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13MCA351

Third Semester MCA Degree Examination, Dec.2018/Jan.2019

UNIX System Programming

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Briefly indicate the significance of any ten headers defined by the POSIX standard. (10 Marks)
b. Indicate any ten POSIX.1 optional interface groups and codes. (10 Marks)
- 2 a. What are the different types of files in UNIX system? Discuss. (07 Marks)
b. Discuss the nine permission bits for each file in UNIX environment. (09 Marks)
c. What are symbolic links? Discuss. (04 Marks)
- 3 a. List the structure used to query the file attributes in UNIX. Write a program in C++ to list the following file attributes of a given regular file passed as command line argument :
i) File type ii) Hard link count iii) file size iv) file name. (10 Marks)
b. i) List the important uses of `fcntl` API. Give its prototype description
ii) Write a C++ program to check whether the `close-on-exec` flag is set for a given file. If it is not set, use `fcntl` to set this flag. Also show the implementation of `dup2` macro using this API. (10 Marks)
- 4 a. Briefly explain the different ways for a process to terminate. (08 Marks)
b. What do you mean by shared libraries? Explain. (04 Marks)
c. Write a note on the following functions along with their syntax :
i) `setjmp` ii) `longjmp` iii) `getrlimit` iv) `setrlimit`. (08 Marks)
- 5 a. i) With a prototype description of `lock_fork`, explain the special features API.
ii) Write a program to create a child process and print the PPID and PID in the child process. The parent process must ensure that the child does not become a Zombie process. The parent process must wait for the child and print exit status of the child using appropriate macros. (10 Marks)
b. i) Explain in brief, what happens when `exec` is called in a child process. List the six different forms of `exec` APIs.
ii) Write a program that `execs` a program `echoall` to display all the command line and environment variables when this program is `execed` in the child process space. (10 Marks)
- 6 a. What is a signal? Explain the use of signal mask with examples. (10 Marks)
b. What do you mean by daemon? Give its basic coding rules. (10 Marks)

- 7 a. i) What are pipes? What are their limitations?
ii) Write a C program that sends "Hello world" message to the child process through the pipe. The child on receiving this message should display it on the standard output. (08 Marks)
- b. What are the three different ways in which the client and server processes can get access to same IPC structure? List the APIs along with their argument details that are used to create, control, send and receive messages from a message queue. (08 Marks)
- c. What are semaphores? What is their purpose? List and explain the API's used to create and control the semaphores. (04 Marks)
- 8 a. i) What is a socket? Describe the socket API.
ii) Write a C program to illustrate the process of creating socket, initializing the socket address structure and establishing a connection from a client to the server. Assume the server IP address as 10.10.2.5 and port number = 8000. The client after establishing a connection, should send "Hello world" message and wait for a reply. (10 Marks)
- b. Write short notes on the following :
i) sigsetjmp and siglongjmp
ii) Race conditions
iii) Error logging facility in BSD UNIX. (10 Marks)

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