27·11·2019 (E)

K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam
Nov – Dec 2019

Max. Marks: 100 **Duration:3Hrs**
Class: TY B.Tech Semester: V
Name of the Course: Operating System Branch: COMP
Course Code: UCEC501

Instructions:
(1) All Questions are Compulsory
(2) Make suitable assumptions if required and state them clearly.

<table>
<tr><th>Question No.</th><th></th><th>Max. Marks</th></tr>
<tr><td>Q.1 (a)</td><td>Draw and explain the Android operating system architecture.</td><td>10</td></tr>
<tr><td>Q.1 (b)</td><td>Write a shell script for changing the permissions of files. Accept the file name from user. Check and display the available permissions and ask for new permissions from user and update accordingly.
OR
Differentiate between Fork and Exec System calls with the help of small programs.</td><td>10

10</td></tr>
<tr><td>Q.2 (a)</td><td>Consider the following workload :
<table>
<tr><th>Process</th><th>Service Time</th><th>Arrival Time</th></tr>
<tr><td>P1</td><td>50ms</td><td>0ms</td></tr>
<tr><td>P2</td><td>20ms</td><td>20ms</td></tr>
<tr><td>P3</td><td>100ms</td><td>40ms</td></tr>
<tr><td>P4</td><td>40ms</td><td>60ms</td></tr>
</table>
a. Show time scale diagram for above using SRTN, MLFQ (considering Queue 1: q=10ms, Queue 2 : q=20ms), FCFS.
b. Calculate the Turnaround time and Waiting time for each process and Calculate Average waiting time.</td><td>10</td></tr>
<tr><td>Q.2 (b)</td><td>Explain 7 state process model and draw the queuing model for 7-state process model.</td><td>10</td></tr>
<tr><td>Q.3(a)</td><td>List different mechanisms used in process concurrency. Explain reader writer problem (assuming Reader having high priority and single reader single writer) and give the solution using semaphore.
OR
Explain the concurrency mechanisms used in Unix operating system</td><td>10

10</td></tr>
<tr><td>Q.3 (b)</td><td>Explain how the system can recover from the deadlock using
(a) Recovery through preemption.
(b) Recovery through rollback.
(c) Recovery through killing processes.</td><td>10</td></tr>
</table>

Q.4 (a)	Explain 3 techniques for performing I/O function. **OR** Explain a model of I/O organization for Local peripheral device, Communication port and File System with the help of diagrams.	10 10
Q4. (b)	Explain file system software architecture along with elements of file management. **OR** Explain different record blocking methods with the help of proper example.	10 10
Q.5 (a)	Disk track requests: 27, 129, 110, 186, 147, 41, 10, 64, 120. Assume that the total tracks are 200 and the disk head is initially positioned over track 100 and is moving in the direction of increasing track number. Calculate the seek length, average seek length. And show the head movements with the help of diagram for following: a. SSTF b. SCAN c. C-SCAN (scan direction → upward)	10
Q.5 (b)	Explain multithreading. How multithreading will improve the response time of application running on uniprocessor system.	10

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End Semester Exam
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Max. Marks: 100 | **Duration:2Hrs**
Class: TY B.Tech | Semester: V
Name of the Course: Operating System | Branch: COMP
Course Code: UCEC501(**PWD**)

Instructions:
(1) All Questions are Compulsory
(2) Make suitable assumptions if required and state them clearly.
(3)

	SECTION - A	
Question No.		**Max. Marks**
Q.1 (a)	Explain the Android operating system architecture (07) With the help of suitable diagram (03)	10
Q.1 (b)	Write a shell script for changing the permissions of files. Accept the file name from user. (02) Check and display the available permissions (03) Ask for new permissions from user and update accordingly. (05) **OR** Differentiate between following system calls Fork (02) and Exec (02) With the help of small programs (06).	10 10
Q.2 (a)	Consider the following workload: **Process** / **Service Time** / **Arrival Time** P1 / 50ms / 0ms P2 / 20ms / 20ms P3 / 100ms / 40ms P4 / 40ms / 60ms a. Show time scale diagram for above using SRTN, MLFQ (considering Queue 1: q=10ms, Queue 2 : q=20ms), FCFS. b. Calculate the Turnaround time and Waiting time for each process and Calculate Average waiting time.	10
Q.2 (b)	Explain 7 state process models. (06) Draw the queuing model for 7-state process model. (04) **OR** List different mechanisms used in process concurrency. (03) Explain reader writer problem (assuming Reader having high priority and single reader single writer) and give the solution using semaphore (07)	10 10

<table>
<tr><td>Q. 3</td><td>Attempt the following multiple choice questions:</td><td></td></tr>
<tr><td>(1)</td><td>The layer between the hardware and the user program is ____
a) Operating environment
b) System environment
c) Operating system
d) All the mentioned</td><td>01</td></tr>
<tr><td>(2)</td><td>Kernel is ____
a) the software which monitors the operating
b) the set of primitive functions upon which the rest of operating system functions are built up
c) Considered as the critical part of the operating system
d) None of the mentioned</td><td>01</td></tr>
<tr><td>(3)</td><td>Which of these is not a goal of scheduling algorithm for different operating systems?
a) Fairness
b) Balance
c) Maximize throughput
d) Policy enforcement</td><td>01</td></tr>
<tr><td>(4)</td><td>Consider the following statements with respect to user-level threads and kernel supported thread ___
a) Context switch is faster with kernel-supported threads
b) For user-level threads, a system call can block the entire process
c) Kernel-supported threads can be scheduled independently
d) User-level threads are transparent to the kernel</td><td>02</td></tr>
<tr><td>(5)</td><td>Which of these is a technique of improving the priority of process waiting in queue for CPU allocation __
a) Starvation
b) Relocation
c) Ageing
d) None</td><td>01</td></tr>
<tr><td>(6)</td><td>Match the following pairs:
<table><tr><td>A. Disk Scheduling</td><td>I. Round Robin</td></tr><tr><td>B. Batch Processing</td><td>II. SCAN</td></tr><tr><td>C. Time Sharing</td><td>III. LIFO</td></tr><tr><td>D. Interrupt Processing</td><td>IV. FIFO</td></tr></table></td><td>04</td></tr>
</table>

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Class: TY B.Tech Semester: V
Name of the Course: Operating System Branch: COMP
Course Code: UCEC501(**PWD**)

Instructions:
(1) All Questions are Compulsory
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	SECTION - B	
Question No.		**Max. Marks**
Q. 4 (a)	Explain how the system can recover from the deadlock using (a) Recovery through preemption. (03) (b) Recovery through rollback. (04) (c) Recovery through killing processes. (03)	10
Q. 4 (b)	Explain multithreading. (02) How multithreading will improve the response time of application running on uniprocessor system. (08) **OR** Explain a model of I/O organization for Local peripheral device (03), Communication port (03) and File System with the help of diagrams (04).	10 10
Q.5 (a)	Explain file system software architecture (05) along with elements (05) of file management. **OR** Explain different record blocking methods with the help of proper example.	10 10
Q.5 (b)	Disk track requests: 27, 129, 110, 186, 147, 41, 10, 64, 120. Assume that the total tracks are 200 and the disk head is initially positioned over track 100 and is moving in the direction of increasing track number. Calculate the seek length, average seek length. And show the head movements with the help of diagram for following: a. SSTF (03) b. SCAN (03) c. C-SCAN (04)	10

Q. 6	Attempt the following ***multiple choice questions***:	
(1)	To avoid the race condition, the number of processes that may be simultaneously inside their critical section is _ a) 8 b) 1 c) 16 d) 0	01
(2)	'm' processes share 'n' resources of the same type. The maximum need of each process doesn't exceed 'n' and the sum all their maximum needs is always less than m + n, In this setup __ a) Deadlock can never occur b) Deadlock may occur c) Deadlock has to occur d) None of the above	01
(3)	Banker's algorithm deals with ___ a) Deadlock prevention b) Deadlock Avoidance c) Deadlock Recovery d) Mutual Exclusion	01
(4)	When a user job starts in a two level directory system or a user logs in: __ a) The user's user file directory is searched b) The system's master file directory is not searched c) The master file directory is indexed by user name or account number. d) All the mentioned above	01
(5)	In UNIX, exactly which operations can be executed by group members and other users is defined by __ a) The group's head b) The file's owner c) The file's permissions d) All the mentioned above	01
(6)	I/O redirection ___. a) implies changing the name of a file b) can be employed to use an existing file as input file for a program c) implies connecting two programs thoruht a piple d) None of the mentioned	01

(7)	_____ Operating System does not implement multitasking. a) Windows XP b) Windows NT c) Windows 98 d) MS DOS	01
(8)	The data block of a very large file in the UNIX file system are allocated using __ a) Contiguous Allocation b) Linked Allocation c) Indexed Allocation d) An extension of indexed allocation	01
(9)	The main disadvantage of spinlocks is that __ a) They are not sufficient for many process b) They require busy waiting c) They are unreliable sometimes d) They are too complex for programmers	01
(10)	Semaphores are mostly used to implement __ a) System calls b) System protection c) IPC mechanism d) None of the mentioned	01