MAASAI MARA UNIVERSITY

UNIVERSITY EXAMINATIONS 2021/2022 (REGULAR)

SCHOOL OF PURE, APPLIED AND HEALTH SCIENCES

DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SECOND YEAR FIRST SEMESTER EXAMINATION

COURSE CODE: COM 2111-1

COURSE TITLE: OPERATING SYSTEMS

DATE: 6TH APRIL 2022 TIME: 11:00AM-1:00PM

INSTRUCTIONS TO CANDIDATES

- **Question ONE in Section "A " is Compulsory**
- **Answer any Two (2) Questions from Section "B"**
- **Illustrate your answers where necessary**

SECTION A

QUESTION ONE (COMPULSORY 30 MARKS)

a)Computer software can be classified into two categories. State and explain them giving an example of each.

[4marks)

b)Briefly explain the following types of operating systems:

[5Marks]

i. Multi-user operating system
ii. Multi-processor and Multitasking operating system
iii. Network operating systems
iv. Real time operating systems
v. Time sharing operating systems

c) Allan wants to purchase an operating system for his new laptop. Help him identify factors to consider when selecting the software**.**

[4Marks]

d) List two situations that might demand a real-time operating system and explain why. **(3marks)**

e) Deadlock prevention is accomplished by preventing any of the Coffman conditions from occurring. Briefly explain how the four conditions can be prevented**.**
[4marks]

f) List and explain four conditions necessary for a deadlock to occur **[4 Marks]**

g) Briefly explain three functions of a computer operating system **[3 Marks]**

h) Outline TWO benefits and TWO disadvantages of Command Driven Interfaces.
[3Marks]

SECTION B

QUESTION TWO (20 marks)

a) Describe four file management activities supported by an operating system

[4 Marks]

b) In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems. Name two such problems. **(2marks)**

c) Define the following terms as used in an operating system **(3marks)**

i. Program
i. Thread-.
ii. Multiprogramming-

d) Describe the difference between **job scheduler** and **process scheduler**

(4marks)

e) Explain the following terms as used in operating systems:

i) Spooling **[1Mark]**

iiThrashing **[1Mark1]**

f) Describe **THREE** types of CPU registers in a typical operating system design**.**

(3 Marks)

g) Distinguish external fragmentation from internal fragmentation.

(2 marks)

QUESTION THREE (20 marks)

(a) Explain five factors that determine the choice of a processor scheduling technique **[5 Marks]**

(b) With the aid of a well labeled diagram, illustrate and briefly explain the five states of a process as used in operating systems

[5 Marks]

(c) With the aid of diagrams, describe each of the following memory management techniques**:** **[8marks]**

(i)swapping

(ii) Segmentation (iii)Paging

iv)Fragmentation

d)Define process synchronization as used in operating systems

[2marks]

QUESTION FOUR (20 marks)

a)The process control block is a data structure containing certain important information about the process. Identify the information contained in the PCB. **[4Marks]**

b) Security goals of any computer system are decided by its security policies. Briefly explain three computer security goals that can be set in an operating system. **[6Marks]**

c) State four types of security threats to consider when designing and implementing any operating system.

[4Marks]

d)Describe threads and the different types of threads, giving their advantages and disadvantages of each.

[6Marks]

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