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University Examinations 2018/2019

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DIPLOMA IN
INFORMATION TECHNOLOGY

CIT 2250: OPERATING SYSTEMS

DATE: AUGUST 2019

TIME: 1½ HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a) Discuss four condition necessary for a deadlock (8 marks)
- b) Differentiate between the following (4 marks)
 - i. Assembler and a compiler
 - ii. File and directory
- c) Using a well labelled diagram briefly describe the four process transitions (4 marks)
- d) State two examples of shared resources used in concurrent programs (2 marks)
- e) Race condition is an undesirable phenomenon in computing. Explain how race conditions can be avoided in the dinning philosopher's problem (4 marks)
- f) Using a preemptive mode of shortest job first scheduling algorithm. First come first serve, round robin with quantum of 5, calculate the average waiting time of the following system (8 marks)

Process	Arrival Time	CPU Burst Time
P1	0	8
P2	1	4

P3	2	9
P4	3	5

QUESTION TWO (20 MARKS)

- a) State two disadvantage of using the first come first served scheduling algorithm
(2 marks)

- b) Distinguish between preemptive and non-preemptive scheduling algorithms as used in process management
(4 marks)
- c) Describe the importance of buffering in the I/O subsystem of operating system
(2 marks)

- d) Briefly explain any four functions of an operating system
(8 marks)
- e) Distinguish between internal fragmentation and external fragmentation in memory management
(4 marks)

QUESTION THREE (20 MARKS)

- a) Discuss three computing benefits of distributed systems over non-distributed systems
(6 marks)

- b) Explain the following terms in regard to memory management
(4 marks)
 - i. Swapping
 - ii. Overlays

- c) Explain three head scheduling algorithms used by hard drive during read and write process
(6 marks)

- d) To manage processes the operating systems needs to know details of the processes. List any four
(4 marks)

QUESTION FOUR (20 MARKS)

- a) Using the Dinning philosophers” analogy, explain how UNIX deals with concurrency using semaphores
(8 marks)

- b) Distinguish between internal fragmentation and external fragmentation in memory management (4 marks)
- c) Calculate the average waiting time of the processes below

Process	Arrival time	Burst time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

- i. Assuming the FIFO scheduling algorithm is used (4 marks)
- ii. Assuming shortest job first(SJF) scheduling algorithm used (4 marks)

QUESTION FIVE (20 MARKS)

- a) Operating systems have been evolving over time, describe the evolution properly stating the specific milestones and innovations at each stage (8 marks)
- b) Operating system schedules processes by moving them to unoccupied memory called “holes”. Describe three schemes used by operating system in allocating memory to processes (6 marks)
- c) Describe three kinds of transparency in distributed systems (6 marks)