Unit 5

The Heart and Soul of a Computer

OPERATING SYSTEMS

Pre-reading Activities

In this unit, you will

- improve your understanding of the target technical words.
- learn about various supporting topic sentences in writing.
- learn how to preview a reading comprehension passage through pre-reading questions to improve comprehension.
- be familiar with the operating system in a computer.

I. Target Academic Vocabulary

Check out the meanings and functions of the target academic words in a monolingual and bilingual dictionary.

Generate (v)

Ballistics (n)

Summon up (v)

Typical (adj)

Scrap (v)

Permanent (adj)

Manage (v)

Husband (v)

Vendor (n)

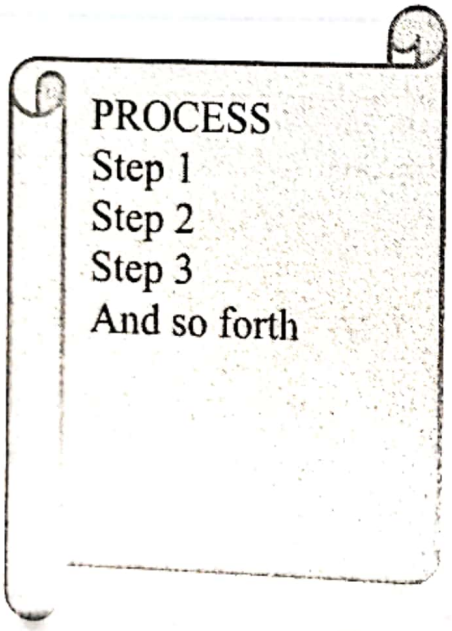
II. Writing development

Types of Enumerators

There are two types of enumerators, *process* and *chronology* (narrative) from which the 'process' is introduced in this unit.

Process

The arrangement of supporting sentences in step-by-step sequence shows the way in which a thing is made or done. This sequence is called a 'process'. An example in this unit is the two functions of the operating system.



Note: the most common enumerators in a process paragraph are *step, stage* and *phase*. Listing signals are like *first, second, third, next, last* and so forth.

The first, The second (The next) The third (The next) The last	Step Stage Phase

III. Pre-reading questions:

Read and respond to the questions below, and then discuss them in pair/group.

1. Do you know about the history of how computer was invented?

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2. What are the functions of the operating system?

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3. What is the difference between Mac and Windows operating system?

IV. Reading comprehension passage

This passage discusses the operating systems and their features as well as the kind of operating systems used in a computer.

OPERATING SYSTEMS

1. History

In the 1940s, electronic digital systems had no operating systems. Electronic systems of this time were programmed on rows of mechanical switches or by jumper wires on plug boards. The aim of these systems was to generate ballistic tables for the military or control the printing of payroll checks from data on punched paper cards. After programmable general-purpose computers were invented, machine languages (consisting of strings of binary digits 0's and 1's on punched paper tape) were introduced and speeded up the programming process.

The purpose of early computers was to perform a series of single tasks like a calculator. Basic operating system features were developed in the 1950s, such as resident monitor functions that could automatically run different programs in succession to speed up processing. Operating systems did not exist in their modern and

advanced forms until the early 1960s. Hardware features were added to enable the use of runtime libraries, interrupts, and parallel processing. When personal computers became popular in the 1980s, operating systems were famous for them and were used on larger computers.

2. Operating system powered computers

When you turn on your computer, it is nice to think that you are in control. There is the trusty computer mouse, which you can move it anywhere on the screen, summon up your music library or Internet browser very fast. Although it is easy to feel like a director in front of your desktop or laptop, there is a lot going on inside, and the Real Man in control behind the curtain handling the necessary tasks is the operating system.

Most desktop PCs or laptops come pre-loaded with Microsoft Windows, while Macintosh computers come pre-loaded with Mac OS X, and many corporate servers use the Linux or UNIX operating systems. The operating system is the first thing loaded onto the computer, and without the operating system, a computer is useless.

More recently, operating systems have started to pop up in smaller computers such as smart phones. The computers used in these little devices are powerful enough that they can now actually run an operating system and applications. The computer in a typical modern smart phone is now more powerful than a desktop computer built 20 years ago, so this progression makes sense and is a natural development. One of the reasons operating systems are made out of portable code rather than permanent physical circuits is that they can be changed or

modified without having scraped the whole device. The purpose of an operating system is to organize and control hardware and software so that the device operates in a flexible but predictable way.

However, not all computers have operating systems. The computer that controls the microwave oven in your kitchen, for example, does not need an operating system. It has one set of tasks to perform, very straightforward input to expect (a numbered keypad and a few pre-set buttons) and simple, never-changing hardware to control. For a computer like this, an operating system would be unnecessary baggage, driving up the development and manufacturing costs significantly and adding complexity where none is required. Instead, the computer in a microwave oven simply runs a single hard-wired program all the time.

For other devices, an operating system creates the ability to: (a) serve a variety of purposes; (b) interact with users in more complicated ways; and (c) keep up with needs that change over time. Now that we realize the importance of the operating system in computers, the next section focuses on the functions of the operating system.

3. *Operating system functions*

At the simplest level, an operating system goes through two steps: First, it manages the hardware and software resources of the system. In a desktop computer, these resources include the processor, memory, disk space and more (on a smart phone, they include the touch screen, the address book, the battery and the network connection). Second, it

provides a stable, consistent way for applications to deal with the hardware without knowing all the details of the hardware.

The first step, managing the hardware and software resources, is very important, as various programs and input methods compete for the attention of the **Central Processing Unit** (CPU) and demand memory, storage and Input/Output (I/O) bandwidth for their own purposes. In this capacity, the operating system plays the role of the good parent, making sure that each application gets the necessary resources while playing nicely with all the other applications, as well as husbanding the limited capacity of the system to the greatest good of all the users and applications.

The second step, providing a consistent application interface, is especially important if there is to be more than one of a particular type of computer using the operating system, or if the hardware making up the computer is ever open to change. A consistent Application Program Interface (API) allows a software developer to write an application on one computer and has a high level of confidence that it will run on another computer of the same type, even if the amount of memory or the quantity of storage is different on the two machines.

Even if a particular computer is unique, an operating system can ensure that applications continue to run when hardware upgrades and updates occur. This is because the operating system - not the application - is charged with managing the hardware and the distribution of its resources. One of the challenges facing developers is keeping their operating systems flexible enough to run hardware from the thousands

of vendors manufacturing computer equipment. Today's systems can accommodate thousands of different printers, disk drives and special peripherals in any possible combination.

4. *Types of operating systems*

Within the broad family of operating systems, they are generally categorized into four types based on computers, and they control the sort of applications they support. The categories are:

A) **Real-time operating system** (RTOS) - Real-time operating systems are used to control machinery, scientific instruments and industrial systems. RTOS has very little user-interface capability, and no end-user utilities, since the system will be a "sealed box" when delivered for use. A very important part of an RTOS is managing the resources of the computer so that a particular operation executes similarly, any time it occurs. In a complex machine, the available system resources make a part move more quickly but it may be catastrophic as the system is busy and does not move at all.

B) **Single-user, single task** - As the name implies, this operating system is designed to manage the computer so that one user can effectively do one thing at a time. The Palm OS for palm handheld computers is a good example of a modern single-user, single-task operating system.

C) **Single-user, multi-tasking** - This is the type of operating system most people use on their desktop and laptop computers today. Microsoft's Windows and Apple's Mac OS platforms are both

examples of operating systems that will let a single user have several programs in operation at the same time. For example, it is entirely possible for a Windows user to be writing a note in a word processor while downloading a file from the Internet and printing the text of an e-mail message all at the same time.

D) **Multi-user** - A multi-user operating system allows many different users to take advantage of the computer's resources simultaneously. The operating system must make sure that the requirements of its various users are balanced, and that each of the programs they are using has sufficient and separate resources so that a problem with one user does not affect the entire community of users. Unix, VMS and mainframe operating systems, such as MVS, are examples of multi-user operating systems.

Post-reading Activities

I. Reading comprehension

Directions: Mark each statement as T (True), F (False), or NG (Not Given) to the information in the reading comprehension passage.

---------1. The operating system has been a part of even the earliest digital systems.

---------2. Personal computers were introduced in 1960s.

---------3. The computer mouse was invented right after the emergence of an operating system.

---------4. All computers have the operating system to control their operations.

---------5. The central processing unit controls the hardware and software resources.

---------6. A software developer can write an application on a system with API's.

---------7. Three types of operating systems are discussed in this unit.

---------8. The aim of multi-user operating system is to allow many people to use their desktop computers and laptops easily.

Questions ***9-15:*** Choose the appropriate letter ***A-C.***

9. Which one of the following does NOT fit the electronic systems based on the passage?

   A. They start with jumper wires.

   B. They are started remotely.

   C. They turn on by mechanical switches.

10. The basic operating systems can speed up the processing through……

    A. resident monitoring.

    B. functioning features.

    C. parallel processing.

11. Linux or UNIX operating systems were commonly used by…….

    A. Windows users.

    B. Macintosh users.

    C. corporate servers.

12. All of the options are TRUE but…..

A. Operating systems perform different services.

B. Operating systems help users to interact.

C. Operating systems help users interact with each other on the Internet.

13. The function of operating systems is NOT .....

A. Providing a consistent way to work with hardware without detailed information.

B. Working with hardware and software resources of the system.

C. Playing an essential role for the necessary resources of the application.

14. Which one of the following options is NOT true for real-time operating system?

A. Controlling machinery and scientific instruments.

B. Using this system in industrial related operations.

C. Using this system to control desktop computers.

15. Which of the following categories of operating system is NOT true?

A. The function of multi-user O.S. is that many users can use the computer resources at the same time.

B. The use of single user O. S., single task means that a user can do one thing at the same time.

C. The benefit of single-user O. S., multi-tasking is that many users can do one task at a time.

II. Vocabulary activities

Directions: Read each sentence on operating systems stated below. Circle the one word or phrase in parentheses ( ) that has the

same meaning as the underlined word in the sentence. Compare your answers with a partner.

1. Electronic systems of this time were programmed on rows of mechanical switches (*tools/instruments/electronic device*) or by jumper wires on plug boards.
2. After programmable general-purpose computers were invented, machine languages (consisting of strings of the binary digits 0's and 1's on punched paper tape) were introduced that speeded up (*destroyed/decreased/increased*) the programming process.
3. There is the trusty (*failing/unfailing/dependable)* computer mouse, which you can move anywhere on the screen, summon up your music library or Internet browser very fast.
4. For a computer like this, an operating system would be unnecessary baggage, driving up (*improving/increasing/managing)* the development and manufacturing costs significantly and adding complexity where none is required.
5. One of the challenges (*parts/solutions/problems*) facing developers is keeping their operating systems flexible enough to run hardware from the thousands of vendors manufacturing computer equipment.
6. Today's systems can accommodate (*exclude/include/introduced*) thousands of different printers, disk drives and special peripherals in any possible combination.
7. In a complex machine, the available system resources makes a part move more quickly but it may be catastrophic (*tragic/vital/unessential*) as the system is busy and does not move at all.
8. It is entirely (*basically/to some extent/completely*) possible for a

Windows user to be writing a note in a word processor while downloading a file from the Internet while printing the text of an e-mail message.

III. Writing development activities

Directions: Analyze the model paragraph below by filling in all the blank spaces that follows.

Model paragraph 1

At the simplest level, an operating system goes through two steps. *First*, it manages the hardware and software resources of the system. In a desktop computer, these resources include the processor, memory, disk space and more (on a smart phone, they include the keypad, the screen, the address book, the phone dialer, the battery, and the network connection). *Second*, it provides a stable, consistent way for applications to deal with the hardware without having to know all the details of the hardware.

1.What is the key word in the topic sentence helping readers understand that the paragraph is describing a *process*?

2.What are the listing signals used in the model paragraph 1 above?

Model paragraph 2

The first step, managing the hardware and software resources, is very important, as various programs and input methods compete for the

attention of the **Central Processing Unit** (CPU) and demand memory, storage and Input/Output (I/O) bandwidth for their own purposes. The second step, providing a consistent application interface, is especially important if there is to be more than one of a particular type of computer using the operating system, or if the hardware making up the computer is ever open to change.

1. Can you find any enumerative listening signals?

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2. Are there any enumerators used in the model paragraph 2?
