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Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 UNIX System Programming

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the major differences between ANSIC and K&R C? Explain in details with example. (08 Marks)
- b. Write the usages and prototype of `sysconf()` and `pathconf()` APIs. Write a C/C++ program to check the following limits:
- Max number of Childs per process.
 - Max number of open files per process.
 - Clock tick per second.
 - Max number of characters in filename. (08 Marks)
- c. Explain the different POSIX sub standards and their features. Write a C/C++ program to check and display the POSIX version. (04 Marks)

OR

- 2 a. What are different POSIX feature test macros? Write a C/C++ program to check for POSIX feature test macros. (10 Marks)
- b. Explain the common characteristics of APIs and list the commonly occurring error status codes with their meanings. (06 Marks)
- c. What are features mandated to be implemented in POSIX.1FIPS conforming system? (04 Marks)

Module-2

- 3 a. Explain the different file types and their attributes in UNIX. (07 Marks)
- b. How UNIX kernel support for files? Explain it with related data structures. (08 Marks)
- c. Why hard link is needed in UNIX? Differentiate hard links with symbolic link. (05 Marks)

OR

- 4 a. Explain the following APIs with prototype: i) `open()` ii) `write()` iii) `lseek()`. (09 Marks)
- b. Write a note on record and file locking. Show the use of `fcntl()` function in record locking with the structure definition of `flock`. (07 Marks)
- c. Write a C/C++ program to implement UNIX “/n” command. (04 Marks)

Module-3

- 5 a. Explain the different process termination ways. Explain the `exit()` and `_exit()` functions with their effects on main function. (06 Marks)
- b. Why `setjmp` and `longjmp` functions are used? Illustrate their usages with simple program. (06 Marks)
- c. Differentiate between `wait` and `waitpid` APIs. List and explain the macros defined by POSIX.1b to check how a process is terminated. (08 Marks)

OR

- 6 a. Write different exec functions with their prototypes and relationships. (06 Marks)
 b. Illustrate the steps involved in terminal login, in details. (07 Marks)
 c. What is a job? How job control is implemented in UNIX systems? (07 Marks)

Module-4

- 7 a. How UNIX kernel support for the signals? (05 Marks)
 b. Explain the following APIs with prototype relating signals:
 i) sigprocmask() ii) sigaction() iii) alarm(). (09 Marks)
 c. Explain the relationship between SIGCHLD and waitpid() API. (06 Marks)

OR

- 8 a. Explain the way a process can send a signal to a process or a process group. (06 Marks)
 b. What are daemon processes? Explain the coding rules a daemon process. (08 Marks)
 c. Explain the error logging facility for daemon process, with neat diagram. (06 Marks)

Module-5

- 9 a. List different IPC mechanisms and explain the communication using FIFO with neat diagram. (07 Marks)
 b. What are semaphores? Write and explain the following APIs:
 i) semget() ii) semctl() (09 Marks)
 c. Explain the benefits of popen() and pclose() in detail. (04 Marks)

OR

- 10 a. Explain the message queue and write and explain the prototype of following APIs:
 i) msgget() ii) msgrcv() iii) msgctl() (10 Marks)
 b. Explain the different client server connection functions. (06 Marks)
 c. Write a C/C++ program to transfer the data between parent and child process over a pipe. (04 Marks)
