



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

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AUGUST – DECEMBER 2018 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER AND LIBRARY SCIENCE

REGULAR PROGRAMME

CMT 206: OPERATING SYSTEMS

Date: DECEMBER 2018

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

- Q1. a) Briefly explain what you understand by the term Operating Systems
(2 Marks)
- b) Give a brief description of three important design principles in operating systems
(6 Marks)
- c) List and briefly describe at least Two typical services provided by an operating system
(4 Marks)
- d) Give a brief description of three approaches that have proven successful when designing and implementing an operating system
(6 Marks)
- e) Most operating system functionality can be provided using a variety of mechanisms, including system calls, built in commands and user level programming support. Give three examples from either Linux, MacOS or Windows, of useful operating system functionality, indicating clearly the mechanism by which the service is provided
(6 Marks)
- f) Write short notes on what you understand by the term bootstrap program as used in operating systems
(2 Marks)
- g) Briefly explain two reasons why a parent process may terminate a child process
(2 Marks)

- h) Give a brief description of what you understand as context switching in operating systems **(2 Marks)**
- Q2. a) With the aid of a well labelled diagram, describe the process states **(10 Marks)**
- b) Briefly explain atleast three attributes that an operating system maintains to keep track of the information about a process **(6 Marks)**
- c) write short notes on why scheduling of processes and threads on a multi processor system is more complicated than scheduling them on a uniprocessor system **(4 Marks)**
- Q3. a) Briefly explain the following terms as used in operating systems
- I. Pre-emptive and non-pre-emptive scheduling
 - II. process and processor
 - III. Protection and security
 - IV. Signal and pipe
 - V. CPU bound and I/O bound
- (10 Marks)**
- b) Operating systems play a key role(s) in a computer system. The choice of any operating depends on the role(s) it plays. Describe briefly any five functions of an operating system **(10 Marks)**
- Q4. a) Consider the following set of jobs to be scheduled for execution on a single CPU system

Job	Arrival Time	Size (msec)	Priority
J ₁	0	10	2
J ₂	2	8	1
J ₃	3	3	3
J ₄	10	4	2
J ₅	12	1	3
J ₆	15	4	1

- i) Draw a Gantt chart showing FCFS scheduling for this jobs **(2 Marks)**
- ii) Draw a Gantt chart showing (non-preemptive) SJF scheduling **(2 Marks)**
- iii) Draw a Gantt chart showing (preemptive) SJF scheduling **(2 Marks)**

- iv) Calculate the waiting Time and the average waiting Time using SJF preemptive scheduling. **(2 Marks)**
- v) Which of the foregoing scheduling policies provides the lowest waiting time for this set of jobs? What is the average waiting time with this policy? (Show your work!) **(2 Marks)**
- b) Briefly explain at least five scheduling criteria that the CPU uses when scheduling processes to be processed **(10 Marks)**
- Q5. a) What happens in a context switch **(2 Marks)**
- b) Give a brief description of at least three objectives of system processor scheduling **(6 Marks)**
- c) Briefly explain with the aid of a diagram the four most important computer Components **(8 Marks)**
- d) Briefly explain what an interrupt is **(2 Marks)**

END