UNIT 2. OPERATING SYSTEMS

I.   Make sure that you know the following words:

computer hardware, service, system software, application programs, function, processor time, printing, input and output, application code, execute, device, cellular phone, supercomputer, web server, Microsoft Windows, Windows Phone, to access a computer, point of view

II.   Learn the following terms:

- time-sharing operating system   операционная система, работающая в режиме разделения времени

- accounting software   бухгалтерское ПО

- memory allocation   распределение памяти

- system call   системный вызов

- real-time operating system   операционная система реального времени

- to use specialized scheduling algorithm использовать специальный алгоритм планирования

- event-driven design   событийно-управляемый проект

- clock interrupt   прерывание по таймеру

- multiple-user access to computer   многопользовательский доступ к компьютеру

- to run programs at the same time   исполнять программы одновременно

- pre-emptive multitasking   вытесняющая многоза-дачность

- cooperative multitasking   кооперативная (сов-местная) многозадачность

- distributed operating system   распределённая операцион-

- networked computer   сетевой компьютер
- to carry out distributed computations   выполнять распределенные
                                                              вычисления
- cloud computing   "облачные" вычисления
- embedded operating system   встроенная операционная
                                                              система

III.   Read and translate the text:

An **operating system** (**OS**) is software that manages computer hardware resources and provides common services for computer programs. The operating system is an essential component of the system software in a computer system. Application programs usually require an operating system to function.

Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and will frequently make a system call to an OS function or be interrupted by it. Operating systems can be found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers. Examples of popular modern operating systems include Android, BSD, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone, and IBM z/OS. All these, except Windows, Windows Phone and z/OS, share roots in UNIX.

Types of operating systems

A real-time operating system is a multitasking operating system that aims at executing real-time applications. Real-time operating systems often use specialized scheduling algorithms so that they can achieve a deterministic nature of behavior. The main objective of real-time operating systems is their quick and predictable response to events. They have an event-driven or time-sharing design and often aspects of both. An event-driven system switches between tasks based on their priorities or external events while time-sharing operating systems switch tasks based on clock interrupts.

A multi-user operating system allows multiple users to access a computer system at the same time. Time-sharing systems and Internet servers can be classified as multi-user systems as they enable multiple-user access to a computer through the sharing of time. Single-user operating systems have only one user but may allow multiple programs to run at the same time.

A multi-tasking operating system allows more than one program to be running at the same time, from the point of view of human time scales. A single-tasking system has only one running program. Multi-tasking can be of two types: pre-emptive and cooperative. In pre-emptive multitasking, the operating system slices the CPU time and dedicates one slot to each of the programs. Unix-like operating systems such as Solaris and Linux support pre-emptive multitasking, as does AmigaOS. Cooperative multitasking is achieved by relying on each process to give time to the other processes in a defined manner. 16-bit versions of Microsoft Windows used cooperative multitasking. 32-bit versions of both Windows NT and Win9x, used pre-emptive multitasking. Mac OS prior to OS X used to support cooperative multitasking.

A distributed operating system manages a group of independent computers and makes them appear to be a single computer. The development of networked computers that could be linked and communicate with each other gave rise to distributed computing. Distributed computations are carried out on more than one machine. When computers in a group work in cooperation, they make a distributed system.

In an o/s, distributed and cloud computing context, templating refers to creating a single virtual machine image as a guest operating system, then saving it as a tool for multiple running virtual machines. The technique is used both in virtualization and cloud computing management, and is common in large server warehouses.

Embedded operating systems are designed to be used in embedded computer systems. They are designed to operate on small machines like PDAs with less autonomy. They are able to operate with a limited number of resources. They are very compact and extremely efficient by design. Windows CE and Minix 3 are some examples of embedded operating systems.

Операционная система (ОС) - это программное обеспечение, которое управляет аппаратными ресурсами компьютера и предоставляет общие службы для компьютерных программ. Операционная система является важным компонентом системного программного обеспечения в компьютерной системе. Прикладным программам обычно для функционирования требуется операционная система.

Операционные системы с разделением времени планируют задачи для эффективного использования системы и могут также включать программное обеспечение для учета затрат на процессорное время, массовое хранение, печать и другие ресурсы.

Для аппаратных функций, таких как ввод и вывод, а также распределение памяти, операционная система действует как посредник между программами и аппаратным обеспечением компьютера, хотя код приложения обычно выполняется непосредственно аппаратным обеспечением и часто выполняет системный вызов функции ОС или прерывается ею. Операционные системы можно найти практически на любом устройстве, содержащем компьютер — от сотовых телефонов и игровых консолей до суперкомпьютеров и веб-серверов. Примерами популярных современных операционных систем являются

Android, BSD, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone и IBM z/OS. Все они, за исключением Windows, Windows Phone и z/OS, имеют общие корни в UNIX.

Типы операционных систем

Операционная система реального времени - это многозадачная операционная система, предназначенная для выполнения приложений реального времени. Операционные системы реального времени часто используют специализированные алгоритмы планирования, чтобы обеспечить детерминированный характер поведения. Основной целью операционных систем реального времени является их быстрое и предсказуемое реагирование на события. Они имеют дизайн, ориентированный на события или совместное использование времени, а часто и на то, и на другое. Управляемая событиями система переключается между задачами на основе их приоритетов или внешних событий, в то время как операционные системы с разделением времени переключают задачи на основе тактовых прерываний.

Многопользовательская операционная система позволяет нескольким пользователям получать доступ к компьютерной системе одновременно. Системы с разделением времени и интернет-серверы можно классифицировать как многопользовательские системы, поскольку они обеспечивают многопользовательский доступ к компьютеру посредством совместного использования времени. Однопользовательские операционные системы имеют только одного пользователя, но могут разрешать одновременный запуск нескольких программ.

Многозадачная операционная система позволяет запускать более одной программы одновременно, с точки зрения человеческих временных масштабов. Однозадачная система имеет только одну запущенную программу. Многозадачность может быть двух типов: упреждающая и совместная. При упреждающей многозадачности операционная система сокращает процессорное время и выделяет по одному слоту для каждой из программ. Unix-подобные операционные системы, такие как Solaris и Linux, поддерживают упреждающую многозадачность, как и AmigaOS. Совместная многозадачность достигается за счет того, что каждый процесс определенным образом выделяет время другим процессам. 16-разрядные версии Microsoft Windows использовали совместную многозадачность. 32-разрядные версии Windows NT и Win9x использовали упреждающую многозадачность. Mac OS до OS X использовалась для поддержки совместной многозадачности.

Распределенная операционная система управляет группой независимых компьютеров и создает впечатление, что они являются одним компьютером. Развитие сетевых компьютеров, которые могли быть связаны между собой и взаимодействовать друг с другом, привело к появлению распределенных вычислений. Распределенные вычисления выполняются более чем на одной машине. Когда компьютеры в группе работают совместно, они создают распределенную систему.

В контексте o/s, распределенных и облачных вычислений создание шаблонов относится к созданию единого образа виртуальной машины в качестве гостевой операционной системы, а затем сохранению его в качестве инструмента для нескольких запущенных виртуальных машин. Этот метод используется как в виртуализации, так и в управлении облачными вычислениями и широко распространен в крупных серверных хранилищах.

Встроенные операционные системы предназначены для использования во встроенных компьютерных системах. Они предназначены для работы на небольших машинах, таких как КПК, с меньшей автономностью. Они способны работать с ограниченным количеством ресурсов. Они очень компактны и чрезвычайно эффективны по конструкции. Windows CE и Minix 3 - вот некоторые примеры встроенных операционных систем.

IV. Answer the following questions:
1. What is an operating system?
2. What does it provide?
3. What tasks do time-sharing systems schedule for efficient use of the system?
4. When does an operating system act as an intermediary between programs and a computer?
5. What kind of devices can an operating systems be found on?
6. What are the examples of popular modern operating systems?
7. What does a real-time operating system aim at?
8. What is the main objective of real-time operating systems?
9. How does a multi-user operating system allow multiple users to access a computer?
10. What is the main feature of a single-user operating system?
11. What are the main types of multi-tasking operating systems?
12. What operating systems support pre-emptive multitasking?
13. What operating system manages a group of independent computers and makes them appear to be a single computer?
14. When do computers make a distributed system?
15. What technique is used both in virtualization and cloud computing management?
16. What type of machines are embedded operating systems designed to operate on?

V. Retell the text briefly using the new words and expressions from ex.II.

An operating system (OS) is software that manages computer hardware resources and provides common services for computer programs. Operating systems can be found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers. Examples of popular modern operating systems include Android, BSD, iOS, Linux, OS X, QNX, Microsoft Windows, Windows Phone, and IBM z/OS. All these, except Windows, Windows Phone and z/OS, share roots in UNIX.

A real-time operating system is a multitasking operating system that aims at executing real-time applications.

A multi-user operating system allows multiple users to access a computer system at the same time.

A multi-tasking operating system allows more than one program to be running at the same time, from the point of view of human time scales.

A distributed operating system manages a group of independent computers and makes them appear to be a single computer.

VI. Fill in the gaps with the words given below. Use the dictionary if necessary.

a) *free software, b) be unproductive, c) programmer, d) the first version, e) UNIX,*

f) *project, g) system software, h) computer science student, j)"Linux" k) user space, k) BSD, l) ported*

The GNU Project was started by activist and (c) Richard Stallman with the goal of creating a complete (a) replacement to the proprietary (e) operating system. While the (f) was highly successful in duplicating the functionality of various parts of UNIX, development of the GNU Hurd kernel proved to (b). In 1991, Finnish computer science student Linus Torvalds, with cooperation from volunteers collaborating over the Internet, released the (d) of the Linux kernel. It was soon merged with the GNU (k) *user space* components and (g) to form a complete operating system. Since then, the combination of the two major components has usually been referred to as simply "(j)" by the software industry. The Berkeley Software Distribution, known as (k) *BSD*, is the UNIX derivative distributed by the University of California, Berkeley, starting in the 1970s. Freely distributed and (l) to many minicomputers, it eventually also gained a following for use on PCs, mainly as FreeBSD, NetBSD and OpenBSD.

(GNU is Not Unix - операционная система GNU, Unix-совместимая ОС, разрабатываемая FSF).

Grammar revision: The –ing form as a noun; after prepositions.

VII. Rewrite each of these sentences like this:
An important function of the operating system is to manage the computer's resources.
Managing the computer's resources is an important function of the operating system.
1. The role of the operating system is to communicate directly with the hardware.
2. One of the key functions of the operating system is to establish a user interface.
3. An additional role is to provide services for applications software.

4. Part of the work of mainframe operating system is to support multiple programs and users.
5. The task in most cases is to facilitate interaction between a single user and a PC.
6. One of the most important functions of a computer is to process large amounts of data quickly.
7. The main reason for installing more memory is to allow the computer to process data faster.

VIII. Complete these sentences with the correct form of the verb: infinitive or –ing form.
1. Don't switch off without (close down) your PC.
2. I want to (upgrade) my computer.
3. He can't get used to (log on) with a password.
4. You can find information on the Internet by (use) a search engine.
5. He objected to (pay) expensive telephone calls for Internet access.
6. He tried to (hack into) the system without (known) the password.
7. You needn't learn how to (program) in HTML before (design) webpages.
8. I look forward to (input) data by voice instead of (use) a keyboard.

IX. Look through the text. Make a short summary of it:
UNIX and UNIX-like operating systems

Unix was originally written in assembly language. Ken Thompson wrote B, mainly based on BCPL, based on his experience in the MULTICS project. B was replaced by C, and Unix, rewritten in C, developed into a large, complex family of inter-related operating systems which have been influential in every modern operating system.

The UNIX-like family is a diverse group of operating systems, with several major sub-categories including System V, BSD, and Linux. The name "UNIX" is a trademark of The Open Group which licenses it for use with any operating system that has been shown to conform to their definitions. "UNIX-like" is commonly used to refer to the large set of operating systems which resemble the original UNIX.

Unix-like systems run on a wide variety of computer architecture. They are used heavily for servers in business, as well as workstations in academic and engineering environments. Free UNIX variants, such as Linux and BSD, are popular in these areas.

Four operating systems are certified by The Open Group (holder of the Unix trademark) as Unix. HP's HP-UX and IBM's AIX are both descendants of the original System V Unix and are designed to run only on their respective vendor's hardware. In contrast, Sun Microsystems's Solaris Operating System can run on multiple types of hardware, including x86 and Sparc servers, and PCs. Apple's OS X, a replacement for Apple's earlier (non-Unix) Mac OS, is a hybrid kernel-based BSD variant derived from NEXTSTEP, Mach, and FreeBSD.

A subgroup of the Unix family is the Berkeley Software Distribution family, which includes FreeBSD, NetBSD, and OpenBSD. These operating systems are most commonly found on webservers, although they can also function as a personal computer OS. The Internet owes much of its existence to BSD, as many of the protocols now commonly used by computers to connect, send and receive data over a network were widely implemented and refined in BSD. The World Wide Web was also first demonstrated on a number of computers running an OS based on BSD called NextStep.

BSD has its roots in Unix. In 1974, University of California, Berkeley installed its first Unix system. Over time, students and staff in the computer science department there began adding new programs to make things easier, such as text editors. When Berkeley received new VAX computers in 1978 with Unix installed, the school's undergraduates modified Unix even more in order to take advantage of the computer's hardware possibilities. The Defense Advanced Research Projects Agency of the US Department of Defense took interest, and decided to fund the project. Many schools, corporations, and government organizations took notice and started to use Berkeley's version of Unix instead of the official one distributed by AT&T.

X.   Translate the text in written form:

Windows 10 is a personal computer operating system developed and released by Microsoft as part of the Windows NT family of operating systems. It was officially unveiled in September 2014 following a brief demo at Build 2014. The first version of the operating system entered a public beta testing process in October 2014, leading up to its consumer release on July 29, 2015.

Windows 10 introduces what Microsoft described as "universal apps"; expanding on Metro-style apps, these apps can be designed to run across multiple Microsoft product families with nearly identical code—including PCs, tablets, smartphones, embedded systems, Xbox One, Surface Hub and Windows Holographic. The Windows user interface was revised to handle transitions between a mouse-oriented interface and a touchscreen-optimized interface based on available input devices—particularly on 2-in-1 PCs; both interfaces include an updated Start menu which incorporates elements of Windows 7's traditional Start menu with the tiles of Windows 8. The first release of Windows 10 also introduces a virtual desktop system, a window and desktop management feature called Task View, the Microsoft Edge web browser, support for fingerprint and face recognition login, new security features for enterprise environments, and DirectX 12 and WDDM 2.0 to improve the operating system's graphics capabilities for games.

Microsoft described Windows 10 as an "operating system as a service" that would receive ongoing updates to its features and functionality, augmented with the ability for enterprise environments to receive non-critical updates at a slower pace, or use long-term support milestones that will only receive critical updates, such as security patches, over their five-year lifespan of mainstream support. Terry Myerson, executive vice president of Microsoft's Windows and Devices Group,

argued that the goal of this model was to reduce fragmentation across the Windows platform, as Microsoft aimed to have Windows 10 installed on at least one billion devices in the two to three years following its release.

As of June 2016, Windows 10 use is on the rise, with previous versions of Windows declining in their share of total usage as measured by web traffic. The operating system is running on 350 million active devices and has an estimated usage share of 22% on personal computers and 12% across all platforms (PC, mobile, tablet, and console).