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Internal Assessment Test 1 – July 2022

Sub:	**Operating Systems**					Sub Code:	18CS43	Branch:	ISE	
Date:	**09/07/2022**	Duration:	90 min's	Max Marks:	50	Sem/Sec:	VI A, B & C		OBE	

	Answer any FIVE FULL Questions	MARKS	CO	RBT
1a)	What is a thread? Explain the different multithreading models.	5	CO2	L1
1b)	What is IPC? Explain direct and indirect communication with respect to message passing.	5	CO1	L2
2	Explain process states with state transition diagram. Also explain PCB with a neat diagram.	10	CO1	L2
3	Differentiate between a process and a program. Describe the life cycle of a process. Also explain PCB with a neat diagram.	10	CO1	L2
4a)	Differentiate between multiprogramming, multiprocessing and multitasking systems.	5	CO1	L2
4b)	What are virtual machines ? Explain with block diagram the benefits of using virtual machines.	5	CO1	L2
5a)	List the reasons for process termination.	5	CO1	L1
5b)	Explain MS-DOS layer structure with a neat diagram.	5	CO1	L2
6	Consider the set of given process with the Burst time Calculate the Average Waiting Time and Turn Around Time for Shortest Job First (SJF) and First Come First Serve(FCFS)	10	CO2	L3

Process	Burst Time
P1	32
P2	5
P3	7
P4	7
P5	15

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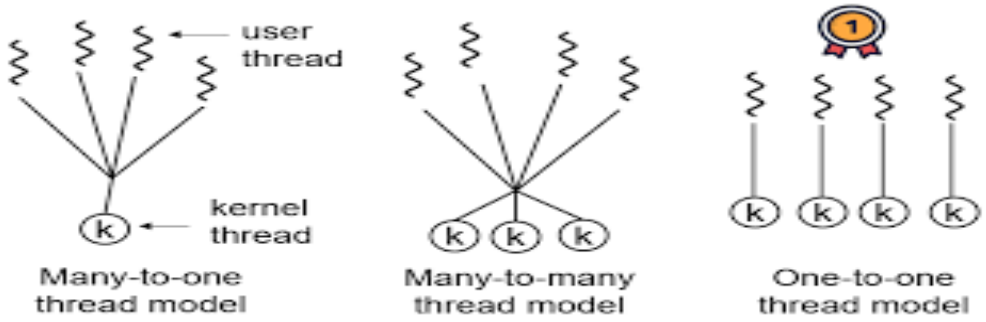
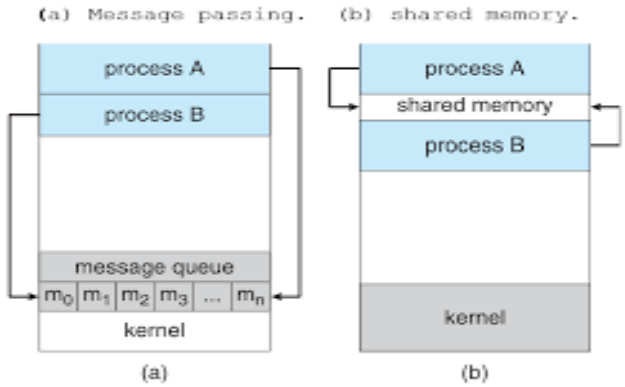
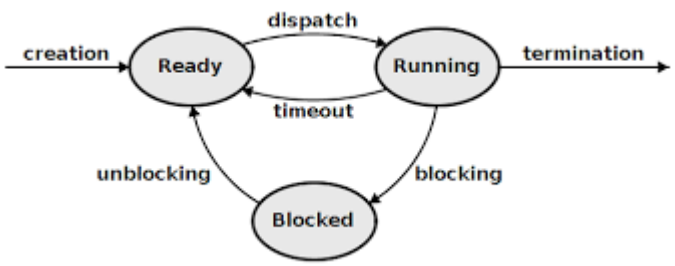
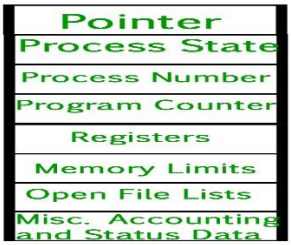
Internal Assessment Test 1 – July 2022
Scheme and Solution

Sub:	**Operating System**					Sub Code:	18CS43	Branch:	ISE	
Date:	**09/07/2022**	Duration:	90 min's	Max Marks:	50	Sem/Sec:	IV A, B & C		OBE	

Answer any FIVE FULL Questions

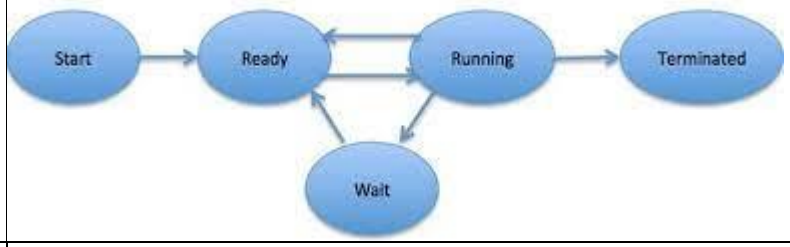
		MARKS	CO	RBT
1a)	**What is a thread? Explain the different multithreading models** A thread is also called a lightweight process. Threads provide a way to improve application performance through parallelism. Threads represent a software approach to improving performance of operating system by reducing the overhead thread is equivalent to a classical process. 	2+3	CO2	L1
1b)	**What is IPC? Explain direct and indirect communication with respect to message passing**. Interprocess communication is the mechanism provided by the operating system that allows processes to communicate with each other. This communication could involve a process letting another process know that some event has occurred or the transferring of data from one process to another. 	5	CO1	L2
2	**Explain process states with state transition diagram. Also explain PCB with a neat diagram** A process is defined as an entity which represents the basic unit of work to be implemented in the system. 	2+4+4	CO1	L2



Process Control Block

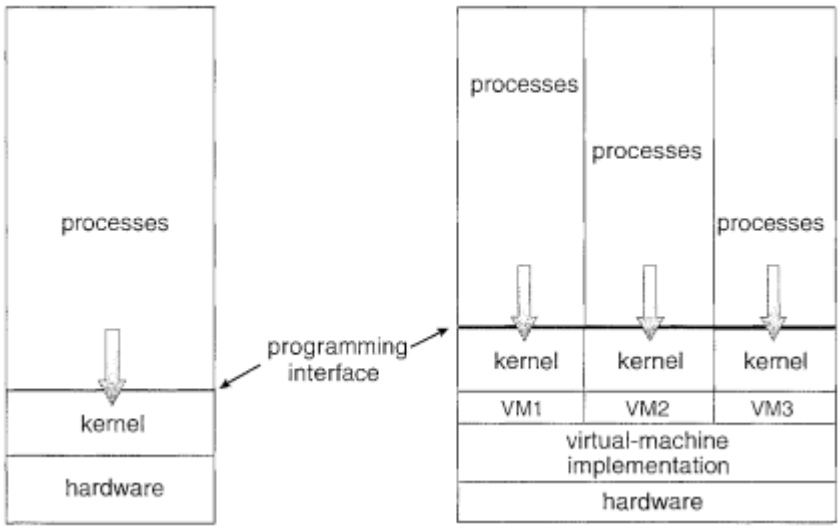
3 **Differentiate between a process and a program. Describe the life cycle of a process.** 5+5 CO1 L2

Program	Process
Consists of set of instructions in programming language	It is a sequence of instruction execution
It is a static object existing in a file form	It is a dynamic object (i.e. program in execution)
Program is loaded into secondary storage device	Process is loaded into main memory
The time span is unlimited	Time span is limited
It is a passive entity	It is an active entity



4a) **Differentiate between multiprogramming, multiprocessing and multitasking systems** 5 CO1 L2

S.No.	Multiprogramming	Multitasking	Multiprocessing
1.	In multiprogramming, multiple programs execute at a same time on a single device.	In Multitasking, a single resource is used to process multiple tasks.	In multiprocessing, multiple processing units are used by a single device.
2.	The process resides in the main memory.	The process resides in the same CPU.	The process switches from one to another CPU as multiple processing units are used.
3.	It uses batch OS. The CPU is utilized completely while execution.	It is time sharing as the task assigned switches regularly.	It carries multiple processors to execute the task.
4.	The processing is slower, as a single job resides in the main memory while execution.	Multitasking follows the concept of context switching.	A large amount of work can be done in a short period of time.

4b)	**What are virtual machines? Explain with block diagram the benefits of using virtual machines.**  The fundamental idea behind a virtual machine is to abstract the hardware of a single computer (the CPU, memory, disk drives, network interface cards, and so forth) into several different execution environments, thereby creating the illusion that each separate execution environment is running its own private computer.	5	CO1	L2
5a)	**List the reasons for process termination**. A process in an operating system can be terminated when certain errors or default conditions occur. Following are some of the reasons that lead to process termination, **Reasons for Process Termination:** 1. **Normal Completion:** A process can complete its execution in a normal manner by executing an operating system service call. 2. **Unavailability of the Required Memory:** A process is terminated when the system is unable to provide the memory required, as it is more than the memory that it is actually contained in the system 3. **Exceed in the Execution Time Limit:** Process termination also occurs when its execution time is very much longer than the specific time limit i.e., it takes longer time to execute. This is because of the following possibilities, **(i)** Total elapsed time **(ii)** Time to execute **(iii)** The time interval since the last input is provided by Total elapsed time Time to execute the user. This usually occurs in case of interactive processes. 4. **Violating Memory Access Limits:** A process can even be terminated, when it is attempting to access a memory location to which access is not permitted 5. **Protection Error:** A protection error occurs when a process is trying to use a resource (e.g. file) to which access is not granted or using it in an inappropriate manner such as writing to a read-only file. 6. **Arithmetic Error:**	5	CO1	L1

Some arithmetic errors such as, division-by-zero or storing a number greater than the hardware capacity also leads to process termination.

7. **Input/Output Failure:**
   It refers to an error that results from some input/output operation, such as inability to find a file, failure of a read or write operation even after trying a certain number of times.

8. **Misuse of Data:**
   Misuse of data i.e., using wrong type or un-initialized data also terminates the process.

9. **Exceeding the Waiting Time Limit:**
   Exceeding the waiting time for occurrence of an event also terminates the process.

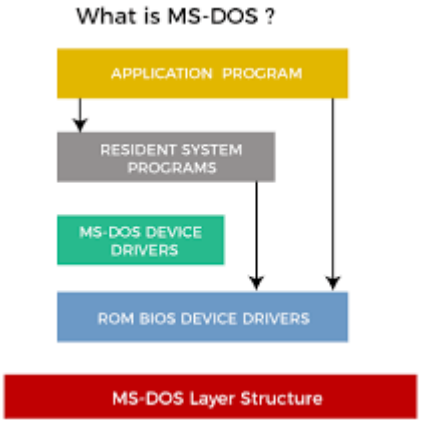
10. **Invalid Instruction Execution:**
    When a process is trying to execute an instruction that actually does not exist, the process gets terminated.

11. **Using a Privileged Instruction:**
    An attempt to use an operating system instruction by a process stops its execution.

12. **Interference by an Operating System or an Operator:**
    An operator or an operating system sometimes interferes with process execution and leads to its termination. One such example is the occurrence of deadlocks.

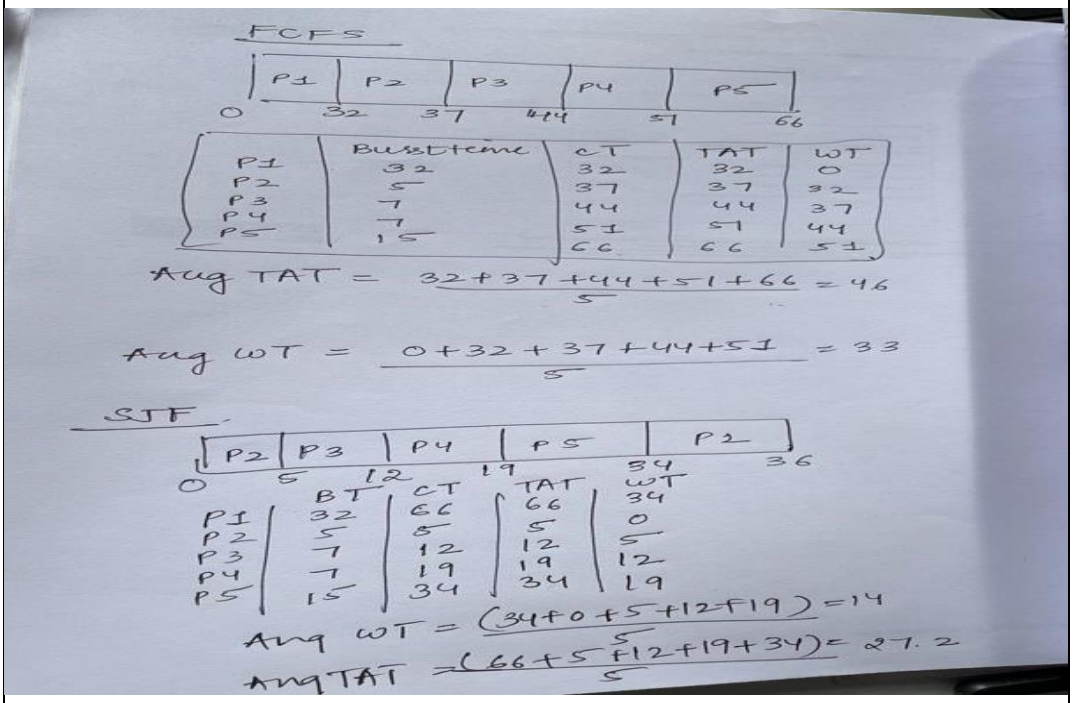
13. **Parent Process Termination:**
    When a parent process terminates, it causes all its child processes to stop their execution.

14. **Request from a Parent Process:**
    A parent process has a right to terminate any of its child processes, at any time during their execution.

b)	Explain MS-DOS layer structure with a neat diagram. 	2+3	CO1	L2
6	Consider the set of given process with the Burst time Process | Burst	5+5	CO2	L3

	Time
P1	32
P2	5
P3	7
P4	7
P5	15

Calculate the Average Waiting Time and Turn Around Time for Shortest Job First (SJF) and First Come First Serve (FCFS)



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