

# ICS Assignment 6

Name: \_\_\_\_\_ ID: \_\_\_\_\_

- ( C ) A program becomes a \_\_\_\_\_ when it is selected by the operating system and brought to the hold state.  
(A) process (B) partition (C) job (D) deadlock
- ( C ) In \_\_\_\_\_, only one program can reside in memory for execution.  
(A) multi-programming (B) paging (C) mono-programming  
(D) partitioning
- ( B ) The \_\_\_\_\_ manager is responsible for archiving and backup.  
(A) device (B) file (C) memory (D) process
- ( A ) \_\_\_\_\_ is a program that facilitates the execution of other programs.  
(A) An operating system (B) A queue (C) Hardware  
(D) An application program
- ( D ) A process in the \_\_\_\_\_ state can go to either the ready, terminated or waiting states.  
(A) hold or running (B) virtual (C) hold (D) running

- How is a program related to a job? How is a job related to a process? How is a program related to a process?

**Sol:**

A program is a non-active set of instructions stored on a disk and does not become a job until it is selected for execution. A job is a program that is scheduled for execution and does not become a process until it actually gets loaded into memory and starts executing.

- A multi-programming operating system uses paging. The available memory is 60 MB divided into 15 frames, each of 4 MB. The first program needs 13 MB. The second program needs 12 MB. The third program needs 27 MB.
  - How many frames are unused?
  - What percentage of memory is wasted?

**Sol:**

(a)  $15 - (4 + 3 + 7) = 1$  frame

(b)  $\frac{4}{60} \times 100\% = 6.66\%$

- How is paging different from partitioning?

**Sol:**

In partitioning, memory is divided into variable-length sections, each of which holds one complete program. In paging, memory is divided into much smaller fixed-length sections as is the program itself; the program does not have to be contiguous in memory.

9. A mono-programming operating system runs programs that on average need 10 microseconds access to the CPU and 70 microseconds access to the I/O devices. What percentage of time is the CPU idle?

**Sol:**

$$\frac{70}{70+10} \times 100\% = 87.5\%$$

10. Three processes (A, B, and C) are running concurrently. Process A has acquired File1, but needs File2. Process B has acquired File3, but needs File1. Process C has acquired File2, but needs File3. Draw a diagram for these processes. Is this a deadlock situation?

**Sol:**

This is a deadlock situation because all four conditions of deadlock are all present. The situation is shown in the following figure.

