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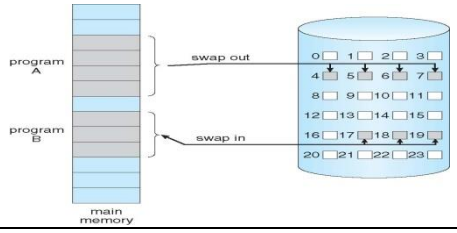
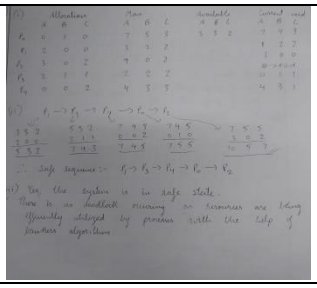
Internal Assessment Test 3 – August 2022

Sub:	**Operating System**					Sub Code:	18CS43	Branch:	ISE	
Date:	27/08/2022	Duration:	90 min's	Max Marks:	50	Sem/Sec:	IV A, B & C		OBE	

Answer any FIVE FULL Questions

		MARKS	CO	RBT
1	Explain virtual memory using a neat labeled diagram. -Virtual Memory is a storage allocation scheme in which secondary memory can be addressed as though it were part of the main memory. The addresses a program may use to reference memory are distinguished from the addresses the memory system uses to identify physical storage sites, and program-generated addresses are translated automatically to the corresponding machine addresses. -Virtual memory can be implemented via: 1. Demand paging 2. Demand segmentation -Demand paging and Page fault 	10	CO3	L2
2	Explain contiguous and non-contiguous memory allocation in detail. Contiguous memory allocation is a classical memory allocation model. Here, a system assigns consecutive memory blocks (that is, memory blocks having consecutive addresses) to a process Contiguous memory allocation can be implemented in operating systems with the help of two registers, known as **the base and limit registers.** **Non-Contiguous Memory Allocation :** Non-Contiguous memory allocation is basically a method on the contrary to contiguous allocation method, allocates the memory space present in different locations to the process as per it's requirements. As all the available memory space is in a distributed pattern so the freely available memory space is also scattered here and there. This technique of memory allocation helps to reduce the wastage of memory, which eventually gives rise to Internal and external fragmentation.	10	CO3	L2
3	Explain the best fit, first fit and worst fit algorithm in contiguous memory allocation. **First-fit**: Allocate the ***first*** hole that is big enough **Best-fit**: Allocate the ***smallest*** hole that is big enough; must search entire list, unless ordered by size . Produces the smallest leftover hole **Worst-fit**: Allocate the ***largest*** hole; must also search entire list . Produces the largest leftover hole First-fit and best-fit better than worst-fit in terms of speed and storage utilization	10	CO3	L2
4	Consider the following snapshot of a system: Allocation Max Available A B C A B C A B C P_0 0 1 0 7 5 3 3 3 2 P_1 2 0 0 3 2 2 P_2 3 0 2 9 0 2 P_3 2 1 1 2 2 2 P_4 0 0 2 4 3 3 Answer the following questions using Banker's Algorithm. i. What is the content of the matrix need? iii. Write the safe sequence. ii. Is the system in a safe state?	10	CO2	L3

5	Consider the following page reference string 6,2,3,4,2,1,5,6,2,1,2,3,7,6,3,4,1,2,7,6 Find out the number of page faults if there are 4-page frames, using the following page replacement algorithm i) LRU ii) FIFO iii) Optimal.	10	CO4	L3
6	Distinguish between the following: ı. Internal fragmentation and external fragmentation. ıı. Paging and segmentation.	10	CO3	L2

FIFO FIRST IN FIRST OUT

PAGE DEMAND	6	2	3	4	2	1	5	6	2	1	2	3	7	6	3	4	1	2	7	6
f1	6	6	6	6	6	1	1	1	1	1	1	3	3	3	3	3	3	2	2	2
f2		2	2	2	2	2	5	5	5	5	5	5	7	7	7	7	7	7	7	6
f3			3	3	3	3	3	6	6	6	6	6	6	6	6	4	4	4	4	4
f4				4	4	4	4	4	2	2	2	2	2	2	2	2	1	1	1	1
	fault	fault	fault	fault	hit	fault	fault	fault	fault	hit	hit	fault	fault	hit	hit	fault	fault	fault	hit	fault

REFERENCE STRING 20
PAGE FAULTS 14
PAGE HITS

OPTIMAL PAGE REPLACEMENT

REFERENCE STRING	6	2	3	4	2	1	5	6	2	1	2	3	7	6	3	4	1	2	7	6
f1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
f2		2	2	2	2	2	2	2	2	2	2	2	7	7	7	7	7	7	7	7
f3			3	3	3	3	5	5	5	5	5	3	3	3	3	4	4	2	2	2
f4				4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	fault	fault	fault	fault	hit	fault	fault	hit	hit	hit	hit	fault	fault	hit	hit	fault	hit	fault	hit	hit

PAGE FAULT 10
PAGE HIT 10

LRU LEAST RECENTLY USED

	6	2	3	4	2	1	5	6	2	1	2	3	7	6	3	4	1	2	7	6
f1	6	6	6	6	6	1	1	1	1	1	1	1	1	6	6	6	6	2	2	2
f2		2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	6
f3			3	3	3	3	5	5	5	5	5	3	3	3	3	3	3	3	7	7
f4				4	4	4	4	6	6	6	6	6	7	7	7	7	1	1	1	1
	fault	fault	fault	fault	hit	fault	fault	fault	hit	hit	hit	fault	fault	fault	hit	fault	fault	fault	fault	fault

PAGE FAULT 15
PAGE HIT 5

	INTERNAL FRAGMENTATION	EXTERNAL FRAGMENTATION
Definition	The difference between memory allocated and required space or memory.	The unused spaces formed between non-contiguous memory fragments are too small to serve a new process.
Sized memory	fixed-sized memory blocks.	variable-sized memory blocks.
Happens	When the method or process is larger than the memory.	When the method or process is removed.
Solution of external fragmentation	Best-fit block.	Compaction, paging and segmentation.

Basis	Paging	Segmentation
Division of program	The program is divided into fixed-size pages in paging.	Program is divided into the variable–size partition in segmentation.
Speed	Paging is faster than segmentation.	Segmentation is slower than paging.
Fragmentation	Internal fragmentation.	External fragmentation.
Protection	Very difficult to apply for protection in paging.	Easier to apply protection in segmentation.
Handling of data structure	Difficult to handle the data structure.	Segmentation efficiently handles the data structure.
Visibility to the user	It is not visible to the user.	It is visible to the user.
Accountability	The operating system is accountable for paging.	Complier is accountable here.
Determining the size	Hardware determines the page size.	The user determines the section size.
Storing the type of data	Page table stores page data.	Section table stores section data.
Sharing	Difficult to share the procedures between processes.	Easier to share the procedures between processes.

Faculty Signature CCI Signature HOD Signature