimaginable in the past centuries. What will be the verdict of time on the man-made world?

Many feel that economic, technological and scientific developments are accompanied by ever-larger risks for environment, society, and health. With each year, unanticipated and unintended consequences of mature technologies reveal themselves more clearly and long after a commitment to the technologies has suffused the economy; the greenhouse effect from fuels that warm and transport us; the hole in the ozone layer from chemicals that cool our refrigerators and make worries about safe and convenient home food supply a dim memory of grandparents: lung cancer associated with asbestos fibers that were a breakthrough a few decades ago for fireproofing ships, schools, and office buildings.

Big cities face the environmental catastrophe. For example, air pollution is caused by increasing number of cars, heavy traffic causes a lot of air pollution, too. Having more buses would improve public transport in cities and there would be fewer cars in the streets.

Furthermore, we can see much litter in the cities. As a result of it industrial centers today look more like garbage dumps. If the authorities put bin on every street corner, people wouldn't drop litter so much.

The necessity to employ all the inhabitants of the city leads to building new factories that produce not only consumer goods, but wastes and smog as well. Chemicals from factories contaminate atmosphere. Governments can solve this problem by passing laws to stop factories from polluting air and water. It

also should force factories to put filters on pipes. If they did these, our cities would be healthier places to live in. Pollution of water creates a problem of water deficit. In fact, over half of the people in the world have to live with water shortages every day. There are solutions to this problem. We can save the water from our baths and use it for the garden. This would help to keep many liters of water especially in summer. Governments could stop water companies from wasting water supplies because of leaking pipes. Many cities have successfully saved water by repairing pipes.

Another source of global danger is an acid rain. It falls as a result of poisonous chemicals from power stations and cars mixing with the moisture in clouds. This toxic mixture then falls as rain which kills trees, plants and pollutes the ground. There are ways to reduce acid rain. Firstly, power stations should stop releasing so much pollution into the air. Secondly, car drivers should use lead-free petrol. Thirdly, we should use less electricity, and finally, we should try to use public transport instead of cars.

Moreover, disappearing of many endangered species of animals. Millions of species have already left from our planet; thousands of others will escape tomorrow. I think we need to teach hunters that it's wrong to kill animals. Each a worm and a bird has each place in an ecological chain. There is one more moral aspect. When we kill animals we damage something in our souls. Today we kill birds; tomorrow we will kill each other.

What is more, destroying forests-lungs of our planet. They were called so because they produce oxygen, which is one of our basic needs. Logging companies are cutting down rainforests destroying wildlife. But if they planted new trees, rainforest wouldn't disappear. If we collected and recycled paper, there would be more forests around.

To sum up, if pollution of land, air and water continues, the damage caused by all these to nature may become irreversible. Serious actions must be taken now to avoid disaster.

BLUE OCEAN STRATEGY

V. V. Kharchenko, groupM-62

S. G. Zolotova – EL Adviser

Blue Ocean Strategy is a business strategy book that promotes a systematic approach "for making the competition irrelevant." It contains retrospective case studies and suggests theoretical approaches to creating "blue oceans" of uncontested market space ripe for growth.

The metaphor of red and blue oceans describes the market universe. Red oceans are all the industries in existence today—the known market space. In the red oceans, industry boundaries are defined and accepted, and the competitive rules of the game are known. Products become commodities or niche, and cutthroat competition turns the red ocean bloody. Hence, the term red oceans.

Blue oceans, in contrast, denote all the industries not in existence today—the unknown market space, untainted by competition. In blue oceans, demand is created rather than fought over. Blue ocean is an analogy to describe the wider, deeper potential of market space that is not yet explored.

This idea was originally proposed by Prof. Charles W. L. Hill from Michigan State University in 1988. Prof. Hill claimed that Porter's model was flawed because differentiation can be a means for firms to achieve low cost. Prof. Hill proposed that a combination of differentiation and low cost may be necessary for firms to achieve a sustainable competitive advantage.

Kim and Mauborgne studied about one hundred fifty strategic moves made from 1880-2000 in more than thirty industries and closely examined the relevant business players in each. They analyzed the winning business players as well as the less successful competitors. Research results were first published in 1997 in a Harvard Business Review article by Kim and Mauborgne titled "Value Innovation: The Strategic Logic of High Growth". The ideas, tools and frameworks were

tested and refined over the years in corporate practice in Europe, the United States and Asia and presented in the following eight additional articles, before being published in the form of a book in 2005.

Some examples of companies that may have created new market spaces in the opinion of Kim and Mauborgne include;

Cirque du Soleil: Blending of opera and ballet with circus format while eliminating star performer and animals;

Netjets: fractional jet ownership;

Southwest Airlines: offering flexibility of bus travel at the speed of air travel using secondary airports;

Kim and Mauborgne argue that traditional competition-based strategies (red ocean strategies) while necessary, are not sufficient to sustain high performance. Companies need to go beyond competing. To seize new profit and growth opportunities they also need to create blue oceans.

The authors argue that competition based strategies assume that an industry's structural conditions are given and that firms are forced to compete within them, an assumption based on what academics call the structuralist view, or environmental determinism. Here, cost and value are seen as trade-offs and a firm chooses a distinctive cost or differentiation position. Because the total profit level of the industry is also determined exogenously by structural factors, firms principally seek to capture and redistribute wealth instead of creating wealth. They focus on dividing up the red ocean, where growth is increasingly limited.

Blue ocean strategy, on the other hand, is based on the view that market boundaries and industry structure are not given and can be reconstructed by the actions and beliefs of industry players. This is what the authors call "reconstructionist view". This is achieved via the simultaneous pursuit of differentiation and low-cost. As market structure is changed by breaking the value/cost tradeoff, so are the rules of the game. Competition in the old game is therefore rendered irrelevant. By expanding the demand side of the economy new wealth is

created. Such a strategy therefore allows firms to largely play a non-zero-sum game, with high payoff possibilities.

While co-authors, Professor Kim and Affiliate Professor Mauborgne, propose approaches to finding uncontested market space, at the present there are few if any success stories of companies that applied their theories. This hole in their data persists despite the publication of Value Innovation concepts since 1997. A critical question is whether this book and its related ideas are descriptive rather than prescriptive. The authors present many examples of successful innovations, and explain from their Blue Ocean perspective - essentially interpreting success through their lenses.

The research process followed by the authors has been criticized on several grounds. No control group was used. There is no way to know how many companies exploiting a blue ocean strategy concept failed. The theory therefore does not meet the falsifiability criteria in practice. A deductive process was not followed. The examples in the book are selected to "tell a winning story".

Brand and communication are taken for granted and do not represent a key for success. Kim and Mauborgne take the marketing of a value innovation as a given, assuming the marketing success will come as a matter of course. The book only presents a snapshot overview of 3 industries: automobiles, computers and movie theaters.

It is argued that rather than a theory, Blue Ocean Strategy is an extremely successful attempt to brand a set of already existing concepts and frameworks with a highly "sticky" idea. The blue ocean/red ocean analogy is a powerful and memorable metaphor, which is responsible for its popularity. This metaphor can be powerful enough to stimulate people to action. However, the concepts behind the Blue Ocean Strategy (such as the competing factors, the consumer cycle, non-customers, etc.) are not new. Many of these tools are also used by Six Sigma practitioners and proposed by other management gurus.

ECOLOGICAL BRANDING

Ecological branding is becoming more widespread today. So many companies today use 'generic green' to add credibility and value to their brand make. Organic this, recycle that, plant a tree here, save water there. There is a need for this kind of brand because the consumers are becoming more aware of their consumption effect on the environment.

Ecological products are becoming more popular. Now we recognize those companies that realize the importance of green products. People noticed various forms of pollution and the damage they cause the world around them harming the ecosystems, animals and humans. The importance of ecological products is evident.

Ecological branding is a new type of branding which deals with positioning ecological goods on the market.

Speaking about this kind of branding the following instruments must be marked:

1) “Ecological legend”. For instance, “This water is the source for youth of your body”. It is a publicity slogan of Evian Water. The reason for such a slogan is that the source of this water is located in the Alps.

2) “The image of harmless locality” provides an idea of a clean origin of commodity. It can be an ecological territory or region. The name of this place can soon become a part of the brand name. For example, medical cosmetology Vichy (the region in France).

3) Industrial “know-how”. A producer tries to convince us that his goods are made without pesticides or harmful fertilizers and dangerous food concentrates.

4) “Personalization of a manufacturer”. When consumers see on the face of a product the family producing this product they entrust its naturalness.

5) “Fito-copywriting”. It is a technology of right naming for goods. Manufactures today use such words as Vita, Pure, Fit, Bio, Nature and others. Such prefixes increase income by 15 per cent.

6) “Merchandising”. Usually ecological products are located in special departments of the shops with signboards “Useful”, “Ecological products”, etc.

It is interesting to investigate environmental brands on the market, and what these brands stand for, e. g. brands that are known all over the world are olive oil Anthropologic, rye vodka Belvedere, sport clothes Patagonia, cosmetology Green Mama and so on.

The ecological producing sphere is constantly changing. Today conditioners do not only refresh air but they also enrich it with vitamin C (Fresco Tech). The world market proposes computer mouses with a system of ionization (Aopen). Today there appear restaurants which specialize in natural food. (Organica). Today you can go to Smoothie-bar where you can always drink fresh juice.

As for Ukraine, in 2010 such ecological brands as Sandora, Nasha Ryaba, Tulchina, Morshinska, Mirgorodska, Arterium and others were included to the rating of “TOP-100 Ukraine” which was made by HPP Consulting agency.

There are many preconditions for development an ecological branding in Ukraine. Each company understands that ecological branding is powerful in many ways. It is complementary to product design, advertising, merchandising, web design, PR and generally everything that the customer can see, touch or perceive.

The goal of ecological branding is to increase profitability which it perfectly provides.

INNOVATIONS IN OUTDOOR ADVERTISING

N. Ye. Kosolap – group MK-71

S.V. Podolkova - EL adviser

Outdoor advertising includes various types of promotional displays, from highway billboards to transit posters and arena placement, all geared towards communicating a message to the public.

The traditional billboard display may be the main element of outdoor advertising campaigns, but like any industry and particularly any advertising method the medium is evolving all the time. New advances in outdoor advertising have not been technological wonders or major diversions from the norm, but have been logical evolutions of the standard method of putting a big message on a big billboard.

Let us look at some changes to outdoor advertising methods. One of the major transformations in outdoor advertising came with the method of putting the announcement on a moving vehicle. This took the clever step of transporting the advertising around a route or around several routes rather than having it static in one prominent position. The trick is very logical: a roadside billboard sits in one place and is seen by everyone it passes. A bus, for instance, moves from place to place, and the ad is therefore viewed not just by those who pass by it, but by those whom it passes in transit. The concept opened the door for a variety of interpretations of the theme. Many companies, in particular, one famous energy drinks manufacturer has taken to supplying reps with cars that are built to look like the product. Incidentally, a well known importer of oranges took this to an extreme by creating a car that was an orange on wheels.

Technology, has, of course, become involved in the area of outdoor advertising, and in many examples the billboard has become an ever changing device that can be used to show different ads in rotation.

LEGAL INSUARANCE OF INNOVATIVE PROCESSES

Y.O. Lozovetska – group U – 95

V. E. Pronyaeva – EL Advise

The modern period of Ukrainian economy development is characterized by the national progress priorities changing. Under the conditions of public and socio-economic globalization processes the world determines person's development and high-quality contribution in human potential as a main factor of public process.

Today the model of innovative development is represented by the achievement of development with such introduction as knowledge, technologies, scientific and technical developments, and others like that. The providing of the reproductive innovative cycle on new technological basis is one of the special requirements for character and rates of national innovative development.

The other special requirements are social orientation provided by this reproductive cycle with the maximum effective innovative country potential usage, internal and external resources, achievement of the LED rates of development dynamics compared with the world leading countries according to the direction of progress in the world.

The main government target is a creation of legal base for the resources concentration in the state on the leading directions of scientific and technological moderating of production and services in the country, providing internal and external market with innovative products.

Directions of innovative activity priority in Ukraine oblige executive power organs of all levels to create the most helpful implementation for their realization. So the establishment of innovative development model of national economy will be provided by competitiveness and trajectory of steady development. This innovative model of development becomes the state imperative.

There are more than two hundred different legal acts. National innovative legislation includes the norms of such laws as Constitution of Ukraine, Economic code, Law of Ukraine

"About innovative activity", Law of Ukraine "About priority directions of innovative activity development in Ukraine.

The main principles and conditions of state innovative policy are provided by Constitution. The article 54 guarantees freedom of scientific and technical, and other types of creation, intellectual property defence, their copyrights for citizens. Article says that the state promotes science development, establishing scientific Ukraine connections with a world.

Ukrainian national interests need immediate and effective measures, directed on the keeping of its scientific and technological potential, providing more effective use for overcoming the crisis situations in economic and social development. Innovative activity is quite expensive. So Ukraine, having many budget problems, can't provide innovative transformation of the proper industries. As for non-state business corporations they are still not interested in realization of long-term projects which would provide basic technological changes. That's why there isn't effective investing mechanism of technological changes. And the government scientific and technical programs do not provide concrete end-point achievement.

As a result we can see a linked circle: there is no money to provide innovative activity and there is no innovative activity in Ukraine to increase economic profit.

TIDAL POWER

D.A.Mazur – group SU-01

S.G.Zolotova – ELA

Tidal power is the only form of energy which derives directly from the relative motions of the Earth–Moon system, and to a lesser extent from the Earth–Sun system. Tidal forces produced by the Moon and Sun, in combination with Earth's rotation, are responsible for the generation of the tides.

Tidal energy is extracted from the relative motion of large bodies of water. Periodic changes of water levels, and associated tidal currents, are due to the gravitational attraction of the Sun and Moon. Magnitude of the tide at a location is the result of the changing positions of the Moon and Sun relative to the Earth, the effects of Earth rotation, and the local geography of the sea floor and coastlines.

Because the Earth's tides are ultimately due to gravitational interaction with the Moon and Sun and the Earth's rotation, tidal power is practically inexhaustible and classified as a renewable energy resource.

A tidal generator uses this phenomenon to generate electricity. Greater tidal variation or tidal current velocities can dramatically increase the potential for tidal electricity generation.

The movement of the tides causes a continual loss of mechanical energy in the Earth–Moon system due to pumping of water through the natural restrictions around coastlines, and consequent viscous dissipation at the seabed and in turbulence. This loss of energy has caused the rotation of the Earth to slow in the 4.5 billion years since formation. During the last 620 million years the period of rotation has increased from 21.9 hours to the 24 hours we see now; in this period the Earth has lost 17% of its rotational energy. While tidal power may take additional energy from the system, increasing the rate of slowdown, the effect would be noticeable over millions of years only, thus being negligible.

Tidal power, also called tidal energy, is a form of hydropower that converts the energy of tides into electricity or other useful forms of power. The first large-scale tidal power plant (the Rance Tidal Power Station) started operation in 1966.

Although not yet widely used, tidal power has potential for future electricity generation. Tides are more predictable than wind energy and solar power. Among sources of renewable energy, tidal power has traditionally suffered from relatively high cost and limited availability of sites with sufficiently high tidal ranges or flow velocities, thus constricting its total availability. However, many recent technological developments and improvements, both in design (e.g. dynamic tidal power, tidal lagoons) and turbine technology (e.g. new axial turbines, crossflow turbines), indicate that the total availability of tidal power may be much higher than previously assumed, and that economic and environmental costs may be brought down to competitive levels.

Historically, tide mills have been used, both in Europe and on the Atlantic coast of North America. The earliest occurrences date from the Middle Ages, or even from Roman times.

The largest tidal power station in the world (and the only one in Europe) is in the Rance estuary in northern France, near St. Malo. It was built in 1966.

A major drawback of tidal power stations is that they can only generate when the tide is flowing in or out - in other words, only for 10 hours each day. However, tides are totally predictable, so we can plan to have other power stations generating at those times when the tidal station is out of action.

THE ALTERNATIVE POLICY SCENARIO

E.S. Melnick – group EM – 91

The energy future which we are creating is unsustainable. If we continue as before, the energy supply to meet the needs of the world economy over the next twenty-five years is too vulnerable to failure arising from under-investment, environmental catastrophe or sudden supply interruption.

The scenario has been the central message from the World Energy Outlook for the past several years; and in 2005 at Gleneagles and in 2006 at St. Petersburg, G8 leaders endorsed that judgement, making a political commitment to change. They asked the IEA to map a new energy future. This edition of the Outlook responds to that challenge. It starts, like previous editions, with a Reference Scenario projecting energy demand and supply if present policies are to continue. This is not to cast doubt on the will for change. Rather it serves as a point of departure for the analysis of how and how far that future can be altered and at what cost. It is a reminder of why that must happen: despite the shock of continuing high oil prices, the projected energy future has hardly changed.

What this scenario shows is that the world economy can flourish while using less energy. Carbon dioxide emissions can be cut by thousands of millions of tonnes by 2030. The investment cost is higher for consumers; but their extra cost is more than offset of savings .

Those benefits are open to all energy suppliers alongside energy consumers and, not least, those consumers in the countries most in need of economic development. They are vulnerable to what the French call “l’*énergie du désespoir*”, the overwhelming power of desperation. On the contrary, they confidently believe that there is “*de l’espoir dans l’énergie*”.

SOLAR WINDOW

I.V. Oliinyk – group F-91

In recent years various companies are developing technology to turn ordinary windows into solar panels. And now the U.S. firm New Energy Technologies has also decided to compete in the creation of new sources of energy generation, providing SolarWindow.

New Energy Technologies is developing the first-of-its kind SolarWindow technology, which enables see-thru windows to generate electricity by ‘spraying’ their glass surfaces with New Energy’s electricity-generating coatings. New Energy’s solution is unique to the SolarWindow coatings. This innovation can make use of the world’s smallest functional solar cells, which measure less than $\frac{1}{4}$ the size of a grain of rice, and have been shown to successfully produce electricity in a published peer-reviewed study in the Journal of Renewable and Sustainable Energy of the American Institute of Physics. SolarWindow differs from its predecessors applying to the glass surface by spraying, using currently available technology. Do not require expensive high-temperature or high-vacuum production methods, but rather, can be sprayed on to glass at room temperature. It also generates electricity from both natural and artificial light sources, outperforming today’s commercial solar and thin-film technologies by as much as 10-fold. The measure is less than 1/10th the thickness of ‘thin’ films (only 1/1000th the thickness of human hair).

SolarWindow technology – capable of generating electricity on see-thru glass windows – is under development for potential application in the estimated 5 million commercial buildings in America (Energy Information Administration) and more than 80 million single detached homes

DRIVE ALERT

A.S.Romashko –group E-92

Drowsy driving is as deadly as drunken driving. Driver fatigue is the primary reason for drivers falling asleep at the wheel. We live in a society where a lot of people are getting tired all the time. Any driver knows how it is difficult to drive the car for some hours. Is created a device “DriveAlert”, like an alarm for the driver. This intelligent device is designed to detect when the driver is in danger of dozing off and immediately alerts him and passengers. It prevents a potential crash. If you feel drowsy but need to keep yourself on road “DriveAlert” will keep you and others in safety during long drowsy driving. Buy “DriveAlert” and go for safe road travel. Externally it resembles Bluetooth-headset, which clings to the ear. The “DriveAlert” is small, lightweight, affordable and extremely effective. It is on one ear and will stay there even if you wear glasses. You just wear it behind the right ear. It works on the principle of electronic balance. If you suddenly bend too low, it immediately starts beeping heart-rending, making you wake up. The device is irresponsive on inclination of head in sides and back. If the driver's head drops forward rather far the alarm sounds off. The position when the alarm sounds can be adjusted. This device consists of a built-in switch, electronic and mechanical charts, and also a siren. In spite of the use of "DriveAlert", drivers must understand that if they are tired it is dangerous to drive a car. “DriveAlert” is not a panacea against sleep and will not improve the reaction of driver, waking up on a sudden turn. It is perfect for people who need to be on full alert while on duty such as security guards, machine operators, and even students who need to work on their posture. So then taking “DriveAlert” you can get an additional chance to safe your life, and it is never superfluous

WHY INNOVATIONS IS SUCH A HUGE TOPIC
TODAY

T. M. Shabelnyk – group EL-01
S. G. Zolotova – EL Adviser

Our today's life is connected with different devices and innovations in this or that way. We can't imagine our lives without such widespread things like mobile phones, cameras, computers etc.

By using mobile phones, you can communicate with everyone whenever you want and wherever you are. You can carry a mobile phone with you don't miss important calls. For its help everybody of us can call for directions if we are lost.

But using mobile phones have their bad sides. The cell phone has pushed people apart from each other. Instead of going to see the parents they just call them and they don't need to go and see them so just to find out how are you is not enough.

Computers, video games and the Internet have become entrenched features of our daily lives. Computers are in houses, in offices, in shops and at schools. It is now a major source of fun and entertainment for many people. But the time spent on the computer or video game is out of balance, and has displaced work, friends, and even family.

Digital camera helps you to catch the best moments of your journey to remember it by: scientists invented the good old camera sensitive to light to make photos of people and placed.

Can you continue this list of things you can't live without?

FUTURE TECHNOLOGY NEWS FOR YEAR 2020
AND BEYOND

T. S. Sotnyk, SU-01
S.G. Zolotova, ELA

March 28, 2020 - Since the introduction of VoIP (Voice over Internet Protocol) in the late 90's and the explosion of VoIP on the market in the beginning of this century, the shift is now completed in Western Europe from TDM (Time Division Multiplexing) to end-to-end fixed VoIP networks.

August 16, 2020 - For the first time a court case is based on a multi voice recognition transcript as the main evidence. It was when Frank Levin took part in a dispute with four people that resulted in a fired gun that killed Adam Denny. The three other all testified that Frank had pulled the trigger, while Frank claims that according to the transcript, it clearly states that he was not the one holding the gun.

August 24, 2020 - The first full-length animated movie with realistic-looking humans, "Tickle" opens tonight. It is an intriguing thriller about a woman who gets framed by her husband, but the most intriguing is to see if you can spot the difference between real actors and these created by computers.

December 18, 2020 - This year shows strong growth for wind power when the total global installed capacity added a record 62,000 MW, making the total capacity more than 480,000 MW. Wind power is by far the renewable source with the largest growth in worldwide capacity during the last decade.

January 5, 2020 - China will this month reach the 1 billion mark for mobile phone users, three times as many as 15 years ago. The market for mobile phones in China is bigger than Europe, US and Japan combined and about 80% of the Chinese population now has a mobile phone.

January 12, 2020 - Even though the oil price crossed another barrier earlier this week with US\$ 320 a barrel, we have probably not seen the end of it. With the stumbling of the world's current oil production even higher oil prices are to expect in the future.

August 23, 2025 - Today a new chapter in space tourism was written. Rod Markham and his wife-to-be Susan Millster arrived safely to the moon to spend 5 days as the first guests at

the Starbright Hotel that was set up for this purpose two years ago.

February 14, 2025 - Today is the release of the first home computer with the new 4 THz microprocessor, currently the highest performing processor available. Several analysts have doubted of the need of the 4THz processor for the home market, but the pre-sale for the last couple of weeks look positive according to the manufacturer.

April 5, 2030 - The international collaboration for the first manned mission to Mars presented today the final plans for the trip next year. Take off will be January 24 and after about five months in space they will land on Martian soil on June 28. The countdown for one of the greatest adventures ever has started.

November 21, 2030 - More manufacturers of electronic equipment are now joining the battery standard, based on the new generation of rechargeable batteries that can keep your TV run for 40 hours without recharging. They will soon be able to run basically all equipment at your home, the computer, toaster, lamps, vacuum cleaner, and they are even considered for washing machines.

December 15, 2030 - There's no doubt what the most popular Christmas present will be this year. Influenced by the launch of the first manned mission to Mars next month, you will most likely get a present with stars, a gift card for a space trip.

December 20, 2030 - The launch yesterday of the virtual realistic-looking human newscaster from Simple News gained rave reviews. Others have made several attempts earlier, but this sends the live newscasters in to a pretty shaky future.

September 5, 2035 - More than 20,000 quadriplegics around the world have now got a BCI, a Brain Computer Interface. It gives them the ability to control their environment, from driving their own electric wheelchairs outside their house, to make their own dinner.

September 12, 2035 - Are you kidding? Is it possible to beam myself? No, of course not, but you can now make a 3-D projection of yourself anywhere in the world. The first product for real teleimmersion has been released, the Telebeamer.

January 8, 2035 - With a first prize of seven million US dollar and the intriguing plot of trying to fool or outsmart Arnold, the most advanced artificial intelligence in public use, the much hyped live show "Fooling Arnold" became the people's choice this Saturday.

January 19, 2035 - According to the latest statistics presented this week, 1 million hydrogen-fueled cars have now been sold in the US. The figures for last year show an increase in sales by 50% from 2033.

February 7, 2035 - After a lot of hush-hush for several years the much longed for search engine TalkTalk was presented to the press this week. One day talking basically made me speechless; the future has never looked brighter in finding information.

April 12, 2040 - Although introduced in the market only five years ago, 10% of all hydrogen fuel now sold in the US is of the environmental friendly Re-Hydro label, produced through electrolysis based on a source of 100% renewable energy.

June 6, 2040 - For the first time ever, in-atmosphere passenger kilometers have passed 8,000 billion per year worldwide, according to the latest statistics, which is an increase by three times during the last 30 years. The introduction of the super-jumbo (600-seat airliners) combined with the low price level for flight traveling has kept the numbers steadily increasing.

September 1, 2040 - From today you have your own therapist available 24 hours a day, always there if you need someone to talk to, always in a good mood, and remembers every word you have ever said. This is the first automated therapist, with the best knowledge known to mankind on treatment and rehabilitation.

November 19, 2040 - Today was a historic day for Iceland when their President this morning at a symbolic ceremony officially shut down the last gasoline pump in the country. Iceland is a model country when it comes to the fuel transition from gasoline to hydrogen and became today the first country in the world to complete it.

ARTIFICIAL RETINA

T. S. Starostenko – group E – 92
N. M. Usenko – EL Adviser

The new retina chip was designed at the University of California at Santa Cruz and fabricated by Second Sight Medical Products. The project was funded by the Artificial Retina Project at the U.S. Energy Department.

The Argus II works by implanting the artificial retina chip directly inside the eye on the old retina. It only works for patients whose retina has degenerated, but still has intact nerves connecting to the brain. The artificial retina has an array of electrodes that stimulates optic nerve cells, sending an image to the brain's vision centers. The plasticity of our brain vision allows to process and adapt to the artificially generated signals.

The first generation Argus I contained just 16 electrodes, enabling patients to detect motion, sense patterns of light and dark and to count large objects. The new model increased the array to 60 electrodes while reducing the surgical implant time has from six to two hours.

The Artificial Retina Project was designed by an ophthalmologist and a bioengineer, Mark Humayun, who pioneered the original project. The project is now a part of a DoE consortium of three universities, six national laboratories, and the commercial company, Second Sight LLC (Sylmar, Calif.)

Argus II is about four times smaller than Argus I, but still uses a sealed package. Argus III will replace the package with a much smaller bare die with a special coating only a few microns thick on a flexible substrate that allows the electrode array to conform to the curve of the inner eye.

HUMAN BRAIN

There are no pain receptors in the brain, so the brain can feel no pain. The human brain is the fattest organ in the body and consists of at least 60% fat. Neurons develop at the rate of 250,000 neurons per minute during early pregnancy. Humans continue to make new neurons throughout life in response to mental activity. Alcohol interferes with brain processes by weakening connections between neurons. Altitude makes the brain see strange visions – many religions involve special visions that occurred at great heights. For example, Moses encountered a voice emanating from a burning bush on Mount Sinai and Muhammad was visited by an angel on Mount Hira. Similar phenomena are reported by mountain climbers, but they don't think it's very mystical. Many of the effects are attributable to the reduced supply of oxygen to the brain. At 8,000ft or higher, some mountaineers report perceiving unseen companions, seeing light emanating from themselves or others, seeing a second body like their own, and suddenly feeling emotions such as fear. Oxygen deprivation is likely to interfere with brain regions active in visual and face processing, and in emotional events. Reading aloud and talking often to a young child promotes brain development.

Information travels at different speeds within different types of neurons. Not all neurons are the same. There are a few different types within the body and transmission along these different kinds can be as slow as 0.5 meters/sec or as fast as 120 meters/sec. The capacity for such emotions as joy, happiness, fear, and shyness are already developed at birth. The specific type of nurturing a child receives shapes how these emotions are developed.

The left side of your brain (left hemisphere) controls the right side of your body; and, the right side of your brain (right hemisphere) controls the left side of your body. Children who learn two languages before the age of five alters the brain structure and adults have a much denser gray matter. Information can be processed as slowly as 0.5 meters/sec or as fast as 120 meters/sec (about 268 miles/hr). While awake, your brain generates between 10 and 23 watts of power—or enough energy to power a light bulb. The old adage of humans only using 10% of their brain is not true. Every part of the brain has a known function.

A study of one million students in New York showed that students who ate lunches that did not include artificial flavors, preservatives, and dyes did 14% better on IQ tests than students who ate lunches with these additives. For years, scientists believed that tinnitus was due to a function within the mechanics of the ear, but newer evidence shows that it is actually a function of the brain. Every time you recall a memory or have a new thought, you are creating a new connection in your brain. Memories triggered by scent have a stronger emotional connection, therefore appear more intense than other memory triggers. Each time we blink, our brain kicks in and keeps things illuminated so the whole world doesn't go dark each time we blink (about 20,000 times a day). Laughing at a joke is no simple task as it requires activity in five different areas of the brain. The average number of thoughts that humans are believed to experience each day is 70,000.

There are two different schools of thought as to why we dream: the physiological school, and the psychological school. While many theories have been proposed, not single consensus has emerged as to why we dream. Some researchers suggest that dreams serve no real purpose, while other believe that dreaming is essential to mental, emotional and physical well-being. One theory for dreaming suggests dreams serve to clean up clutter from the mind.

The Hypothalamus part of the brain regulates body temperature much like a thermostat. The hypothalamus knows what temperature your body should be (about 98.6 Fahrenheit or 37 Celsius), and if your body is too hot, the hypothalamus tells it to sweat. If you're too cold, the hypothalamus makes you start shivering. Shivering and sweating helps get your body's temperature back to normal.

Approximately 85,000 neocortical neurons are lost each day in your brain. Fortunately, this goes unnoticed due to the built-in redundancies and the fact that even after three years this loss adds up to less than 1% of the total.

Differences in brain weight and size do not equal differences in mental ability. The weight of Albert Einstein's brain was 1,230 grams that is less than an average weight of the human brain.

Thus human brain is the most perfect device which needs further study and may stimulate creative technology development.

SUPERSONIC AIRCRAFT

In aviation, a supersonic aircraft is one that is designed to exceed the speed of sound in at least some of its normal flight configurations.

The great majority of supersonic aircraft today are military or experimental aircraft. Most of them, including many military fighter aircraft, are designed to exceed the speed of sound only in certain exceptional flight regimes; a handful of aircraft, such as the SR-71 Blackbird military reconnaissance aircraft and the Concorde supersonic civilian transport, are designed to cruise continuously at speeds above the speed of sound.

Supersonic flight brings with it substantial technical challenges, as the aerodynamics of supersonic flight are dramatically different from those of subsonic flight (i.e., flight at speeds slower than that of sound). These challenges have largely been met. However, political, environmental, and economic obstacles of greater magnitude continue to severely limit the actual deployment of supersonic aircraft, particularly in the civilian world. Additionally, the need and demand for supersonic flight have often been insufficient to justify development or deployment of supersonic aircraft, particularly in the domain of civilian transport.

The aforementioned SR-71 and Concorde aircraft are no longer flying today although Concorde was highly profitable in service, but because of the low market among operators (due to sonic booms, relatively high fuel

consumption and poor range) in turn making it unprofitable for manufacturers to produce these kinds of aircraft.

Supersonic aircraft usually use low bypass turbofans as they give good efficiency below the speed of sound as well as above, or if extended supercruise is needed turbojet engines are desirable as they give less nacelle drag at supersonic speeds.

A supersonic transport (SST) is a civil aircraft designed to transport passengers at speeds greater than the speed of sound. The only SST to see regular international service was Concorde, and the only other design built in quantity was the Tupolev Tu-144. The last passenger flight of the Tu-144 was in June 1978, and Concorde's last flight was on November 26, 2003. Following the permanent cessation of flying by all Concorde, there are no SSTs in commercial service.

A supersonic business jet (SSBJ) would be a small business jet, intended to travel at speeds above Mach 1.0.

Typically intended to transport about ten passengers, SSBJs are about the same size as traditional subsonic business jets. Larger commercial supersonic transports such as the Aérospatiale / British Aerospace Concorde and Tupolev Tu-144 'Charger' had relatively high costs, and high noise, low range and some environmental concerns (although these problems were less evident in Concorde than the Tu-144). Many fighter aircraft and some bombers today are capable of supersonic speeds.

TYPE OF INTELLECTUAL PROPERTY INTEREST

M.S. Utkina – group YU-05

T.V. Pochatko – EL Advisor

Intellectual property (IP) is a term applying to a number of distinct types of creations of the mind for which a set of exclusive rights are recognized—and the corresponding fields of law. IP, in particular copyright, is highly valuable to the development of a forward thinking society.

IP confers a form of ownership interest in human intellectual output. IP law developed to regulate the ownership of such interests, and is a system of laws that confers enforceable rights upon the person responsible for the intellectual output, so that the creator or owner of IP can exercise a measure of control over its future use. In addition, market forces dictate the overall value of the intellectual output, potentially granting the person responsible for having created it an opportunity to generate revenue. Finally, IP law grants the creator an exclusive opportunity to exploit their creations by granting others the rights to use it.

A trade mark, or mark, needs to be registered at the Patent Office to be protected. A trade mark is a territorial. It can be a sign including words, symbols, or pictures, or a combination of all these elements. Its function is to represent the goods graphically and distinguish them from other goods. It is essentially a badge of origin enabling customers to recognize a brand. A service mark is the same as a trade mark but it identifies the source of a service.

To be capable of registration, a trade mark must be original and sufficiently distinctive from any other marks for the same or similar goods or services. The mark must be specific to the goods or services to which it is to apply and must not be misleading or contrary to law or morality. In the UK, a trade mark can be enforced to protect the mark's

proprietor under the Trade Marks Act 1994, which implements the EC (European Community) Trade Mark directive.

Application to the Trade Mark Registry at the UK Patent Office for a national trade mark; or for a CTM (Community Trade Mark) valid throughout the EU (European Union), to OHIM (the Office for Harmonisation in the Internal Market – Trade Marks and Designs); or to the Patent and Trademark Office for granting of a trademark in the USA.

Not all trade marks are registerable, for example where the shape results from the nature of the goods, such as an umbrella. The mark may be licensed for authorised use.

Domain names are unique Internet addresses which distinguish one computer from all others connected to the Internet, for example yandex.ua

Top level domains (TLD) include two letter country codes (ccTLD) such as .uk and .nl. Generic TLDs (gTLD) include .com, .org, .biz, and .coop. Below these are the second level domain names, for example “McDonalds” in McDonalds.com

Disputes may arise when:

- two or more people are entitled to use the identical trademark in different countries and each claim the same domain name; or
- a third party registers a domain name the same as, or very similar to, a famous name or trademark, hoping to sell it to use the business value of a well-known name—a practice known as cybersquatting, or net name piracy.

Domain names can be registered directly at accredited registrars, that is, Internet name licensing authorities, or by buying them from the Internet naming companies. Names are registered for one or more years, often with annual renewal. Disputes, may be referred to accredited dispute resolution providers, such as the World Intellectual Property Organization (WIPO), or country registrars.

ANALYSIS OF CAUSES OF INTRAUTERINE GROWTH RESTRICTION

Kh.I. Vasylyshyn- M.S., group NR-02

S.V. Zolotova- EL Adviser

V.E. Markevych- AmE, M.D., Scientific Adviser

The problem of intrauterine growth retardation (IUGR) has been drawing more and more attention recently. Frequency of this complication of pregnancy and the resulting perinatal morbidity and mortality as well as the risk of sudden infant death are increasing. According to different authors, IUGR frequency varies from 1 to 31.2%. The level of perinatal mortality among children with IUGR is 4-8 times higher than among children born with normal body weight, and it constitutes 65-70% depending on the term of IUGR and background diseases, and it is 90% among premature infants. Perinatal morbidity of children born with IUGR, is 47-50%.

Causing disorders of neuropsychological and somatic development, IUGR adversely influences the further development of children and adolescents.

Intrauterine growth retardation is a pathological condition that occurs due to inadequate maternal-fetal circulation and leads to giving birth to infants with birth weight and/or birth length below the 10th percentile for gestational age.

In 2008-2011, there was made an analysis of 953 case records of newborns who were on treatment in department of pathology of newborns and department of premature of Sumy Regional Children's Clinical Hospital (SRCCH), and IUGR was diagnosed among 134 newborns. Age of women who gave birth to children with IUGR signs ranged from 18 to 42. 56.7% (76) of these women were pregnant for the first time, and for 66.7% (89) of them it was the first birth delivery. Encumbered obstetric history was observed in 26.7% (36) cases. 20,1% (27) of mothers had medical abortion in the anamnesis.

Background diseases were found in 36.6% (49) women. Speaking about the complications of pregnancy, 30% (40) of women were diagnosed with colpitis, 46,6% (42) – with threatened miscarriage, 100% (134) – with anemia of pregnancy, 60% (80) – with chronic placental insufficiency, 23,3% (31) – with gestosis of the first half of pregnancy, 30% (40) – gestosis of the second half of pregnancy, 20% (27) – with SARS in the second half of pregnancy.

Almost all the children studied had signs of perinatal hypoxic lesions of NS of different severity level. Among the syndromes of lesions of NS, excitation syndrome predominated. In 13 (18,6%) children of the main group and 2 (6.7%) newborns out of comparison group in the early neonatal period the syndrome of vegeta visceral disorders was identified, and it manifested itself by violation of microcirculation, thermoregulation and motility of the gastrointestinal tract. Long and expressed transient states (primary pathological loss of body weight, thermoregulation violation) occurred in 51.4% (36) infants of the core group, indicating the lack of adaptation at birth.

Thus, IUGR remains a multifactor pathology, in the implementation of which both the hereditary and external factors of the environment are very important. Increased frequency of births with IUGR is caused by combined effect of socioeconomic, environmental, medical and biological factors which have led to deteriorating the health index of women of reproductive age. The analysis shows that IUGR is formed because of negative premorbid condition and pregnancy complications. Among them, it is vitally important to emphasise the risk of miscarriage and chronic fetoplacental insufficiency observed in every second patient. High sickness rate and low adaptive capabilities during neonatal period are peculiar for newborns with IUGR.

INVENTIONS OF 2010

V.V. Vlasenko – student, group EM – 91

D.O. Marchenko – EL Adviser

Science is all about having an open imagination, not being afraid of making mistakes and asking the right questions. Almost all old and new scientific inventions and discoveries owe their origins and existence to these three essential human attitudes! The year 2010 has given us some useful technological inventions. The development of technology started in the real sense in 1960s and 1970s. If you are interested to know more check these articles about inventions of 1960s and also the technology in 1970s. But, here is a short list of few important inventions of 2010. Here is an attempt to enlist few of the important inventions of 2010. These may not be the greatest inventions of all time, however, are important in their own right. The descriptions of these inventions should provide a rough idea of their working and especially the importance in today's life.

New Inventions of 2010:

1) Teleportation

It was considered one of the major inventions for the year, 2010. The success in teleporting data from one atom to other led to this invention. This experiment was conducted by scientists at the 'Joint Quantum Institute' (University of Maryland). The invention is considered to be important due to the fact that it can prove to be useful in the creation of secure and fast computer systems. It is therefore, one of the best inventions of 2010.

2) Android Phone

The 'Android' is an operating system developed by Google Inc. Use of this operating system in phones has resulted into these phones being called as Android phones. One of the great inventions of 2010, Android is a phone that has provided

customers with an alternative to the popular 'Apple iPhone'. One of the specialty of the Android operating system is that the code being used can be altered since it falls in the 'open source' category. Based on the Android operating system, different interfaces can be created for users and with the help of many different hardware platforms.

3) Electric Eye

The 'Electric Eye' is one of the best inventions of year 2010 with the potential of providing partial eyesight to blind people. The main component of this device is a chip encased in a titanium cover. It (titanium) prevents water from damaging the chip. The whole device comes in the form of eye glasses fitted with a camera. This camera is used in the transmission of captured images to the titanium covered chip. As the chip receives transmission from camera, it fires an electrode array present under the retina which in turn does the task of stimulating optic nerves. This new invention can therefore, be considered as one of the most important of 2010.

4) Flying car

The flying car is an automobile that can travel on roads and take off, fly and land as an aircraft. If you want to drive the flying car, you must have a driver license and a pilot's license.

All the inventions of 2010 mentioned in this article are known for their usefulness. These devices for example, the 'Electric Eye' can be of great help to the blind people. Inventions of the year 2010 which range from devices for home use to the space telescope are enlisted and described in short. There are many other inventions of the year 2010 which are not included in the paragraphs above. Inventions have an especially important value for all people. Important inventions are the technologies of the future. Inventions are opened by new possibilities for humanity. Innovative activity was, is and remains main rushiem of development of humanity.

SECTION II INFORMATION COMMUNICATIONS TECHNOLOGY

INFORMATION COMMUNICATIONS TECHNOLOGY

M.I.Bilan – group MK – 01

I.A. Morozova – EL Adviser

Information and communications technology or information and communication technology, usually called ICT, is often used as an extended synonym for information technology (IT) but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), intelligent building management systems and audio-visual systems in modern information technology.

ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, robots.

Lets focus on the three words behind ICT. So, information is knowledge of specific events or situations that has been gathered or received by communication; intelligence or news. Communications is exchange of information between individuals through a common system of signs, symbols, or behavior representation is a usable channel of communication between humans. And, technology - the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment.

In the early days of the PC in schools, games were almost the only software available thanks largely to the concept of ‘edutainment’ – a mixture of ‘education’ and ‘entertainment’. These software titles, such as Magic Bus, presented a rather second rate entertainment score combined with a little education along the way. Thankfully, and due in no

small measure to ELCs, software has moved on a long way since those days and the educational aspect of school software has become more dominant.

What kinds of technology do teachers and students use and what role do ICT play in supporting these innovations? A large majority of the innovations use productivity tools (78%), Web resources (71%), and e-mail (68%). Many—52%—use multimedia software. In almost all of the cases—94%—computers are used in regular school settings such as the classroom, library, or computer laboratory. In far fewer cases, teachers use ICT to plan or organize instruction or to monitor or assess student work. In a small number of cases ICT are used to support student collaboration, or simulations or modeling software packages are used for research or experimentation.

10 important rules are for teaching with ICT:

- 1) Teachers need a reliable internet connection with good bandwidth
- 2) Teachers need the support of well-designed resources
- 3) The secret to a successful online course is interaction
- 4) A successful course is usually a well-planned one
- 5) Intended outcomes need to be clear
- 6) Online learning is more than repeating previously learned material
- 7) 'Something for nothing' is always good
- 8) Don't allow time for questions!
- 9) Use the tools
- 10) Online teaching requires new skills

TABLET PERSONAL COMPUTER

Chernenko S.O – group IN-02

Zolotova Z.G – Advisor GL

A tablet personal computer (tablet PC) is a tablet computer having the main characteristics of a personal computer as a machine operated by an end-user with no intervening computer operator.

A portable tablet personal computer is equipped with a touchscreen as a primary input device and designed to be operated and owned by an individual. The term was made popular as a concept presented by Microsoft in 2001, but tablet PCs now refer to any tablet-sized personal computer, even if it's not using Windows but another PC operating system. Tablets may use virtual keyboards and handwriting recognition for text input through the touchscreen.

All tablet personal computers have a wireless adapter for Internet and local network connection. Software applications for tablet PCs include office suites, web browsers, games and a variety of applications. However, since portable computer hardware components are low powered, demanding PC applications may not provide an ideal experience to the user.

According to a study released by the law firm Olswang in early 2011, the tablet market is in an early stage with 3% of Americans owning an iPad and 2% own some other kind of tablet, with Apple users being more likely to show brand loyalty.

PAST AND FUTURE OF 3D-TECHNOLOGY

I.S.Girenko – group F-93

L.Y. Hmelick – EL Adviser

You have probably seen 3D films in the cinema or heard about the latest 3D screens. They are already on the market. In fact, 3D is not new. But what really makes this technology so exciting?

The concept of stereo images appeared in the XIX-th century. Charles Witton made a demonstration device, the principle of which was based on physiological characteristics of the human vision – on the difference in perception of the right and left eyes. That device allowed to see an object in volume, rather than flat. And finally, in the era of digital technologies, 3D technology has got a new and progressive solution and use.

3D – technology can be used anywhere. You should understand the main advantage of 3D – format – a new standard of visualization, which strongly affects our perception and helps our brain to see what was previously impossible. 3D – technology is already used in different types of human activity, not only in entertainments. For example, visualization, reconstitution and the creation of virtual reality facilitate and reduce the costs and increase productivity and improve solutions in industrial and design organizations.

Medicine is one of the best areas where 3D – technology will be developed and widely used: it will be very effective for solving the latest problems because practice and experience are very important, the virtual three-dimensional body models will be ideal instruments and examples for practice in training future doctors. 3D – technology is also used in stomatology. Now in promoted dental center 3-dimensional modeling of the tooth is carried out. The internet services will be also need a 3D – technology. Imagine, how it will be interesting to the user when he visits the site, where visualization is given in three-dimensional graphics.

3D – technology opens interesting possibilities for distance learning where three-dimensional teaching books will be used. And of course 3D will be used in the entertainments.

We have already televisions, monitors, projectors, scanners, video and photo cameras with 3D.

Some words about the negative effects of 3D: you should be very careful while watching 3D films because some people may experience discomfort, headaches, dizziness and etc. And, of course, while watching you should wear special eyeglasses.

3D MOVIES AT HOME

S.S.Klochko – group IN-02

E.I.Zolotova – EL Adviser

Introduction of volumetric 3D movies in the film industry can be likened to a revolution in the field of cinema, which gave the transition from black and white to color a picture or appearance in the film sound. Hollywood studios have experience in 3D cinema technology, however, despite the current financial difficulties, the technology is already in a short time must find a way to screen home theater.

The question arises: if a 3D-image is so good, why does the movie industry did not take him back in the time of its appearance - in the 50's of last century? It should be noted that 3D movies cost 10-20% more expensive than "normal", moreover, they are complicated to manufacture. In addition, the need to take two cameras that would work synchronously, which is quite a challenge. All three-dimensional films consist of two images - one for the right eye and another for the left. If the image data is synchronized correctly, but a viewer looks at the screen through special glasses, the two pictures for him merge into a single volume.

The earliest three-dimensional movies were shown with two projectors, which operate synchronously, and each of which displays a picture of his color. Spectators enjoyed the glasses with color filters - red for one eye and one blue to another. Due to problematic data images from two projectors in one of the audience after such a view, usually a headache or eye. Despite the fact that the basic technology for producing 3D images for the cinema has not changed, a new digital three-dimensional image is much easier to see and better. By the

same image can now be formed using a single projector, which provides alternate output image to the right and left eyes.

Appeared in 2009, DLP TVs with rear projection and home projectors high resolution allows you to watch 3D movies at home . However, while this possibility is limited to software conflicts, players and codecs from different manufacturers, the lack of interoperability between different content formats, the presence of hardware incompatibilities and control devices required. For example, to view three-dimensional movies at home requires special high-quality 3D glasses gate type with a flicker frequency of at least 60 Hz for a sufficient viewing angle 3D-image. Therefore, the home viewer is watching a much better picture than the 3d at the cinema, using passive polarized glasses. For this reason, the user will see a substantial difference in quality, viewing 3D movies at home with the help of modern media player. Compared with what can be seen in the cinema, the effects at home viewing will be much more convincing.

Lack of uniform standards in this area - is one of the obstacles to viewing 3D movies at home. In order to remedy this situation the company has developed a 3D Vision HomeSystems common software standards for all entries 3D-images. Firm specializing in the manufacture of parts and home electronics are also exploring the possibility of 3D-view movies at home, but no one company can not offer a solution to the complex. At the moment our specialists develop unique professional video equipment, intended for home viewing of three-dimensional movies of its own production.

During the three-dimensional images - the future of home cinema. However, in order to make this "magic" idea was embodied in practice need to successfully achieve two main objectives: "to equip" the film industry standard equipment to capture and further processing of 3D-video content, available to develop end-user tools for viewing movies in surround format, 3D Full HD . And although the three-dimensional image has not won a home theater, a time when every "home-cinema-goer will receive the opportunity to watch three-dimensional movies at home, getting closer.

VIRTUAL REALITY

A. V. Kolesova – group IN-02

S. G. Zolotova – EL Adviser

Nowadays we live in the fascinating and challenging world of science. Today people are surprised very difficult. Not long ago computers were considered an amazing invention. Today they form part of our everyday life.

The latest innovation is Virtual Reality. A Virtual Reality system can transport the user to exotic locations such as a beach in Hawaii or even the inside of the human body. But the Virtual Reality system is still in the early stages of its development. At the moment it is necessary to put a large helmet on your head to see the simulated world and you have to wear a special glove on your hand in order to manipulate the objects you see there. Lenses and two miniature display screens inside the helmet create the illusion that the screen surrounds you on every side. You can “look behind” computer generated objects, pick them up and examine them, walk around and see things from a different angle.

Already today Virtual Reality is used in medicine. In hospitals, surgeons could plan operations by first «travelling» through the brain, heart or lungs without damaging the body. It is also used in police training schools. In schools pupils could explore the Great Pyramid or study molecules from the inside. Developers of Virtual Reality say its potential is powerful.

As you see Virtual Reality has a lot of advantages, but every medal two sides! On the other hand, in the wrong hands Virtual Reality can do much harm to society.

So at first we should ask ourselves “How to use it so as not to harm?”

NOKIA'S HISTORY AND ITS PEOPLE

Kukavskaya T.M IN-02

Zolotova S.G. – ELA

The first Nokia century began with Fredrik Idestam's paper mill on the banks of the Nokianvirta river. Between 1865 and 1967, the company would become a major industrial force; but it took a merger with a cable company and a rubber firm to set the new Nokia Corporation on the path to electronics...

The newly formed Nokia Corporation was ideally positioned for a pioneering role in the early evolution of mobile communications. As European telecommunications markets were deregulated and mobile networks became global, Nokia led the way with some iconic products...

In 1992, Nokia decided to focus on its telecommunications business. This was probably the most important strategic decision in its history.

As adoption of the GSM standard grew, new CEO Jorma Ollila put Nokia at the head of the mobile telephone industry's global boom – and made it the world leader before the end of the decade...

Nokia's story continues with 3G, mobile multiplayer gaming, multimedia devices and a look to the future...

RESEARCH PROGRESS AND INFORMATION COMMUNICATIONS TECHNOLOGY

K.N Kulinich – group MK – 01

I.A. Morozova – EL Adviser

The introduction and rapid spread of Information and Communications Technologies (ICTs), such as the world wide web, e-mail, telephones, fibre optics and satellites is revolutionising the way in which societies interact, conduct their businesses, compete in international markets and set their economic and human development agendas.

ICT (information and communications technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware software, satellite systems. Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society.

Technological developments lead to changes in work and changes in the organization of work, and required competencies are therefore changing. Gaining in importance are the following competencies:

- critical thinking,
- generalist (broad) competencies,
- ICT competencies enabling expert work,
- decision-making,
- handling of dynamic situations,
- working as a member of a team, and
- communicating effectively

The second part of my representation is about the development of mobile phones and their influence on people.

But the most important invention of 21st century is mobile phone, as for me because of communication with anyone whenever you want and wherever you are. Innovation in mobile phones has been happening so fast that it's difficult for consumers to change their behaviour. Phones are constantly swallowing up other products like cameras, calculators, clocks, radios, and digital music players. There are twenty different products that previously might have been bought separately that can now be part of a mobile phone. Mobiles have changed the way people talk to one another, they have generated a new type of language, they have saved lives and become style icons.

Obviously, the rich have been buying phones faster than the poor. But this happens with every innovation. Mobile phone take-up among the poor has actually been far quicker than it was in the case of previous products, such as colour television, computers and Internet access. Indeed, as mobile phones continue to become cheaper and more powerful, they might prove to be more successful in bridging the gap between the rich and the poor than expensive computers.

There are obviously drawbacks to mobiles as well: mobile users are two and a half times more likely to develop cancer in areas of the brain adjacent to their phone ear, although researchers are unable to prove whether this has anything to do with the phone; mobile thefts now account for a third of all street robberies in London, and don't forget about all the accidents waiting to happen as people drive with a mobile in one hand. But, overall, mobile phones have proved to be a big benefit for people.

And to sum up, be aware of the possible dangerous – and enjoy your mobile!

TOUCH PHONES

M.S. Metelyova – group EL – 01

S.G. Zolotova – EL Adviser

When we hear the term ‘touch phone’, or ‘touch screen phone’, we may wonder exactly how a touch phone differs from other phones. Basically, a touch phone is a portable phone or cell phone that allows you to navigate the features of the phone by using a touch screen. You use a pointer device and sometimes your finger tip to slide, tap, and touch the screen and execute the actions on the phone.

The touch phone takes telephone technology from the dial phone, through the age of portable phones, and cell phones to products that allow you to interact with the device through touch, slide and voice activation. Today's technology is truly amazing and bounded only by the creativity and ingenuity of inventors, technology professionals and engineers.

Touch panel phones come in all shapes and sizes so you can find something to suit your needs. Features include new GPS functionality that allows you to find your friend and know exactly where they are in the city and then call that friend to make plans to meet somewhere that is mutually convenient. Truly, touch screen phones go beyond the origins of the telephone to further define our understanding of communication.

Advantage of touch phones:

There is no trouble of a keypad. You just have to touch the screen on the desired alphabet or number and you are done with it. A touch screen is very intuitive. It acts as a both input and output device!

INFORMATION COMMUNICATION TECHNOLOGY IN SCHOOL PRESS

M. O. Osukhina – group JT-81

V. E. Pronaeva – EL adviser

School press – is a big a developed sector of mass communication. It plays the same role as a huge paper in a city or even country. It helps to solve problems, appeals to master, teachers, students to tell about school events, victories, interesting pupils and others.

In our city Sumy there are 13 school news papers, which are trying to carry interesting and useful information, using different communication technology. Quality of this technology depends on the level of the school, amounts of payments of parents and school administration. High level of information technology have gymnasiums (they are 3 in our city), they have an opportunity to print their papers in printing-houses and even make copies for each student of the gymnasium.

Another schools (they are about 10) had to make their papers in school printers, ask for help of pupils and their parents. In this way editors of this papers can make one or two copies and put them only in school-hall. Children can't take papers with them to show parents if even they were authors of some materials. Not all school papers have photoes. It is connected with the fact, that not all schools have photo cameras. And not all school printers can make good and high-quality printing. 60% of school papers are made with the help of black and gray colors only. This quality of papers can't allow to print good photoes.

So, we can see, that school papers try to use modern communication technologies, but little financing can't allow all of them to realize their creative potential. We hope, that in future our government will pay attention to such huge sphere of mass communication as school press.

THE TECHNOLOGICAL REVOLUTION TRULY IS A
MIRACLE, BUT AS FOR ME IT HAS BOTH
ADVANTAGES AND DISADVANTAGES

M.K.Rozhyn – group IN-02

S. G. Zolotova – EL Adviser

Computers have had a huge impact on our lives since their conception in the later half of the 20th century. From communication to transportation, from manufacturing to design – there is hardly a single aspect of modern life that has not been influenced greatly by the introduction of digital technology.

One of the biggest and most measurable changes in the modern world since the onset of the digital age is in the areas surrounding automation and control. Automation is defined as the use of control systems to drive particular applications, thus reducing the need for human intervention. In terms of late 20th and early 21st century industrialisation, automation is a step beyond mechanisation, and is heavily linked with computerisation and the rise of digital information technology.

With a mechanised process, human operators are used to assist and work side by side with machinery in order to meet certain goals. With automated processes however, the work flow is shifted, reducing the need for sensory and mental human intervention.

Automation plays an absolutely massive role in the 21st century world economy, where it is used in a number of individual control systems and processes. Some of the control systems that are regularly automated in the modern world include numerical control, logic control, industrial control, and information control. Computers are at the very heart of these processes, and automation would be almost unthinkable without them.

Computers are the brains of modern automation, and advances in computer engineering are one of the major factors behind the spread and advancement of automated procedures throughout the modern world. Whether it is designing automated systems, controlling input and output, or analysing feedback from automated mechanisms, computers are vital to every stage of automated control. For example, programmable logic computers, sensors, and computer-human interfaces often form a chain of operation within industrialised processes and manufacturing environments.

The Internet has had a huge effect of global culture, and because it is easier to build a website than ever before, this is also having an effect on the decentralisation of knowledge. Linux notebooks (linux-onlineshop.de) and other accessible products are helping to make technology available to more people all the time.

The everyday lives of people around the world have been changed dramatically through innovations in automation, especially in relation to the modern work place and the role of humans within it. Manufacturing and telephone operation are two widely noted impact areas, where automated processes regularly impact on real world jobs.

While the role of automation in the 21st century workplace may be controversial at times, there is no denying that automated control is here to stay, and likely to grow and include a wider range of industries and economic sectors.

3D GAMING

T. M. Shabelnyk – group EL-01

S. G. Zolotova – EL Adviser

The fact that to get any kind of 3D image from a 2D screen means wearing a pair of sunglasses or worse means that three dimensional gaming isn't quite as convincing as multitouch and natural user interfaces, even though the two have been commoditised at almost the same time

An Acer Aspire 5738 laptop with a 3D display costs about £550 at the moment, not bad for something with cutting edge technology that adds depth to any DirectX 9 game. The screen is of the polarised filter type, which is the new norm for extra dimensions.

Instead of using coloured filters splitting an image into two – one for each eye – the vertical pixel columns are alternated between left image and right image and shone through a piece of polarised glass. A pair of dark glasses with oppositely polarised lenses ensures that only one image is seen by each eye. The difference to a game is tangible too, something like WoW runs and looks incredible on the low-end graphics hardware.

It's over in TV land that the real push for 3D is happening, though, as LCD suppliers ask us to upgrade again to watch hyper-real cinema in the lounge. Compared to the other technologies we've talked about here, though, 3D requires a lot of effort on behalf of the watcher (those pesky glasses) and most of us are very lazy; hence the ubiquity of MP3 and standard definition movies, while Blu-ray and higher resolution sound standards continue to flounder. We value ease of use over quality every time.

In its favour, 3D doesn't actually require any work on behalf of games developers or publishers, as the stereoscopic image is created at the driver level. On the other hand, that means there's no massive push by the people who make and sell games to encourage us to adopt it.

THE MOBILE WEB

V.S. Shubnikov – group EL 01

S. G. Zolotova – EL Adviser

The Mobile Web refers to the use of Internet-connected applications, or browser-based access to the Internet from a mobile device - such as a smartphone or tablet PC - connected to a wireless network.

Traditionally, access to the Web has been via fixed-line services. However the Web is becoming more accessible by portable and wireless devices. In 2008 an important milestone in the transition from fixed to mobile Web use was reached when mobile access to the Internet exceeded desktop computer-based access for the first time. In fact, the shift to mobile Web access has been accelerating since 2007 with the rise of larger form factor multitouch smartphones, and more recently since 2010 with the emergence of multitouch tablet computers. Both platforms are more conducive to Internet access and better browser- or application-based user Web experiences than have been afforded by previous generations of mobile devices.

The distinction between mobile Web applications and native applications is anticipated to become increasingly blurred, as mobile browsers gain direct access to the hardware of mobile devices (including accelerometers and GPS chips), and the performance of browser-based applications improve (speed- and capability-wise). Persistent storage and access to sophisticated user interface graphics functions may further reduce the need for the development of platform-specific native applications.

Once users are unable to differentiate between native and mobile web applications, the Mobile Web will refer generically to web access or use of Internet-connected apps from a mobile device.

Mobile Web access today still suffers from interoperability and usability problems. Interoperability issues stem from the platform fragmentation of mobile devices, mobile operating systems, and browsers. Usability problems are centered around the small physical size of the mobile phone

form factors (limited resolution screens and user input/operating limitations).

APPLE. COMPUTERS OF THE FUTURE

J. L. Sidorenko – group IH-02

S. G. Zolotova – EL Adviser

We live in high-tech world. Every day we use mobile phones, cameras, computers or laptops etc. Each user uses the technique of different brands: Samsung, HP, Asus, Acer, Apple etc. Recently, I was confronted with products of Apple. And I realized that the future of Apple products the computer industry.

March 2, 2011 Apple unveiled the new device. iPad2 - the device that does it all now does even more. iPad future of computers. The iPad2 is the second generation of the iPad, a tablet computer designed, developed and marketed by Apple Inc. Sometimes referred to as the "iPad 2nd Generation," it serves primarily as a platform for audio-visual media including books, periodicals, movies, music, games and web content. iPad isn't just the best device of its kind — it's a whole new kind of device. And it's poised to change the learning landscape.

Computer and other technology makes our lives easier. But, with Apple iPad your life will not just easier, and mobile, beautiful and unforgettable. With iPad you can be closer to his friends. It will be an excellent assistant in education and work. Once you do, you'll see teaching — and learning — in a whole new way.

Apple products are the best on the market of computer devices. And I think that soon Apple will dictate the "fashion" on the PC market.

BRAIN-COMPUTER INTERFACE

N. S. Sirobaba — student, group IK-91

D. O. Marchenko — EI. Advisor

A brain–computer interface (BCI), sometimes called a direct neural interface or a brain–machine interface (BMI), is a direct communication pathway between the brain and an external device. BCIs are often aimed at assisting, augmenting or repairing human cognitive or sensory-motor functions.

The field of BCI has advanced mostly toward neuroprosthetics applications that aim at restoring damaged hearing, sight and movement. Thanks to the remarkable cortical plasticity of the brain, signals from implanted prostheses can, after adaptation, be handled by the brain like natural sensor or effector channels. Following years of animal experimentation, the first neuroprosthetic devices implanted in humans appeared in the mid-nineties.

Invasive BCI research has targeted repairing damaged sight and providing new functionality to persons with paralysis. Invasive BCIs are implanted directly into the grey matter of the brain during neurosurgery. As they rest in the grey matter, invasive devices produce the highest quality signals of BCI devices but are prone to scar-tissue build-up, causing the signal to become weaker or even lost as the body reacts to a foreign object in the brain.

In vision science, direct brain implants have been used to treat non-congenital (acquired) blindness. One of the first scientists to come up with a working brain interface to restore sight was a private researcher William Dobelle.

Dobelle's first prototype was implanted into "Jerry", a man blinded in adulthood. A single-array BCI containing 68 electrodes was implanted onto Jerry's visual cortex and succeeded in producing phosphenes, the sensation of seeing light. The system included cameras mounted on glasses to send

signals to the implant. Initially, the implant allowed Jerry to see shades of grey in a limited field of vision at a low frame-rate. This also required him to be hooked up to a two-ton mainframe, but shrinking electronics and faster computers made his artificial eye more portable and now enable him to perform simple tasks unassisted.

In 2002, Jens Naumann, also blinded in adulthood, became the first in a series of 16 paying patients to receive. The second generation device used a more sophisticated implant enabling better mapping of phosphenes into coherent vision. Phosphenes are spread out across the visual field in what researchers call the starry-night effect. Immediately after his implant, Jens was able to use his imperfectly restored vision to drive slowly around the parking area of the research institute.

Tetraplegic Matt Nagle became the first person to control an artificial hand using a BCI in 2005 as part of the first nine-month human trial of Cyberkinetics Neurotechnology's BrainGate chip-implant. Implanted in Nagle's right precentral gyrus (area of the motor cortex for arm movement), the 96-electrode BrainGate implant allowed Nagle to control a robotic arm by thinking about moving his hand as well as a computer cursor, lights and TV. BCIs focusing on motor neuroprosthetics aim to either restore movement in individuals with paralysis or provide devices to assist them, such as interfaces with computers or robot arms.

The ability of computers to enhance and augment both mental and physical abilities and potential is no longer the exclusive realm of science fiction writers. It is becoming a reality. Brain Computer Interface technology will help define the potential of the human race. It holds the promise of bringing sight to the blind, hearing to the deaf, and the return of normal functionality to the physically impaired.

THE COME OF THE “DIGITAL DECADE”

A lot of things have changed since the come of the “digital decade”. As we enter the era of modern inventions, people’s ideology of living becomes very different, in comparison as it was fifty years ago. We got used to such new things, which very help us in everyday life, people from the nearest past couldn’t even dream about. Nowadays many people can’t think their existence without such props of modern living as: huge screen TV-set and powerful multi-channel music system, tidal wave of sound from which crashes around the house, VHS/DVD/MP3-player etc. We can’t live without computer, telephone, television. Their history is very interesting.

The computer has been another life-transforming invention. British mathematician Charles Babbage designed a form of computer in the mid-1830s, but it was not until more than a century later that theory was put into practice. Now, a whole generation has grown up with calculators, windows, icons, computer games and word processors, and the Internet and e-mail have transformed communication and information.

The invention that swept the world and changed leisure habits for countless millions was pioneered by Scottish-born electrical engineer John Logie Baird. It had been realised for some time that light could be converted into electrical impulses, making it possible to transmit such impulses over a distance and then reconvert them into light.

Edinburgh-born scientist Alexander Graham Bell patented his invention of the telephone in 1876. The following year, the great American inventor Thomas Edison produced the first working telephone. With telephones soon becoming rapidly available, the days of letter-writing became numbered.

IPAD. INFORMATION DEVICE

The iPad is a tablet computer designed and developed by Apple. It is particularly marketed as a platform for audio and visual media such as books, periodicals, movies, music, and games, as well as web content. At about 1.5 pounds (680 grams), its size and weight are between those of most contemporary smartphones and laptop computers. Apple released the iPad in April 2010, and sold 3 million of the devices in 80 days.

The iPad runs the same operating system as the iPod Touch and iPhone. It can run its own applications as well as ones developed for the iPhone. Without modification, it will only run programs approved by Apple and distributed via its online store.

Like iPhone and iPod Touch, the iPad is controlled by a multitouch display — a break from most previous tablet computers, which used a pressure-triggered stylus. The iPad uses a Wi-Fi data connection to browse the Internet, load and stream media, and install software. Some models also have a 3G wireless data connection which can connect to GSM 3G data networks. The device is managed and synced by iTunes on a personal computer via USB cable.

The iPad's touchscreen display is a 9.7 in (25 cm) liquid crystal display (1024 × 768 pixels) with fingerprint-resistant and scratch-resistant glass. Like the iPhone, the iPad is designed to be controlled by bare fingers; normal gloves and styli that prevent electrical conductivity may not be used, although there are special gloves and capacitive styli designed for this use.

The iPad is mostly used by consumers. It also has been taken up by business users. Some companies are adopting iPads in their business offices by distributing or making available the iPads to employees.

3D PRINTING OFFERS ABILITY TO PRINT PHYSICAL OBJECTS

Znamenshchykov Y. – student ES-71

Pochatko T. V. – E L Adviser

3D printing is a form of additive manufacturing technology where a three dimensional object is created by laying down successive layers of material. 3D printers are generally faster, more affordable and easier to use than other additive manufacturing technologies. 3D printers offer product developers the ability to print parts and assemblies made of several materials with different mechanical and physical properties in a single build process.

A 3D printer works by taking a 3D computer file and using and making a series of cross-sectional slices. Each slice is then printed one on top of the other to create the 3D object.

Methods

A large number of competing technologies are available to do 3D printing. Their main differences are found in the way layers are built to create parts. Some methods use melting or softening material to produce the layers, e.g. selective laser sintering (SLS) and fused deposition modeling (FDM), while others lay liquid materials that are cured with different technologies. In the case of lamination systems, thin layers are cut to shape and joined together.

One method of 3D printing consists of an inkjet printing system. The printer creates the model one layer at a time by spreading a layer of powder (plaster, or resins) and inkjet printing a binder in the cross-section of the part. The process is repeated until every layer is printed. This technology is the only one that allows for the printing of full colour prototypes. This method also allows overhangs. It is also recognized as the fastest method.

In digital light processing (DLP), a vat of liquid polymer is exposed to light from a DLP projector under safelight conditions. The exposed liquid polymer hardens. The build plate then moves down in small increments and the liquid polymer is again exposed to light. The process repeats until the

model is built. The liquid polymer is then drained from the vat, leaving the solid model.

Another approach is selective fusing of print media in a granular bed. In this variation, the unfused media serves to support overhangs and thin walls in the part being produced, reducing the need for auxiliary temporary supports for the workpiece. Typically a laser is used to sinter the media and form the solid.

Finally, ultra-small features may be made by the 3D microfabrication technique of 2-photon photopolymerization. In this approach, the desired 3D object is traced out in a block of gel by a focused laser. The gel is cured to a solid only in the places where the laser was focused, due to the nonlinear nature of photoexcitation, and then the remaining gel is washed away. Feature sizes of under 100 nm are easily produced, as well as complex structures such as moving and interlocked parts.

Applications

Standard applications include design visualization, prototyping/CAD, metal casting, architecture, education, geospatial, healthcare and entertainment/retail. Other applications would include reconstructing fossils in paleontology, replicating ancient and priceless artifacts in archaeology, reconstructing bones and body parts in forensic pathology and reconstructing heavily damaged evidence acquired from crime scene investigations.

3D printing technology is currently being studied by biotechnology firms and academia for possible use in tissue engineering applications where organs and body parts are built using inkjet techniques. Layers of living cells are deposited onto a gel medium and slowly built up to form three dimensional structures. Several terms have been used to refer to this field of research: Organ printing, bio-printing, and computer-aided tissue engineering among others.

The use of 3D scanning technologies allow the replication of real objects without the use of molding techniques, that in many cases can be more expensive, more difficult, or too invasive to be performed; particularly with precious or delicate cultural heritage artifacts where the direct contact of the molding substances could harm the surface of the original object.

SECTION III LABOUR-SAVING GADGETS

GADGET GIFT IDEAS

T.V. Chaika - group F - 91

N.M. Usenko - EL Adviser

A gadget is a useful, clever and innovative device designed to improve the quality of life or make a particular task easier to accomplish. Gadgets are very ordinary products that tend to be more unusual or cleverly designed.

Spoon Scale. With baking, precision is absolutely vital. Measuring your wet ingredients and your dry ingredients with new ultra-precise spoon scale. With two spoons included, you can scoop out just the right amount of sugar, or even 10-1 grams of salt.

Projection Alarm Clock and Weather Monitor. This alarm clock and weather monitor projects the current time and outdoor temperature onto your ceiling or wall in large, easy-to-read digits. A built-in sensor detects ambient light and activates the large LCD's backlighting for a clear view. Shows time, alarm, temperature at the three included sensors' locations, and weather forecast icons. Time is automatically updated via radio signal from the Atomic Clock in Boulder, Colorado. With dual alarm and snooze.

PoGo Instant Photo Printer. You've probably got oldest of photos trapped inside your mobile phone and digital camera. But how do you print them off when you're out and about? No, you don't cart around a computer, a tech-nerd and a bulky printer. You don't even dust off your raincoat and head to the nearest photo lab. You use the revolutionary PoGo Instant Photo Printer.

Tao Photo Keychain. Remember when picture keychains involved passport photos and see-through plastic? The Tao Digital Photo Keychain is one doozy of a gadget with

on-board memory to load up 99 of your favourite photos and show them off on a large 1.5 inch LCD screen.

[Good Nite Lite](#). Being a parent would also make you wear another hat – that of being a zombie, since when your little one doesn't sleep, nobody else at home gets their sleep. That's the way things have been all the while, but with the [Good Nite Lite](#), we hope that the situation would end up being the better for you. It basically teaches your little one the difference between night and day as long as he/she is able to recognize the difference between the Sun and the Moon. When night falls, the Moon will shine brightly to fill up the room with a gentle light, while the Sun's rays will shine brightly when morning comes (at your preset time, of course). Measuring 6" in diameter, the Good Nite Lite retails for [\\$34.99](#) and makes for a great teaching tool for your little one, while helping regulate your own sleeping pattern to that of a normal human.

[Ball that measures how far it was thrown](#). A football (American) that can measure and display how far it has been thrown, so next time you throw a great touch down pass you can brag about the distance accurately (rather than saying it went really really far). Known as the Virtual Distance Football, the distance thrown is calculated by using sensors to detect when the ball is thrown and then the impact of a catch or fumble (though how it knows the distance between the two is beyond me).

The Floating Sofa, measuring 68" in diameter. This inflatable waterborne sofa is able to comfortably seat three adults. It is meant for use in swimming pools or other calm waters. A trio of inflatable pillows complete the collection, where it is made from resilient PVC that is both puncture- and UV-resistant, with a maximum weight support of 350 lbs. Device comes with a battery powered pump that is able to inflate and deflate the Floating Sofa within minutes.

HUMAN CAPITAL AS A FORM OF LABOUR POTENTIAL

L. Kovalenko group M-62
S. G. Zolotova – EL Adviser

In the scientific literature the problem of an economic estimation of labour potential practically hasn't been explored.

Nowadays there is no interpretation of the concept of "human capital", that's why there are considerable differences in literature in understanding the essence, the constituent elements, the relationship of such categories as "human capital", "labour potential", "personal potential". You can meet delusion connected with the identification of categories of human potential and human capital more often. However, human capital is an important form of the human potential manifestation in the system of market relations associated with the receiving the income stream. It depends on the effectiveness of investing in the development of the professional skills of the carrier. In this case, expenses on education are not a guaranteed growth of the human capital, because there is no stable causal relationship among these factors, although statistic correlation can be traced. Thus, the investment in education represents only a potential benefit in the future, and the scope of the possibilities is the notion of the potential, therefore, the term "human potential" is more widely used than "human capital".

The analysis of the existing theoretical and methodical bases of the economical potential of the region has been recently made. Usually we consider the labour potential of the territory as an economic category. Then it should be taken into account that existing, relatively stable capacity which integrates economically active population of a region (including their quality and quantity characteristics) into creation material and spiritual wealth can meet the needs of our society at the present stage of its development.

Today in our country and abroad we have more and more supporters of understanding the economic development as human development. It means the expanding of man's functions and potentiality, the accumulation of human capital and its use in the expanded social reproduction to meet the needs of every member of modern society.

HOME GADGETS

A. O. Manzuk - group F-91

N. M. Usenko – El Adviser

A gadget is a small technological object (such as a device or an appliance) that has a particular function, but is often thought of as a novelty. Gadgets are invariably considered to be more unusually or cleverly designed than normal technological objects at the time of their invention.

Athena Sofa

Normally, when you spend the night sleeping on your friend's couch, you're usually in for a second-rate experience. I mean, the best you can hope for is that it folds out into a bed. In the case of the Athena sofa, I could easily make it into an office. I mean, it has an LCD in each armrest that are integrated by a multimedia PC. As you can see, these screens pop out of the armrests itself and flatten themselves out when not in use. (I wouldn't rest my coffee cup there, though. At least not without a coaster.) I see that one of them has a keyboard, but if they were touchscreens, then I'd have a fun time running all my operations with Windows 7. The Athena sofa also comes with an iPhone and iPod dock, and a set of hidden speakers that include an 8-inch subwoofer. The price of it is about \$15,436.

TeleMax III combines remote and phone

The TeleMax III device combines the idea of a universal TV remote control and a hands free phone that targets living rooms in homes all over the world. The final product would come in a sleek, compact, and easy to use package,

featuring a virtually unbreakable body (which works great especially in homes that have little kids who seem to have a penchant of destroying just about every single fragile item in your house) that is tough against accidental spills as well. The TeleMax III is shaped like a small tray, complete with handles on both sides that give you an easy grip as you go about pressing all the individual buttons contained on it.

Hand gestures's remote control

Australian scientists have taken idea and came up a device which enables TV viewers to change channels, turn on the DVD player, or even turn off the TV with a simple hand gesture. There is an integrated camera in the controller which recognizes up to seven simple hand gestures, and is smart enough to be compatible with eight different controllers around the home. The software used with the device is capable of recognizing simple, deliberate hand gestures which then sends the corresponding signal to a universal remote control that can work with the majority of TVs, video recorders, DVD players, HiFi sets, and digital set top boxes. It is smart enough to tell the difference between real commands and unintentional gestures, making this a great addition to have in any living room with young children.

Electric Dustpan

It's called the Eye Vac. It costs about \$80. Incorporating infrared beam technology, the Eye Vac will suck up anything within it's range once detritus breaks the infrared beam. In addition, the Eye Vac does double duty by cleaning the air thanks to it's built in HEPA filtration system. Now that's a handy feature. With it's 1200-watt stationary vacuum motor, the Eye Vac uses works like a mini cyclone that picks up dirt, dust and even hair. It'll clean on tile, wood, vinyl, concrete, and most any non-carpeted surface.

THE INFLUENCE OF TELEVISION ON CHILDREN
V.A.Sivovol – SU-01
S.G. Zolotova – ELA

Children often internalize gender role stereotypes from books, songs, television, and the movies. Television, however, is perhaps the most influential form of media. Research on television viewing and children's socialization indicates that television has a great impact on children's lives.

Studies show preschoolers spend an average of nearly 30 hours a week watching television; some spend more time watching television than doing anything else except sleeping. Nielsen Media Research has found that by the time children are 16 years old, they have spent more time watching television than going to school. As a result, children are exposed to about 20,000 advertisements a year. By the time a child graduates from high school, he will have witnessed 13,000 violent deaths on television. Television influences both children's prosocial and antisocial behaviors, as well as their attitudes about race and gender.

Development of children as children grow and develop, they take in information and acquire knowledge at a rapid pace. As they develop their cognitive abilities, they assimilate new information and accommodate it to what they already know. Children's ideas about how the world works come from their experiences and from the attitudes and behaviors they see around them. The young child who believes that only women are nurses and only men are doctors may have developed this understanding because the first doctor he or she saw was a man, who was assisted by a female nurse.

This "man as doctor, woman as nurse" idea may have been reinforced further by parents, books, conversations with

friends, and television. If the child frequently meets such gender biases and gender stereotypes, this knowledge will be incorporated into future perceptions. Keeping in mind that young children with developing minds watch many hours of television, and recalling how television reinforces gender stereotypes, it is not surprising when children develop stereotyped beliefs.

Of the various factors that help shape gender-typed behaviors, role models and imitation are extremely influential. Research suggests that children who view violent programming on television will behave more aggressively with peers. It is also true that children who view prosocial behaviors on television are more likely to exhibit those types of behaviors themselves. Young children will imitate and repeat behaviors they see on television. Consequently, children may exhibit these gender-biased behaviors and develop the gender-biased attitudes that they see modeled on television.

Developing autonomy, initiative, and a sense of industriousness are critical to young children's positive development. Children who witness female characters on television programs who are passive, indecisive, and subordinate to men, and who see this reinforced by their environment, will likely believe that this is the appropriate way for females to behave. Female children are less likely to develop autonomy, initiative, and industriousness if they rarely see those traits modeled. Similarly, because male characters on television programs are more likely to be shown in leadership roles and exhibiting assertive, decisive behavior, children learn this is the appropriate way for males to behave.

KITCHEN GADGETS AND CONCEPTS

A. A. Sokur – group F – 91

N. N. Usenko – EL Adviser

One the most important part in every house is a kitchen. Here is a list of kitchen gadgets which would save you a lot of time and even make your life easier. I also have listed some brilliant concepts; and if these ever see daylight, your time in the kitchen is going to be way more awesome.

Chomp, the Super Toaster

Imagine a toaster which can make sandwiches of different sizes, and allow you to adjust the thickness of the bread. It can also be used while open to fry eggs, make waffles or grill meat! I'm sure that this is what you've always wished for, and that is exactly what Chomp does. Sadly, this is just a concept but don't worry, it will become a reality soon.

Yellow Submarine Tea Infuser

Designed by Ototo, this tea-infusing submarines leaves to the boiling hot water in your mug and creates the perfect infusion of your favourite brew. I know that Tea has never been so fun before.

Interactive Digital Cooking Aid

If you are planning for a diet or if you are planning to surprise someone with some really tasty meal, this device is your answer. This is a great concept for a kitchen gadget, and it is called the Interactive Digital Cooking Aid. It helps you out with all the amazing recipes, with a weighing scale, USB ports to upload new recipes, and Wi-Fi enabled, so you can even get it done over Wife.

DIY Peanut Butter Device

This device from Homemade Peanut Butter Factory lets you make your very own peanut butter in the comfort of your home. The best thing is that it not only grinds peanuts, but it can also grind cashew, almonds, Brazil nuts, pistachios, and

various other nuts. It costs \$39.99 and is a great device for your kitchen.

Hands-Free Automatic Can Opener

This brilliant can opener allows you to open any of your cans within a few seconds, and you don't even have to put in a lot of effort. All you need do is place it on the can and it does the rest.

Pizza Cutter Scissors

Here is a really unique and sensible pizza cutter design. This is the pizza cutter scissors, which not only cuts your pizza, but also makes it really easy to serve a slice; and it costs \$20.

Kitchen Donut Maker

This is called the DOUGH-NU-MATIC and it is like a mini donut factory in your kitchen, which makes you some delicious donuts in about 60 seconds. It is priced at \$130, and if you love eating donuts this is totally worth it.

Wavebox Portable Microwave

If you have a really hectic schedule, and you don't like your meal cold, here is a real great option. It is called the Wavebox Portable Microwave and it is priced at \$199.99.

Digital Measuring Cup

A very important thing about cooking is the right amount of ingredients; and this digital measuring cup makes it easier for the perfectionist. It is a brilliant measuring device which has an LCD on the handle, which gives you the exact measurement of liquids as well as solids. It costs \$39.99 and comes with a replaceable lithium battery.

Smart Fridge Concept

No one can forget about the fridge when talking about the kitchen. So here is Ashley Legg's concept for a Smart Fridge, and this concept has some really great functions. You can track all the stuff in your fridge, and it also recommends you stuff you can cook using all the available ingredients.

LAND ROVER S1 BY SONIM

A. V. Sylka– group IN-02

S. G. Zolotova – EL Adviser

15 June 2009 newspapers wrote that Land Rover announced that it has teamed up with Sonim Technologies, to launch the Land Rover S1 by Sonim, a rugged, high quality mobile phone designed to meet the needs of those who work and play in the great outdoors. The mobile phone was unveiled by the world's greatest explorer, Sir Ranulph Fiennes, fresh from his successful ascent of Mount Everest.

The Land Rover S1 by Sonim is the world's first IP-67 rated GSM mobile phone - a standard which indicates it has been tested and found to be totally impervious to dust, as well as dirt, shocks and drops. The Land Rover S1 is also completely waterproof to a depth of one metre for up to 30 minutes and is resistant to extreme pressure of up to 400 kgs.

The current handset will come equipped with a 2Mega-Pixel waterproof camera with built-in flash, built-in GPS, torch light, FM radio, 2GB memory slot, J2ME Java for mobile, WAP browsing through its in-built Opera Mini WAP browser and Bluetooth.

This phone is extremely capable and will work in the toughest of environments. Designed to meet the needs and demands of the outdoor adventurer the phone has an IP-67 rating, which is a first for a commercially available GSM handset, and is operational in temperatures ranging from -20 to 55 degrees Celsius and backed by an unconditional three-year guarantee.

The phone is compatible with a wide range of off-the-shelf car kits and headsets and comes with complete with charger, belt clip and headset as standard. The phone is compatible with a wide range of off-the-shelf car kits and headsets and comes with complete with charger, belt clip and headset as standard.

The Land Rover S1 by Sonim will be available through www.landroverphone.co.uk or from Go Mobile stores nationwide or the www.gomobileuk.com website from June 2009 priced at £299.99.

A ROBOT-RESCUER EMILY

A.M.Zuy-group E-92
N.M.Usenko-EL Adviser

American company Hydronalix, which is specialized on the development of robots moving on water, showed a new invention under the name Emily-Emergency Integrated Lifesaving Lanyard.

Emily is a raft that can replace people-rescuers in the future. This robot is an electric autonomous floating device. Length of Emily is about 140 centimetres. In fact, it is a board for surfing dwelling of soft material, equipped by an engine and an impeller from gidrocykle. For the search of getting lost people Emily is equipped by a radio-locator.

Using sonar sensors robot Emily can find some moving in water characterized to people getting in a calamity.

The water-jet engine of the robot will allow it to speed up on water to 45 kilometres per hour, even during difficult weather terms.

A built-in video camera, a microphone and loud speakers will allow to the rescuers remotely to calm a man and give him detailed instructions and commands for the further actions.

A man will be got to a safe zone, holding this robot. Afterwards people-rescuers and doctors will examine victims.

A robot will be able to cover distance about 130 kilometres on one charge of storage batteries.

The leader of company Hydronalix, who worked out this robot, Tony Mulligan says that fully autonomous variant of robot Emily will cost about 3500 dollars.

In any case the robot will only help to rescuers. Because their experience in different difficult situations will not be replaced by a very advanced computer.

SECTION IV MODERN ENGINEERING

NANOPOWDERS FOR ADVANCED CERAMICS

M. Bilokur – student, group FE-91

S.V. Mikhno – EL Advisor

Nanopowders improve mechanical properties of fine ceramics and lowers sintering temperature. Yet, unlike regular micronic powders, the preparation of a ready-to-sinter nanopowder requires a specific know-how.

Indeed, very fine powders bring new difficulties such as appropriate deagglomeration. Taking advantage of its scientific partnerships with renowned laboratories, Nanoe has focused on these issues and gained solid competencies to give you a ready-to-use product.

Using nanometrical ceramics powders improves mechanical properties such as:

- bending strength
- toughness
- hardness
- and wear resistance

When properly prepared, the densification of nanopowders occurs at low temperatures (about 150°C lower), which has an impact on grain size after sintering.

Nanostructured ceramics has better resistance to thermal shocks.

When sintered with HIP or SPS methods, ceramics can be translucent and even transparent.

Nanoe brings you [years of experience and solid know-how](#) so that your factory can take advantage all the benefits of nanoscale ceramics within a reach

POWERING NANOROBOTS

D. A. Borshchenko – group DM - 91

T. N. Plokhuta - EL Adviser

We live in a world of technology. We are surrounded by an uncountable number of machines and devices without which we can't imagine our lives. And what awaits us in the future? Many scientists are trying to answer this question translating into practice the most amazing ideas. Nanorobots are exactly the epitome of their creative and brilliant thinking.

Imagine that we could make cars, aircraft and submarines as small as bacteria or molecules. Microscopic robotic surgeons injected in the body could locate and neutralize the causes of disease. And nanomachines could penetrate the steel beams of bridges or the wings of airplanes fixing invisible cracks before they propagate and cause catastrophic failures. But look under the hood of the nanocar and you will not find an engine. This is the biggest current problem with molecular machines: we know how to build them but we still do not know how to power them.

Nature provides many examples of nanomotors. The cell uses nanoengines to change its shape, push apart its chromosomes as it divides, construct proteins, engulf nutrients, shuttle chemicals around, and so on. All these motors are based on the same principle: they convert chemical energy. Researchers are now making exciting progress toward building artificial nanomotors by applying similar principles. The Harvard team had found that centimeter-scale "boats" with catalytic platinum strips on their stern would spontaneously move on the surface of a tank of water and hydrogen peroxide.

The miniaturized version of the Harvard engine was gold-platinum rod about as long as a bacterial cell (two microns) and half as wide (350 nanometers). Oar rods were mixed into the solution rather than floating on the surface. These

tiny catalytic cylinders were essentially immersed in their own fuel. And they did indeed move autonomously at speeds of tens of microns per second bearing an eerie resemblance under the microscope to live swimming bacteria.

One limitation of the first fluid-immersed nanorods was that they moved in random directions and were continuously undergoing random turns because of Brownian motion. In realistic applications, of course, nanomachines will need some mechanism to steer them toward their destination.

The first attempt to solve the steering problem relied on a magnetic field. Nanorods then move in straight lines and can be steered by turning the magnet. This motion is analogous to the behavior of bacteria that align themselves with the earth's weak magnetic field. Scientists Velegol and Sen discovered that catalytic nanorods can follow chemical "bread crumb trails" the way bacteria do. This strategy is called chemotaxis. The particles can also be driven by light or phototaxis. These particles use light to break up molecules and create positive and negative ions. The two types of ions diffuse away at different speeds, setting up an electric field that causes the particles to move.

Nature has found ways to put Brownian motion to work rather than fighting it. Many biological motors are based on the principle of the Brownian ratchet, which uses energy from chemical catalysis not to create motion in a certain direction but to allow Brownian-motion jolts only when they push in the favorable direction, while blocking them when they push in the opposite direction.

Investigators have learned a good deal about how to make nonbiological motors inspired by those of biology, but there is still much to learn about the principles of catalyzed movement on this length scale. Future work will find as yet unimagined ways to exploit such knowledge in biomedicine, energy conversion, chemical synthesis and other fields.

GENETIC ENGINEERING

E.V. German – group SU-91
V.E. Pronyaeva – EL Adviser

Genetic engineering is the alteration of genetic code by artificial means, and is therefore different from traditional selective breeding.

Genetic engineering examples include taking the gene of poison out of the tail of a scorpion, and combining it with a cabbage. These genetically modified cabbages kill caterpillars because they have learned to grow scorpion poison in their sap. Genetic engineering also includes insertion of human genes into sheep so that they secrete alpha-1 antitrypsin in their milk - a useful substance in treating some cases of lung disease. Genetic engineering has created a chicken with four legs and no wings. Genetic engineering has created a goat with spider genes that creates "silk" in its milk. Genetic engineering works because there is one language of life: human genes work in bacteria, monkey genes work in mice and earthworms. Tree genes work in bananas and frog genes work in rice. There is no limit in theory to the potential of genetic engineering. Genetic engineering has given us the power to alter the very basis of life on earth.

Genetic engineering has been said to be no different than ancient breeding methods but this is untrue. For a start, breeding or cross-breeding, or in-breeding (for example to make pedigree dogs) all work by using the same species. In contrast genetic engineering allows us to combine fish, mouse, human and insect genes in the same person or animal. Genetic engineering therefore has few limits - except our imagination, and our moral or ethical code. Genetic engineering makes the whole digital revolution. Digital technology changes what we do. Genetic engineering has the power of changing human beings too.

In summary I'd like to say that genetic engineering will alter the basis of life the on earth - permanently - unless controlled. This could happen if - say - mutant viruses, or bacteria, or fish or reptiles are released into the general environment. But it can give us a great future, with great contributions. Everything depends on the ways we use it.

NANOROBOTS

Olena Grytsyna, gr. FE-91

S.V. Mikhno -EL Advisor

Nanorobot is defined as a nanotechnological robot nanomachine, also called a nanite, which is a mechanical or electromechanical device whose dimensions are measured in nanometers (millionths of a millimeter, or units of 10^{-9} meter). They would get their energy by eating molecules from their environment and also be able to not only do things but also make more of themselves.

Nanorobots are nanodevices that will be used for the purpose of maintaining and protecting the human body against pathogens and to cure the human body of its various ills. Such devices have been designed in recent years, but no working model has been build so far.

As far as the fields of their possible application concerns, a cream containing nanorobots may be used to cure skin diseases. This cream could be a smart material with smooth-on and pill-of convenience. Medical nanodevices could augment the immune system by finding and disabling unwanted bacteria and viruses. Also, devices working in the bloodstream could nibble away arteriosclerotic deposits. Cell herding devices could restore artery walls and artery linings to health, by ensuring that the right cells and supporting structures are in the right places. It would prevent most heart attacks.

Nanotechnology can also be used to treat cancer. Nanorobots can use special kinds of light to heat only the cancer cells up and not the healthy tissue around it. Most of this stuff is still experimental but progress is being made.

So, as a conclusion it can be said that nanorobots represent medicine of the future and they will change our lives. Don't expect to see nanorobots curing disease anytime soon, but it is fun to think about the possibilities.

NANOTECHNOLOGY AND ITS APPLICATION IN ELECTRONICS AND COMPUTERS

A.G. Khalizeva – group DM – 91

T.M. Plokhuta – EL Adviser

Nanotechnology is the process of development and production of material microparticles. Nanometer is the main measurement unit in this area. Basis of nanotechnology is a highlight material microparticles with 100 nanometers size. At least today nanotechnology just have started grow. It is widely used in microelectronics, chemical industry and robotics.

Computers and the industries around them are set to be advanced a further giant step with the application of nanotechnology.

Nanotechnology gives scope to develop new ideas and methods of running super-fast processors, storing data, and many other computational advances.

Intel and other computer-chip companies already sell tens of billions of dollars worth of chips every year packed with electronic circuitry patterned down to the nanoscale. Computer hard drives, LED-based traffic signals, CD players, and low-friction coatings account for billions more in sales.

There are 4 fields of nanotechnology application: nanocomputers, spintronics, magneto electronics and nanoelectronics.

Nanotechnology could prove to be a “transformative” technology comparable in its impact to the steam engine in the 18th century, electricity in the 20th century, and the internet in contemporary society. Scientists have already developed nano-applications that are radically transforming a host of products and services, including battery-storage capacity, computer-chip minimization, drug delivery, facial creams, food processing, solar energy and water purification. But the development of nanotechnology in our country has not reached a high level yet.

APPLICATION OF MAGNETIC NANOPARTICLES IN BIOMEDICINE

O.V. Orel – group DM – 91
T.M. Plokhuta – EL Adviser

Nanoparticles are generally considered a discovery of modern science. But not everybody knows that they were used by artisans back in 9th century Mesopotamia to produce a glittering effect on the surface of pots.

The nano-size particles or nanoparticles are a class of materials with properties distinctly different from their counterparts.

There are a lot of applications of magnetic nanoparticles in biomedicine but the most popular are: magnetic separation, drug delivery, hyperthermia treatments and magnetic resonance imaging (MRI) contrast enhancement.

In biomedicine it is often necessary to separate out specific biological objects from their native environment. Magnetic separation using nanoparticles is one way to achieve this. The majority of medical procedures harm us instead of helping but not using nanoparticles. With the help of magnetic nanoparticles doctors can heat malignant cells while sparing surrounding healthy tissue. It is called hyperthermia treatment.

A variety of magnetic nanoparticles and microparticles are developed to deliver drugs to specific target sites in vivo. The optimization of this useful process using magnetic nanoparticles continues today. In biomedicine methods based on a magnetic resonance are powerful methods of diagnostics. Magnetic nanoparticles can raise accuracy and sensitivity of the MRI.

Nano-size particles are a real possibility for us to use new invention. Medicine and science are developing rapidly. It's a pity that we cannot use all their achievements now but time will show.

THE TRAIN OF THE FUTURE

N. Provozin student M-71
S.V. Podolkova – E L Adviser

The only alternatives to airplanes - feet, cars, buses, boats and conventional trains - are just too slow for today's fast-paced society. However, there is a new form of transportation that could revolutionize transportation of the 21st century the way airplanes did in the 20th century.

A few countries are using powerful electromagnets to develop high-speed trains, called *maglev trains*.

Maglev is short for magnetic levitation, which means that these trains will float over a guide way using the basic principles of magnets to replace the old steel wheel and track trains.

Maglev or magnetic levitation is a transportation method that suspends and propels a vehicle, usually a train, very quickly along a guide way.

Maglev trains are theoretically capable of speeds upwards of 4,000 miles per hour if operating in a vacuum.

If you've ever played with magnets, you know that opposite poles attract and like poles repel each other. This is the basic principle behind electromagnetic propulsion.

There are three basic types of maglev propulsion:

- Electromagnetic suspension uses the attractive magnetic force to lift the train.
- Electrodynamic suspension uses the repulsive magnetic force to lift the train away from the rail.
- Stabilized permanent magnet suspension uses opposing arrays of permanent magnets to suspend the train above the guide way.

The big difference between a maglev train and a conventional train is that maglev trains do not have an engine -

at least not the kind of engine used to pull typical train cars along steel tracks. The engine for maglev trains is rather inconspicuous. Instead of using fossil fuels, the magnetic field created by the electrified coils in the guide way walls and the track combine to propel the train.

The idea of maglev transportation has been around since the early 1900s. The basic idea of a maglev train is to levitate it with magnetic fields so there is no physical contact between the train and the rails (guide ways).

Many maglev systems have been proposed in various nations of North America (for example, Union Pacific Freight Conveyor, California-Nevada Interstate Maglev, Atlanta – Chattanooga); Asia (Shanghai – Hangzhou, Mumbai – Delhi, Tokyo - Nagoya - Osaka), and Europe (London – Glasgow). Many are still in the early planning stages, or even mere speculation, as with the transatlantic tunnel.

The first operating maglev system was built in Britain, at the Birmingham airport in 1984, where it was used as a people mover.

Since the 1980s, Japan has been acknowledged as the world leader in the development of maglev technology.

Japan currently operates two experimental maglev trains. One is the HSST, which has been developed by Japan Airlines. The other is the JR-Maglev, which is owned and operated by Japan Railways. In April, 2007 Central Japan Railways announced that commercial maglev service would be available between Tokyo and Nagoya starting sometime in 2025.

MODERN ENGINEERING

M.S. Shkurat – group M-01
I.A. Morozova – EL Adviser

Technology is taking such rapid strides forward at such a blurring pace that what is considered a marvelous novelty turns into a mundane common object within no time. To classify and bunch a set of man-made marvels from a world that is being constantly altered is a pretty tough job. Finding them is easy enough in a world filled with man-made wonders but the relevance of such a compilation will be short-lived compared with a list from the ancient world. Yet I embark on a journey across the planet and beyond to try and find out the best the world has to offer—our own creations that leave us in awe.

I have found seven marvels of modern engineering.

1. CERN's Large Hadron Collider:

With an ability to change our understanding of the world around us and give us the reasons of our own existence, CERN's LHC is for now the most spectacular and important technological marvel modern science has created. It's truly amazing creation that could answer the questions about the creation and existence of this universe itself!

2. International Space Station (ISS):

It is one thing making wonders of engineering on earth and a whole different ballgame when you need to do it outside the planet in outer space. The International Space Station (ISS) is a research facility that is a joint project among the space agencies of the United States (NASA), Russia (RKA), Japan (JAXA), Canada (CSA) and eleven European countries. When completed in 2010, it will be the largest and grandest human endeavor away from home.

3. Three Gorges Dam:

Taking shape of the largest hydroelectric power plant in the world and that too by a long shot, the Three Gorges Dam in China is not just spectacular to watch but enormous in magnitude. Creating a reservoir as large as Lake Superior, this dam will be good as a grand marvel of modern engineering by becoming the world's largest concrete structure!

4. Petronas Twin Towers:

At 452 meters tall, the Petronas Twin Towers are magnificent and unique. While their familiarity seems at times to diminish their true aura, you only need to stand in front of the towers for one moment to realize the magnitude of the construction. For sheer intimidating height and the sophisticated look, they are a marvel of modern times.

5. Space Telescope Chandra:

Also known as the Advanced X-ray Astrophysics Facility, Chandra is an X-ray telescope orbiting the earth and sending back the most spectacular images of the cosmos that man has ever captured. The telescope moves in an orbit which makes it the furthest traveling earth-orbiting man-made object. The X-ray images offered by Chandra since its launch have redefined our notions of the cosmos and have given astronomy a whole new direction.

6. Palm Deira of Dubai:

Palm Deira is the latest of Dubai's trilogy of man-made islands. This island will occupy all of 46.35 million square meters of land reclaimed from the Persian Gulf to make the Palm Deira the largest man-made island in the entire world. All set to be finished by the year 2013, the island will further alter the landscape of effervescent Dubai!

ABU DHABI'S ENERGY-GENERATING ILLUMINATED PYRAMIDS

N.A. Sytnik, F-82

M. O. Chernyshova

D.A. Marchenko – EL Adviser

We live in the 21 century and because of overpopulation scientists run into plenty of problems today. Modern cities don't have enough energy for producing electricity and as a result, necessity to find new cheap energy is one of the main tasks for scientists in the nearest time.

The solar energy is the cheapest one in our days. Researches in this sphere are conducted for many years. The solar energy will allow people to use the potential in a production, industry and ordinary life without restriction. This energy doesn't pollute an atmosphere and consequently doesn't have a bad influence for people's health. Like the Great Pyramids of Cheops, Abu Dhabi plans to build their own pyramid collection too, only as solar channeled structures. The Great Pyramid of Cheops in Giza has always been a structure of idolism, heritage and inspiration. Abu Dhabi is planning to follow in similar footsteps and build their own pyramids as well. Abu Dhabi's plan to build their pyramids is slightly different. They will be contemporary pyramids that instead of serving as mummy tombs or heritage symbols will be solar paneled to utilize solar energy through the structures. The project is expected to benefit even in approximately five years. It is a forward-thinking public art project: an energy-generating installation that could power not just its own illuminated surface, but as many as 250 nearby homes as well.

The project was recently awarded the first prize in the Land Art Generator Initiative's first international design competition held in the United Arab Emirates. The project proposal, which has yet to be financed and green-lit, would construct the set of nine pyramids in the United Arab Emirates capital of Abu Dhabi, outside Masdar City.

The installation is designed as a monthly calendar and sun-dial, drawing from ancient Islamic astronomical traditions. It consists of nine sleek, black pyramid structures made of glass and amorphous silicon, giving the appearance of onyx polished to a mirror finish, as well as frameless solar panels that capture the sun's energy during the day. Then it is used to illuminate the sculptures at night with low energy lighting. One large pyramid rests in the center, encircled by eight smaller pyramids representing the eight different stages of the lunar cycle. We know the shape of Egyptian pyramids represented the primordial mound from which the Egyptians believed the earth was created. The shape of a pyramid represents descending rays of the sun. Designed with proportions matching the Great Pyramid at Giza and using Royal Cubits, the earliest one attested standard of measure; eight pyramids each 42 Royal Cubits high (~22meters) form a ring around a central pyramid 96 Royal Cubits high (~50 meters). Each of the eight smaller pyramids represents one of the eight lunar phases. Starting at North and rotating counter clockwise, following the orbit of the moon, they are; New, Waxing Crescent, First Quarter, Waxing Gibbous, Full, Waning Gibbous, Third Quarter, Waning Crescent. Each night the central pyramid will always illuminate inversely to the lunar cycle. Pyramids forming the ring also illuminate inversely but they are lit only when their corresponding moon phase is active, orbiting around the central pyramid like the moon orbits around earth. Underground electrical cables would pull the energy harnessed by the outer pyramids to four 500-kilowatt inverters inside the central pyramid.

The transmission lines and human access routes will be combined in order to minimize disruption to the local ecology. When compared with oil, gas, and nuclear energy generation plants, once built, this will be, hands-down, one of the most beautiful power plants in the world. Using of this building will positively influence the new researches in the field of technologies, construction and in discover of new energy.