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06CS62

Sixth Semester B.E. Degree Examination, June/July 2011
Unix Systems Programming

Time: 3 hrs.

Max. Marks:100

Note: *Answer FIVE full questions selecting*
at least TWO questions from each part.

PART – A

1 a. What are the major differences between ANSI "C" and K and R "C"? Explain with examples. **(08 Marks)**
   b. What do you understand by the term feature test macros? List all the five features test macros along with their meanings. **(06 Marks)**
   c. Write a C++ program to list the actual values of the following system configuration limits on a given unix OS.
      i)   Maximum number of child process that can be created.
      ii) Minimum number of files that can be opened simultaneously.
      iii) Number of clock ticks. **(06 Marks)**

2 a. What are the API common characteristics? List any five values of the global variable errno along with their meanings whenever API's fail. **(06 Marks)**
   b. List and explain the different file types available in unix. **(08 Marks)**
   c. Describe the unix kernel support files. **(06 Marks)**

3 a. Explain the following API's with prototypes :
      i) Open ; ii) Lseek ; iii) Stat ; iv) Read. **(08 Marks)**
   b. Write a C++ program to implement following unix commands i) *ln* ; ii) mv **(08 Marks)**
   c. Bring out the differences between hardlink and symbolic link. **(04 Marks)**

4 a. What are the different ways for a process to terminate? Explain exit, -exit, atexit functions with its prototypes. **(08 Marks)**
   b. Explain the memory layout of a C program with a neat diagram. **(06 Marks)**
   c. Explain getrlimit and setrlimit functions with prototype. Mention the three rules to change the resource limits. Give four resource values. **(06 Marks)**

PART – B

5 a. What is fork and vfork? Explain with an example program for each. **(08 Marks)**
   b. What is zombic process? Write a C program to avoid zombic process by forking twice. **(06 Marks)**
   c. List the six different forms of exec API's. Write a program that exec's a program echoall to display all the command line and environment variables. **(06 Marks)**

6 a. What is a signal? Mention the different sources of signals. Discuss any four POSIX defined signals. Write a program to setup signal handler for SIGINT and SIGALARM. **(08 Marks)**
   b. What is Daemon? Discuss the basic coding rules. **(08 Marks)**
   c. What is job control? What are three forms of support from the OS required for job control? **(04 Marks)**

7 a. What are pipes? What are their limitations? Write a program to send data from parent to child over a pipe. **(06 Marks)**
   b. What is FIFO? Explain how FIFO can be used to implement client server communication model with an example. **(06 Marks)**
   c. What are the different system calls available to create and manipulate semaphores? Explain. **(08 Marks)**

8 a. What is socket? Discuss how to create and destroy a socket. **(08 Marks)**
   b. Write short notes on: i) Race condition ; ii) Network login ; iii) Message queues. **(12 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011
UNIX System Programming

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1. a. Bringout the major differences between ANSIC and K and R C. Explain each with example. **(07 Marks)**
    b. Write a C/ C++ program that prints the POSIX defined configuration options supported on any given system using feature test macros. **(08 Marks)**
    c. Write a C /C++ program to check following limits :
        i)   Clock ticks
        ii) Maximum number of child process
        iii) Maximum path length
        iv) Maximum file name
        v)   Maximum number of files can be opened. **(05 Marks)**

2. a. Explain the different file types available in UNIX or POSIX. Also write the commands to create all the files. **(06 Marks)**
    b. What are inodes in UNIX system? Differentiate between hard link and symbolic link. **(04 Marks)**
    c. With a neat diagram, explain the UNIX Kernel support for files. **(05 Marks)**
    d. Explain the following APIs, with prototype :
        i)   umask
        ii) stat
        iii) fstat
        iv) chown
        v)   link. **(05 Marks)**

3. a. Write a C or C++ program to illustrate the use of fcntl API for file locking. **(08 Marks)**
    b. Explain the file APIs : READ, WRITE and OPEN, with prototypes and arguments. **(06 Marks)**
    c. Write a C or C++ program to emulate UNIX $ls - l$ command. **(06 Marks)**

4. a. With a neat diagram, explain how a C – program is initiated and various ways it can be terminated. **(05 Marks)**
    b. Write a C or C++ program to illustrate use of setjmp and longjmp functions. **(05 Marks)**
    c. Describe the UNIX Kernel support for a process. Show the related data structure. **(05 Marks)**
    d. Explain in detail, the memory layout of a C – program. **(05 Marks)**

PART – B

5. a. List and explain the family of exec functions with their prototypes. How do they differ from each other? Also give one program example using any one of the exec functions. **(06 Marks)**
    b. What is a race condition? Write the program for generating race condition and to avoid the race condition. **(07 Marks)**
    c. What is a job control? With a neat diagram, explain the job control features. **(07 Marks)**

6 a. What are signals? Explain the prototype of sigation function. Also write a C or C++ program to setup signal handler using sigaction function. **(06 Marks)**

b. What is a signalmask of a process? Write a program to demonstrate use of sigprocmask function. Also write the prototype of all functions that are used to manipulate the signal sets. **(07 Marks)**

c. What are daemons? Explain the coding rules of the daemon process. Write a C or C++ program to initialize the uses defined daemon process. **(07 Marks)**

7 a. What are pipes? Write a C or C++ program to create pipe from the parent to the child and send the data down the pipe. **(07 Marks)**

b. What are FIFOs? With a neat diagram, explain the client–server communication using FIFOs. **(07 Marks)**

c. What are message queues? Write the structure of the message queue and explain each member, in detail. **(06 Marks)**

8 a. What are sockets? Explain the sequence of calling socket APIs for both server and client process. Briefly explain the prototype of each socket API. **(10 Marks)**

b. Write short notes on :
   i) Controlling terminal
   ii) Sigsetjmp and siglongkmp
   iii) Interpreter files
   iv) Out – of – band data. **(10 Marks)**

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