



"Investing in Africa's Future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP, AND GOVERNANCE

NCSC 211: OPERATING SYSTEM

END OF SECOND SEMESTER EXAMINATIONS

APRIL/MAY 2023

LECTURER: MRS L TEMBANI-FUNDISI

DURATION: (3 HRS)

INSTRUCTIONS

Answer **any 4 (four)** questions

All questions carry equal marks (25)

Show working!

Smart presentation of all answers will earn you extra marks

Begin your answer to each question on a fresh page

Question 1

- a) List and explain any 5 functions of an Operating systems [5 marks]
- b) Briefly explain the following schedulers: Long term, short term and medium-term [6 marks]
- c) With the aid of a diagram outline and explain the process attributes [14 marks]

Question 2

- a) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A, B, C, and D, and processes P1 to P5:

	MAXIMUM				ALLOCATION				NEED				AVAILABILITY			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
P0	6	0	1	2	4	0	0	1					3	2	1	2
P1	2	7	5	0	1	1	0	0								
P2	2	3	5	6	1	2	5	4								
P3	1	6	5	3	0	6	3	3								
P4	1	6	5	6	0	2	1	2								

Using Banker's algorithm, answer the following questions.

- a) How many resources of type A, B, C, and D are there? [3 marks]
- b) What are the contents of the Need matrix? [4 marks]
- c) With a clear indication of the safe sequence, is the system in a safe state? Why? (show working) [13 marks]
- d) **New request made** **1 5 0 6**

Using Banker's algorithm, determine if the projected allocation state is safe and whether the request will be granted or not. [5 marks]

Question Three

Using examples, explain the following in process synchronization.

- Dining philosophers problem
 - Readers writers problem
 - Critical section problem
 - Consumer-Producer Problem
 - Semaphores
- [25 marks]

Question Four

Table below shows a set of processes and the associated burst time

Process	Burst time
P1	16
P2	13
P3	14
P4	23
P5	37
P6	2
P7	18

- Compute the average waiting time for this algorithms is used. Show the total waiting time. Assume a slice of 15. [13 marks]
- Describe the condition for deadlock and four strategies of dealing with deadlock [12 marks]

Question Five

Describe the evolution of operation systems up to the 20th century. [25 marks]

Question Six

- “Linux-based operating system has better security over Windows-based operating system on a server”. Analyse this statement with better justification [10 marks]
- Given 7 memory partitions of 100Kb, 500Kb, 200Kb, 300Kb, 600Kb, 400Kb, and 250Kb(in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 100 Kb, 318 Kb, 212 Kb, and 515 Kb, 50Kb, 495Kb (in order)? Which algorithm makes the most efficient use of memory and why? Explain the solution to the left memory. [15 marks]

END OF EXAMINATION