



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN COMPUTER SECURITY AND FORENSIC 2NDYEAR 1ST**

/DEGREE OF BUSINESS INFORMATION SYSTEMS SEMESTER 2018/2019

ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: IIT 3211

COURSE TITLE: OPERATING SYSTEMS

EXAM VENUE:

STREAM: CSF/BIS

DATE: DECEMBER 2018

EXAM SESSION:

TIME: 2.00 HOURS

INSTRUCTIONS:

1. Answer Question 1 (Compulsory) and ANY other two questions
2. Candidates are advised not to write on the question paper
3. Candidates must hand in their answer booklets to the invigilator while in the examination room

QUATION ONE (30 marks)

- a) Using a diagram explain how multiprogramming operating system helps in concurrent execution of process A and process B. (6 marks)
- b) How does operating system provide convenience in utilizing computer hardware? (2 marks).
- c) How does multiprogramming operating system differ from single user operating system? (4 marks)
- d) (i) Assume two operations A(counter++) and B(counter--):

A: register1 = Counter
register1 = register1 + 1
Counter = register1

B: Register2 = Counter;
Register2 = register2 - 1
Counter = register2

Show a computation sequence to illustrate how race condition may happen. (5 marks)

- (ii) Demonstrate how semaphore can be used in (i) to prevent the race condition. (5 marks)

- e) Explain the following terms (8 marks)
- i) Time slice
 - ii) Context Switching
 - iii) Interrupts
 - iv) Memory Compaction

QUATION TWO (20 marks)

- a) Explain how operating system deals with a big program that cannot fit in the main memory (8 marks).
- b) Explain the following memory management scheme.
- i. Memory management with variable partitioning,
 - ii. Memory management with fixed partitioning
 - iii. Memory management with compaction

(12 marks)

QUESTION THREE (20 marks)

- a) Describe between the terms *Race Condition and mutual exclusion* as used in process synchronization. (4 marks)
- b) Describe with examples where necessary how the following techniques used to implement mutual exclusion. What are their limitations? (8 marks)
- v) Monitors
 - vi) Variable locks
 - vii) Semaphores
- f) What is deadlock? How does it occur and how can it be resolved? (6 marks)

QUESTION FOUR (20 marks)

- a) Identify and explain the process states. (9 marks)
- b) What is a file control block? Outline its content. (6 marks)
- c) Explain how a process state transition is achieved by the operating system. (4 marks)

QUESTION FIVE (20 marks)

Consider the following jobs

JOBS	ARRIVAL TIME	CPU BURST
A	0	7
B	2	3
C	3	2

Using the above diagram calculate the average waiting time, average turn-around time of the following algorithms hence recommend the one that will provide the higher throughput

- i) FCFS
- ii) SRTN
- iii) SJN
- iv) RR