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First Semester M.Tech. Degree Examination, February 2013
Advances in Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. Describe the essential properties of the following operating systems:
 i) Time sharing ii) Embedded systems iii) Personal computer. (08 Marks)
 - b. Suppose that a multiprogrammed system has a load of N processes with individual execution times of t_1, t_2, \dots, t_N . How would it be possible that total execution time (T) be $T > t_1 + t_2 + \dots + t_N$? What could cause the T to exceed the sum of the individual process execution times? (04 Marks)
 - c. Explain the two methods of resources sharing used to create the abstract machines. Give two examples. (08 Marks)
- 2
 - a. Explain the OS primitive functions FORK(), QUIT() and JOIN() with fragment code example for each. (08 Marks)
 - b. Distinguish between sequential computation and multithreaded computation. Using block diagram, represent the various objects of single threaded and multithreaded process. (08 Marks)
 - c. Explain the POSIX file along with any three POSIX file command. (04 Marks)
- 3
 - a. What does a mode bit do? Why are there more than one processor modes? (05 Marks)
 - b. Explain the two techniques by which a program executing in "User mode" can request the kernel's services. (05 Marks)
 - c. Discriminate 'Trusted software' from 'Untrusted software'. (05 Marks)
 - d. With neat block diagram, explain the device management component of any generic operating system. (05 Marks)
- 4
 - a. With the help of neat block diagrams, explain the four software modularization approaches used to implement different operating systems. (10 Marks)
 - b. Explain one important advantage and one implementation challenge of a layered kernel in an OS. Describe the layered architecture of Dijkstra's THE system. (10 Marks)
- 5
 - a. List and explain the five issues that distinguish distributed operating system from network operating system. (10 Marks)
 - b. Explain the four different mechanisms by which a user process can perform IPC using the Linux kernel. (10 Marks)
- 6
 - a. Draw the block diagram of various components of the virtual memory manager of Linux OS and explain its general characteristics. (10 Marks)
 - b. Represent the process and thread descriptors of Windows NT using a suitable block diagram and explain the NT executive process manager. (10 Marks)
- 7
 - a. With a neat diagram, explain the socket functions used for elementary TCP/IP client/server. (12 Marks)
 - b. Explain the distributed algorithm for mutual exclusion, with an example. (08 Marks)
- 8

Write short notes on the following :

 - a. Linux Clusters b. Process migration
 - c. Mach OS kernel-based memory manager d. OS implementation considerations. (20 Marks)

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