



МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ
Федеральное государственное автономное образовательное учреждение
высшего образования
«Южно-Уральский государственный университет
(Национальный исследовательский университет)»

Институт лингвистики и международных коммуникаций
Кафедра иностранных языков

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направления 02.04.02 Фундаментальная информатика и информационные
технологии

09.04.01 Информатика и вычислительная техника

09.04.03 Прикладная информатика

11.04.02 Инфокоммуникационные технологии и системы связи

11.04.03 Конструирование и технология электронных средств

11.04.04 Электроника и нанoeлектроника

Дисциплина: «Иностранный язык в профессиональной деятельности»

1 семестр

Зачёт.

1. Чтение и аннотирование двух статей на выбор по разным типам мобильности современного профессионала.

Articles on different types of mobility (1-27)

1. Job mobility We believe that job mobility makes an essential contribution to the professional growth of people. Mobility is thus one of the pillars of a human resources policy. For employees, job mobility is a source of professional and personal fulfillment, an opportunity to develop new skills, broaden experience and cultivate professional networks. Job mobility is an important driver for career advancement. Curiosity, an open mind and a strong desire to progress are decisive to successful job changes. While people play the lead role in their professional development, the success of a new assignment is the fruit of a collaborative effort involving the employee, his or her manager, and Human Resources. A distinction is made between *horizontal* and *vertical* social mobility. The former refers to change of occupational position or role of an individual or a group without involving any change in its position in the social hierarchy, the latter refers essentially to changes in the position of an individual or a group along the social hierarchy or to any movement up or down a hierarchy of any kind. When a rural laborer comes to the city and becomes an industrial worker or a manager takes a position in another company there are no significant changes in their position in the hierarchy. Those are the examples of horizontal mobility. Horizontal mobility is a change in position without the change in status. It indicates a change in position within the range of the same status. It is a movement from one status to its equivalent. But if an industrial worker becomes a businessman or lawyer he has radically changed his position in the stratification system. This is an example of vertical mobility. Vertical mobility refers to a

movement of an individual or people or groups from one status to another. It involves change within the lifetime of an individual to a higher or lower status than the person had to begin with.

2. Contest mobility refers to system of social mobility in which all individuals are seen as participants in a race where elite status is the end goal and the contest is an open one. The idea is also sometimes referred to as *tournament* mobility. This serves in opposition to *sponsored* mobility, in which controlled selection is prevalent. In a system of contest mobility, equal footing among individuals is assumed as a given. Achievement is attributed directly to the effort put in by each contestant. Skill is not as valued as enterprise or perseverance; a person of average intelligence who works hard is seen as more deserving a reward than someone who is the most intelligent and does not try. "...the governing objective of contest mobility is to give elite status to those who earn it... Under the contest system society at large establishes and interprets the criteria of elite status."

These criteria are most commonly in the form of credentials, which are used by others to identify an individual's class. Examples of these can be material assets or skills.

Social control in a system of contest mobility is established by emphasizing a futuristic way of thinking and encouraging individuals to remember that they are competing for upward social mobility. In doing this, social norms are cultivated and emphasized as well. Also, elite control is perilous, because any individual can be displaced at any time. Looking past education to the realm of the working world, job success has also been studied in terms of contest vs. sponsored mobility; as for mobility in the workplace, contest mobility is shown to emphasize equity and productivity, and individuals who show originality and innovation are rewarded.

3. Apprentices' mobility is the movement of students and teachers in Vocational education or training (VET) to another institution inside or outside their own country to study or teach for a limited time. The term is usually used in the context of European Union (EU) policy. Under the EU Lisbon agenda attempts have been made to lower cultural, socioeconomical and academic barriers to mobility. Mobile learners are usually divided into two groups: *free-movers* are learners who travel entirely on their own initiative, while *program students* use exchange programs at department, faculty, institution or national level (such as Leonardo da Vinci II). The practice of going abroad to learn has been denoted by different terms in different contexts over the years, such as "*exchange*" or "*transnational mobility*". For the specific practice of sending people abroad on placements in public and private enterprise, the more neutral term of "*placements abroad*" has been preferred. Many different practices use the term "placement" as a denominator for their activities, and some form of definition is necessary to distinguish between these, and to mark it off from ordinary employment abroad as well as other forms of transnational mobility. Placements may be set up by an organizer who has made the necessary arrangements for a placement, defined the intended learning outcome, and thought out the pedagogic implications. Placements may also be self-organized by the participant. When a student organizes a work stay in another country during holidays or a study break, this may or may not qualify as a placement according to the criterion of intent. If the purpose is to acquire vocational skills and/or improve language and intercultural skills in general, it should be seen as a placement, and count it as such, rather than a holiday job. It may be inscribed in an educational context through accreditation of prior experiential learning (APEL), if the organization can be convinced that the person in question has sought out learning situations during the stay rather than just focused on having a good time or earning as much money as possible. Other activities in this borderline category are *au pair* placements and voluntary work in charitable institutions and organizations, e.g. as financed under the European Voluntary Service. The practice of some companies to send employees abroad in foreign subsidiaries for a period of time in order to acquire specific competences may also be considered under this label. It should be distinguished from employment abroad in general, which is another matter. The line is blurred, and different definitions may collide here. Any labour market activity where the participant draws some kind of wages or salary is juridically considered as employment. But payment is not necessarily a way of distinguishing between placements and

proper jobs; placements may be paid or unpaid, even though the learning role of participants is often signified by the fact that they receive no – or a considerably reduced – payment.

4. Criteria for defining placements abroad in VET: Criteria have been established to define what a work placement is, in order to differentiate it from other activities. A placement

- is carried out in an authentic work environment. The placement period is not an artificially created situation, where the central feature is the learning of the participant. The most important thing here is continuing production, and learning is placed second or third or even lower down on the scale of priorities;
- implies involvement in concrete work processes. The participants are not merely onlookers to the activities, but are given an active role; is for a limited time. Placements are planned and carried out as a period abroad that is set in a (national) learning context – i.e. surrounded by this on both sides. They are not open-ended. Duration, however, may vary considerably, from two weeks to two years.

To this we may add other features, which we should term characteristics rather than criteria, since they need not always be applicable. A placement thus as a rule: demands professional experience as the “entry ticket”. Workplaces where it is possible to become integrated in work processes immediately without any prior training or experience are few and far between. Therefore participation in most placement projects is contingent upon either a wholly or partly completed training course or solid practical experience; is not under the supervision of trained pedagogical staff. Contrary to a school environment or youth exchanges, there are usually no pedagogically trained staff (teachers) or experienced youth leaders around to offer guidance and practical support during the placement period. Mentors may be appointed, but the supervision of the participants is only a secondary task for them; does not take place among peer groups. In school stays or youth exchanges, the participants will often be surrounded by people in the same age bracket and societal position who are in a similar life situation.

At the workplace, however, there is a broad spectrum of colleagues, who are largely in a different position from the participant and have different dreams, expectations and interests. Some activities are excluded from the definition.

5. “Work camps” organized to improve intercultural understanding bring together young people from many countries to accomplish a practical task such as building a playground, or restoring a building to be used by the local community. However, the work situation is an artificially created one, there are trained supervisors present, and the group is composed of young people in the same age bracket. Study visits are also excluded: even though they may be in authentic work environments, the participants are merely engaged as onlookers. A definition of the term “placement abroad” is “a shorter or longer period spent abroad in a public or private enterprise, which has been consciously organized for learning purposes, which implies active involvement in concrete work processes, and which can be paid or unpaid”. The phenomenon is often associated with past and present programs of the European Commission. These have grant-aided placements abroad, represent the largest single programs and initiatives, and provide the best statistical material. Currently, the Leonardo da Vinci program is much in evidence in discussions on mobility in VET for exactly these reasons. The practice goes well beyond these programs, however, and encompasses also programs and initiatives at a binational, national and regional level, as well as the activities of organizations and individuals, which are undertaken without any recourse to program funding.

6. Benefits: Placements abroad can be a pedagogical exercise. Mobility in a context of education and training differs substantially from other types of mobility in that it is primarily a pedagogical exercise: it is a tool used to produce certain kinds of learning of an affective and/or cognitive nature in the participant.

Placements abroad can be a means for achieving intercultural understanding, learning how to live peacefully together in Europe and in the world and develop a sense of “European Citizenship” as opposed to a strictly nationalist outlook. Placements abroad can be a method for acquiring “new basic skills” and developing “employability.” The world has changed fundamentally in the last

decade. The world is flattening. We can focus on the many differences between apprentices and placements in Europe. And we can continue to question the importance of experience abroad for apprentices and other young people in IVET, who often work in small and medium sized enterprises with a regional focus. However the reality is that experience of mobility provides apprentices and IVET students with particular competences over and above those obtained from the vocational curriculum including communicative, social, meaning-related and change-related skills.

7. These critical competences benefit the individual apprentice and IVET student personally and they are also likely to make them more employable. Within this discourse, the rationale for the activity lies in the use of placements abroad as a didactic tool to equip participants with so called “key skills” that enable them to cope with the constant changes in occupational profiles, work organization and career paths arising as a consequence of globalization and technological change. This corresponds to a focus on education and training as a motor for economic growth, and the aims of the Lisbon-declaration concerning the creation of a “Europe of knowledge”. Placements abroad can be an activity linked to internationalization of education and training in Europe. In this case they are the response of national educational systems to the perceived negative effects of globalization. At the level of the individual, it enables the future workforce to acquire foreign language skills and intercultural skills so that they can deal with increased foreign contacts at the workplace. At systemic level, it allows national educational systems to fill in temporary gaps in training provision by sending trainees abroad to where such opportunities exist. Increasingly, employees from all levels need to be able to operate in an environment that deals with international customers and suppliers. Those companies and sectors that earn their money abroad or work with foreign suppliers are more likely to be engaged in mobility. Although right now less than 50% of small and medium enterprises (SMEs) are internationalized, figures by the World Trade Organization, show that more and more economies are dependent on external and foreign trade. It is likely that this will increase the pressure on employers to hire people with a “worldly mindset”. In the best tradition of “Master craftsmen” who only got their credentials after having been abroad, sectors can use this changing environment to train their future employees. To facilitate knowledge-transfer between sectors, economies and generations, education should continue to play its role here. Placements abroad can be a method for promoting the free movement of workers in Europe. In this case they are concerned with learning how to live and work in another country, how to become a “migrant worker” willing and able to move across borders and thereby allay skills shortages in other Member States.

8. The rationales for mobility may differ for each actor. At EU level, several reasons for stimulating mobility are mentioned, i.e. more mobility between regions and jobs represents an essential part of the Lisbon Agenda, mobility is a tool for acquiring language skills and mobility contributes to increasing stability and peace of the EU. More exposure to other countries leads to increased intercultural awareness and good feelings about host nation/culture. Mobility implies acquiring international skills, which become increasingly important with the liberalization of trade and commerce. For individuals, mobility implies developing personal skills and competencies For vocational schools and training centers hosting students and apprentices and other young people in IVET from abroad creates an international atmosphere that brings benefits for the whole institution (e.g. inspiration of other students, learning language). Transnational mobility projects can serve as a launch pad for transnational partnerships and for a proactive internationalization strategy and policy. For employers, reasons for engaging in mobility can be a faster diffusion and acquisition of knowledge and skills.

9. Benefits for stakeholders:

employers :

- Mobility is a means to address both short-term and long-term shortages in skills.
- Greater use of mobile workers and trainees is an important measure to cope with recruitment difficulties. In the long run, companies can include recruitment for young people in their human resource policies.

- While time for adaptation to key technologies is becoming shorter, the mobility of employees can facilitate a fast diffusion of knowledge.
- Hiring of trainees implies low costs. The risk of hiring trainees for the sole purpose of lowering the labour costs needs to be mitigated by some forms of control and accreditation by the education system.
- *Benefits for individuals*
- Mobility implies acquiring of international skills, what becomes increasingly important with the liberalization of trade and commerce.
- Mobility implies developing of personal skills and competencies such as change-related, relational, learning-related, and meaning-related skills.
- *Benefits for vocational schools and training centers*
- Hosting students and apprentices from abroad creates an international atmosphere that brings benefit for the whole institution (e.g. inspiration of other students, learning language).
- VET-institutions have the possibility to benchmark their course contents and pedagogic practices.
- Involvement of a VET-institution in mobility activities makes it attractive for students in comparison with other ‘not-towards-mobility-oriented’ institutions.
- Transnational mobility projects can serve as a launch pad for transnational partnerships and for a proactive internationalization strategy and policy.
- The role of VET-institutions is gradually changing from a traditional ‘school’ towards a regional knowledge centre. There is a need to reflect internationalization in their array of competences and skills.
- Mobility projects might imply income-generating activities.

10. Economic mobility is the ability of an individual, family or some other group to improve (or lower) their economic status - usually measured in income. Economic mobility is often measured by movement between income quintiles. Economic mobility may be considered a type of social mobility, which is often measured in change in income.

Types: Mobility may be between generations (“inter-generational”) or within a person or groups lifetime (“intra-generational”). It may be “absolute” or “relative”.

Inter-generational mobility compares a person’s (or group’s) income to that of her/his/their parents. **Intra-generational** mobility, in contrast, refers to movement up or down over the course of a working career. **Absolute** mobility involves widespread economic growth and answers the question “To what extent do families improve their incomes over a generation?” **Relative** mobility is specific to individuals or groups and occurs without relation to the economy as a whole. It answers the question, “How closely are the economic fortunes of children tied to that of their parents?” Relative mobility is a zero-sum game, absolute is not.

11. Labour power and labour market flexibilisation: The commercial value of human labour power is strongly linked to the assertion of human needs by workers as citizens. It is not simply a question of supply and demand here, but of human needs which must be met. Therefore labour costs have never been simply an economic or commercial matter, but also a moral, cultural and political issue. In turn, this has meant that governments have typically strongly regulated the sale of labour power with laws and rules for labour contracts. These laws and rules affect e.g. the minimum wage, wage bargaining, the operation of trade unions, the obligations of employers in respect of employees, hiring and firing procedures, labour taxes, and unemployment benefits.

This has led to repeated criticism from employers that labour markets are overregulated, and that the costs and obligations of hiring labour weigh too heavily on employers. Moreover, it is argued that over-regulation prevents the free movement of labour to where it is really necessary. If labour markets were deregulated by removing excessive legal restrictions, it is argued that costs to business would be reduced and more labour could be hired, thereby increasing employment opportunities and economic growth. However, trade union representatives often argue that the real effect of deregulation is to reduce wages and conditions for workers, with the effect of reducing

market demand for products. In turn, the effect would be slower economic growth and a decline in living standards, with increased casualisation of labour and more “contingent labour”. It is argued that, because the positions of employees and employers in the market are unequal (it is usually easier for an employer to lose an employee than an employee to lose an employer), employees must be legally protected against undue exploitation.

12. Otherwise employers will simply hire workers as and when it suits them, without regard for their needs as citizens. A further twist in some countries is that unions are part of the political establishment, and not interested in collecting complaints and suggestions from individual employees, employing staff in proportion to dues received, backing employees’ legal cases, or rocking the boat in their public statements. For example, in China some workers are in prison for criticizing the official unions. Often the demand for “labour market flexibility” is combined with the demand for strong immigration controls, to block any movement of labour which would be only a burden for capital accumulation. The term “flexibility” is used because, while capital must be able to move freely around the globe, the movement of labour must be strictly controlled. If that control does not exist, it is argued, it could mean additional costs to employers and taxpayers.

13. Geographic mobility is the measure of how populations move over time. *Geographic mobility*, *population mobility*, or more simply *mobility* is also a statistic that measures migration within a population. Commonly used in demography and human geography, it may also be used to describe the movement of animals between populations. These moves can be as large scale as international migrations or as small as regional commuting arrangements. Geographic mobility has a large impact on many sociological factors in a community and is a current topic of academic research. It varies between different regions depending on both formal policies and established social norms, and has different effects and responses in different societies. Population mobility has implications ranging from administrative changes in government and impacts on local economic growth to housing markets and demand for regional services.

Geographic mobility data is available from census and public government records in the United States, The European Union, The People’s Republic of China and many other countries.

Population turnover is a related statistic that measures gross moves in relation to the size of the population, for example movement of residents into and out of a geographic location between censuses counts.

14. Influencing factors

Economic reasons – Most theoretical models attribute the desire to relocate to the impact of wages and employment on personal expected earnings. The prospect of gainful employment in another region leads to movement to capitalize on new opportunities and/or resources unavailable in the original community. Perceptions, gaps in prospective incomes, availability of accurate information, and geographic distance all play a part in the decision to migrate. Studies have shown that unemployment rates statistically correlate to measured migrations in the EU (a relatively mobile society). Further, there is evidence that comparable statistical results can be obtained using labor availability interchangeably with population migration data.

Surveys show potential movers also face anxiety about the prospects of actually finding a suitable job in their new location. The capacity to migrate depends on current income or access to credit to support the move, and is always up to chance. Economists have shown that the decline in home values in the US in the late 2000s diminished state-to-state migration, with roughly 110,000 to 150,000 fewer individuals migrating across state lines in any given year. Socialized unemployment insurance programs help to increase individual liquidity and lessen the burden of search costs and movement risk. Research has shown that overall the presence of social insurance does not have a strong effect on the rate of personal movement because while it lowers relative movement costs, it also increases the opportunity costs of movement. Current international laws present challenges to ideal geographic mobility. Migrants must have a physical means (legal or illegal) over which to travel to a new country. An increase in individual income was shown to increase access to long distance transportation and enable individuals more freedom of travel. Seeking a job in another country often requires sponsorship, visas, or may not even be possible in

a given situation. Government support is in no way guaranteed for international geographic mobility. Existing language and cultural barriers also severely hamper geographic mobility on both regional and national levels.

15. Personal preferences – Personal preference factors besides economic logic can exert a strong influence on an individual's geographic mobility. Concerns such as climate, the strength of regional housing markets, cultural comfort, family, and local social capital all play into the decision to move or not. Individualization of the job market in industrializing countries has led to an increased preference among workers to follow market opportunities. Media driven self-awareness and highly individualistic symbolism exported from the western world have allowed people to imagine themselves living completely different lifestyles. Western media glamorizes the image of the self-sufficient youth, showing examples of both men and women who lead strong, individualistic, empowered lifestyles. Globalization has destabilized previously immutable social institutions, shifting cultural value away from old traditions to new more individualist and market friendly ideas. This combined with a privatization and individualization of labor has in many ways made fluidity more the norm than structure. The availability of geographic mobility can also directly affect an individual's selfempowerment. Large numbers of women in South Korea, Japan, and China are taking advantage of newly available travel opportunities: experiencing life overseas and touring or studying. In South Korea progressive educational reforms have led to large numbers of women receiving higher level degrees, but structural inequality in the job market makes it difficult for them to get middle or upper class jobs. 93% of women graduate from high school and 63% from college, but only 46.7% of college grads are employed. Further, those employed women suffer from a 76% wage differential compared to like qualified men. Japan has similar structural issues where half of the employed women in the country only work part-time. Geographic relocation presents social opportunities to both seek a more favorable job climate and a social order more accepting of educated women. The prospect of greater control over their own lives and careers draws many of these young women to build their futures away from their immediate surroundings: 80% of Japanese people studying abroad are women.

16. Social forces – Social forces can also foster individual geographic mobility. Support from the community can increase the probability of relocation; it has been shown that the chances of a migration in India improve when groups of houses from same sub-caste all decide to move together. Worldly exposure also increases one's tendency to be mobile. Public health studies measured higher geographic mobility among female sex workers who drank, had experienced violence, had worked for more than 4 years, and had a regular non-paying partner than those who did not.

Demographically, research shows that one's level of education tends to correlate to higher mobility, especially among university graduates. Youth and a lack of a family or children correlate to increased mobility too, with the peak in mobility occurring in the mid-late 20s for populations surveyed in Europe.

17. Economic effects

Labor supply - Geographical mobility of labor allows the labor supply to respond to regional disparities, limiting economic inefficiencies. Low labor mobility quickly leads to inequality between static economic regions and a misappropriation of labor resources. Geographic mobility can help alleviate asymmetric shocks between regions with diversified economies, like in the European Union. A mobile population allows a region to shed workers when jobs are scarce and gives those workers the opportunity to seek employment elsewhere where opportunities might be better. While an increase in geographic mobility increases overall economic efficiency, the increased competition for jobs on the local level in otherwise prosperous regions could lead to higher unemployment than before the migration.

Female labor supply rates actually have larger statistical effect on mobility than male rates. Traditionally male jobs in the developing world have much more inelastic demand than female ones, so the variations in the female rate lead to more drastic changes in employment that more strongly affect mobility.

Resource allocation – Labor mobility theoretically leads to a more balanced and economically efficient distribution of jobs and resources overall. Individual employees can better match their skills to potential jobs on the open job market. They can seek out ideal jobs instead of artificially limiting themselves to their geographic areas. The opportunity to study abroad is a major vehicle of entry to western countries for Asian women. Moving to the West to study is a common career move for Asian women in their 20s, allowing them to abandon the traditional marriage track and pursue economic ventures outside the home.

On the other hand, mobility can also have negative consequences on a region facing widespread emigration. Brain drain and labor resource diminishment make it more difficult for troubled regions to recover after an economic stumble. Additional people migrating into a region can also place extra stress on existing social infrastructure for services like healthcare, welfare, and unemployment.

Remittances – Geographic mobility allows for remittances from distant family members back to support local needs. Loans and transfers can flow back from migrated members of a community to sustain those who remain behind. Remittances are one of the primary benefits of migration to the country of origin, not only substantially enhancing local family income but also spilling over into benefits of increased capital flow in the entire local economy. Remittances play a large role in sustaining the economies of many developing nations, for example bringing over US\$1bn into the Philippines every month and eclipsing the entire tourism profit of Morocco.

18. Female mobility

Empowerment – With heightened self-awareness, educated women hope to grasp opportunities from moving, leading to increased female individualization and empowerment. Given access to travel, international education provides one of few avenues for women in China to live non-traditional personally emancipated lives. In Japan geographic mobility offers an opportunity to gain real job experience and advance a career too. Japanese society places a great social pressure on women to get married, but many young women feel the need to “escape” and can find their independent selves in another setting.

Many migrants do choose to continue to benefit and rely on older home ties though. These women cannot change behavior too much from social norms or risk being cut off. Studies show that household choices in India are affected by distance from the ancestral home, especially within the caste system.

There are also other new risks for women in new locations. Female sex workers have statistically higher sexually transmitted diseases and HIV rates when more mobile. There is also potential for male backlash in a new setting. Domestic violence can be sparked by power struggles when newly empowered women regain some control traditionally held by men.

Participation – Female labor participation is vital to improving regional disparities in a competitive world and will increase in value over time. Women’s participation and creative energy is vital for the success of economies on a global scale. Female labor participation can act as a substitute for more generalized labor mobility too. In the European Union women provide a dynamic substitute for male labor with fluctuations in the economy. This allows for more geographic stability while maintaining the variability of a flexible labor economy. When families do migrate, women often get employed first and become the breadwinner for house. Even if this only lasts for duration of time, the experience is empowering and helps shape social dynamics within the home.

Often relocation is primarily motivated by lack of any better opportunities in their prior situation though. Many of the women go through the trial of moving and starting over due to economic and social circumstances outside of their control. Research also seems to indicate that women and minorities migrating into a new area often act as economic substitutes for local minorities rather than paving their own new ground. Female income effects from migration will only kick in if there are sufficient differences between males and females too, so long term changes will likely not happen quickly.

Transportation access – Women have traditionally had more limited access to improved means of personal transportation and thus had more limited local mobility. Women surveyed in England were less likely overall than men to have drivers' licenses and took longer to get to key destinations. Women often seek work closer to home compared to men, taking jobs in a more geographically confined area and relying more on non-automobile transportation. Access to personal transportation could improve women's choice of feasible destinations and decrease average trip time.

19. Effects on children, family, and education

Increased geographic mobility can offer new opportunities to previously isolated groups. In India, increasing mobility allows families the chance to strengthen family ties by sending children to traditional homes or expand educational opportunities with options to attend urban schools. Additional economic freedom bolstered by additional capital from remittances can allow children to stay in school longer without having to worry about supporting the core family.

Increased geographic mobility and long distance moves do place strains on the household. The loss of established strong ties decreases social support and can lower productivity. Geographic isolation from previous relationships increases personal dependence on the nuclear family unit and can lead to power unbalances within the household.

Migration for work allows the migrants themselves to develop new skills and receive new technical training abroad. Migrants surveyed in Australia and the US have lower rates of continual training than their native born peers as a whole, but are likely to continue gaining technical skills after establishing an initial technical aptitude. The appeal of new educational opportunities to migrants also loses appeal with age; older movers see less of an incentive to spend time to improve upon their existing skills.

Increased global mobility has helped to destabilize the prospects of young people looking for reliable work and led to a greater assumption of risk on behalf of young people. Coping strategies push them to put off long term commitments, decreasing the formation of families and lowering birth rates. Labor market volatility increases the dangers of settling down since incomes cannot be relied upon long term. Women in the workplace also face more disincentives to having children since they could be more easily replaced if forced to leave their job temporarily.

20. Effects on culture

Cultural exchange – Increased geographic mobility increases the depth and quality of cultural exchange between communities. Travel and cooperation bring people together across cultural bounds and facilitate the trade of customs and ideas. New community members bring unique talents and skills that can improve overall services and bring additional opportunity to an area. Additional population "churn" can also increase diversity and lower tensions that would arise otherwise with large concentrations of particular demographic groups. On the other hand, accelerated cultural exchange can dilute existing customs and cause social friction between competing immigrating populations too. Residents in communities with a large percentage of highly mobile occupants also worry about long term social cohesion. Rapid turnover can lead to cultural isolation and sometimes prevents neighbors from building close cohesive relationships.

Social networks – Increasing long range personal mobility tends to lead to geographic expansion of an individual's support network. Long distance connections require more time to visit and minimize the occurrence of unplanned social interaction. Increased mobility can decrease an individual's attachment to a local community and weaken local support networks. People often turn to information technology to maintain connections across distance, strengthening distance relationships and allowing people to pursue career opportunities despite geographic distance from a partner.

17. Social mobility is the movement of individuals or groups of people in social position. It may refer to classes, ethnic groups, or entire nations, and may measure health status, literacy, or education. More commonly it refers to individuals or families, and their change in income or wealth (economic mobility). It also typically refers to vertical mobility – movement of individuals or groups, up or down from one socio-economic level to another often by changing jobs or

marriage. In addition it can also refer to horizontal mobility – movement from one position to another within the same social level.

Social mobility can be the change in status between someone (or a group) and their parents/previous family generations (“inter-generational”); or over the change during one’s lifetime (“intra-generational”). It can be “absolute” i.e. total amount of movement of people between classes, usually over one generation (such as when education and economic development raises the socio-economic level of a population); or “relative” which is an estimation of the chance of upward or downward social mobility of a member of one social class in comparison with a member from another class. A higher level of intergenerational mobility is often considered a sign of greater fairness, or equality of opportunity, in a society.

Mobility is enabled to a varying extent by economic capital, cultural capital (such as higher education), human capital (such as competence and effort in labour), social capital (such as support from one’s social network), physical capital (such as ownership of tools, or the “means of production”), and symbolic capital (such as the worth of an official title, status class, celebrity, etc.).

Inter- and intra-generational mobility – *Intra-generational* mobility (“within” a generation) is defined as change in social status over a single life-time. *Intergenerational* mobility (“across” generations) is defined as changes in social status that occur from the parents’ to the children’s generation.

21. Inter-generational mobility is generally measured in terms of intergenerational elasticity, or a statistical correlation between parent’s and children’s economic standings. The higher the intergenerational elasticity, the less social mobility a society offers. The higher the intergenerational elasticity, the more of a role childhood upbringing plays when compared to individual talents and capabilities. Income and wealth are two measures of well-being that are also typically used to measure mobility. Income mobility is low in the United States and Britain; however, because wealth can be transferred directly from parents to children, both intergenerational mobility and intragenerational wealth mobility are even lower. Sociologist Lisa Keister has shown that educational attainment and business startup are two important processes that allow people to become upwardly mobile. Sociologist Annette Lareau discusses two different ways to raise children: concerted cultivation and natural growth:

- Concerted cultivation, normally used by middle-class families, incorporates scheduling many structured, organized activities for the child. Such children learn to use their language to reason with parents and other adults, and they often adopt a sense of entitlement.
- Natural growth is almost the exact opposite of concerted cultivation. Occurring mainly in poor or working-class families, this style of childrearing does not include organized activities, and there is a clear division between the adult and the child. Children usually spend large amounts of their day creating their own activities, and they hardly ever speak with adults. In fact, adults use language in order to direct or order the children, never to negotiate with them.

These two different types of childrearing can affect inter-generational mobility. Children who grow up with a concerted cultivation style of childrearing learn from their parents how to talk with adults as equals and negotiate to get favorable outcomes in any situation. This skill helps them create powerful social networks, which can improve their social standing. Children with natural growth accomplishment tend to have a more difficult time improving their social standing. They lack the social skills and sense of entitlement that children raised with the concerted cultivation method have, and therefore are less likely to acquire good jobs (and therefore, improve their social standing).

22. Absolute and relative mobility – Absolute mobility measures whether (and by how much) living standards in a society have increased - often measured by what percentage of people have higher incomes than their parents. Relative mobility refers to how likely children are to move from their parents’ place in the income distribution.

The more absolute mobility, the better off the population is than their parents, and their children will consequently be better off than them. Relative mobility refers to the fluidity of a society. If

one grows up in a poor family, one has a decent chance of moving up the relative-income ladder. Because relative mobility depends on one's place in the distribution, it is a zero-sum phenomenon. In other words, if one person moves up in relative terms, another by definition must have moved down. In contrast, absolute mobility is not zero-sum. Sociologists can classify social mobility as:

- **vertical mobility**: the movement of individuals and groups up or down the socioeconomic scale. Those who gain in property, income, status, and position are dubbed “upwardly mobile”, while those who move in the opposite direction are “downwardly mobile”.
- **horizontal mobility**: the movement of individuals and groups in similar socioeconomic positions, which may be in different work-situations. This may involve change in occupation or remaining in the same occupation but in a different organization, or may be in the same organization but at a different location.
- **lateral mobility**: geographical movement between neighborhoods, towns or regions. Modern societies exhibit a great deal of geographical mobility. Lateral mobility is often combined with vertical as well as horizontal mobility. **Rules of status: ascription and achievement** – Achieved status is a position gained based on merit. Ascribed status is a position based on who a person is, not what he does.

Mobility regimes can be positive and/or a negative sum. *Structural mobility* is mobility resulting from changes in the number and kinds of jobs available in a society. Examples: Great Depression, many job losses, the government and many people in need of major help. According to sociologist John H. Goldthorpe, social mobility is normally seen in two ways: the first being that it is a basic source of social “structuration”; the second is that the extent of mobility may be a strong indicator of the balance of power and status within a society.

23. Structural and exchange mobility – Structural mobility is a type of forced vertical mobility that results from a change in the distribution of statuses within a society, owing more to changes in society itself than to individual efforts. It occurs when the demand for a particular occupation reaches its maximum and more people are needed to trade-off. This means, instead of positions reaching the maximum and more people being needed, positions are dropped and someone else must step up to fill the position. When ascriptive status is in play, there is not much exchange mobility occurring.

Upward and downward mobility – Upward social mobility is a change in a person's social status resulting in that person rising to a higher position in their status system. However, downward mobility implies a person's social status falls to a lower position in their status system. A prime example of an opportunity for upward mobility nowadays is in athletics. There is an increasing number of minorities holding top executive positions in the NBA.

Upward and downward social mobility is not directly correlated with higher education. A merit-based higher education system can offset the role of social class in determining economic outcomes. Post-secondary schooling is a filter that keeps parents' economic position from simply passing straight through to their children, thus simultaneously promoting economic efficiency, social justice, and social mobility.

Social mobility is normally discussed as “upward only”, but it is a two-sided phenomenon – where there is upward mobility, there can also be relative downward mobility. If merit and fortune play a larger role in life chances than the luck of birth, and some people can manage a relative upward shift in their social status, then some people can also move downward relative to others. This is the risk that motivates people in power to increasingly devise and commission political, legal, educational, and economic mechanisms that permit them to fortify their advantages.

24. Labour Mobility – Labour mobility consists of changes in the location of workers both across physical space (geographic mobility) and across a set of jobs (occupational mobility). *Geographic mobility* can be further subdivided into short-distance and long-distance moves, as well as into voluntary and coerced migration. *Occupational mobility* can be *lateral* (within a broad class of jobs similar in socioeconomic status) or *vertical* (from one job to a better or worse job). The availability of large, nationally-representative longitudinal surveys in the late twentieth century

has made it possible to measure the extent of mobility in all these dimensions, and how they are related, in several developed economies.

Recent analysis of **labour mobility** in Canada categorizes barriers to labour mobility as either “natural, economic barriers” or “artificial barriers.” *Natural, economic barriers* include distance and linguistic-cultural differences, although language differences are affected by law and regulations. *Artificial barriers* to mobility are those imposed by law and regulation, including “professional occupational licensing, government occupational licensing of trades, preferential hiring practices, income security programs, education and language requirements, and employment standards legislation.”

At the aggregate level, labour mobility conveys important economic benefits. The reallocation of workers across regions permits the exploitation of complementary resources as they are discovered in new places, while reallocation across sectors makes possible the use of new technologies and the growth of new industries. At the individual level, mobility allows for improvements in the economic circumstances of those whose skills or aspirations are a poor match for the job or location in which they find themselves.

The impact of labour mobility extends well beyond these economic considerations, however. Sociologists have examined the impact of mobility on the operation of communities and interpersonal relationships, and political scientists have considered how mobility effects political participation

25. Occupational mobility is often wrongly called *social mobility*. It refers to the movement of an occupational group itself, or of an individual member of an occupation, or of an occupational vacancy, through the stratification system of social space. Studies of the Hindu caste system illustrate the first; father-son occupational achievement the second; and Harrison White's study of clergy vacancy-chains the third.

Most studies assume a unidimensional scaling or gradation of occupations in terms of their prestige or status against which movement is then assessed. Thus, “downward” mobility refers to loss, and “upward” mobility to increase in occupational prestige. An important distinction is to be drawn between *within* or intra-generational mobility (for example career patterns) and *between* intergenerational mobility (for example caste mobility or father-son achievement). **Labor mobility** or *worker mobility* is the geographical and occupational movement of workers. Worker mobility is best gauged by the lack of impediments to such mobility. Impediments to mobility are easily divided into two distinct classes with one being personal and the other being systemic. Personal impediments include physical location, and physical and mental ability. The systemic impediments include educational opportunities as well as various laws and political contrivances and even barriers and hurdles arising from historical happenstance.

Increasing and maintaining a high level of labor mobility allows a more efficient allocation of resources. Labor mobility has proven to be a forceful driver of innovations.

26. International Labor Mobility – International labor mobility is the movement of workers between states. It is an example of an international factor movement. The movement of laborers is based on a difference in resources between countries. According to economists, over time the migration of labor should have an equalizing effect on wages, with workers in the same industries garnering the same wage. **Common impediments to worker mobility In the United States:**

- Minimum Wage laws that prevent unskilled workers, willing to work below minimum, from entering workforce.
- Absence of “right to work” laws / presence of forced unionization.
- Inadequate infrastructure and housing to accommodate fast moving changes in labor demand.
- Binding ties to a geographic location. e.g.: a worker’s inability to sell his home for a price that covers his existing mortgage.
- A worker’s lack of education and/or access to education.
- Government mandates on industry labor standards. e.g.: license requirements to cut hair or give a massage.

- Unemployment benefits that disincentivize workers from accepting employment at market clearing wage rates.
- *In the Asia-Pacific Region*, some common reasons workers are immobile include:
- National and regional differences in the qualifications necessary for different jobs.
- A lack of standards for skills and vocations.
- Discrimination based on citizenship or national origin.
- *Other impediments to worker mobility:*
- Discrimination based on social class.
- Systems of economics and property rights that impede workers.

27. Youth mobility – The level of youth unemployment following the recession has become a serious concern. Across the EU, the unemployment rate amongst those aged 15-24 rose from 15.5% in 2007 to 19.8% in 2009. The increase in youth unemployment as a result of the recession hit across the board but particularly affected young men and those with low levels of education. The proportion of unemployed youth in long term unemployment was slightly lower in 2009 than in 2007 but it has started to increase and whilst demand in the labour market remains low the fear is that it will continue to increase.

Unemployment rates alone do not paint a full picture of the situation for young people. Many young people are engaged in full-time education and the part that is actually active in the labour market varies considerably between countries. Moreover, the situation is not static over time as the number of young people who enter the labour market is sensitive to the economic cycle. The rates at which young people move from year to year between different labour market situations (employment, unemployment, student and other inactive) have changed since the onset of the recession. The proportion of young people who remained employed from one year to the next has fallen, as has the share that moved into jobs from unemployment.

On the other hand, a larger proportion either remained in education or returned to it. Furthermore, when this situation is compared with those over the age of 25, there is evidence that young people were hit disproportionately by both job losses and a reduced rate of new job creation. Analysis of the experiences of young people moving into the labour market from education over a four year period shows that those leaving education at an earlier age (16-17) tend to have less success in finding jobs than those who leave at an older age (18 or over). However, the data also suggest that there is not much gain (in terms of the chances of finding a job of any type) from remaining in education beyond the age of 20.

Further, a later exit from education into the labour market does not noticeably reduce the chances of experiencing unemployment during the transition period. In fact, those who moved into the labour market at an older age tended to experience more spells of unemployment and more time in unemployment than younger age groups despite being more successful in the long run. However, this pattern is not evident for all countries.

Young people are much more likely than other age-groups to be employed on a temporary contract. In 2009, 40% of employees aged 15-24 were on a temporary contract compared to just 10% of those aged 25-64. Although inherently less stable forms of employment, for young people temporary contracts can be valuable stepping stones towards more secure long-term employment. Analysis of how the employment situation of young people on temporary contracts changes over one or two years suggests that this is the case in some countries but not in others.

2. Сообщение на тему: «К какому виду мобильности вы готовы в целях саморазвития и самореализации».

3. Вопросы для беседы:

1. What is your research problem?
2. What is of special interest in the problem of your research?
3. What is the subject of your research?

4. Why has the interest in this problem increased considerably in recent years?
5. Do you follow/stick to any theory/hypothesis/concept? What is it?
6. What concept is your research based on?
7. How does your research differ from other studies of the same problem?
8. Is there much literature available on your research problem?
9. Is your research problem described comprehensively/thoroughly/ extensively in literature?
10. Is the problem only outlined or mentioned in passing?
11. What are the main aspects of the problem that have been considered?
12. Have you already obtained any research results?
13. What are the main/comprehensive results of your current research?
14. Has your research been successful?
15. Have you succeeded in receiving extensive data?
16. Do your research data agree with the theory you follow?
17. Do your results coincide with those obtained by other researchers?
18. Are the results of purely theoretical or practical interest?
19. Do your research results appear to be of both theoretical and practical importance?
20. Are the data/observations you have obtained sufficient to formulate your final conclusions?

ОЦЕНОЧНЫХ СРЕДСТВ



МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

Федеральное государственное автономное образовательное учреждение

высшего образования

«Южно-уральский государственный университет

(Национальный исследовательский университет)»

Институт лингвистики и международных коммуникаций

Кафедра иностранных языков

Направления 02.04.02 Фундаментальная информатика и информационные технологии

09.04.01 Информатика и вычислительная техника

09.04.03 Прикладная информатика

11.04.02 Инфокоммуникационные технологии и системы связи

11.04.03 Конструирование и технология электронных средств

11.04.04 Электроника и наноэлектроника

Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзаменационный билет № 1

I. а) Прочитайте предложенный текст № 1 “WikiWikiWeb”.

б) Письменно переведите отрывок текста, где приводится пример сайта, на котором используется программное обеспечение Wiki.

с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.

II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

1. “WikiWikiWeb”

Wiki is a World Wide Web (WWW) site that can be modified or contributed to by users. Wikis can be dated to 1995, when American computer programmer Ward Cunningham created a new collaborative technology for organizing information on Web sites. Using a Hawaiian term meaning “quick,” he called this new software WikiWikiWeb, attracted by its alliteration and also by its matching abbreviation (WWW).

Wikis were inspired in part by Apple’s HyperCard program, which allowed users to create virtual “card stacks” of information with a host of connections, or links, among the various cards. HyperCard in turn drew upon an idea suggested by Vannevar Bush in his 1945 *Atlantic Monthly* article *As We May Think*. There Bush envisioned the memex, a machine that would allow readers to annotate and create links between articles and books recorded on microfilm. HyperCard’s “stacks” implemented a version of Bush’s vision, but the program relied upon the user to create both the text and the links. For example, one might take a musical score of a symphony and annotate different sections with different cards linked together.

Bush also had imagined that memex users might share what he called “trails,” a record of their individual travels through a textual universe. Cunningham’s wiki software expanded this idea by allowing users to comment on and change one another’s text. Perhaps the best-known use of wiki software is *Wikipedia*, an online encyclopaedia using the model of open-source software development. Individuals write articles and post them on *Wikipedia*, and these articles are then open for vetting and editing by the community of *Wikipedia* readers, rather than by a single editor and fact-checker. Just as open-source software – such as the Linux operating system and the Firefox Web browser – has been developed by nonprofit communities, so too is *Wikipedia* a nonprofit effort.

Rather than worrying about every user’s actions and intentions, proponents of wiki software rely on their community of users to edit and correct what are perceived to be errors or biases. Although such a system is certainly far from foolproof, wikis stand as an example of the origin of an Internet counterculture that has a basic assumption of the goodness of people.

In addition to encyclopaedias, wiki software is used in a wide variety of contexts to facilitate interaction and cooperation in projects at various scales.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

In a peer-to-peer network each computer acts as both a server and a client – supplying and receiving files – with bandwidth and processing distributed among all members of the network. Such a decentralized network uses resources more efficiently than a traditional network and is

less vulnerable to systemic failure. P2P networks are used by Bluetooth-powered electronics and Internet-based communication services, but development has largely been driven by online file sharing.

P2P file sharing was introduced to the general public in 1999 when American college student Shawn Fanning created the music-sharing service Napster. It employed a centralized index server, which users would search on the basis of song title or artist name. If the index located the song on the hard drive of any other computer that was currently connected to the network, a user could download a personal copy while simultaneously offering his or her own computer-supplied files in response to other users' searches. The service quickly became a hub for large-scale unauthorized distribution of copyrighted music, and in 2001 it was shut down as a result of a lawsuit from members of the American recording industry.

A new generation of P2P services arose to fill the void, expanding the range of sharable file types and further decentralizing networks. The Gnutella protocol operates without any centralized server and allows for numerous software clients to be used for access, which makes it nearly impossible to shut down. BitTorrent, used commonly for distributing large video files, employs a "swarm" model, whereby files are downloaded in simultaneous pieces from multiple host computers. Newer services have established degrees of encryption and anonymity to protect users from legal action by copyright holders.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»
2 семестр

Экзамен

Экзаменационный билет № 2

- I. а) Прочитайте предложенный текст № 1 “Cloud Services and Major Providers”.
- б) Письменно переведите отрывок текста, в котором описываются возможности, предоставляемые облачными сервисами.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 2

1. “Cloud Services and Major Providers”

Cloud computing is a method of running application software and storing related data in central computer systems and providing customers or other users access to them through the Internet.

The origin of the expression *cloud computing* is obscure, but it appears to derive from the practice of using drawings of stylized clouds to denote networks in diagrams of computing and communications systems. The term came into popular use in 2008, though the practice of providing remote access to computing functions through networks dates back to the mainframe time-sharing systems of the 1960s and 1970s. In his 1966 book *The Challenge of the Computer Utility*, the Canadian electrical engineer Douglas F. Parkhill predicted that the computer industry would come to resemble a public utility “in which many remotely located users are connected via communication links to a central computing facility.”

Cloud computing encompasses a number of different services. One set of services, sometimes called software as a service (SaaS), involves the supply of a discrete application to outside users. The application can be geared either to business users (such as an accounting application) or to consumers (such as an application for storing and sharing personal photographs). Another set of services, variously called utility computing, grid computing, and hardware as a service (HaaS), involves the provision of computer processing and data storage to outside users, who are able to run their own applications and store their own data on the remote system. A third set of services, sometimes called platform as a service (PaaS), involves the supply of remote computing capacity along with a set of software-development tools for use by outside software programmers.

Early pioneers of cloud computing include Salesforce.com, which supplies a popular business application for managing sales and marketing efforts; Google, Inc., which in addition to its search engine supplies an array of applications, known as Google Apps, to consumers and businesses; and Amazon Web Services, a division of online retailer Amazon.com, which offers access to its computing system to Web-site developers and other companies and individuals. Cloud computing also underpins popular social networks and other online media sites such as Facebook, MySpace, and Twitter. Traditional software companies, including Microsoft Corporation, Apple Inc., Intuit Inc., and Oracle Corporation, have also introduced cloud applications.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

Since the emergence of the Internet, however, national governments and their analysts have shown the relevance of both national regulations and international agreements on the character of cyberspace. Those bodiless actors in cyberspace must access this other realm through their

corporeal form, and thus they continue to be constrained by the laws governing their physical location. The Chinese government maintains strict controls on who is able to access the Internet and what content is available to them. The U.S. government limits certain online activities, such as the sharing of digital data, through the Digital Millennium Copyright Act and other legislation. In addition, the United States developed a strategy for the security of cyberspace in order to prevent and respond to attacks on the Internet infrastructure. The control of cyberspace is thus important not only because of the actions of individual participants but because the infrastructure of cyberspace is now fundamental to the functioning of national and international security systems, trade networks, emergency services, basic communications, and other public and private activities. Because national governments see potential threats to the security of their citizens and to the stability of their regimes arising within cyberspace, they act to control both access and content.

Organizations such as the Electronic Frontier Foundation (EFF), of which Barlow was a cofounder, have been formed with the intention of protecting the use of cyberspace as a location for the free sharing of knowledge, ideas, culture, and community. These organizations pursue this goal through a variety of activities, including opposition to legislation seen to be in conflict with free use of technology, initiation of court cases to preserve people's rights, and publicity campaigns to inform and engage the public on issues of cyberspace and technology.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»
2 семестр

Экзамен

Экзаменационный билет № 3

- I. а) Прочитайте предложенный текст № 3 “Local area network (LAN)”.
- б) Письменно переведите отрывок текста, в котором описывается метод коллективного доступа в локальных сетях.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 3

1. “Local area network”

Local area network (**LAN**) is any communication network for connecting computers within a building or small group of buildings. A LAN may be configured as (1) a bus, a main channel to which nodes or secondary channels are connected in a branching structure, (2) a ring, in which each computer is connected to two neighbouring computers to form a closed circuit, or (3) a star, in which each computer is linked directly to a central computer and only indirectly to one another. Each of these has advantages, though the bus configuration has become the most common.

Even if only two computers are connected, they must follow rules, or protocols, to communicate. For example, one might signal “ready to send” and wait for the other to signal “ready to receive.” When many computers share a network, the protocol might include a rule “talk only when it is your turn” or “do not talk when anyone else is talking.” Protocols must also be designed to handle network errors.

The most common LAN design since the mid-1970s has been the bus-connected Ethernet, originally developed at Xerox PARC. Every computer or other device on an Ethernet has a unique 48-bit address. Any computer that wants to transmit listens for a carrier signal that indicates that a transmission is under way. If it detects none, it starts transmitting, sending the address of the recipient at the start of its transmission. Every system on the network receives each message but ignores those not addressed to it. While a system is transmitting, it also listens, and if it detects a simultaneous transmission, it stops, waits for a random time, and retries. The random time delay before retrying reduces the probability that they will collide again. This scheme is known as carrier sense multiple access with collision detection (CSMA/CD). It works very well until a network is moderately heavily loaded, and then it degrades as collisions become more frequent.

The first Ethernet had a capacity of about 2 megabits (millions of bits) per second (mbps), and today 10- and 100-mbps Ethernet is common, with gigabit-per-second (billions of bits per second; gbps) Ethernet also in use. Ethernet transceivers (transmitter-receivers) for personal computers are inexpensive and easily installed. A standard for wireless Ethernet, known as Wi-Fi, has become common for small office and home networks. Using frequencies from 2.4 to 5 gigahertz (GHz), such networks can transfer data at rates up to 600 mbps.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

Sensory stimulation was a promising method for creating virtual environments before the use of computers. After the release of a promotional film called *This Is Cinerama* (1952), the cinematographer Morton Heilig became fascinated with Cinerama and 3-D movies. Like Waller, he studied human sensory signals and illusions, hoping to realize a “cinema of the future.” By late 1960, Heilig had built an individual console with a variety of inputs—stereoscopic images, motion chair, audio, temperature changes, odours, and blown air—that he patented in 1962 as the Sensorama Simulator, designed to “stimulate the senses of an individual to simulate an actual

experience realistically.” During the work on Sensorama, he also designed the Telesphere Mask, a head-mounted “stereoscopic 3-D TV display” that he patented in 1960. Although Heilig was unsuccessful in his efforts to market Sensorama, in the mid-1960s he extended the idea to a multiviewer theatre concept patented as the Experience Theater and a similar system called Thrillerama for the Walt Disney Company.

The seeds for virtual reality were planted in several computing fields during the 1950s and '60s, especially in 3-D interactive computer graphics and vehicle/flight simulation. Beginning in the late 1940s, Project Whirlwind, funded by the U.S. Navy, and its successor project, the SAGE (Semi-Automated Ground Environment) early-warning radar system, funded by the U.S. Air Force, first utilized cathode-ray tube (CRT) displays and input devices such as light pens (originally called “light guns”). By the time the SAGE system became operational in 1957, air force operators were routinely using these devices to display aircraft positions and manipulate related data.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии

Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 4

- I. а) Прочитайте предложенный текст № 4 “Cyberspace”.
- б) Письменно переведите отрывок текста, в котором говорится о проблеме взаимодействия киберпространства и правительства.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

1. Письменный перевод отрывка текста

1. "Cyberspace"

Cyberspace **is an** amorphous, supposedly "virtual" world created by links between computers, Internet-enabled devices, servers, routers, and other components of the Internet's infrastructure. As opposed to the Internet itself, however, cyberspace is the place produced by these links. It exists, in the perspective of some, apart from any particular nation-state. The term *cyberspace* was first used by the American-Canadian author William Gibson in 1982 in a story published in *Omni* magazine and then in his book *Neuromancer*. In this science-fiction novel, Gibson described cyberspace as the creation of a computer network in a world filled with artificially intelligent beings.

In the popular culture of the 1990s, *cyberspace* as a term was taken to describe the "location" in which people interacted with each other while using the Internet. This is the place in which online games occur, the land of chat rooms, and the home of instant-messaging conversations. In this sense, the location of the games or the chat room itself can be said to "exist" in cyberspace. Cyberspace has also become an important location for social and political discussion, with the popular emergence in the late 20th and the early 21st century of Web-based discussion boards and blogs. Blogs are typically produced by individuals who include their personal writing and often offer running commentary and links to other locations on the Web they deem of interest. With the emergence of blogging software, even those people unfamiliar with software programming for the Web can create their own blog. Thus, blogs can be seen as offering an opportunity for public discussion in cyberspace that is not available in the off-line world.

Early in the evolution of the Internet, in the middle of the 1990s, many users believed and argued that the world of cyberspace should be free from the regulations of any national government. John Perry Barlow's "A Declaration of the Independence of Cyberspace" proposed that national governments should play no role in governing cyberspace. He argued that the community existing in cyberspace would create its own rules and manage conflicts apart from the laws and judiciary of any particular country. Particularly important was the protection of free expression and exchange among the "bodiless" personalities of cyberspace. This perspective would be particularly relevant if it were possible to hide the physical location and identity of a person participating in an activity "in cyberspace."

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

The development of Adobe Flash software can be traced back to American software developer Jonathan Gay's first experiments with writing programs on his Apple II computer in high school during the 1980s. Before long, Gay had written a graphics program for the Apple II using Pascal. Later, he teamed up with a local Macintosh users-group organizer, Charlie Jackson, who started a Macintosh software company called Silicon Beach Software. At Silicon Beach Software, Gay combined animation and digital sound to create the Macintosh electronic game *Airborne!*. Eventually, in his drive to create animation software compatible with Apple Inc.'s Macintosh and Microsoft Corporation's Windows programs, he produced SmartSketch, a program in which users could draw on the computer screen with an electronic pen. This was the start of his own software company, FutureWave Software, in the mid-1990s.

As the Internet grew in popularity, FutureWave added two-dimensional animation features to SmartSketch that let Internet users display graphics and animation over the World Wide Web, and FutureSplash Animator was born. The program's first success came when Microsoft used the

software for their MSN Web site. Macromedia, Inc., bought the rights to FutureSplash Animator in 1996, creating Macromedia Flash, which became Adobe Flash after Adobe purchased Macromedia in 2005. Adobe Flash allows users to create animation for use on the Internet, and Adobe's Flash Player is one of the most widely distributed applications on the Internet.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 5

- I. а) Прочитайте предложенный текст № 5 “Virtual reality”.
- б) Письменно переведите отрывок текста, в котором говорится об эффекте телеприсутствия.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

1. “Virtual reality”

Virtual reality (**VR**) is the use of computer modeling and simulation that enables a person to interact with an artificial three-dimensional (3-D) visual or other sensory environment. VR applications immerse the user in a computer-generated environment that simulates reality through the use of interactive devices, which send and receive information and are worn as goggles, headsets, gloves, or body suits. In a typical VR format, a user wearing a helmet with a stereoscopic screen views animated images of a simulated environment. The illusion of “being there” (telepresence) is effected by motion sensors that pick up the user’s movements and adjust the view on the screen accordingly, usually in real time (the instant the user’s movement takes place). Thus, a user can tour a simulated suite of rooms, experiencing changing viewpoints and perspectives that are convincingly related to his own head turnings and steps. Wearing data gloves equipped with force-feedback devices that provide the sensation of touch, the user can even pick up and manipulate objects that he sees in the virtual environment.

The term *virtual reality* was coined in 1987 by Jaron Lanier, whose research and engineering contributed a number of products to the nascent VR industry. Projects funded by these agencies and pursued at university-based research laboratories yielded an extensive pool of talented personnel in fields such as computer graphics, simulation, and networked environments and established links between academic, military, and commercial work.

Artists, performers, and entertainers have always been interested in techniques for creating imaginative worlds, setting narratives in fictional spaces, and deceiving the senses. Numerous precedents for the suspension of disbelief in an artificial world in artistic and entertainment media preceded virtual reality. Illusionary spaces created by paintings or views have been constructed for residences and public spaces since antiquity, culminating in the monumental panoramas of the 18th and 19th centuries. Panoramas blurred the visual boundaries between the two-dimensional images displaying the main scenes and the three-dimensional spaces from which these were viewed, creating an illusion of immersion in the events depicted. This image tradition stimulated the creation of a series of media – from futuristic theatre designs, stereopticons, and 3-D movies to IMAX movie theatres – over the course of the 20th century to achieve similar effects. For example, the Cinerama widescreen film format the Vitarama process used multiple cameras and projectors and an arc-shaped screen to create the illusion of immersion in the space perceived by a viewer. Though Vitarama was not a commercial hit until the mid-1950s (as Cinerama), the Army Air Corps successfully used the system during World War II.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

Software **comprises** instructions that tell a computer what to do. Software comprises the entire set of programs, procedures, and routines associated with the operation of a computer system. The term was coined to differentiate these instructions from hardware – *i.e.*, the physical components of a computer system. A set of instructions that directs a computer’s hardware to perform a task is called a program, or software program.

The two main types of software are system software and application software. System software controls a computer’s internal functioning, chiefly through an operating system, and also controls such peripherals as monitors, printers, and storage devices. Application software, by contrast, directs the computer to execute commands given by the user and may be said to include any program that processes data for a user. Application software thus includes word processors, spreadsheets, database management, inventory and payroll programs, and many other

“applications.” A third software category is that of network software, which coordinates communication between the computers linked in a network.

Software is typically stored on an external long-term memory device, such as a hard drive or magnetic diskette. When the program is in use, the computer reads it from the storage device and temporarily places the instructions in random access memory (RAM). The process of storing and then performing the instructions is called “running,” or “executing,” a program. By contrast, software programs and procedures that are permanently stored in a computer’s memory using a read-only (ROM) technology are called firmware, or “hard software.”

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 6

- I. а) Прочитайте предложенный текст № 6 “Multiprocessor systems”.
- б) Письменно переведите отрывок текста, в котором говорится о преимуществах многопроцессорной обработки данных.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

1. “Multiprocessor systems”

Multiprocessing, in computing, is a mode of operation in which two or more processors in a computer simultaneously process two or more different portions of the same program (set of instructions). Multiprocessing is typically carried out by two or more microprocessors, each of which is in effect a central processing unit (CPU) on a single tiny chip. Supercomputers typically combine thousands of such microprocessors to interpret and execute instructions.

The primary advantage of a multiprocessor computer is speed, and thus the ability to manage larger amounts of information. Because each processor in such a system is assigned to perform a specific function, it can perform its task, pass the instruction set on to the next processor, and begin working on a new set of instructions. For example, different processors may be used to manage memory storage, data communications, or arithmetic functions. Or a larger processor might utilize “slave” processors to conduct miscellaneous housekeeping duties, such as memory management. Multiprocessor systems first appeared in large computers known as mainframes, before their costs declined enough to warrant inclusion in personal computers (PCs).

Personal computers had long relied on increasing clock speeds, measured in megahertz (MHz) or gigahertz (GHz), which correlates to the number of computations the CPU calculates per second, in order to handle ever more complex tasks. But as gains in clock speed became difficult to sustain, in part because of overheating in the microprocessor circuitry, another approach developed in which specialized processors were used for tasks such as video display. These video processors typically come on modular units known as video cards, or graphic accelerator cards. The best cards, which are needed to play the most graphic-intensive electronic games on personal computers, often cost more than a bargain PC. The commercial demands for ever better cards to run ever more realistic games, on PCs and video game systems, led IBM to develop a multiprocessor microchip, known as the Cell Broadband Engine, for use in the Sony Computer Entertainment PlayStation 3 and a new supercomputer that included thousands of the microchips.

It must be noted, however, that simply adding more processors does not guarantee significant gains in computing power; computer program problems remain. While programmers and computer programming languages have developed some proficiency in allocating executions among a small number of processors, parsing instructions beyond two to eight processors is impracticable for all but the most repetitive tasks

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

In 1998 Isaac Chuang of the Los Alamos National Laboratory, Neil Gershenfeld of the Massachusetts Institute of Technology (MIT), and Mark Kubinec of the University of California at Berkeley created the first quantum computer (2-qubit) that could be loaded with data and output a solution. Although their system was coherent for only a few nanoseconds and trivial from the perspective of solving meaningful problems, it demonstrated the principles of quantum computation. Rather than trying to isolate a few subatomic particles, they dissolved a large number of chloroform molecules (CHCl_3) in water at room temperature and applied a magnetic field to orient the spins of the carbon and hydrogen nuclei in the chloroform. (Because ordinary carbon has no magnetic spin, their solution used an isotope, carbon-13.) A spin parallel to the external magnetic field could then be interpreted as a 1 and an antiparallel spin as 0, and the hydrogen nuclei and carbon-13 nuclei could be treated collectively as a 2-qubit system. In addition to the external magnetic field, radio frequency pulses were applied to cause spin states to “flip,” thereby creating superimposed parallel and antiparallel states. Further pulses were applied to execute a simple algorithm and to examine the system’s final state. This type of quantum computer can be extended by using molecules with more individually addressable nuclei. In fact, in March 2000 Emanuel Knill, Raymond Laflamme, and Rudy Martinez of Los Alamos and Ching-Hua Tseng of

MIT announced that they had created a 7-qubit quantum computer using trans-crotonic acid. However, many researchers are skeptical about extending magnetic techniques much beyond 10 to 15 qubits because of diminishing coherence among the nuclei.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

**ФОНД
ОЦЕНОЧНЫХ СРЕДСТВ**

Направление 02.04.02 Фундаментальная информатика и информационные технологии

Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 7

I. а) Прочитайте предложенный текст № 7 “Quantum computer”.

б) Письменно переведите отрывок текста, в котором сравниваются единицы измерения информации в обычном и квантовом компьютерах.

с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.

II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 7

1. Письменный перевод отрывка текста

1. “Quantum computer”

Quantum computer is a device that employs properties described by quantum mechanics to enhance computations.

As early as 1959 the American physicist and Nobel laureate Richard Feynman noted that, as electronic components begin to reach microscopic scales, effects predicted by quantum mechanics occur – which, he suggested, might be exploited in the design of more powerful computers. In particular, quantum researchers hope to harness a phenomenon known as superposition. In the quantum mechanical world, objects do not necessarily have clearly defined states, as demonstrated by the famous experiment in which a single photon of light passing through a screen with two small slits will produce a wavelike interference pattern, or superposition of all available paths. However, when one slit is closed – or a detector is used to determine which slit the photon passed through – the interference pattern disappears. In consequence, a quantum system “exists” in all possible states before a measurement “collapses” the system into one state. Harnessing this phenomenon in a computer promises to expand computational power greatly. A traditional digital computer employs binary digits, or bits, that can be in one of two states, represented as 0 and 1; thus, for example, a 4-bit computer register can hold any one of 16 (2^4) possible numbers. In contrast, a quantum bit (qubit) exists in a wavelike superposition of values from 0 to 1; thus, for example, a 4-qubit computer register can hold 16 different numbers simultaneously. In theory, a quantum computer can therefore operate on a great many values in

parallel, so that a 30-qubit quantum computer would be comparable to a digital computer capable of performing 10 trillion floating-point operations per second (TFLOPS)—comparable to the speed of the fastest supercomputers.

During the 1980s and '90s the theory of quantum computers advanced considerably beyond Feynman's early speculations. In 1985 David Deutsch of the University of Oxford described the construction of quantum logic gates for a universal quantum computer, and in 1994 Peter Shor of AT&T devised an algorithm to factor numbers with a quantum computer that would require as few as six qubits (although many more qubits would be necessary for factoring large numbers in a reasonable time). When a practical quantum computer is built, it will break current encryption schemes based on multiplying two large primes; in compensation, quantum mechanical effects offer a new method of secure communication known as quantum encryption. However, actually building a useful quantum computer has proved difficult. Although the potential of quantum computers is enormous, the requirements are equally stringent.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

Java is a modern object-oriented computer programming language. Java was created at Sun Microsystems, Inc., where cofounder William (Bill) Joy led a team of researchers in an effort to create a new language that would allow consumer electronic devices to communicate with each other. Work on the language began in 1991, and before long the team's focus changed to a new niche, the World Wide Web. Java was first used on the Web in 1994, and Java's ability to provide interactivity and multimedia showed that it was particularly well suited for the Web.

The difference between the way Java and other programming languages worked was revolutionary. Code in other languages is first translated by a compiler into instructions for a specific type of computer. The Java compiler instead turns code into something called Bytecode, which is then interpreted by software called the Java Runtime Environment (JRE), or the Java virtual machine. The JRE acts as a virtual computer that interprets Bytecode and translates it for the host computer. Because of this, Java code can be written the same way for many platforms ("write once, run anywhere"), which helped lead to its popularity for use on the Internet, where many different types of computers may retrieve the same Web page. By the late 1990s, Java had brought multimedia to the Internet and started to grow beyond the Web, powering consumer devices (such as cellular telephones), retail and financial computers, and even the onboard computer of NASA's Mars exploration rovers. Because of this popularity, Sun created different varieties of Java for different purposes, including Java SE for home computers, Java ME for embedded devices, and Java EE for Internet servers and supercomputers.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»
2 семестр

Экзамен

Экзаменационный билет № 8

- I. а) Прочитайте предложенный текст № 8 “Google Chrome”.
- б) Письменно переведите отрывок текста, в котором описываются уникальные особенности этого браузера.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 8

1. Письменный перевод отрывка текста
1. “Google Chrome”

Chrome is an open-source Internet browser released by Google, Inc., a major American search engine company, in 2008.

The first beta version of the software was released on Sept. 2, 2008, for personal computers (PCs) running various versions of Microsoft Corporation's Windows OS (operating system). The development of Chrome was kept a well-guarded secret until a Web-based "comic book" describing the browser was released just hours before links appeared on Google's Web site to download the program. In its public statements the company declared that it did not expect to supplant the major browsers, such as Microsoft's Internet Explorer and Firefox (the latter an open-source browser that Google supports with technical and monetary help). Instead, Google stated that its goal was to advance the usefulness of the Internet by including features that would work better with newer Web-based technologies, such as the company's Google Apps (e.g., calendar, word processor, spreadsheet), that operate within a browser. This concept is often called "cloud computing," as the user relies on programs operating "out there," somewhere "in the cloud" (on the Internet).

Part of Chrome's speed improvement over existing browsers is its use of a new JavaScript engine (V8). Chrome uses code from Apple Inc.'s WebKit, the open-source rendering engine used in Apple's Safari Web browser. Chrome is the first browser to feature isolated, or protected, windows (or tabs) for each Web page or application running in it. While this means that each new tab that is opened requires as much dedicated computer memory as the first tab, it also means that if any computer code causes one of these tabs to crash, it will not bring down the entire browser. Closing a tab fully releases its allocated memory, thus solving a persistent problem of older browsers, which frequently have to be restarted in order to release the increasing amounts of memory that are requisitioned over time.

On July 7, 2009, Google announced plans to develop an open-source operating system, known as Chrome OS. The first devices to use Chrome OS were released in 2011 and were netbooks called Chromebooks. Chrome OS, which runs on top of a Linux kernel, requires fewer system resources than most operating systems because it uses cloud computing, in which the only software run on a Chrome OS device is Chrome and all other software applications are accessed through the Internet inside the Chrome browser.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

There are two basic kinds of semiconductor memory. Static RAM (SRAM) consists of flip-flops, a bistable circuit composed of four to six transistors. Once a flip-flop stores a bit, it keeps that value until the opposite value is stored in it. SRAM gives fast access to data, but it is physically relatively large. It is used primarily for small amounts of memory called registers in a computer's central processing unit (CPU) and for fast "cache" memory. Dynamic RAM (DRAM) stores each bit in an electrical capacitor rather than in a flip-flop, using a transistor as a switch to charge or discharge the capacitor. Because it has fewer electrical components, a DRAM storage cell is smaller than SRAM. However, access to its value is slower and, because capacitors gradually leak charges, stored values must be recharged approximately 50 times per second. Nonetheless, DRAM is generally used for main memory because the same size chip can hold several times as much DRAM as SRAM.

Storage cells in RAM have addresses. It is common to organize RAM into "words" of 8 to 64 bits, or 1 to 8 bytes (8 bits = 1 byte). The size of a word is generally the number of bits that can be transferred at a time between main memory and the CPU. Every word, and usually every byte, has an address. A memory chip must have additional decoding circuits that select the set of storage cells that are at a particular address and either store a value at that address or fetch what is stored there. The main memory of a modern computer consists of a number of memory chips, each of which might hold many megabytes (millions of bytes), and still further addressing circuitry selects

the appropriate chip for each address. In addition, DRAM requires circuits to detect its stored values and refresh them periodically.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

Направление 02.04.02 Фундаментальная информатика и информационные технологии
Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 9

- I. а) Прочитайте предложенный текст № 9 “Computer memory”.
- б) Письменно переведите отрывок текста, в котором рассказывается о самых первых запоминающих устройствах компьютера.
- с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.
- II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.
- III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 9

1. Письменный перевод отрывка текста
1. “Computer memory”

Computer memory **is a** device that is used to store data or programs (sequences of instructions) on a temporary or permanent basis for use in an electronic digital computer. Computers represent information in binary code, written as sequences of 0s and 1s. Each binary digit (or “bit”) may be stored by any physical system that can be in either of two stable states, to represent 0 and 1. Such a system is called bistable. This could be an on-off switch, an electrical capacitor that can store or lose a charge, a magnet with its polarity up or down, or a surface that can have a pit or not. Today capacitors and transistors, functioning as tiny electrical switches, are used for temporary storage, and either disks or tape with a magnetic coating, or plastic discs with patterns of pits are used for long-term storage.

Computer memory is divided into main (or primary) memory and auxiliary (or secondary) memory. Main memory holds instructions and data when a program is executing, while auxiliary memory holds data and programs not currently in use and provides long-term storage.

The earliest memory devices were electro-mechanical switches, or relays, and electron tubes. In the late 1940s the first stored-program computers used ultrasonic waves in tubes of mercury or charges in special electron tubes as main memory. The latter were the first random-access memory (RAM). RAM contains storage cells that can be accessed directly for read and write operations, as opposed to serial access memory, such as magnetic tape, in which each cell in sequence must be accessed till the required cell is located.

Magnetic drums, which had fixed read/write heads for each of many tracks on the outside surface of a rotating cylinder coated with a ferromagnetic material, were used for both main and auxiliary memory in the 1950s, although their data access was serial.

About 1952 the first relatively cheap RAM was developed: magnetic core memory, an arrangement of tiny ferrite cores on a wire grid through which current could be directed to change individual core alignments. Because of the inherent advantage of RAM, core memory was the principal form of main memory until superseded by semiconductor memory in the late 1960s.

Main memories take longer to access data than CPUs take to operate on them. For instance, DRAM memory access typically takes 20 to 80 nanoseconds (billionths of a second), but CPU arithmetic operations may take only a nanosecond or less. There are several ways in which this disparity is handled. CPUs have a small number of registers, very fast SRAM that hold current instructions and the data on which they operate. Cache memory is a larger amount (up to several megabytes) of fast SRAM on the CPU chip. Data and instructions from main memory are transferred to the cache, and since programs frequently exhibit “locality of reference” – that is, they execute the same instruction sequence for a while in a repetitive loop and operate on sets of related data – memory references can be made to the fast cache once values are copied into it from main memory.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

The non-algorithmic model of computing that I propose is inherently parallel, synchronous and reactive. I have argued in the past and I continue to argue that it is the solution to all the major problems that currently afflict the computer industry. There is only one way to implement this model in a Von Neumann computer. As I have said repeatedly elsewhere, it is not rocket science.

Essentially, it requires a collection of linked elements (or objects), two buffers and a loop mechanism. While the objects in one buffer are being processed, the other buffer is filled with objects to be processed during the next cycle. Two buffers are used in order to prevent signal racing conditions. Programmers have been using this technique to simulate parallelism for ages.

They use it in such well-known applications as neural networks, cellular automata, simulations, video games, and VHDL. And it is all done without threads, mind you. What is needed in order to turn this technique into a parallel programming model is to apply it at the instruction level.

However, doing so in software would be too slow. This is the reason that the two buffers and the loop mechanism should ideally reside within the processor and managed by on-chip circuitry.

The underlying process should be transparent to the programmer and he or she should not have to care about whether the processor is single-core or multicore. Adding more cores to the processor does not affect existing non-algorithmic programs; they should automatically run faster, that is, depending on the number of objects to be processed in parallel. Indeed the application developer should not have to think about cores at all, other than as a way to increase performance. Using the non-algorithmic software model, it is possible to design an auto-scalable, self-balancing multicore processor that implements fine-grained deterministic parallelism and can handle anything you can throw at it.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.

ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

Направление 02.04.02 Фундаментальная информатика и информационные технологии

Дисциплина: «Иностранный язык в профессиональной деятельности»

2 семестр

Экзамен

Экзаменационный билет № 10

I. а) Прочитайте предложенный текст №10 "Magnetic disk drives"

б) Письменно переведите отрывок текста, где говорится о поэтажном плане здания.

с) Обсудите с преподавателем тему статьи, её общее содержание и затронутые проблемы.

II. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

III. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта.

Преподаватель _____

Заведующий кафедрой _____

К.Н. Волченкова

Экзаменационный билет № 10

1. Письменный перевод отрывка текста

1. "Magnetic disk drives"

Auxiliary memory units are among computer peripheral equipment. They trade slower access rates for greater storage capacity and data stability. Since the 1980s, the most common forms of auxiliary storage have been magnetic disks, magnetic tapes, and optical discs. Magnetic disks are coated with a magnetic material such as iron oxide. There are two types: hard disks made of rigid aluminum or glass, and removable diskettes made of flexible plastic. In 1956 the first magnetic hard drive (HD) was invented at IBM; consisting of 50 21-inch (53-cm) disks, it had a storage capacity of 5 megabytes. By the 1990s the standard HD diameter for PCs had shrunk to 3.5 inches (about 8.9 cm), with storage capacities in excess of 100 gigabytes (billions of bytes); the standard size HD for portable PCs ("laptops") was 2.5 inches (about 6.4 cm). Since the invention of the floppy disk drive (FDD) at IBM by Alan Shugart in 1967, diskettes have shrunk from 8 inches (about 20 cm) to the current standard of 3.5 inches (about 8.9 cm). FDDs have low capacity – generally less than two megabytes – and have become obsolete since the introduction of optical disc drives in the 1990s.

Hard drives generally have several disks, or platters, with an electromagnetic read/write head for each surface; the entire assembly is called a comb. A microprocessor in the drive controls the motion of the heads and also contains RAM to store data for transfer to and from the disks. The heads move across the disk surface as it spins up to 15,000 revolutions per minute; the drives are hermetically sealed, permitting the heads to float on a thin film of air very close to the disk's surface. A small current is applied to the head to magnetize tiny spots on the disk surface for storage; similarly, magnetized spots on the disk generate currents in the head as it moves by, enabling data to be read. FDDs function similarly, but the removable diskettes spin at only a few hundred revolutions per minute.

Data are stored in close concentric tracks that require very precise control of the read/write heads. Refinements in controlling the heads have enabled smaller and closer packing of tracks – up to 20,000 tracks per inch (8,000 tracks per cm) by the start of the 21st century – which has resulted in the storage capacity of these devices growing nearly 30 percent per year since the 1980s. RAID (redundant array of inexpensive disks) combines multiple disk drives to store data redundantly for greater reliability and faster access. They are used in high-performance computer network servers.

2. Беглое чтение текста и передача извлеченной информации на русском языке в форме аннотации.

I have always maintained that all elementary processes in a parallel program should be synchronized to a global virtual clock and that all elementary calculations should have equal durations, equal to one virtual cycle. The main reason for this is that synchronous processing guarantees that the execution order of operations is deterministic. Temporal order determinism goes a long way toward making software stable and reliable. Because of the relative execution order, a huge number of events in a deterministic system can be easily predicted and the predictions can in turn be used to detect violations, i.e., bugs. Expected events are like constraints. They can be used to force all additions or modifications to an application under construction to be consistent with the code already in place. The end result is that, in addition to being robust, the application is easier and cheaper to maintain.

The most important reason for having a synchronous system has to do with the temporal nature of the human brain. There is a direct causal correlation between the temporal nature of the brain and program comprehensibility. Most of us may not think of the world that we sense as being temporally deterministic and predictable but almost all of it is. If it weren't, we would have a hard time making sense of it and adapting to it. Note that, here, I am speaking of the macroscopic world of our senses, not the microscopic quantum universe, which is known to be probabilistic.

For example, as we scan a landscape with our eyes, the relative motion of the objects in our visual field occurs according to the laws of optics and perspective. Our visual cortex is genetically wired to learn these deterministic temporal correlations. Once the correlations are

learned, the newly formed neural structures become fixed and they can then be used to instantly recognize previously learned patterns every time they occur.

3. Сообщение и беседа с экзаменаторами на иностранном языке по вопросам, связанным со специальностью и научной работой магистранта, где магистрант представляет SWOT analysis проделанной работы и даёт обзор ситуации в релевантной профессиональной области.