Lecture№ 1

The role of ICT in key sectors of the development of society. Standards in the field of ICT(2hour)

1.0 Aims and objectives

In this lesson, we are going to discuss about:Definition of ICT. The subject of ICT and its objectives. The role of ICT in key sectors of the development of society. Standards in the field of ICT. The link between ICT and the achievement of sustainable development goals in the Millennium Declaration.

1.1 The role of ICT in key sectors of the development of society. Standards in the field of ICT

Information and communications technology (ICT) is an extended term forinformation technology (IT) which stresses the role of unified communicationsand the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

Information and communications technologies (ICT) are a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.

Information Communications and Technology (ICT) is a term that refers to all the hardware and software that people use to send and receive information. Social networking sites such as Facebook, Twitter and MySpace, computers, phones and tablets make up the term ICT. Over the past few years, the ICT sector has grown substantially with a lot of new companies releasing new gadgets to improve how we communicate

Information and communication technologies for development (ICT4D) refers to the use of information and communication technologies (ICTs) in the fields of socioeconomic development, international development, and human rights. The theory behind this is, more and better information and communication furthers the development of a society.

Aside from its reliance on technology, ICT4D also requires an understanding of community development, poverty, agriculture, healthcare, and basic education. This makes ICT4D appropriate technology, and if it is shared openly, open source appropriate technology. Richard Heeks suggests that the I in ICT4D is related with "library and information sciences", the C is associated with "communication studies", the T is linked with "information systems", and the D for "development studies". It is aimed at bridging the digital divide and assisting economic development by fostering equitable access to modern communications technologies, and it is a powerful tool for economic and social development. Other terms can also be used for "ICT4D" or "ICT4Dev" ("ICT for development") such as ICTD ("ICT and development", which is used in a broader sense) and development informatics.

ICT4D can refer to assisting disadvantaged populations anywhere in the world, but it is usually associated with applications in developing countries. It is concerned with directly applying information technology approaches to poverty reduction. ICTs can be applied directly, benefiting the disadvantaged population, or indirectly, by assisting aid organizations, non-governmental organizations, governments, and/or businesses, to improve socio-economic conditions. The field is an interdisciplinary research area, quickly growing through a number of conferences, workshops and publications, but there is a need for scientifically validated benchmarks and results, to measure the effectiveness of current projects. This field has also produced an informal community of technical and social science researchers who rose out of the annual ICT4D conferences.

One of the main objectives of the ICT sector is the creation of a digital transport medium to support the processes of information, modern telecommunications infrastructure and its integration with the infrastructure of other states. Therefore, the development of transit potential in the sphere of information technologies, the integration of national economies into the global environment and act as an important task and a priority infrastructure identified in the strategy.

In order to develop promising technology areas to move to the next phase of industrialization, the task of further development of the Park of innovative technologies as one of the leading countries of innovation clusters.

World experience of ICT development

Beginning in the 1980s, during the rise of the level of use of personal computers, as well as a consequence of increased demand for software products and completing formation of the different approaches of state policy towards the development of the ICT sector. Next, the transition to digital telecommunications in the 1990s and the subsequent formation of the Internet, the impetus to promote the further development of ICT in the world.

A lot of approaches to ICT development conventionally divided into two directions: the first - the development of ICT production and services (computers, software, devices, telecommunications and others.), In order to increase output and to strengthen ICT industry - "ICT as a manufacturing sector "; the second - the introduction of ICTs in different sectors of the economy, to maximize the information society and economy - "ICT as a tool of information society." Within these two areas can be classified in the following levels of strategic approaches: the development of the ICT sector, export-oriented; ICT sector development, oriented to the domestic market; approach global positioning; ICT as a tool for social and economic development. Consider these approaches on country practices.

In modern society ICT is ever-present, with over three billion people having access to the Internet. With approximately 8 out of 10 Internet users owning a smartphone, information and data are increasing by leaps and bounds. This rapid growth, especially in developing countries, has led ICT to become a keystone of everyday life, in which life without some facet of technology renders most of clerical, work and routine tasks dysfunctional. The most recent authoritative data, released in 2014, shows "that Internet use continues to grow steadily, at 6.6% globally in 2014 (3.3% in developed countries, 8.7% in the developing world); the number of Internet users in developing countries has doubled in five years (2009-2014), with two thirds of all people online now living in the developing world.

Favorably, the gap between the access to the Internet and mobile coverage has decreased substantially in the last fifteen years, in which "2015 is the deadline for achievements of the UN Millennium Development Goals (MDGs), which global leaders agreed upon in the year 2000, and the new data show ICT progress and highlight remaining gaps."ICT continues to

take on new form, with nanotechnology set to usher in a new wave of ICT electronics and gadgets. ICT newest editions into the modern electronic world include smart watches, such as the Apple Watch, smart wristbands such as the Nike+ FuelBand, and smart TVs such as Google TV. With desktops soon becoming part of a bygone era, and laptops becoming the preferred method of computing, ICT continues to insinuate and alter itself in the ever-changing globe.

Standards in the field of ICT

A new generation of components and systems

- ICT1 – 2016: Smart Cyber-Physical Systems
- ICT2 – 2016: Thin, Organic and Large Area Electronics
- ICT3 – 2016: SSI – Smart System Integration
- ICT4 – 2017: Smart Anything Everywhere Initiative
- ICT5 – 2017: Customized and low energy computing
- ICT6 – 2016: Cloud Computing

Smart Cyber-Physical Systems

The challenge is to design, programme and implement highly distributed and connected digital technologies that are embedded in a multitude of increasingly autonomous physical systems with various dynamics and satisfying multiple critical constraints including safety, security, power efficiency, high performance, size and cost.

- What are Cyber-Physical Systems?
- Scientific challenges
  - Composition and compositionality
    - How to build, compose networked CPS at all scales?
    - How to achieve compositionality in high-confidence, dynamically-configured systems?
  - Design and design automation
    - What is the meaning and cost of heterogeneity?
    - How to accommodate changes in products, design process and design culture
  - Interaction-based computing
    - What are the new computing paradigms?
    - How to model interactions

Programming

- Group of instructions that directs a computer is called an**program**
- **No computer can do anything without a program or Computer cannot do anything without a program**
- A **programming language** is a formal computer language designed to communicate instructions to a machine, particularly a computer. Programming languages can be used to create programs to control the behaviour of a machine or to express algorithms.
- The person contributing the idea of the stored program was **John von Neumann**
- The language that the computer can understand and execute is called **Machine language**
- Programs designed to perform specific tasks is called known as **Application software**
- **Multiprogramming system** execute more jobs in the same time period
- **Device driver** type of **program** allows communication between a peripheral device, such as a mouse or printer, and the rest of the computer system
- **PASCAL is** the computer program language which is widely used in computer science and engineering and also in business
- Personnel who design, program, operate and maintain computer equipment refers to **Peopleware**
- A step-by-step procedure used to solve a problem is called **Algorithm**
- A prewritten program that's sold to perform a common task is called an application **Package**
- A computer program that instructs other programs to perform a particular type of operation is **System software**
- A acronym for the organization that publishes programming language standard is **ANSI**

Future Internet

- Internet of Things (IoT)
- Internet of People (IoP)
- Internet of Energy (IoE)
- Internet of Media (IoM)
- Internet of Services (IoS)

A Brief History of Robotics

- Mechanical Automata
  - Ancient Greece & Egypt
    - Water powered for ceremonies
  - 14^{th} – 19^{th} century Europe

- Clockwork driven for entertainment
- Motor driven Robots
  - 1928: First motor driven automata
  - 1961: Unimate
    - First industrial robot
  - 1967: Shakey
    - Autonomous mobile research robot
  - 1969: Stanford Arm
    - Dextrous, electric motor driven robot arm

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1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
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Lecture№ 2

Introduction to Computer Systems. Architecture of Computer Systems(2 hour)

2.0 Aims and objectives

In this lesson, we are going to discuss about: Overview of computer systems. Evolution of computer systems. Architecture and components of computer systems. Application of computer systems. Representation of data in computer systems.

2.1 Introduction to Computer Systems. Architecture of Computer Systems

The course provides an overview of the major conceptual paradigms of Information and Communication Technologies, from their theoretical foundations to practical implementation.

Computer Architecture this term answers the question how is a computer designed? rather than how does the computer work? An alternative definition of **computer architecture** is the **components** or **attributes** of the computer that are visible to the assembler language programmer.

Here are a few more general terms used with computers:

- "Software" refers to how the computer is used
- "Hardware" refers to how the computer is constructed (its physical building blocks)
- The general term "computing" refers to problem solving on computers by means of programming
- The computer itself is a machine that performs tasks and solves problems by storing and manipulating information
- Information stored in computers is **digital** (it consists of discrete digits)

The development of computer architecture

- **Computers consist** of many components, From the point of view of **organization**, the computer is divided into three components:
- **Processor**

The processor (or central processing unit, CPU) is the main part of the computer

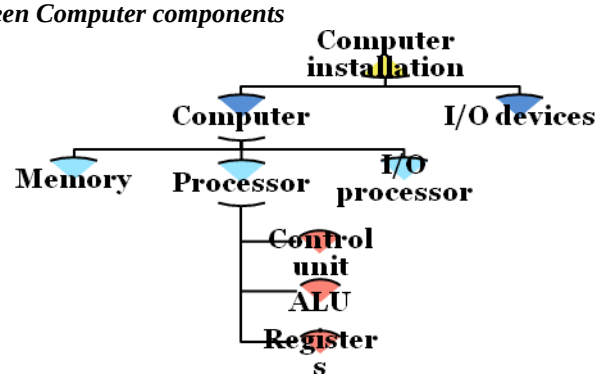
- **Memory**

The memory is a passive component. It simply stores the information written in it

- **Input/Output (I/O) processor**

The function of the I/O processor is to interface the computer to the outside world

Relations between Computer components



History of computers

- The **history of computers** begins with the people's **need to calculate** and **keep records**

From ancient times, people have working to invent a **computing device** to assist them in calculating and processing data

All the data processing equipment can be categorized under three types:-
1- **Mechanical devices:** Which are hand-operated such as the "*ABACUS*" and the "*Slide rule*"
2- **Electro-mechanical devices:** Which are powered by an electric motor and use switches and relays, e.g. "*Card reader*" and "*Card stored*"
3- **Electronic devices:** Which have such components as "*Transistors, Circuits, Chips*", e.g. "*Modern Computer*"

We outline historical evolution of the computer in three stages:
*1- **The dark (earliest)** ages:(3000 B.C.E – 1890 C.E)*
*2- **The middle ages:** (1890 – 1944)*
*3- **The modern ages:** (1944 till now)*

B.C.E (Before the Common Era)
C.E (Common Era (Current))

Generations of Computer
First Generation of Computer (1946-1959)
Second Generation of Computers (1959-1964)
Third Generation of Computers (1965-1970)
Fourth Generation of Computers (1971-1981)
Fifth Generation (1981-Onward)

Types of Computers
Supercomputers...are used to process very large amounts of information including **processing** information to predict hurricanes, satellite images and navigation, and process military war scenarios
Mainframes...are used by government and businesses to process very large amounts of information
Mini-Computers...are similar to mainframes...they are used by business and government to process large amounts of information
Personal Computers (PC)…

The memory chips. Microchips processors and tires
Types of Memory:
RAM (Random Access Memory) is volatile memory found on the motherboard and stores the operating system, the software applications, and the data being used by all of the software.
ROM (Read Only Memory) is a non-volatile type of memory that keeps data in chips even when the computer is shut off.
Types of RAM:
DRAM (Dynamic RAM) is less expensive, but slower than SRAM. It requires periodic refreshing of the electrical charges holding the 1s and 0s.
SRAM (Static RAM) is faster but more expensive than DRAM. It is also known as cache memory or L2 cache.

References
1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
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Lecture№ 3
Software. Operating Systems (OS)(2 hour)

3.0 Aims and objectives

In this lesson, we are going to discuss about: Software. Types of software, goals and characteristics. Basic OS concepts. Evolution of operating systems. Classification of operating systems, including for mobile devices. Classification of desktop applications.

3.1 Software. Operating Systems (OS)

There are two basic parts that make up a computer...
Hardware and Software
Hardware is basically anything that you can touch with your fingers.

Software

- Software is the programs and applications that tell the computer what to do and how to look.

- Computer programmers write the codes/instructions that make-up software applications/programs.
- HTML is a type of computer programming language that allows programmers to make web pages.
- The next 2 slides show what HTML codes look like and the web page the codes produce.

Application Software

1. Business software: word processors, spreadsheets, and database programs.

2. Communication software: allows computers to communicate with other computers: fax software, Novell NetWare, AOL, Modem Software.

3. Graphics software: software that allows users to create and manipulate graphics...Photoshop, Print Shop, etc.

Education and Reference software: Programs that help teach new material and ideas, and programs that can be used to find information...Encarta, Worldbook Encyclopedia, Jumpstart Kindergarten, MicroType.

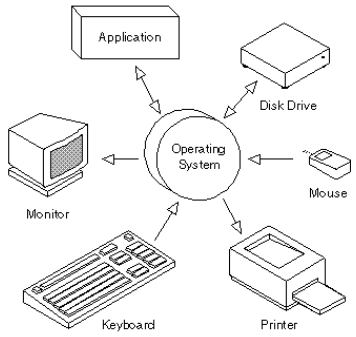
5. Entertainment and Leisure software...Warcraft, Age of Empires, Barbie Design Center, Mrs. Pacman, Solitair

6. Integrated software: Combines several types of software into one program or package...Quicken (Spreadsheet/data base/communications/reference) or Print Shop (Graphics/Word processor).

Definition

An Operating System, or OS, is low-level software that enables a user and higher-level application software to interact with a computer's hardware and the data and other programs stored on the computer.

An OS performs basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as printers.



Other Services

- Program Execution

OSprovides an environment where the user can conveniently run programs. The user does not have to worry about memory allocation or CPU scheduling.

- I/O Operations

Each program requires input and produces output. The OS hides some of the details of the underlying hardware for such I/O. All the user sees is that the I/O has been performed, without those details.

- Communications
- There are instances where processes need to communicate with each other to exchange information. It may be between processes running on the same computer or running on different computers. The OS provides these services to application programs, making inter-process communication possible, and relieving the user of having to worry about how this accomplished.

Application programs and OS

- Operating systems provide a software platform on top of which other programs, called *applicationprograms*, can run.
- The choice of operating system, therefore, determines to a great extent the applications a user can run.
- For example, the DOS operating system contains commands such as COPY and RENAME for copying files and changing the names of files, respectively. The commands are accepted and executed by a part of the operating system.

Similarly, the UNIX operating system has commands like CP and MV to copy and rename.

UNIX

- UNIX was one of the first operating systems to be written, in 1971.
- Advantages of UNIX are…
  - Multitasking – multiple programs can run at one time.
  - Multi-user – allows more than a single user to work at any given time. This is accomplished by sharing processing time between each user.
  - Safe – prevents one program from accessing memory or storage space allocated to another program, and enables file protection, requiring users to have permission to perform certain functions, such as accessing a directory, file, or disk drive.

Operating system timeline

- First generation: 1945 – 1955
  - Vacuum tubes

- Plug boards
- ❑ Second generation: 1955 – 1965
  - Transistors
  - Batch systems
- ❑ Third generation: 1965 – 1980
  - Integrated circuits
  - Multiprogramming
- ❑ Fourth generation: 1980 – present
  - Large scale integration
  - Personal computers
- ❑ Next generation: ???
  - Systems connected by high-speed networks?
  - Wide area resource management?

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
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Lecture№ 4
Human-Computer Interaction(2 hour)

4.0 Aims and objectives

In this lesson, we are going to discuss about: The user interface, as a means of human-computer interaction. Usability of interfaces. Types of interfaces: command-line interface, text interface, graphical interface. Physical and mental characteristics of the user. Stages of development of the user interface. Types of testing interfaces (user testing). Prospects for the development of interfaces.

4.1 Human-computer interaction

- **Interacting** with technology has become an essential part of everyday life for the majority of people.
- The average user of a computer system is now less likely **to understand the technology**. Since, there are different types of technology they have to use.
- People are busy and may spend little or no time actually **learning a new system**.
- Therefore, **computer systems** should be easy to use, easy to learn, and with no errors.
- **Todesign** and **develop** of such a system is **a major concern of HCI**

a computer system is made up of various elements
each of these elements affects the interaction

- input devices – text entry and pointing
- output devices – screen (small&large), digital paper
- virtual reality – special interaction and display devices
- physical interaction – e.g. sound, haptic, bio-sensing
- paper – as output (print) and input (scan)
- memory – RAM & permanent media, capacity & access
- processing – speed of processing, networks

What is HCI?

- **Human-computer interaction (HCI): "***is a discipline concerned with the **design**, **evaluation** and **implementation** of interactive systems for human use and with study of major phenomena surrounding them."*
  (ACM SIGCHI, 1992, p. 6)

- **HCI (human-computer interaction)** is the **study** of **interaction** between **people** (users) and **computers**.
- **Interaction** between users and computers occurs **at the user interface**
- The golden principle in **HCI** is that "people should come first".

HCI consists of three parts:

- **Human**: could be an individual user or a group of users.
- **Computer**: could be any technology ranging from the general desktop computer to a large scale computer system.

Interaction: any direct or indirect communication between a human and computer.

Examples of interactive computing systems

- Single PC - capable of displaying web pages
- Embedded devices, for example in cars and in cell phones
- Handheld Global Positioning Systems for outdoor activities

- The goal of HCI *"is to develop or improve the safety, utility, effectiveness, efficiency and usability of system that include computers."*
- The goals of HCI are to produce usable and safe systems, as well as functional systems. In order to fulfill that, developers must attempt to:
    - Understand how people use technology
    - Building suitable systems
    - Achieve efficient, effective, and safe interaction
    - Put people first

People needs, capabilities and preferences should come first. People should not have to change the way that they use a system. Instead, the system should be designed to match their requirements

Safety

- Safety of Users—think of
    - Air traffic control
    - Hospital intensive care
- Safety of Data—think of
    - Protection of files from tampering
    - Privacy and security

Utility and effectiveness

- Utility: what services a system provides
  e.g. Ability to print documents
- Effectiveness: user's ability to achieve goals, e.g.
    - How to enter the desired information
    - How to print a report
- Utility and effectiveness are distinct
    - A system might provide all necessary services, but if users can't find the services items, the system lacks effectiveness

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
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Lecture№ 5
Database Systems(2 hour)

5.0 Aims and objectives

In this lesson, we are going to discuss about: Fundamentals of database systems: concept, characteristic, architecture. Data models. Normalization. Data integrityrestrictions. Query optimization and processing. The basics of SQL. Parallel processing of data and their recovery. Design and development of databases. Object-relational mapping (ORM) programming technology. Distributed, parallel and heterogeneous databases.

5.1 Database Systems

1.Fundamentals of database systems: concept, characteristic, architecture. Data models. Normalization. Data integrityrestrictions. Query optimization and processing.

Introduction to Databases.A database is a structured collection of records or data. A computer database is a kind of software to organize the storage of data. Databases help you organize this related information in a logical fashion for easy access and retrieval. To develop a database, there are several models used such as Hierarchical model, Network model, Relational model, Object-Oriented model etc.

Hierarchical model. In a hierarchical model, data is organized into an inverted tree-like structure. This structure arranges the various data elements in a hierarchy and helps to establish logical relationships among data elements of multiple files. Each unit in the model is a **record** which is also known as a **node**. Each record has a single parent.

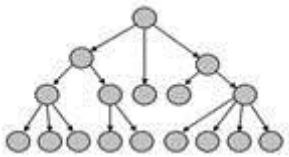

Figure 1- Hierarchical Model

Network model. The network model tends to store records with links to other records. Each record in the database can have multiple parents, i.e., the relationships among data elements can have a many to many relationships. So, this model is an expansion to the hierarchical structure, allowing many-to-many relationships in a tree-like structure that allows multiple parents.

The network model provides greater advantage than the hierarchical model in that it promotes greater flexibility and data accessibility.

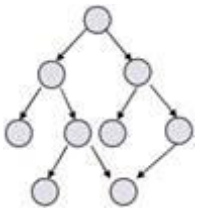

Figure 2- Network Model

Relational model. The relational model for the database management is a database model based on relations. The basic data structure of the relational model is a **table** where information about a particular **entity** (say, a student) is represented in columns and rows. The columns enumerate the various **attributes**(i.e. characteristics) of an**entity**(e.g. student name, address, registration _number).The rows (also called records) represent **instances** of an entity (e.g. specific student).

Object-Oriented model. In this Model, we have to discuss the functionality of the object-oriented Programming. It takes more than storage of programming language objects. It provides full-featured database programming capability, while containing native language compatibility. It adds the database functionality to object programming languages. This approach is the analogical of the application and database development into a constant data model and language environment. Applications require less code, use more natural data modeling, and code bases are easier to maintain. Object developers can write complete database applications with a decent amount of additional effort. But object-oriented databases are more expensive to develop.

Database Management System.A Database Management System (DBMS) is computer software designed for the purpose of managing databases based on a variety of data models. A DBMS is a complex set of software programs that controls the organization, storage, management, and retrieval of data in a database. DBMS are categorized according to their data structures or types; sometime DBMS is also known as a Database Manager. Data management tasks fall into one of four general categories as given below:

Entering data into the database.

Housekeeping tasks such as updating data, deleting obsolete records, and backing up the database.

Sorting the data: arranging or re-arranging the database's records.

Obtaining subsets of data.

There are several advantages in DBMS such as reduced data redundancy and inconsistency, enhanced data integrity, improved security etc.

Normalization of databases is a process of transformation of database to the kind answering the normalized forms.

Classification of limitations of integrity

In the theory of relational databases, it is accepted to distinguish four types of limitations of integrity:

· Limitation of database is name a limit on values that it is let to accept to the indicated database.

· Limiting to the variable of relation is name a limit on values that it is let to accept to the indicated variable of relation.

· Limitation of attribute is name a limit on values that it is let to accept to the indicated attribute.

· Limitation of type is not that another, as determination of great number of values this type consists of that.

Example of widespread restriction of level of a variable of the relation is the potential key; an example of widespread restriction of level of the database is the foreign key.

Integrity and truth of data in a DB

Integrity of a DB doesn't guarantee reliability (truth) of the information which is contained in it, but provides at least plausibility of this information, rejecting certainly improbable, impossible values. Thus, it isn't necessary to confuse integrity (consistency) of a DB to truth of a DB. Truth and consistency — not same.

Reliability (or truth) is compliance of the facts which are stored in the database, to the real world. It is obvious that determination of reliability of a DB requires possession of full knowledges both about DB contents, and about the real world. Determination of integrity of a DB requires only possession of knowledge of contents of a DB and about the rules set for it. Therefore, the DBMS can't guarantee existence in the database only of the true expressions; all that she can make, are to guarantee absence of any data causing violation of integrity constraints (that is to guarantee that she doesn't contain any data not compatible to these restrictions).

Query optimization and processing

The DBMS SQL component which defines how to realize navigation on physical data structures for access to the required data, is called the query optimizer (query optimizer).

The navigation logic (algorithm option) for access to the required data is called way or the access method (access path).

The sequence of the operations performed by the optimizer which provide the selected access paths is called the **execution plan** (execution plan).

Process, the used query optimizer for determination of an access path, is called **query** optimization.

During process of optimization of requests ways of access for all types of the SQL DML teams are determined. However the SQL SELECT team represents the greatest complexity in the solution of a task of the choice of a way of access. Therefore this process is usually called optimization of a request, but not optimization of ways of access to data. Further, it should be noted that the term "optimization of requests" is not absolutely exact — in the sense that there is no guarantee that in the course of optimization of a request the optimum way of access will be really received.

Thus, optimization of requests can be determined as the amount of all techniques which are applied to increase in efficiency of handling of requests.

2.The basics of SQL. Parallel processing of data and their restoration

The structured language of requests (Structured Query Language) – the standard of communication with the database which is supported by ANSI. The majority of databases solid adheres to the ANSI-92 standard. Almost each separate database uses some unique set of syntax, though very strongly similar to the ANSI standard. In most cases, this syntax is extension of the basic standard though there are cases when such syntax results in different results for different databases.

In the general terms, "SQL the database" is the general name for the **relational database management** system (RDMS). For some systems, "database" also concerns to group of tables, data, the configuration information which are essentially separate part from other, similar constructions. In this case, each installation of SQL of the database can consist of several databases. In other systems, they are mentioned as tables.

The table – construction of the database which consists of the **columns** containing **lines** of data. Usually tables are created to contain the connected information. Within the same database several tables can be created.

Each column represents attribute or set of objects attributes, for example identification numbers of employees, growth, color of machines, etc. Often concerning a column, the term a field with specifying of a name, for example "in the field of Name" is used. The field of a line is the minimum element of the table. Each column in the table has a certain name, data type and the size. Column names shall be unique within the table.

Every line (or record) represents set of attributes of a specific object, for example, the line can contain identification number of the employee, the size of its salary, year of its birth, etc. Lines of tables have no names. To address a specific line, the user needs to specify some attribute (or a set of attributes), it is unique it identifying.

One of the major operations which are executed by datafull operation is selection of the information which is stored in the database. For this purpose, the user shall execute a **request** (query).

Types of requests of data

There are four main types of requests of data in SQL which relate to so-called language of a **manipulation data**(DataManipulationLanguage or DML):

- **SELECT** – to choose lines from tables;
- **INSERT** – to add a line to the table;
- **UPDATE** – to change lines in the table;
- **DELETE** – to remove lines in the table;

Each of these requests has different operators and functions which are used to make some dataful actions. The SELECT QUERY has the most large number of options. There are also additional types of the requests used together with SELECT, the JOIN and UNION type. But so far, we will concentrate only on the main requests.

Use of a Select query for selection of the necessary data

To obtain information which is stored in the database the Select query is used. Basic action of this request is restricted to one table though there are constructions providing selection from several tables at the same time. To receive all lines of data for specific columns, the request of such look is used:

SELECT column1, column2 FROM table_name;

Also, it is possible to receive all columns from the table, using the sign "*":

SELECT * FROM table_name;

It can be useful in that case when you are going to choose data with a certain condition of WHERE. The following inquiry will return all columns from all lines where "column1" contains 3 value:

SELECT * FROM table_name WHERE column1=3;

3.Design and development of databases. Technology of programming of ORM. The distributed, parallel and heterogeneous databases.

Design of databases — process of creation of the database scheme and determination of necessary integrity constraints.

Main objectives of design of databases:

- Support of storage in a DB of all necessary information.
- A data acquisition possibility on all necessary requests.
- Abbreviation of redundancy and duplicating of data.

• Support of integrity of the database.

Main design stages of databases

Conceptual design

Conceptual design — creation of a semantic domain model, that is information model of the highest level of abstraction. Such model is created without orientation to any specific DBMS and a data model. The terms "semantic model", "conceptual model" are synonyms.

The specific type and the maintenance of conceptual model of the database is defined by the formal device selected for this purpose. Graphic notations, similar to ER charts are usually used.

Most often the conceptual model of the database includes:

• description of information objects or concepts of data domain and communications in between.

• description of integrity constraints, that is requirements to admissible values of data and to communications in between.

Logic design

Logic design — creation of the database scheme on the basis of a specific data model, for example, a relational data model. For a relational data model data logical model — a set of diagrams of the relations, it is normal with specifying of primary keys, and also the "communications" between the relations representing foreign keys.

Conversion of conceptual model to a logical model is, as a rule, carried out by the formal rules. This stage can be substantially automated.

At a stage of logic design specifics of a specific data model are considered, but specifics of specific DBMS can not be considered.

Physical design

Physical design — creation of the database scheme for specific DBMS. Specifics of specific DBMS can include restrictions for naming of database objects, restrictions for the supported data types, etc. Besides, specifics of specific DBMS in case of physical design include a choice of the decisions connected to a physical medium of data storage (a choice of methods of management of disk memory, division of a DB according to files and devices, data access methods), creation of indexes etc.

What is ORM?

ORM or Object-relational mappingis a technology of programming which allows to transform incompatible types of models to OOP, in particular, between the data store and subjects to programming. ORM is used for simplification of process of saving objects in a relational database and their extraction, in case of this ORM itself cares for data transformation between two incompatible statuses. The majority of ORM tools considerably rely on meta data of the database and objects so objects need to know nothing about a database structure, and the database — nothing about how data are organized in the application. ORM provides complete division of tasks in well programmed applications in case of which both the database, and the application can work datafull everyone in the root form.

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
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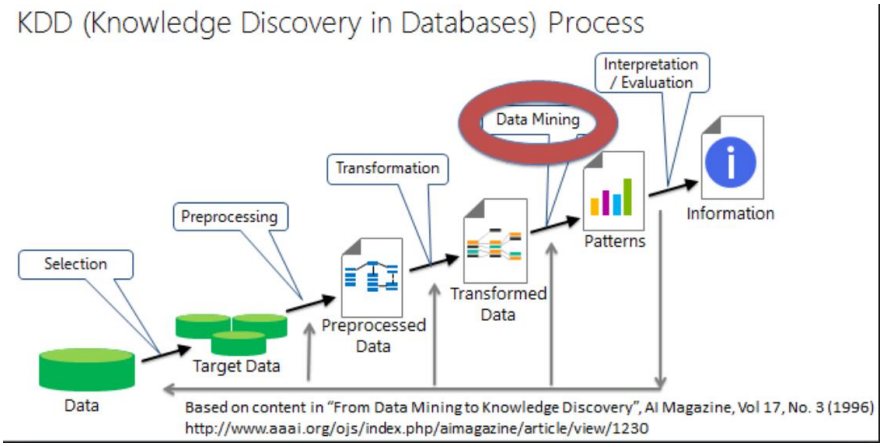
Lecture№ 6

Data Analysis. Data Management(2 hour)

6.0 Aims and objectives

In this lesson, we are going to discuss about: Basics of data analysis. Methods of collection, classification and forecasting. Trees of solutions. Processing large amounts of data. Methods and stages of Data Mining. Data Mining tasks. Visualization of data.

6.1 Data Analysis. Data Management



Data mining where certain algorithms/processes are applied to extract patterns

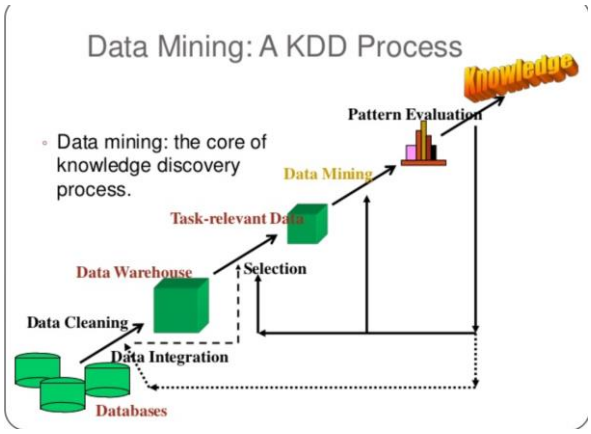
What is Data Mining (DM)?

- Group of activities used to find different patterns in data
- Information provided through a Data Warehouse
- Provides valuable information for different types of research.

DM – Set of activities used to find new, hidden, or unexpected patterns in data; or the practice of examining large databases in order to generate new information

-A data warehouse is main source where all data is stored. Example: **database**

-Research may be used for marketing or Customer Relationship Management



Visual Data Mining (VDM) is a new approach for exploring very large data sets, **combining**traditional mining methods and information visualization techniques.

- **Visual data mining** "discovers implicit and useful knowledge from large data sets using data and/or knowledge visualization techniques"
- Data visualization + Data mining techniques

Purpose of Visualization

- **Gain insight** into an information space by mapping data onto graphical primitives
- **Provide qualitative overview** of large data sets
- **Search** for patterns, trends, structure, irregularities, relationships among data
- **Help find interesting regions** and **suitable parameters** for further quantitative analysis
- **Provide a visual proof** of computer representations derived

Methods of Data Visualization
Different methods are available for visualization of data based on type of data
Data can be

Univariate (1-D) (Histogram, Pie Chart)
Bivariate (2-D) (Scatter plots, Line graphs)
Multivariate (Icon based methods, Pixel based methods, Dynamic parallel coordinate system)

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
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Lecture№ 7
Networks and Telecommunications(2 hour)

7.0 Aims and objectives

In this lesson, we are going to discuss about: End devices, data transmission devices, data transmission medium. Types of networks. Stack protocols: TCP/IP, OSI. IP addressing. Local and global networks. Wired and wireless networking technologies. DHCP. Technologies of connection to the Internet. Telecommunication technologies.

7.1 Networks and Telecommunications

Networks

- A network is a group of computers that share information and hardware.
- The computers are connected together using copper phone wires, fiber optic cables, or radio waves.
- Our computers are on a network here at school...Look under the table and see the blue wires that connect your computer to the network.
- The internet is many networks around the world that are all connected together to make 1 huge network.

Information & Communication

- Generation and transfer of information is critical to today's businesses
- Flow of information both mirror and shape organizational structures
- Networks are the enabling technology for this process

What is Data Communication?

- Communication of data between sources
- Data formats – analog or digital or both
- Data travels by a medium
    - Wires
    - Space

Essentials of Data Communication

- Message
- Sender
- Receiver
- Medium
- Understandability
- Error detection
- Security

Important Dates in the History of Data Communications

- 1837 – Invention of the **telegraph**
- 1876 – Invention of the **telephone**
- 1947 – Invention of the **transistor** (replaced vacuum tubes)
- 1948 – First commercial computer installed, the UNIVAC I
- 1958 – First U.S. Communications satellite sent into orbit
- 1959 – FCC approves private microwave communications networks
- 1964 – Packet switching network concept proposed by the Rand Corporation
- 1966 – IBM's binary synchronous (BISYNC or BSC) protocol announced
- 1969 – **ARPANET**, first packet switching network (later to become the Internet), begins operation
- 1972 – Ethernet local area network specifications formulated
- 1972 – IBM's Synchronous Data Link Control (SDLC) protocol announced
- 1974 – IBM announces its Systems Network Architecture (SNA)
- 1975 – Personal computers introduced, the Altaire 8800 replaced terminals in many cases
- 1981 – **IBM PC** introduced
- 1985 – Cellular radio telephones are introduced
- 1990 – **World Wide Web** is introduced
- 1993 – Web search engines introduced
- 1995 – The Internet grows to over four million host computers
- 1999 – The Internet grows to over ten million host computers

Network Technologies

Ethernet

- Based on bus topology; but can be used in star topology;
- Higher speed: first Fast Ethernet, then Gigabit Ethernet;
- Most popular: inexpensive, easy to install and maintain.

Token Ring

- Based on a ring topology; but can use a star topology;
- Token-passing scheme to prevent collision of data;
- The second most widely-used protocol after Ethernet.

TCP/IP

- Based on client/server model of network computing;
- Uses packet switching technique for data transmission;
- Commonly used for Internet applications.

WAP

- Uses client/server model of network computing;
- Allows wireless devices to access the Internet and WWW;
- Meets increasing demands for wireless Internet access.

Networking and Telecommunications

- Networking - an interconnection of computers and computing equipment using either wires or radio waves over small or large geographic distances
- Telecommunications - study of telephones and the systems that transmit telephone signals
- Network management - design, installation, and support of a network and its hardware and software

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
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Lecture№ 8

Cybersecurity(2 hour)

8.0 Aims and objectives

In this lesson, we are going to discuss about: Threats to information security and classification. The industry of cybersecurity. Cybersecurity and Internet governance. Malicious programs. Measures and means of information protection. Standards and specifications in the field of information security. Legislative acts of the Republic of Kazakhstan, regulating legal relations in the field of information security. Electronic digital signature. Encryption.

8.1 Cybersecurity

The History of Information Security

- Began immediately after the first mainframes were developed
- Groups developing code-breaking computations during World War II created the first modern computers
- Physical controls to limit access to sensitive military locations to authorized personnel
- Rudimentary in defending against physical theft, espionage, and sabotage

The 1960s

- **Advanced Research Procurement Agency** (**ARPA**) began to examine feasibility of redundant networked communications
- **Larry Roberts**, known as the Founder of the Internet, developed**ARPANET** from its inception (start)

The 1970s and 80s

- ARPANET grew in popularity as did its potential for misuse
- Fundamental problems with ARPANET security were identified
  - No safety procedures for dial-up connections to ARPANET
  - Non-existent user identification and authorization to system
- Late 1970s: microprocessor expanded computing capabilities and security threats

The 1990s

- Networks of computers became more common; so too did the need to interconnect networks
- Internet became first manifestation of a global network of networks
- In early Internet deployments, security was treated as a low priority

The Present

- The Internet brings millions of computer networks into communication with each other—many of them unsecured
- Ability to secure a computer's data influenced by the security of every computer to which it is connected

What is Security?

- "The quality or state of being secure—to be free from danger"
- A successful organization should have multiple layers of security in place:
  - Physical security
  - Personal security
  - Operations security
  - Communications security
  - Network security
  - Information security

Principles of Information Security Management

Include the following characteristics that will be the focus of the current course (six P's):

1. Planning
2. Policy
3. Programs
4. Protection
5. People
6. Project Management

Antivirus software

- **Antivirus** or **anti-virus** software (often abbreviated as **AV**), sometimes known as **anti-malware** software, is computer software used to prevent, detect and remove malicious software.[1]
- Antivirus software was originally developed to detect and remove computer viruses, hence the name.
- However, with the proliferation of other kinds of malware, antivirus software started to provide protection from other computer threats.

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
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Lecture№ 9
Internet Technologies(2 hour)

9.0 Aims and objectives

In this lesson, we are going to discuss about: Basic concepts of the Internet. Universal resource identifier (URI), its purpose and its constituent parts. DNS service. Web technologies: HTTP, DHTML, CSS, and JavaScript. Email. The format of the message. SMTP, POP3, IMAP Protocols.

9.1 Internet Technologies

1. Basic concepts Internet. The universal identifier of resources (URI), its assignment and components.Service DNS.

A **URL** (**Uniform Resource Locator**) is a form of URI and is a standardized naming convention for addressing documents accessible over the Internet and Intranet. An example of a URL is http://www.computerhope.com, which is the URL for the Computer Hope website.

Overview of a URL

Below is additional information about each of the sections of the http URL for this page.

http://

The "http" stands for HyperText Transfer Protocol and is what enables the browser to know what protocol it is going to use to access the information specified in the domain. After the http is the colon(:) and two forward slashes (//) that separate the protocol from the remainder of the URL.

www.

Next, www.stands for World Wide Web and is used to distinguish the content. This portion of the URL is not required and many times can be left out. For example, typing "http://computerhope.com" would still get you to the Computer Hope web page. This portion of the address can also be substituted for an important sub page known as a subdomain. For example, http://support.computerhope.com forwards you to the main help section of Computer Hope.

computerhope.com

Next, computerhope.com is the domain name for the website. The last portion of the domain is known as the "domain suffix", or TLD, and is used to identify the type or location of the website. There are dozens of other domain suffixes available. To get a domain, you would register the name through a domain registrar.

/jargon/u/

Next, the "jargon" and "u" portions of the above URL are the directories of where on the server the web page is located. In this example, the web page is two directories deep, so if you were trying to find the file on the server, it would be in the /public_html/jargon/u directory. With most servers, the public_html directory is the default directory containing the HTML files.

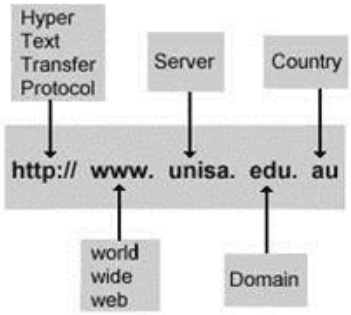
url.htm

Finally, url.htm is the actual web page on the domain you're viewing. The trailing .htm is the file extension of the web page that indicates the file is an HTML file. Other common file extensions on the Internet include .html, .php, .asp, .cgi, .xml, .jpg, and .gif. Each of these file extensions performs a different function, just like all the different types of files on your computer.

The structure of the URL is shown in the figure below.

There are several domains available in the web such as:

edu = education institute
com = commercial enterprise
gov = government
org = organization
net = network provider
mil = military



Structure of the URL

2. Web technologies: HTTP, DHTML, CSS, and JavaScript

Internet Protocols

Internet Protocol	Refersto	Description	Internet Services
SMTP	SimpleMailTransfer Protocol	A protocol for sending e-mail messages between servers	Email
POP3	PostOfficeProtocol version 3	Used by local e-mail clients to retrieve e-mail from a remote server over a TCP/IP connection	email
FTP	FileTransferProtocol	This is used to transfer files from one host to another host over a TCP-based network, suchastheInternet.	Transferring files
HTTP	HyperTextTransfer Protocol	Define show messages are formatted and transmitted, and what actions Web	WorldWide Web(www)

		server sand browsers should	
		take in response to the wide	
		range of commands.	
HTTPS	HyperTextTransfer	Provides authentication of	WorldWide
	ProtocolSecure	the web site and associated	Web(www)
		web server andprotects	
		against man-in-the-middle	
		attacks.	
VoIP	VoiceoverInternet	This enables people to use	Online
	Protocol	the Internet as the	chat(thereare
		transmission medium for	exceptions)
		telephone calls.	

The Internet Protocols

The Internet uses a variety of languages to transmit information from one place to the other. These languages are called protocols. Using these protocols, we can acquire the services from the Internet. Each protocol has a specific functionality and www is considered to be the largest service acquired amongst the services provided by the Internet.

Internet is an interconnection of computer networks all around the world. In other words, it is the hardware which forms the physical layer to these connections is what we refer to as the Internet. Hence, the Internet comprises of network of computers, fiber-optic cables, copper wires and wireless networks. But www is the software which is used to access the information from the Internet. It consists of files, folders and the documents which are stored in different computers. Now it is crystal clear to you that the www depends on the Internet to work.

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
3. Watson, D. and Williams, H. – Cambridge IGCSE Computer Science: Hodder Edu.; 3 ed. 2015.-278 p. **[W]**
4. http://helpiks.org/Informatika/

Lecture№ 10
Cloud and Mobile Technologies(2 hour)

10.0 Aims and objectives

In this lesson, we are going to discuss about: Date centers. Trends in the development of modern infrastructure solutions. Principles of cloud computing. Virtualization technologies. Web services in the Cloud. Basic terms and concepts of mobile technologies. Mobile services. Mobile technology standards.

10.1 Cloud and Mobile Technologies

Two Technologies for Agility

- Virtualization:

The ability to run multiple operating systems on a single physical system and share the underlying hardware resources*

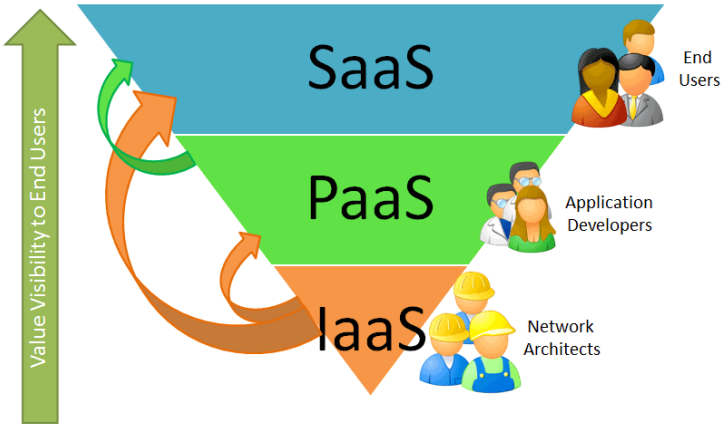
- Cloud Computing:

"The provisioning of services in a timely (near on instant), on-demand manner, to allow the scaling up and down of resources"

What is Cloud Computing?

- **Cloud Computing** is a general term used to describe a new class of network based computing that takes place over the Internet,
  - basically a step on from Utility Computing
  - a collection/group of integrated and networked hardware, software and Internet infrastructure (called a platform).
  - Using the Internet for communication and transport provides hardware, software and networking services to clients
- These platforms hide the complexity and details of the underlying infrastructure from users and applications by providing very simple graphical interface or API (Applications Programming Interface).
- In addition, the platform provides on demand services, that are always on, anywhere, anytime and any place.
- Pay for use and as needed, elastic
  - scale up and down in capacity and functionalities
- The hardware and software services are available to
  - general public, enterprises, corporations and businesses markets

Cloud Computing Layers



Software as a Service (SaaS)

- SaaS is where an application is hosted as a service provided to customers across the Internet.
  - Saas alleviates the burden of software maintenance/support
  - but users relinquish control over software versions and requirements.

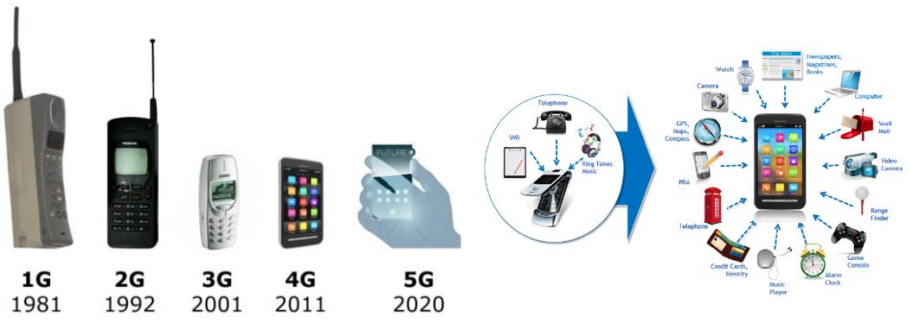
Platform as a Service (PaaS)

- PaaS provides a computing platform and a solution stack as a service.
  - Consumer creates the software using tools and/or libraries from the provider.
  - The consumer also controls software deployment and configuration settings. The provider provides the networks, servers, storage and other services.

Infrastructure as a Service (IaaS)

- IaaS providers offer virtual machines, virtual-machine image libraris, raw (block) and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles.
- Pools of hypervisors can scale services up and down according to customers' varying requirements
- All infrastructure is provided on-demand

Evolution of Mobile Hardware



What is an Operating System?

- ❑ A set of programs that manage computer hardware resources and provide common services for application software
- ❑ Most important system software in computer system
- ❑ NOTE: User cannot run an application program on computer without OS
- ❑ Ie. Android, Mac OS X, Microsoft Windows

Some Requirements for successful Mobile OS

- Easy and consistent for app developers
- Responsive, fast and efficient
- Secure
- Run with limited RAM

Responsive, fast and efficient

As opposed to desktop users, mobile phone users are accustomed to a responsive system.
Every single CPU cycle consumes battery power.
The more time the CPU can spend sleeping the longer the battery life will be.

Apple iOS:

Entire system along with applications written **in C/C++** and **Objective C**

Pro: No inherent inefficiency **Con:** Very hard to port

Google Android:

Core of system written **in C/C++**

Application framework and applications in **Java**, but interpreted with efficient **Dalvik VM (**since 2014 Android Runtime (**ART**)**)**

Pro: Trivial to port

Con: All of the instructions consumed interpreting JAVA are essentially wasted

Windows Phone 7.5:

Entire System **in C/C++**. Only applications are interpreted using **JIT**

Pro: OK for efficiency and portability **Con:** Harder to port than Android

What is Mobile Application Development ?

- Mobile application development is the process by which application software is developed for small low-power handheld devices such as mobile phones.
- These applications are either pre-installed on phones during manufacture, downloaded by customers from various mobile software distribution platforms, or web applications delivered over HTTP which use server-side (e.g. ASP.NET or C#) or client-side processing (e.g. JavaScript) to provide an "application-like" experience within a Web browser.
- Windows Mobile, Android, HP webOS and iOS offer free **SDKs** (software development kit) and **IDEs** (integrated development environment) to developers.

Programming Language

There is generally no common programming language that can be used on all platforms:

- **iOS** apps are written using **Objective-C** (a superset of **C** influenced by **Smalltalk**)
- **Android** and **BlackBerry** use different dialects of **Java** as their main programming languages
- **Windows Phone** apps are developed using **C#**, which is part of **.NET framework**
- **Symbian^3**, **Bada** and **BREW** support commonly-used **C** and **C++ languages**

webOS uses **JavaScript** together with **HTML/CSS** as its primary development language.

The Best Android Phones of 2017

Name	Google Pixel	Google Pixel XL	LG V20	Motorola Moto Z Force Droid	Samsung Galaxy S7 Active (AT&T)	Samsung Galaxy S7 Edge	ZTE Axon 7	Samsung Galaxy S7	Huawei Honor 6X	OnePlus 3T
										
Lowest Price	$649.99 Verizon Wireless	$769.99 Verizon Wireless	$560.98 Amazon	$720.00 Verizon Wireless	$794.99 AT&T	$789.99 T-Mobile	$396.97 Amazon	$669.99 T-Mobile	$259.99 Amazon	$403.92 Amazon

Development Environment

There is generally no common **development environment** either:

- **iOS** apps can only be developed using Apple **XCode** tools running on **Mac OS** computers
- **Windows Phone** apps have to be developed with **Microsoft Visual Studio** tools using a **Windows PC**; Windows is the de facto platform for enterprise software developers.
- **Symbian^3** development uses the **Qt** environment.
- **WebOS** apps are developed using the **Ares** browser-based development environment that is used in combination with **Eclipse IDE**.

Application stores

- Several initiatives exist both from mobile vendor and mobile operators around the world.
- Most famous is **Apple's App Store**, where only approved applications may be distributed and run on **iOS** devices (otherwise known as a walled garden).
- With extraordinary speed **Google's Android Market** counting (at the moment) the 2nd largest number of apps and which are running on devices with **Android OS**.
- HP / Palm, Inc have also created the Palm App Catalog where HP / Palm, Inc **webOS** device users can download applications directly from the device or send a link to the application via a unique web distribution method.
- Additionally, mobile phone manufacturers such as Nokia has launched Ovi app store for **Nokia** smartphones.

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
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Lecture№ 11
Multimedia technologies(2 hour)

11.0 Aims and objectives

In this lesson, we are going to discuss about: Representation of text, audio, video and graphic information in digital format. Basic technologies for information compression. 3-D representation of the virtual world and animation. Tools for developing multimedia applications. Use of multimedia technologies for planning, description of business processes and their visualization.

11.1 Multimedia technologies

What is Multimedia?

- Derived from the word "**Multi**" and "**Media**"
  - **Multi**
  - Many, Multiple,
  - **Media**
  - Tools that is used to represent or do a certain thing, delivery medium, a form of mass communication – newspaper, magazine / tv.
  - Distribution tool & information presentation – text, graphic, voice, images, music and etc.

- Multimedia is media and content that uses a combination of different content forms.
- Multimedia includes a combination of **text, audio, still images, animation, video, and interactivity content forms.**

Linear VS Non-Linear

- A Multimedia Project is identified as Linear when:
  - It is not interactive
  - User have no control over the content that is being showed to them.
- Example:
  - A movie
  - A non-interactive lecture / demo show

- A Multimedia Project is identified as Non-Linear when:
  - It is interactive
  - Users have control over the content that is being showed to them.
  - Users are given navigational control
- Example:
  - Games
  - Courseware
  - Interactive CD

Authoring Tools

- Use to merge multimedia elements (text, audio, graphic, animation, video) into a project.
- Designed to manage individual multimedia elements and provide user interaction (if required).

Example:

- Macromedia Authorware
- Macromedia Director
- Macromedia Flash
- Microsoft Power Point

Multimedia Products

1. Briefing Products (instruct or inform)
2. Reference Products
3. Database Products
4. Education and Training Products
5. Kiosk
6. Entertainment and Games

- Multimedia Computer (MPC): a computer that is optimized for high multimedia performance, enabling rich multimedia experience.

Multimedia System Components

- Software
  - System Software
    - Multimedia Drivers

- Multimedia Operating System
- Support Software (Develop Tools)
  - Text : Cool3D, Microsoft Word, etc.
  - Audio: CoolEdit, Audition, Cakewalk, etc.
  - Graphics/Image: CorelDRAW, Photoshop, PhotoImpact, etc.
  - Animation: Flash, 3d Max, Maya, etc.
  - Video: Premiere, Media Studio, etc.

References

1. Brown G., Sargent B., and Watson D. Cambridge IGCSE ICT. - London: Hodder Education Group, 2015. -439 p. **[BW]**
2. Williams, B. K. and Sawyer, S. Using information technology: A practical introduction to computers & communications. - New York: McGraw-Hil., - 8th ed. 2010. -563 p. **[WS]**
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Lecture№ 12
Smart Technology(2 hour)

12.0 Aims and objectives

In this lesson, we are going to discuss about: Internet of things. Great data. Technology Block chain. Artificial Intelligence. Use of Smart-services. Green technologies in ICT. Teleconferences. Telemedicine.

12.1 Smart Technology

The Internet of things (IoT) refers to the connection of devices (other than typical fare such as computers and smartphones) to the Internet. Cars, kitchen appliances, and even heart monitors can all be connected through the IoT. And as the Internet of Things grows in the next few years, more devices will join that list.

What is block chain technology?

For the past several weeks, you've likely heard some of the following terms if you've paid attention to the world of finance: Cryptocurrency, Block chain, Bitcoin, Bitcoin Cash, and Ethereum. But what do they mean? And why is cryptocurrency suddenly so hot?

First, we'll explain the block chain basics.

As society become increasingly digital, financial services providers are looking to offer customers the same services to which they're accustomed, but in a more efficient, secure, and cost effective way.

Enter block chain technology.

The origins of block chain are a bit nebulous. A person or group of people known by the pseudonym Satoshi Nakomoto invented and released the tech in 2009 as a way to digitally and anonymously send payments between two parties without needing a third party to verify the transaction. It was initially designed to facilitate, authorize, and log the transfer of bitcoins and other cryptocurrencies.

Block chain tech is actually rather easy to understand at its core. Essentially, it's a shared database populated with entries that must be confirmed and encrypted. Think of it as a kind of highly encrypted and verified shared Google Document, in which each entry in the sheet depends on a logical relationship to all its predecessors. Block chain tech offers a way to securely and efficiently create a tamper-proof log of sensitive activity (anything from international money transfers to shareholder records).

Overview of Artificial Intelligence

- **Artificial Intelligence** (AI)
  - Computers with the ability to mimic or duplicate the functions of the human brain
- **Artificial Intelligence Systems**
  - The people, procedures, hardware, software, data, and knowledge needed to develop computer systems and machines that demonstrate the characteristics of intelligence
- **Intelligent behaviour**
  - Learn from experience
  - Apply knowledge acquired from experience
  - Handle complex situations
  - Solve problems when important information is missing
  - Determine what is important
  - React quickly and correctly to a new situation
  - Understand visual images
  - Process and manipulate symbols
  - Be creative and imaginative
  - Use heuristics

Major Branches of AI

- **Perceptive system**
  - A system that approximates the way a human sees, hears, and **feels objects**
- **Vision system**
  - Capture, store, and manipulate visual images and pictures
- **Robotics**
  - Mechanical and computer devices that perform tedious tasks with high precision
- **Expert system**
  - Stores knowledge and makes **i**nferences (conclusion)
- **Learning system**
  - Computer changes how it functions or reacts to situations based on feedback
- **Natural language processing**
  - Computers understand and react to statements and commands made in a "natural" language, such as English
- **Neural network**
  - Computer system that can act like or simulate the functioning of the **human brain**

AI – The History

AI is as old as computing, whose theory started in the 1930 with **Alan Turing**, Alonzo Church, and others
• 1941 Konrad Zuse, Germany, general purpose computer
• 1943 Britain (Turing and others) **Colossus**, for decoding
• 1945 **ENIAC**, US. John von Neumann a consultant
• 1956 Dartmouth Conference organized by John McCarthy (inventor of LISP)
• The term **Artificial Intelligence** was coined (invented) at Dartmouth, which was intended as a two month study.

- Computers land 200 tonjumbo (huge) jets unaided (without help) every few minutes
- Search systems like **Google** are not perfect but provide very effective information retrieval.
- Robots cut slots for hip joints better than surgeons.
- The chess program Deep Blue beat world champion Kasparov in 1997.
- Medical expert systems can outperform doctors in many areas of diagnosis
- Self-driving cars are beginning to enter the market.
- Programs such as **Siri** communicate via natural language.

Smart City

Smart city - the harmony and transformation itself – touches and transforms our cities from end to end

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Lecture№ 13

Industrial information and communication technologies(2 hour)

13.0 Aims and objectives

In this lesson, we are going to discuss about: Electronic business: Main models of electronic business. Information infrastructure of electronic business. Legal regulation in electronic business. Electronic training: architecture, structure and platforms. Electronic textbooks Electronic government: concept, architecture, services. Formats of implementation of the electronic government in developed countries.

13.1 Industrial information and communication technologies

Electronic business: Main models of electronic business. Information infrastructure of electronic business. Legal regulation in electronic business

According to the definition of IBM professionals, **electronic business**(e-business) The transformation of key business processes using Internet technologies. Thus, e-business refers to any business activity that uses the possibilities of global information networks for transforming internal and external relationships to create a profit.

An important part of e-business is **e-commerce.Under** the e-commerce (e-commerce) refers to all forms of business transactions that are carried out with the help of information networks definitions:.

in the dictionary e-business terms by PriceWaterhouseCoopers and eTopS Consulting companies are given the following

E-business -improving the efficiency of the business, based on the use of information technology for in order to ensure interoperability of business partners and create an integrated value chain-..

E-commercemarketing, submission of proposals, sales, rental, licensing, supply of goods, services or information through computer networks or the Internet

Internet business can be described as medium which allows companies to

increase revenues · because created new channels of income and an increase in sales volumes;
· reduce costs by reducing the costs of transactions and overheads needs;.
· improve the quality of services, improving the service offered to customers and better meet their
· Improve conditions for investment;
· ensure corporate company information all over the world or just a target group of customers;
· automate and optimize business processes both internally and in its relations with suppliers, dealers and partners;
· ensure business continuity (7 days a week, 24 hours a day).

The basic model of Internet business models There are pure e-business.

	The state (G)	Business (B)	Citizen (C)
State	G2G coordination	G2B information and sale of illiquid assets	G2C
Business	B2B supply of	B2Ge-commerce	B2C E-Commerce
Citizen	C2G taxes	C2B price comparisons	C2C Auctions

Table - The basic model of Internet business

B2B «Business-to-business»or "Business to Business" - these terms are indicated all the interactions between enterprises, companies and firms. The organization of deliveries, exchange of documents, purchase orders, financial flows, coordination, joint activities - all this interaction of business with another

Major B2B tools include:

1.the corporate web-site (info page with the listing, project goods and services, activities, proposals for cooperation),

2.internet incubator (a company specializing in the creation of start-up companies with a view to their subsequent sale to

3.investors.Internet marketing

Internet marketing is an important tool for effective Internet business Internet enables companies. more automated marketing through the use of databases-

B2C «Business-to-customer» B2Cor "Business-to-consumer" is the relationship of the seller and the buyer these include the acquisition of the customer of any product or service, receiving the consultations, registration of insurance etc.

All the trading system through the Internet can be categorized as web-showcases, Internet shops and Internet business systems.

Web-showcase designed web-design means the price list the trading company, which does not contain the business logic of the trading process.

2.Shop Online also comprises web-shop windows, all necessary business logic to manage the e-commerce process (back-office).

3.Online trading system (OTS) is an online store, the back office is fully (in real time) is integrated into the trading company's business processes, as well as internal company document automation-.

Today main attention is focused on the so-called B2C model in which the main consumers of e-commerce services are the buyer's individuals. A very important point that must be borne in mind when talking about the growth of B2C e-business market - it is the overall development of the economy, improving the welfare of the "average" customer. If there is an active development of the economy, will be at a standstill and the most promising high-tech markets. A man willing to spend money in the e-shop only when they stayed with him after satisfying the basic needs of food, clothing, etc.

Another aspect of the problem The quality of services. Online shopping can be developed only if the high quality of all its components. Logistics - perhaps the defining component of e-commerce B2C model, and we have it is almost not developed. Transport infrastructure, e-mail system - to high-quality delivery of Culture continue to develop and evolve. In addition, to create a functioning delivery infrastructure needs a lot of money and considerable time

Well, the fundamental problem hindering the rapid growth of B2C applications in our country, -. Standard of living

C2C

Model**«Customer-to-Customer»,C2C the**reflects business relationship arising between individuals on the on-line auctions and exchanges-.

1.Internet market trading marketplace through which companies conduct trade in goods and services. The owner gets a commission or, in each transaction it is the seller or the buyer, reducing costs.

The Exchange is a program of trade-information system that provides traders (members) equal rights and opportunities for making transactions impartially performing set of trading rules. The trading system is open and secure due to accessibility of information on the Internet-.

2.Internet auction Trading showcase, where sellers put up for sale the goods belong to them, and buyers apply for the purchase of these goods«Business-to-government».

«B2G»

B2Gor - a special type of trade on the orders of government organizations

Commodity market

infrastructure - a mandatory component of any integrated economic system. The word "infrastructure" refers to the base, the internal structure of the economic system. The infrastructure business is a set of components that provide the free flow and overflow of various resources: financial, trade, labor, information, etc. and linking the movement together. Business infrastructure ensures its successful functioning control.

She currently performs several important functions:
- the institutionalization of business relations,
- help the subjects of business in the realization of their interests,
- specialized businesses, improving the efficiency of their work on the basis of differentiation filled their niche markets;
- facilitating forms of legal state and public regulation of business practices

Under the trade market is the sphere of realization of a particular product or group of products, linked to certain features of the production or consumption nature markets

There are many different **signs of the classification**of commodityon the territorial coverage. Analysis of the market in a particular study, conducted within the framework of the internal, external and regional market;

the nature of the end-use product (markets of consumer goods, the markets of capital goods);

by the ability of goods to satisfy the needs of certain groups of consumers (market men's, women's clothing, goods market for photographers, tourists,etc.).

on terms of use of the goods (durable consumer goods, the average period of use, short-term)

of product sales market - it is part of the market, within which is carried out, the sale of goods divided.

Individual commodity market consumers can be into several segments: consumers, who do not know about the product; They know about the product, but do not buy it; acquire competitors' products; purchase our products work in the commodity market require a comprehensive information support

Financial market

Modern financial markets this is an extremely complex structure with multiple participants - financial intermediaries, operating with a variety of financial instruments, and perform a wide range of functions for the maintenance of economic processes and management. In the financial market presented a special commodity - money provided for use at a time, in the form of loans under the obligation or permanently, under the action

Labor market

JobsWays, public organizations and mechanisms that allow people to find a job according to their abilities and skills, and employers to hire workers they need for the organization of the business or other activity.

Wagesthe value of remuneration paid to the employee for the performance of a specific task, the amount of work or the performance of their duties for some time

The market has two unique features that leave their mark on the action of the common market mechanisms -. the universality of goods sold there and the desire for social justice sellers

product versatility workforce due to the fact that the person is fit to master different professions and retrained for life, if it is profitable and justify the investment of time, effort and money. In developed countries, is not uncommon, when changing profession even people with higher education.

In addition, the flexibility of labor as a commodity is manifested in the fact that professionals of the same profession can work in a variety of companies, parts of the same country, and even to change the country, where they have to work hard .

Information marketinformation services market is a confluence of economic, legal and organizational relations on trade (buying and selling) information services between suppliers and consumers, and is characterized by a particular nomenclature of services, as well as the terms and conditions of their representation mechanisms.

The advent of modern information services expanded demand information on products, as promoted the individualization of supply of these products, their approximation to the individual needs of individual users and, thus, to the convergence of information models of producers and users teaching.

Electronic training: architecture, structure and platforms. Electronic textbooks

E-learning(Eng. E-learning, an abbreviation of the English. Learning) -Electronica system of training through computer and electronic technologies

Definition UNESCO«E-Learning - learning through the Internet and experts: Multimedia,"

e-learning include:

· independent work with electronic materials, using a personal computer, PDA, mobile phone, DVD-player,TV and other,

· obtaining advice, tips, ratings from a remote (geographically) expert (teacher), for remote interaction, theof

· Creation a distributed user community (social networks), leading the overall virtual learning activities,

· timely Hour delivery of e-learning materials; standards and specifications for electronic learning materials and technology, distance learning tools,

· formation and improvement of information culture for all heads of enterprises and divisions of the group, and the mastery of modern information technology, improving the efficiency of its ordinary activities,

· the development and promotion of innovative educational technologies, the transfer of their teachers;

· to develop educational web-resources;

· the opportunity at any time and in any place to get modern knowledge, are available in any part of the world access to higher education for persons with special needs

related to e-learning, electronic textbooks, educational services and technology. In fact, e-learning began with the use of computers in education. Initially training with the use of computers alternated conventional, classic practical exercises. E-learning and now does not exclude communication with the teacher face to face.

ELearning modern sample concept has evolved along with the Internet connectivity technologies, and includes the ability to virtually anywhere download additional materials underpinning received by electronic aids theory, pass the completed task ,

consult with the instructor. The main thing is that all these features are supported electronic media programs. Now the development of e-learning depends on the development of the media, but electronic books, fully revealing its potential, are still in the development stage of traditional:

e-education has a number of advantages

1. Freedom of access- the student can do almost anywhere. Not all e-learning is available through the Internet. Adult students can study without interruption from work

2. Reduced training costs the student bears the cost of media, but it does not bear on the methodological literature. In addition, the economy is growing at the expense of wages, which do not need to pay teachers, the content of education and so on. Production of e-learning materials does not imply deforestation

3. Flexibility training- duration and sequence of study materials listener chooses, completely adapting the whole learning process to fit their capabilities and needs courses

4. The opportunity to develop in step with the times- users of electronic And the teachers and students develop their skills and knowledge in accordance with the latest modern technology and standards. Electronic courses also allow you to update the study materials timely and promptly.

5. Potentially equal opportunities obucheniya- training becomes independent of the quality of teaching in a particular school.

6. The ability to define the criteria for assessment of Knowledge in e-learning has the opportunity to exhibit clear criteria by which to assess the knowledge gained in the process of student learning.

Electronic textbook- a special device or program software used in the educational process and replaces the traditional paper book. Currently, treatment of the phrase "electronic textbook" is very broad: in some cases, it means the electronic version of the paper textbook, in some - a complex program on electronic devices, allowing to show students, in addition to the text, studies multimedia material containing a interactive units of examination updating from a central source and so on. Electronic textbooks latter species are still under development, so basically modern electronic textbooks are electronic text with illustrations. Almost all teachers celebrate the simplicity of using the electronic textbook students, increase students' motivation and interest in working with academic subject with the help of a technical device, the pleasure when using ET in the classroom and at home.

Electronic government: concept, architecture, services. Formats of implementation of the electronic government in developed countries.

Electronic Government (English e-Government.) - A way to provide information and assistance already formed a set of public services to citizens, businesses, other branches of the government and public officials, in which the personal interaction between the state and the applicant is minimized and information technology is used as much as possible. E-government - state electronic document management system based on the automation of the entire set of management processes across the country and serves as the target of significantly improving governance and reducing social communications costs for each member of society. Creation of e-government involves building a nationwide distribution of the social management system, implementing the decision of the full range of tasks associated with managing documents and their processing.

Definition of E-Government

“E-Government is an ongoing process of transformation of Government towards the provision of government services (information, transactions) through electronic means, including access to government information and the completion of government transactions on an ‘anywhere, anytime’ basis.” PricewaterhouseCoopers

The economic benefits of E-government

- Improve efficiency and quality
- One-stop-shop service delivery
- Cost effectiveness
- Promote wider adoption of e-commerce

e-Government & e-Governance

- e-Government
    - Transformation of Government
    - Modernization of processes & functions
    - Better delivery mechanisms
    - Citizens are recipients
- e-Governance
    - A decisional process
    - Use of ICT for wider participation of citizens
    - Citizens are participants

Benefits to Government

- **Law & Policy-making**
    - e-Government can be a catalyst for legal reform

- Wider & faster **dissemination** of laws (propagation, spread)
- Faster & better formulation of policies

- **Better Regulation**
  - Registration & Licensing - speedier
  - Taxation – better revenues
  - Environmental Regulations – better compliance (agreement)
  - Transportation & Police – more transparency
- **More efficient Services to Citizens & Businesses**
  - Better Image
  - Cost-cutting
  - Better targeting of benefits
  - Control of corruption

Benefits to Business

- Increased velocity of business
- Ease of doing business with Government
  - e-Procurement (acquisition, purchase)
- Better Investment climate
- Transparency

Benefits to Citizens

- Cost and time-savings
- Certainty in getting services
- Better quality of life
- Ease of access of information
- Added convenience – multiple delivery channels
- Possibility of self-service

Questions:
1. What is Electronic business?
2. What are the principles of electronic government?
3. What are the electronic trainings?
What are the differences between electronic training and electronic textbooks?
4. What are formats of implementation of the electronic government in developed countries an archive?

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Lecture№ 14
Information Technologies in the professional sphere. Industrial ICT(2 hour)

14.0 Aims and objectives

In this lesson, we are going to discuss about: Software for solving the problems of specialized professional sphere. Modern IT trends in the professional field: medicine, energy, etc. Use of search engines and electronic resources for professional purposes. Security issues in industrial information and communication technologies».

14.1 Information Technologies in the professional sphere. Industrial ICT

Software for solving the problems of specialized professional sphere

Application package- a set of programs designed to meet the challenges of a certain class (functional subsystem, business application)method-oriented.

the following types of AP:
· general purpose (universal);
· problem-oriented,
· global networks;
· organization (administration) computing process whole.

A request for proposal (RFP) class includes:
· text editor (word processor) and graphics,

· spreadsheets,
· database management systems (DBMS);
· integrated packages; Case-technology;
· the shell of expert systems and artificial intelligence systems changes.

A request for proposal (RFP) for creating and text documents, graphics, and illustrations, called the editor.

Text editors designed to handle text and perform mainly the following functions:
record the text file;
insert, delete, replace characters, lines, text fragments,
spell checking,
formatted text, different fonts,
text alignment
preparation tables of contents, splitting the text on the page;
search and replace words and expressions,
the inclusion in the text of simple illustrations;
text printing

The most widely used text editor Microsoft word, word Perfect (currently owned by the company Corel), chiWriter, Multi-Edit And other used.

Graphic editors are for processing graphic documents, including diagrams, illustrations, drawings and tables. Allowed to control the size and font of figures, moving figures and letters, the formation of any image. Among the most famous image editors can be called packages Corel DRAW, Adobe PhotoShop and Adobe Illustrator.

Publishing systems combine the possibilities of text and graphic editors have developed capabilities for formatting strips with graphic materials and then printed. These systems are targeted for use in publishing and typesetting systems are called. Because these systems can be called PageMaker products from Adobe and Ventura Publisher of Corel Corporation.

Spreadsheets. Spreadsheet called RFP for processing tables.

The data in the table is stored in the cells located at the intersection of rows and columns. The cells can be stored numbers, formulas and character data. Formula values are set dependent on the contents of one cell to other cells. Changing the contents of a cell resulting in a change of values in the dependent cells.

The most popular PPP of this class are products such as Microsoft Excel, Lotus 1-2-3, Quattro Pro, and others.

Database ManagementSystems.To create a database inside the machine information support uses special IFR - database management system.

Database A set of specially data organized sets stored on disk adding,

database management includes data entry, their correction and manipulation of data, that is, delete, retrieve, update, etc. Developed database applications to ensure the independence, working with them on the specific organization of information in databases. Depending on how these organizations are distinguished: network, hierarchical, distributed, relational database management system

from the available database the most widely used Microsoft Access, Microsoft FoxPro, Paradox (corporation Borland), and the Oracle database company, Informix, Sybase, Modern etc.

Modern IT trends in the professional sphere: medicine, power, etc.

Computers have long been used in medicine. Many modern diagnostic methods based on computer technology. Such methods are surveys, as ultrasound or computed tomography, generally unthinkable without a computer. But in a more "old" methods of examination and diagnostic computers are invading more and more actively. Cardiogram and blood tests, the study of the fundus and dental health ... - It's hard to find an area of medicine in which computers have not been applied to more and more to.

Active, but only diagnostic use of computers in medicine is not limited They are increasingly beginning to be used in the treatment of various diseases -. Starting from the construction of the optimal treatment plan and to manage the various medical facilities during procedures

The information economy has changed many aspects of economic reality, in particular, and the function of money, that of a universal equivalent effort gradually turned into a means of calculation. Virtual banks and payment systems -. The fruit of development of information technologies

in economics and business information technology applied to the processing, sorting and aggregating data for the organization of interaction of actors and computer technology, to meet the information needs for operational communications, etc.

It is understood investment decision in the development of information technologies, as well as other management decisions should take into account economic feasibility. But it turns out that this very convenient to calculate the benefit in using all of the same information technologies. There are models of counting the total economic impact, which allows to take into account, among other things, additional benefits of the introduction of information technologies, scalability and flexibility of the systems, as well as potential risks.

Use of search engines and electronic resources in the professional purposes.

The search engine (Eng. engine) -search it is a computer system designed tofor search information.One of the most well-known applications of search engines - web services to search for text or graphic information in the World WideWeb.There are also systems that can search for files on the FTP-server, goods inonlinestores, information in the Usenetnewsgroups.

To search for information using a search engine user formulates a search request.The search engine's job is to search for the user to find documents that contain any specified keywords, or words, in any way related to the keyword. In this case the search engine generates a search result page. Such a search listing may comprise various types of results, such as web pages, images, audio files. Some search engines also extract information from the appropriate database and web directory.

The search engine is better than more documents that are to relevant the user's request, it will return. Search results may become less relevant due to the nature of algorithms or due to human error. Most popular search engine in the world is Google.

According to the methods of research and service shared by four types of search Systems using crawlers, systems controlled by a person, the hybrid system and the meta-system. The search system architecture typically includes:

· crawler that collects information from Internet sites or from other documents,
· indexer, provides a quick search on the stored information, and
· the search engine - a graphical interface for the user

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Lecture№ 15
ICT Development Prospects(2 hour)

15.0 Aims and objectives

In this lesson, we are going to discuss about: Prospects of development in the IT market: the development of free software. Forming an ecosystem of IT entrepreneurship and supporting small start-up companies. Acceleration and incubation programs. Development of the necessary infrastructure of electronic payments and logistics. Prospects for the development of E-technologies.

15.1 ICT Development Prospects

Prospects of development in the sphere of the IT market: development of the free software. Forming of an ecosystem of IT of entrepreneurship and support small startup of the companies

The free software (SPO, eng. free software also software liber or liber software), free software software, where users have rights ("freedom") on its installation, start-up, free use, study, dissemination and change (improvement) and distribution of copies and results of any changes. If the software has the exclusive rights, the freedom, are declared using the free license.

As a free (freeware) and free software, SPO can be used to obtain and usually free (but the distributor can charge for the obtaining of his copies, delivery channels, media CD-ROMs or additional services). However, freeware is usually distributed as executables without source code is proprietary, and to be free (free software), recipients must be available in source code from which you can create executable files together with the appropriate licenses. Due to the fact that the word "sale" and called the original sale, and distribution of copies for the money, and paid licensing (usually proprietary conditions), some still believe free software is a subset of the free.

Often distinguish between free and open source software (open source) — although the availability of source code for the SPO is required and many open programs are both free. The choice of the name is often associated with the language and purpose of vacancy or openness.

The free software movement began in 1983 when Richard Stallman formed the idea of having freedom to use the software (eng. software freedom) users. In 1985 Stallman founded the free software Foundation to provide organizational structure to promote their ideas.

The business model of the SPO, as a rule, based on the principle of empowerment — for example, new objects of application, training, integration, configuration or certification. At the same time, some business models which work with proprietary software that is not compatible with free software, especially those that force users to pay for the license to legally use a software product.

Programs of acceleration and incubation

Accelerator — a company the business of which is to help other companies (residents of the accelerator).

Accelerators offer residents a structured program that helps the team to hone the business model to get the necessary contacts and increase sales. The program lasts from 3 months to half a year. The accelerator typically is a coworking space, where resident companies can be during acceleration.

The business model accelerator

Accelerators make the receipt of shares in the company and the subsequent sale of this stake, so often work in conjunction with the venture Fund (the Fund makes investments, the accelerator educational program, networking, infrastructure).

For example, the accelerator received a share in the amount of 10% of the project N. a Project N went through the acceleration program, has grown to become a significant player in the market. Google decided to buy the startup for $10 million In this case, the accelerator receives 10% of the purchase amount is $1 million.

Program incubation – assistance in the development, promotion and financing for established small innovative or entrepreneurial companies.

To obtain resident status for the incubation program small businesses must meet the requirements:

• be registered as a legal entity or individual entrepreneur

• period of activity of a small business entity with the state registration till the moment of submission of the application should not exceed one year

not carry out the following activities:

• financial, insurance services
• retail and wholesale trade
•building
• medical services
• catering
• real estate transactions
• production of excisable goods
• production and sale of minerals
• gambling.

During the implementation of the incubation program provided office space or workplace, and end up consulting services on business issues.

Development of necessary infrastructure of electronic payments and logistics

E-logistics is the management and optimization of information flows that arise in the supply chain management of products from producer to consumer. The review considers the main components of e-logistics: the international system of commodity numbering codes, electronic data interchange (EDI), global data synchronization network (GDSN), the role of international and local product catalogues.

"E-logistics" – a study of current trends in development of logistics management e-logistics and the mastery of techniques and approaches in designing and managing the supply chain using modern information, communication and computer technology (ICT).

Examines theoretical and applied aspects of electronic logistics as part of overall concept of supply chain management with the use of active learning methods (discussion problems, case studies and group work

Payment system — a set of procedures enabling the transfer of funds.

It is generally understood that through payment systems money is transferred. If we approach translation from a legal point of view, in most cases there is a transfer of debt: means that the payment system should one of the customers, it becomes must to another client.

Payment systems are a substitute for cash transactions in the implementation of domestic and international payments and is one of the basic services provided by banks and other specialized financial institutions. The biggest service of this kind is the system SWIFT — society for worldwide interbank financial telecommunication, an international interbank transfer system information and make payments.

Advanced forms of payment systems are the financial procedures carried out via ATMs, payment kiosks, POS terminals, and cards with a stored cash value transaction in the foreign exchange markets, futures, derivatives and options.

Electronic payment systems are a sub-set of payment systems that ensure the implementation of electronic transfer of payments through the payment network or the chips.

In an average day through the payment system of Kazakhstan is of 119.3 thousand transactions in the amount of 753,8 billion tenge.

The largest payment systems are WebMoney — system of instant payments, Yandex.Money, Qiwi payment service, payment terminals (indoor and outdoor).

WebMoney is a universal tool for calculations in the Network, the whole financial relationships, which today are used by millions of people around the world. Kazakhstan takes the 4th place in the number of registrations and probably other indicators too. Kazakhstan is ahead of only Russia, Ukraine and Belarus.

Yandex.Money is the largest electronic payment system in Runet, which offers simple secure methods of payment for goods and services. Are the offices of Alliance Bank and branch transfer system CONTACT, as well as terminals Quickpay. Most Kazakhstanis pay via Yandex.Money online game, entertainment, extra opportunities in social networks and online advertising.

Qiwi payment service designed to pay for everyday services from mobile communications and utilities to Bank loans.

The peculiarity of Qiwi service is that payments can be made in cash in the network of QIWI payment terminals and via the Internet service and the app for mobile devices. In fact, the user can make a payment from your account in the system being in a convenient place and in convenient time.

At the moment, with the help of the payment system in Kazakhstan will be possible to replenish the account in favor of the 157 companies-providers such as utilities, Internet, cellular communication, IP-telephony, various products through catalogs, including the services of the three thousand companies that are connected to QIWI-wallet.

Also on the territory of Kazakhstan has a QIWI-purse in two languages.

Payment terminal — a hardware-software complex providing reception of payments from individuals in self-service mode. For a payment terminal is characterized by a high degree of autonomy in its work.

Using terminal you can pay for mobile communication, utility services, Internet service providers, repay loans, replenish the Bank account.

Kazakhstan companies providing services in the field of payment terminals: Quickpay, Taulink of Asia Terminal ComepayCyberPlat, TelePay.

Quickpay — the company was founded in 2003. The company started its activity as a software developer. For the first time in Russia the company developed software for touch-screen payment terminals on the operating system "Linux". In 2007, the company entered the market of Kazakhstan.

Taulinkcompany started its activity in the Republic of Kazakhstan in 2006 by the commercial launch of the first business decisions within the international telecommunications exhibition KITEL-2006. System for accepting payments TAULINK represented in more than 8 200 sales and service outlets in 507 settlements of Kazakhstan.

"Asia Terminal" company exists on the market since 2006. Under the brand "Asia Terminal" has been known since 2008. Is the production of a full (closed) cycle – from design and cutting to sales, software and service.

Comepay (Kampey) — the company was founded in 2006, operates in the market under the registered brand name "Comepay" and is one of the leading companies of the Russian Federation for reception of instant payments.

Organized more than 2000 service providers — from utilities companies to leading domestic banks that are connected to more than 38 000 points of payment and more than 25 000 payment terminals.

"CyberPlat-Kazakhstan" company was founded on 15 September 2005. The first payment was made in April 2006. Currently, the network of points of reception of payments on the territory of Kazakhstan has more than 3,100 outlets, which carry out reception of payments in favor of mobile operators and Internet service through the payment system CyberPlat.

TelePay — the company exists since 2004. The system used the latest in telecommunications and banking technology.

Recently introduced payment system Wooppay is more than just an electronic wallet. This is an indispensable tool in addressing any daily concerns, leisure, shopping or travel planning. This — Multibank system. This means that you can choose which of the banks-partners of the system. The money credited to your purse, lie in the chosen Bank and their electronic rights are in your wallet that provides 100% security for your money.

Director of marketing Wooppay Dmitry Prihozhan in an interview CabMarket — about the history of the origin of the company and plans for the future.

There are also disadvantages: in Karaganda hard to find someone who is not in Wooppay. So, if you want to gather a great company and not to talk about work, you need to try hard, because each second in Karaganda in any way associated with our company.

So far we have implemented only a small part of what you planned, but every day we are working on new services, add features and remove bugs. Every week on the website filled with changes and services become more convenient. Anyone interested — sign up, enjoy and stay tuned. And on all issues, you can contact our customer service Department.

Prospects of development of E-technologies

The state program "Information Kazakhstan - 2020"

The decree of the President of the Republic of Kazakhstan dated 1 February 2010 № 922 "Strategic plan of development of Kazakhstan till 2020"

The purpose of the Program: creation of conditions for transition to Basic information society.

Program objectives:

1) the Development of it
2) ensure the availability of information and communication infrastructure
3) automation of the activities of state bodies and e-services
4) open government
5) the Development of domestic information space.

Target indicators:

1) the share of the ICT sector in GDP in 2020 - 4 %
2) quantity updated standard curricula of it professions in accordance with professional standards: technical and vocational UNIVERSITY in 2020 – 6
3) the level of digital literacy in 2020 - 80 %
4) density of Internet users per 100 inhabitants in 2020 - 75 %
5) the coverage of digital terrestrial television of Kazakhstan's population in 2020 – 95%
6) the coverage of the state radio channels in the FM band "Kazakh radio" and "Shalkar", in 2020 - 95%
7) the effectiveness ratio of use of information technologies, which developed the target architecture (ROA-return on IT assets) to the year 2020 – 30
8) the level of Kazakhstan's development index of "e-government" in 2020 - among the first 25 countries
9) index the e-participation of the Republic of Kazakhstan in 2020 - among the first 20 countries
10) the number of available local media in Kazakhstan to 2020 – 2280
11) the proportion of the population satisfying the basic information needs at the expense of the domestic media (according to sociological research), in 2020 – 53%

Questions:

1. What are the differences between programs of acceleration and incubation?
2. What are prospects of development of E-technologies?
3. Are there prospects of development in the sphere of the IT market?
4. Development of necessary infrastructure of electronic payments and logistics.

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