First Semester M.Tech. Degree Examination, January 2011
Advances in Operating Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Describe the essential properties of following types of operating systems:
     i) Time sharing   ii) Embedded systems.   **(06 Marks)**
   b. Differentiate between the space multiplexing and time multiplexing. Give two examples.
                                        (05 Marks)
   c. What are the distinctions among Windows NT, Windows 2000 and Windows XP? **(06 Marks)**
   d. What are the benefits of the batch systems?   **(03 Marks)**

2 a. Write a UNIX program that creates a child process that prints a greeting, sleeps for 20 seconds, and then exits. The parent process should print a greeting before creating the child and another after the child has terminated. It should then terminate.   **(05 Marks)**
   b. Explain the difference between the Fork( ), Join( ) and Quit( ) system calls with code fragments.   **(05 Marks)**
   c. Write a program to create a thread using pthreads / Javathreads.   **(05 Marks)**
   d. With a neat labeled diagram, explain a process, with multiple threads.   **(05 Marks)**

3 a. Explain any five major activities of an operating system in regard to main memory management.   **(05 Marks)**
   b. Explain any five general considerations used to design an operating system.   **(05 Marks)**
   c. Describe the UNIX architecture with a neat labelled diagram.   **(07 Marks)**
   d. Describe the actions a kernel takes to context switch between the processes.   **(03 Marks)**

4 a. Differentiate between trusted software and untrusted software. Give examples.   **(04 Marks)**
   b. What are the major issues in designing a distributed operating system?   **(05 Marks)**
   c. In the Miuokernel approach for designing an operating system, what are the primary tasks that the kernel must perform?   **(04 Marks)**
   d. Describe the CHORUS Miuokernel architecture, with a neat labelled diagram.   **(07 Marks)**

5 a. With a neat diagram, explain the process and resource management organization in Linux.
                                        (08 Marks)
   b. Explain the four mechanisms used by the Linux kernel to perform the interprocess communication.   **(08 Marks)**
   c. Write a note on the device driver interface in Linux.   **(04 Marks)**

6 a. With a neat diagram, explain the Windows NT/2000 organization.   **(08 Marks)**
   b. Write a note on thread descriptors in Windows NT kernel.   **(05 Marks)**
   c. Explain the Win32 API in Windows NT/2000/XP system.   **(07 Marks)**

7 a. Explain the distributed algorithm for mutual exclusion, with an example.   **(08 Marks)**
   b. What are the different methods of handling deadlocks?   **(04 Marks)**
   c. List and explain some of the potential advantages of process migration.   **(05 Marks)**
   d. Explain any three desirable features of a good message passing system.   **(03 Marks)**

8 a. Differentiate between R, RR and RRA protocols for RPCs. Give an example of an application in which each type of protocol may be most suitable one to use.   **(08 Marks)**
   b. Explain the socket functions used for elementary TCP client/server, with a neat diagram.
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