

Operating System UNIT TEST - II (DIV A)

DATE: 27TH APRIL 2021

Time: 02 TO 03 PM

Note: Section 2, which is based on MCQ's is compulsory

Attempt both the Numerical from Section 3

Numerical Solutions has to be handwritten on an assignment sheet.

Mention your class, division, roll-on and name on top of every sheet used.

Scan the Handwritten Solutions for the sums attempted and create a single PDF file and upload it in the google form shared.

- NAME THE PDF AS: ROLLNO_DIVA_OS_UT2 (For Eg: 8123_DIVA_OS_UT2)
- Upload the scanned copy of your solutions for the numerical in the below given link (03:00pm to 03:15pm)

*****ALL THE BEST*****

* Required

1. Email *

2. Full Name (As per attendance records) *

3. Roll No (As per attendance records) *

Multiple Choice Questions

10 MCQ's carrying 1 mark each. Attempting all the question is compulsory.

4. Q1. Read the scenario given carefully and answer Which one of the following assignments to P, Q, R and S will yield the correct solution? *

Consider the following solution to the producer-consumer synchronization problem. The shared buffer size is N. Three semaphores *empty*, *full* and *mutex* are defined with respective initial values of 0, N and 1. Semaphore *empty* denotes the number of available slots in the buffer, for the consumer to read from. Semaphore *full* denotes the number of available slots in the buffer, for the producer to write to. The placeholder variables, denoted by P, Q, R and S, in the code below can be assigned either *empty* or *full*. The valid semaphore operations are: *wait()* and *signal()*.

Producer	Consumer
<pre>do { wait (P); wait (mutex); //Add item to buffer Signal (mutex); Signal (Q); } while (1);</pre>	<pre>do { wait (R); wait (mutex); //Consume item from buffer Signal (mutex); Signal (S); } while (1);</pre>

Mark only one oval.

- ☐ P: full, Q: full, R: empty, S: empty
- ☐ P: empty, Q: empty, R: full, S: full
- ☐ P: full, Q: empty, R: empty, S: full
- ☐ P: empty, Q: full, R: full, S: empty

5. Q.2. Which of the following (one or more) statements are true. *

(a.) Semaphore is used when we wish to execute critical section.

(b.) A binary semaphore can take only two values.

(c.) Semaphores have the properties of an integer variable.

(d.) Operations on semaphore are atomic in nature

Mark only one oval.

☐ a

☐ a & b

☐ c & d

☐ all the mentioned

6. Q.3. The deadlock in a system can be prevented by: *

- a) Defining a linear ordering of resource types**
- b) Using thread**
- c) Using pipes**
- d) Having multiple instances of shared resources.**

Mark only one oval.

- ☐ a & d
- ☐ b & c
- ☐ all the above mentioned

7. Q.4. Test and Set Lock instruction helps us achieve: *

(a) only one process can enter critical region

(b) a process will not block other process from entering the critical section

(c) No process will be waiting forever to enter critical region.

(d) Architectural Neutrality

Mark only one oval.

☐ a

☐ a & b

☐ a & b & c

☐ all of the mentioned

8. Q.5 Against the following statements indicate the policy which best describes the characteristics: *

(a) Holes can be distributed throughout the memory

(b) It requires the maximum time to allocate the suitable hole.

(c) It leaves the largest holes in size.

Mark only one oval.

- ☐ Best Fit
- ☐ FIFO
- ☐ Worst Fit
- ☐ LRU
- ☐ First Fit
- ☐ OPTIMAL

9. Q.6. Indicate which amongst the following statements are true for virtual memory. *

(a.) It allows for multiple users to use the system

(b.) It enhances scope for multi-programming

(c.) It extends the address space

(d.) It reduces external fragmentation as well as internal fragmentation.

Mark only one oval.

☐ a & b

☐ b & c

☐ c & d

☐ all the mentioned

10. Q.7. Out of the options mentioned which all reasons are the causes of thrashing? *

(a.) Because there are too many programs running on the system

(b.) Because the page size was very small

(c.) Because we followed a first in first out policy

(d.) Because we followed a least recently used policy for page replacement.

Mark only one oval.

☐ a

☐ a & b

☐ a & b & c

☐ all the mentioned

11. Q.8.What is compaction? *

Mark only one oval.

☐ a technique for overcoming internal fragmentation in paging

☐ a technique for overcoming internal fragmentation in segmentation

☐ a technique for overcoming external fragmentation in paging

☐ a technique for overcoming external fragmentation in segmentation

12. Q.9.Which of the statements are true for indexed file organization strategy? *

(a)Records are accessed only through their indexes

(b)Fixed-length records can be employed

(c) Multilevel indexes can be created

(d) Suitable for batch processing applications

Mark only one oval.

☐ a & b

☐ a & c

☐ a & b & c

☐ all of the mentioned

13. Q.10. In Indexed file allocation technique, *

(a) index block is mapped on to one of the blocks on the disk to maintain block information related to all file

(b) File allocation table contains the information of index block for that file.

Mark only one oval.

- ☐ a & b both are true
- ☐ only a is true
- ☐ only b is true
- ☐ both a & b are false

Numerical on
Process Scheduling
Algorithm

Each Question carries 5 Marks. Attempting Both the Question is Compulsory.

Note you have to solve the Numerical on an assignment sheet and put your details like (class, division, roll no , name on top right corner of every sheet) Scan the solution and create a combined pdf for both the sums, later to be uploaded

NAME THE PDF AS: ROLLNO_DIVA_OS_UT2 (For Eg: 8123_DIVA_OS_UT2)

Q1. Bankers Algorithm (Note you have to solve the Numerical on an assignment sheet and put your details like (class, division, roll no , name on top right corner of every sheet) Scan the solution and create a combined pdf for both the sums, later to be uploaded)

An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in a safe state. Consider the following independent requests for additional resources in the current state:

REQ1: P0 requests 0 units of X,
0 units of Y and 2 units of Z
REQ2: P1 requests 2 units of X,
0 units of Y and 0 units of Z

14. Which one of the following is TRUE? *

Solve the sum on the assignment sheet and upload as pdf (marks will be given for the steps in solving this question)

Mark only one oval.

- ☐ (i) Only Process P0 request can be permitted.
- ☐ (ii) Only Process P1 request can be permitted.
- ☐ (iii) Neither P0 nor P1 Request can be permitted
- ☐ (iv) Both P0 and P1 Request can be permitted

Q2. Page Replacement Algorithms (Note you have to solve the Numerical on an assignment sheet and put your details like (class, division, roll no , name on top right corner of every sheet) Scan the solution and create a combined pdf for both the sums, later to be uploaded)

Consider a main memory with **three page frames** and the following sequence of page references:

3,2,1,3,4,1,6,2,4,3,4,2,1,4,5,2,1,3,4.

Answer the below given questions with respect to various page replacement algorithms.

15. Answers to Question 2 (No of page faults if the page replacement algorithm used is LRU) *

enter only number (for eg. 4)

16. Answers to Question 2 (No of page hits if the page replacement algorithm used is LRU) *

enter only number (for eg. 4)

17. Answers to Question 2 (No of page faults if the page replacement algorithm used is OPTIMAL Page replacement) *

enter only number (for eg. 4)

18. Answers to Question 2 (No of page hits if the page replacement algorithm used is OPTIMAL Page replacement) *

enter only number (for eg. 4)

19. Answers to Question 2(Based on the above scenario select the right observations) *

Check all that apply.

- ☐ Optimal page replacement has better hit ratio than LRU
- ☐ LRU page replacement has better hit ratio than OPTIMAL
- ☐ Page Faults of LRU are more as compared to OPTIMAL
- ☐ Page Faults of OPTIMAL are more as compared to LRU

This content is neither created nor endorsed by Google.

Google Forms