



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SCO 107/SIT 304: OPERATING SYSTEMS

DATE: 24/9/2019

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

This paper consists of FIVE Questions.

Answer Question one (compulsory) and any other two Questions.

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the following terminologies as used with operating systems (5marks)
- i) Process
 - ii) Process state
 - iii) Program counter
 - iv) Dispatch latency
 - v) starvation
- b) Explain any THREE conditions in which CPU scheduling decisions may take place in a process (3 marks)
- c) Briefly explain any FOUR scheduling criteria in a process (6 marks)
- d) Using First-Come, First-Served (FCFS) Scheduling algorithm, calculate average waiting time for the processes (3 marks)

Process	Burst Time (milliseconds)
P_1	24
P_2	3
P_3	3

Suppose that the processes arrive in the order: P_1, P_2, P_3

- e) Using a well-labeled diagram, explain various process states (5 marks)
- f) State TWO advantages and TWO disadvantages of demand paging as used in operating system virtual memory. (4 marks)
- g) Explain services provided by Kernel I/O subsystems in relation to operating system I/O software (4 marks)

QUESTION TWO (20 MARKS)

- a) Using the shortest job First(SJF) scheduling algorithm for non-preemptive, calculate the average waiting time for the processes. (5 marks)

Process	Arrival Time	Burst Time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

- b) Explain any FIVE ways of optimizing scheduling criteria in processes (10 marks)
- c) List any THREE program threats and TWO system Threats as used with Operating systems. (5 marks)

QUESTION THREE (20 MARKS)

- a) using Round Robin scheduling criteria with time quantum = 20, draw a Gantt chart and calculate the average waiting time for the processes (8 marks)

Process	Burst Time	Waiting Time of each Process
P_1	53	
P_2	17	
P_3	63	
P_4	26	

- b) Explain any FOUR conditions that characterizes a deadlock (8 marks)
- c) Explain any TWO ways operating system uses to authenticate users (4 marks)

QUESTION FOUR (20 MARKS)

- a) Explain FOUR ways of effecting deadlock prevention (8 marks)
- b) Explain the following terminologies as used with operating system memory management
 - i) Segmentation
 - ii) Paging
 - iii) Fragmentation
 - iv) Memory allocation
 - v) Swapping(10 marks)

- c) List TWO ways of implementing one time passwords in operating system security (2 marks)

QUESTION FIVE (20 MARKS)

- a)
 - i) Outline THREE ways of accessing Files in operating systems (3 marks)
 - ii) Explain THREE main ways operating system uses to allocate disk space to files. (6 marks)
- b) Explain any FOUR ways of Recovering from a deadlock condition (8 marks)
- c) Explain the following terminologies as used with operating systems (3 marks)
 - i) Pooling
 - ii) Direct memory access(DMA)
 - iii) Program status register