PES UNIVERSITY

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Department of Computer Science & Engg

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UE19CS254: Operating Systems

Unit 1 Question Bank

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	Chapter 1
1.	What are the three main purposes of an operating system?
2.	Differentiate between firmware and software.
3.	Explain OS structure?
4.	What are the kernel data structured used in OS?
5.	What is the purpose of timer in OS?
6.	Differentiate between multicore and multiprocessor systems
7.	Differentiate between Asymmetric Multiprocessing and Symmetric Multiprocessing
8.	What are multitasking or time-sharing systems?
9.	What are the modes in which the operating system operates?
10.	What is the significance of timers in OS?
11.	Explain any two computing environments
12.	Name the applications of peer-to-peer computing environment
13.	What is virtualization?
14.	What are the steps involved in handling interrupts?
15.	What are the advantages of multiprocessor systems?
	Chapter 2
1.	What is the purpose of system calls?
2.	What are the services provided by the OS?
3.	Why policies are to be separated from mechanisms?
4.	Name the language used to build the UNIX and windows operating system
5.	Why high-level languages are used to build operating systems than the assembly language.
	Chapter 3
1.	Describe the differences among short-term, medium-term, and long term scheduling.
2.	Describe the actions taken by a kernel to context-switch between processes
3.	Explain the memory layout of a process.
4.	Explain the state transition diagram process life cycle
5.	What do you mean by PCB? Where is it used? What are its contents?
6.	What Information about a process is maintained in the PCB?
7.	Explain different queues the processes enter and leave during their life cycle.
8.	What is a scheduler.
9.	Explain different scheduler and their significance
10.	What is context switching
11.	What are the operations that can be performed on the processes?
12.	Differentiate between process & program

13.	Identify the section of a process's memory for the following statements. i. The section that contains temporary data ii. The section that contains global variable iii.The section that contains Program code iv. The section that contains Function parameters
14.	What sections of process?
15.	What are the possible conditions for the process to move from running state to ready state? A diagram depicting the same is required.
	Chapter 5
1.	Explain the differences in how much the following scheduling algorithms discriminate in favour of short processes: a. FCFS b. RR c. Multilevel feedback queues
2.	Consider a variant of the RR scheduling algorithm in which the entries in the ready queue are pointers to the PCBs. a. What would be the effect of putting two pointers to the same process in the ready queue? b. What would be two major advantages and two disadvantages of this scheme? c. Howwould youmodify the basic RR algorithm to achieve the same effect without the duplicate pointers?
3.	What are the characteristics of Round Robin scheduling algorithm?
4.	What is the drawback of priority scheduling? How to overcome this.
5.	Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use nonpreemptive scheduling, and base all decisions on the information you have at the time the decision must be made. Process / Arrival Time / Burst Time P_1 0.0 8 P_2 0.4 4 P_3 1.0 1 • What is the average turnaround time for these processes with the FCFS scheduling algorithm? • What is the average turnaround time for these processes with the SJF scheduling algorithm? • The SJF algorithm is supposed to improve performance, but notice that we chose to run process *P*1 at time 0 because we did not know that two shorter processes would arrive soon. Compute what the average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used. Remember that processes *P*1 and *P*2 are waiting during this idle time, so their waiting time may increase. This algorithm could be called future-knowledge scheduling.
6.	Consider the following set of processes, with the length of the CPU burst given in milliseconds

	<table><tr><th>Process</th><th>Burst Time</th><th>Priority</th></tr><tr><td>P_1</td><td>10</td><td>3</td></tr><tr><td>P_2</td><td>1</td><td>1</td></tr><tr><td>P_3</td><td>2</td><td>3</td></tr><tr><td>P_4</td><td>1</td><td>4</td></tr><tr><td>P_5</td><td>5</td><td>2</td></tr></table> The processes are assumed to have arrived in the order *P*1, *P*2, *P*3, *P*4, *P*5, all at time 0. a. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1). b. What is the turnaround time of each process for each of the scheduling algorithms in part a? c. What is the waiting time of each process for each of these scheduling algorithms? d. Which of the algorithms results in the minimum average waiting time (over all processes)?
7.	An operating system uses Shortest Remaining Time first (SRT) process scheduling algorithm. Consider the arrival times and execution times for the following processes: Process Execution time Arrival time P1 20 0 P2 25 15 P3 10 30 P4 15 45 What is the total waiting time for process P2?
8.	What are the characteristics of Round-Robin Scheduling algorithm
9.	Name the criterias used to judge the scheduling algorithms.
10.	What are the advantages and disadvantages of Round-robin Scheduling?
11.	Consider three process, all arriving at time zero, with total execution time of 10, 20 and 30 units respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of does the CPU remain idle? 0% 10.6% 30.0% 89.4%
IPC	
1.	What are the limitations of pipes?
2.	What are the types of Interprocess communication mechanisms? Explain each of them briefly.

3.	Differentiate between direct and indirect communication
4.	What are the ways in which message queue can be implemented?
5.	What are named pipes?