COMP30640 Operating Systems: Quiz 1

Exercise 2 – Which of the following are correct? An Operating System is:

1. A piece of software
2. A piece of hardware sipped with your computer
3. A program running at all times on the computer
4. A graphical user interface

Sample Solution 2

1. Yes. An OS is a large software system.
2. No.
3. Yes. Most OS run constantly (at least in the background) on the computer.
4. No. A GUI is one of the component of the OS not the whole OS.

Exercise 3 – How are layered OSs different to monolithic OSs?

Sample Solution 3

In a layered OS each OS component is implemented within a different layer. Each layer has its own interface that allows each layer to be tested and debugged separately. Also, it allows a designer to change each layer implementation without needing to modify the other layers.

Exercise 4 – Design Goals of OS

Which operating system goals given below correspond to each of the following characteristics?

OS Goals:

- Robustness
- Scalability
- Security
- Portability
- Extensibility

OS Characteristics

1. Users cannot access services of information without proper authorisation.
2. The operating system supports devices that were not available at the time of its design.
3. Hardware failure does not necessarily cause the system to fail.
4. The operating system runs on a variety of hardware configurations.
5. System performance increase steadily when additional memory and processors are added.

Sample Solution 4

- **Robustness:** Hardware failure does not necessarily cause the system to fail.
- **Scalability:** System performance increase steadily when additional memory and processors are added.
- **Security:** Users cannot access services of information without proper authorisation.
- **Portability:** The operating system runs on a variety of hardware configurations.
- **Extensibility:** The operating system supports devices that were not available at the time of its design.

Exercise 5 – OS Components

Which operating system components perform each of the following operations?

1. Write to disk
2. Determine which process will run next.
3. Determine where in memory a new process should be placed.
4. Organise files on disk.
5. Enable one process to send data to another.

Sample Solution 5

- Write to disk*: I/O Management*
- Determine which process will run next: *Scheduling*
- Determine where in memory a new process should be placed: *Memory management*
- Organise files on disk: *File system*
- Enable one process to send data to another: *Inter-process communication*

Exercise 6 – Why do layered OSs tend to be less efficient than monolithic OSs?

Sample Solution 6

In layered OSs, several calls may be needed to communicate between the layers, whereas there is no such overhead in monolithic OSs.

Exercise 7

Which of the following statements are not true?

A. The operating system kernel consists of all system and application programs in a computer.
B. A system call is triggered by applications.
C. There is no universally accepted definition of an operating system.
D. System calls can be run in either user mode or kernel mode.

Sample Solution 7

Ans: A, D

Exercise 8 –What is the defining characteristic of a monolithic operating system?

Sample Solution 8

Every component of the operating system is contained in the kernel.

Exercise 9 –Why do monolithic operating systems tend to be efficient?

Sample Solution 9

Tight integration: few calls cross from user space to kernel space.