銘傳大學九十二學年度資訊工程學系碩士班招生考試

第一節

作業系統 試題

請依題目順序作答，未依順序答扣五分

1. What resources are used when a **thread** is created? (5%) how do they different from those used when a **process** is created? (5%)
2. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P1	5	2
P2	7	1
P3	1	3
P4	6	2
P5	2	4
P6	1	2

   (a) Draw four Gantt charts illustrating the executing of these processes using **FCFS**, **SJF**, a nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum=1) scheduling. (8%)

   (b) What is the turnaround time of each process for each of the scheduling algorithms in part (a)? (4%)

3. A file is to be shared among different processes, each of which has a unique number. The file can be accessed simultaneously by several processes, subject to the following constraint: The sum of all unique numbers associated with all the processes currently accessing the file must be less than **n**. Write a **monitor** to coordinate access to the file. (11%)
4. Consider the following page reference string:

   1, 2, 3, 4, 2, 1, 5, 6, 3,

   Show the contents of the frames after each reference for the following replacement algorithms, assuming that the system has 3 frames and all frames are initially empty.

   (a) **LRU** replacement (5%)

   (b) **FIFO** replacement (5%)

5. Consider an operating system implementing virtual memory mechanism. While the system is powered on, the program runs in **physical memory mode** initially. After some preparation, it changes to **virtual memory mode**.

(a) What preparation has been done before the memory mode is changed? (5%)
(b) How can a program currently runs in **physical memory mode** at this moment but next instruction will be run in **virtual memory mode**? (5%)

6. Consider a file system on a disk that has both logical and physical block sizes of 1024 bytes. Assume that that the information about each of the three allocation strategies (**contiguous**, **linked**, and **indexed**), answer the following questions:
   (a) How is the logical-to-physical address mapping accomplished in this system? (For the indexed allocation, assume that a file is always less than 1024 blocks long.)(12%)
   (b) If we are currently at logical block 20 (the last block accessed was block 20) and want to accesses logical block 7 how many physical blocks must be read from the disk? (6%)
7. Compare the use of **networking sockets** with use of **shared memory** as a mechanism for communicating data between processes on a single computer.
   (a) What are the advantages of each method? (6%)
   (b) When might each be preferred? (4%)
8. UNIX coordinates the activities of the kernel I/O components by manipulating shared in-kernel data structures, whereas Windows NT uses object-oriented message passing between kernel I/O components. Discuss three pros and three cons of each approach. (10%)
9. Explain the following terms
   (a) **Thrashing** (3%)
   (b) **Locality of reference** (3%)
   (c) **Belady's anomaly** (3%)