Unix Systems Programming VTU Question Paper Set

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10CS62

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
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. Explain the major difference between ANSI 'C' and K and R 'C' with example. **(10 Marks)**

b. Write a C/C++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros. **(08 Marks)**

c. Mention any 4 compile time limits with their values. **(02 Marks)**

2 a. Explain the different types of files in UNIX. **(10 Marks)**

b. Explain the UNIX Kernel support for files. **(10 Marks)**

3 a. Explain the working of the open function with prototype. **(10 Marks)**

b. Write a C++ program to implement following UNIX command i) *ln* ii) mv. **(10 Marks)**

4 a. Write a C/C++ program to demonstrate the use of outexit function. **(10 Marks)**

b. Explain briefly the memory layout of a C program. **(10 Marks)**

PART – B

5 a. What is fork and vfork? Explain with an example program for each. **(08 Marks)**

b. What is zombie process? Write a C program to avoid zombie process by forking twice. **(06 Marks)**

c. Explain the six different forms of exec API. **(06 Marks)**

6 a. What is signal? Explain with a program how to setup a signal handler. **(10 Marks)**

b. What is daemon process? Explain daemon characteristics and relation to session and process groups. **(10 Marks)**

7 a. What are pipes? Write a C/C++ program to send data from parent to child over a pipe. **(10 Marks)**

b. What are FIFO's? With a neat diagram explain the client server communicating FIFO's. **(10 Marks)**

8 a. Explain the following socket programming functions with their prototype:
i) Socket; ii) Connect; iii) Listen; iv) Accept. **(10 Marks)**

b. Explain the different client server connection functions, with example program. **(10 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, June/July 2016
UNIX Systems Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Compare and explain : ANSI C and K and R C with examples. **(08 Marks)**
b. List and explain feature test macros in POSIX systems. **(08 Marks)**
c. Compare : execution of an API with execution of C library function. Also list any four error status codes with their meaning. **(04 Marks)**

2 a. What is file? Explain types of files with command examples. **(06 Marks)**
b. Explain UNIX Kernel support for files with a neat sketch. **(08 Marks)**
c. Write any three differences between :
i) Hard links and soft links ii) C steam pointer and file descriptor. **(06 Marks)**

3 a. Explain file and record locking with C/C++ program. **(08 Marks)**
b. Explain the following API's with their prototypes. :
i) open ii) read iii) write iv) close. **(08 Marks)**
c. Write a C/C++ program to rename a file [use mv command /link and unlink APIs]. **(04 Marks)**

4 a. With a neat diagram, explain about termination ways for a process. Also write a C/C++ programs to display :
i) Command line arguments ii) Environment variables. **(10 Marks)**
b. Explain setjmp and longjmp functions with their prototypes. **(06 Marks)**
c. With neat sketch, explain memory structure/ layout of a C/C++ program that is to be executed. **(04 Marks)**

PART – B

5 a. What is race condition? Mention and explain routines to avoid race condition. **(06 Marks)**
b. Explain the following :
i) orphaned process ii) zombie process iii) terminal login iv) network login. **(10 Marks)**
c. Explain : i) process group ii) session. **(04 Marks)**

6 a. What is daemon? Explain characteristics and coding rules. **(10 Marks)**
b. Write a C/C++ program to show the use of alarm API. **(06 Marks)**
c. Define and explain : i) SIGCHLD signal ii) waitpid function. **(04 Marks)**

7 a. What is inter-process communication? List any 4 mechanisms (IPC). Also write a C/C++ program that creates a child process to print a message. **(08 Marks)**
b. Write a C/C++ program(s) to implement inter-process communication using FIFO file. **(06 Marks)**
c. Explain briefly with examples : i) Message queues ii) semaphores. **(06 Marks)**

8 a. Explain shared memory as an inter-process mechanism (IPC). **(08 Marks)**
b. What are steam pipes? Explain passing of file descriptors. **(06 Marks)**
c. Briefly explain client-server functions. **(06 Marks)**

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10CS65

Sixth Semester B.E. Degree Examination, June/July 2016
Computer Graphics & Visualization

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With neat diagrams, explain different graphics architectures. **(13 Marks)**
b. With a neat diagram, explain the elements of a computer graphics system. **(07 Marks)**

2 a. Explain two forms of text. Mention GLUT library functions for each of the form. **(06 Marks)**
b. Explain seven major groups of openGL graphics functions. **(07 Marks)**
c. Explain index color model. How it is supported in GLUT library. **(07 Marks)**

3 a. What are the major characteristics that describe the logical behaviour of an input device? Explain how openGL provides the functionality of each of the classes of logical input devices. **(08 Marks)**
b. What is double buffering? How it is implemented in openGL? **(05 Marks)**
c. What is display list? Write openGL code segment that generate a blue colored square using display list. **(07 Marks)**

4 a. Explain different frames in openGL. **(08 Marks)**
b. With the help of code segments, explain the modeling of colored cube and also explain bilinear interpolation. **(12 Marks)**

PART – B

5 a. Explain translation, scaling and rotation in a homogeneous coordinate system. **(10 Marks)**
b. What is concatenation of transformation? Derive concatenated final matrix M for rotating a 3D object about a fixed point. **(10 Marks)**

6 a. With neat diagram explain the following projections in openGL along with APIs provided i) perspective ii) Parallel. **(10 Marks)**
b. Explain different classical viewings **(10 Marks)**

7 a. Briefly explain the different classification of light and material interaction. How material properties are specified in openGL? **(10 Marks)**
b. What are the different types of light sources? Explain. **(10 Marks)**

8 a. What are the basic implementation strategies? Explain. **(10 Marks)**
b. What is clipper? Briefly explain Cohen Sutherland line clipping without code. Discuss four cases. **(10 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016

UNIX System Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Discuss the differences between ANSI C and K & R C with example for each. **(10 Marks)**

b. What are the API common characteristics? List any six values of the global variable errno along with their meanings whenever API's fail. **(10 Marks)**

2 a. Explain the commands to create different file types supported by UNIX. **(06 Marks)**

b. Explain UNIX Kernel support for files with a neat diagram. **(08 Marks)**

c. Differentiate symbolic links and hard links. **(06 Marks)**

3 a. Explain the following general file API's:
i) open( ) ii) fcntl( ) iii) lseek( ) **(12 Marks)**

b. Explain Symbolic Link file API's. **(08 Marks)**

4 a. Draw and explain the summary of starting and terminating a C program. **(06 Marks)**

b. With a neat sketch, explain the memory layout of a C-program. **(06 Marks)**

c. Explain exit, _exit and atexit functions with their prototypes. **(08 Marks)**

PART – B

5 a. What is a race condition? Write a program for generating race condition. **(08 Marks)**

b. Explain in detail the family of exec functions. **(12 Marks)**

6 a. What are signals? Write a program to setup signal handler for the SIGINT signal using sigaction API. **(06 Marks)**

b. What is signal mask of a process? Explain sigprocmask function along with its prototype. **(06 Marks)**

c. Define daemon process. Discuss the basic coding rules of the daemon process. **(08 Marks)**

7 a. Discuss the applications of FIFOs. **(04 Marks)**

b. Explain Popen and Pclose functions. **(06 Marks)**

c. Explain different API's used with message queues. **(10 Marks)**

8 a. Explain shmget, shmctl, shmat and shmdt functions. **(12 Marks)**

b. Write short notes on client server properties. **(08 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, June/July 2015

Unix System Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. All posix confirming system are not unix system (True/False). **(01 Marks)**

b. What are the restrictions specified to POSIX.1 by FIPS standard? **(07 Marks)**

c. Define different C preprocessor symbols defined by ANSI C. **(06 Marks)**

d. What is errno variable? Write a C/C++ program to print error diagnostic message of API executions (using this variable). **(06 Marks)**

2 a. With a neat structure, explain how Kernel supports for files (file operation open, read/write, lseek). **(10 Marks)**

b. What is the relationship between file stream pointer and file descriptor? What functions to be used to convert them one from each other. **(06 Marks)**

c. Give any four differences between hard link and symbolic link files. **(04 Marks)**

3 a. What is umask value? What is the actual permission set for newly created file, if umask value is 0002 and permission specified in open call is 0664? Define how umask value can be changed by calling process to remove write permission of group members and read, write permission for other members. **(05 Marks)**

b. Write C/C++ command line program to implement Unix mv command. **(05 Marks)**

c. What access permission is set for a process created while executing excutable file, if set UID and set GID flags are ON? **(05 Marks)**

d. Define structure flock. Create a write lock for a region behind 5 bytes from current file offset position to the end of the file. Consider file size is 100 bytes and current file offset is at 10 bytes. **(05 Marks)**

4 a. Illustrate with simple program how atexit function is used to register exit handler function. **(07 Marks)**

b. What alloca function? Indicate any one advantage and disadvantage of this function. **(03 Marks)**

c. What is the use of setjmp and longjmp functions? Illustrate them with simple program. **(10 Marks)**

PART – B

5 a. What is the effect when following happens in the system?
i) Parent terminates before child.
ii) Child terminates before parent and parent not waited for child termination status.
iii) Any of the Init child process terminates. **(06 Marks)**

b. Explain wait and waitpid functions. What are the macros defined by POSIX.1 to check how process is terminated? **(08 Marks)**

c. What is exec function? Describe different exec functions with their prototypes. **(06 Marks)**

6 a. Explain characteristics of sessions and process groups with a neat diagram. **(08 Marks)**

b. Explain with a neat diagram how Kernel supports for signals. **(06 Marks)**

c. Explain sigaction API with its prototype. **(06 Marks)**

7 a. What are pipes? With a simple diagram show how parent and child communicate using pipes. Write a program to send data from parent to child over a pipe. **(12 Marks)**

b. What is FIFO? With a neat figure show FIFO's are used for client server communication. **(08 Marks)**

8 a. What is message queue? Write functions to use message queue for sending and receiving data. **(10 Marks)**

b. Write short notes on any two :

i) popen and pclose functions.

ii) Semaphores

iii) Characteristics of Daemon process. **(10 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, Dec.2014/Jan. 2015
UNIX System Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What are POSIX standards? Explain different subsets of POSIX standards. Write a C or C++ program to check and display _POSIX _VERSION. **(06 Marks)**

b. Write a C OR C++ program to check the following compile time limits, along with its minimum value. i) supplemental groups, ii) maximum number of links of a file, iii) number of simultaneous asynchronous I/O, iv) real time signals, v) maximum number of child processes. **(08 Marks)**

c. List common set of APIs in UNIX system. Discuss the common characteristics of APIs along with their error status codes. **(06 Marks)**

2 a. Mention the different file types available in UNIX/ POSIX systems. **(08 Marks)**

b. List out the common files of UNIX systems with their usage and general file attributes. **(08 Marks)**

c. Differentiate between file stream pointer and file descriptor. **(04 Marks)**

3 a. Write the prototype and structure of APIs mentioned. Write a simple program for using these APIs. i) utime ii) link. **(12 Marks)**

b. Describe the device file APIs along with a sample program. **(08 Marks)**

4 a. Outline the environment structure of a process and mention any FOUR environment variables. **(06 Marks)**

b. Give reasons as to why shared libraries are better, with an example. **(06 Marks)**

c. Mention at least SIX resource limits and briefly explain the limits that they put on a process. **(08 Marks)**

PART – B

5 a. Explain various exec functions along with its prototypes and diagram that shows the relationships among them. **(10 Marks)**

b. Explain the "system" function with its prototype. **(04 Marks)**

c. Explain network login, with suitable diagram. **(06 Marks)**

6 a. Explain error handling for a Daemon process with a neat block diagram. Write the system library functions associated with error logging. **(08 Marks)**

b. Write the timeline or program sequence of execution for sigsetjmp and siglongjmp handling. **(08 Marks)**

c. Write the prototype of ALARM and PAUSE function and explain how they operate. **(04 Marks)**

7 a. Write the neat diagrammatic representation of a message queue with proper labeling. Write the data structure associated with message queue along with its elements detail. **(08 Marks)**

b. Write the prototypes of system library calls available to manipulate shared memory and semaphores. **(07 Marks)**

c. Write a simple C program to illustrate the concept of a co-process. **(05 Marks)**

8 a. Explain with a neat diagram, how STREAM PIPES can be used to implement client server model. **(10 Marks)**

b. Explain POPEN and PCLOSE functions with prototypes and demonstrate its usage with a simple C program. **(10 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, June/July 2014
Unix System 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&R C? Explain with examples. **(08 Marks)**

b. What is POSIX API? Explain the commonly occurring error status codes and their meaning. **(08 Marks)**

c. Write a C++ program to check and display the POSIX version constant of the system on which it is run. **(04 Marks)**

2 a. Discuss with a neat diagram the different data structures supported by Unix kernel for file manipulation. **(08 Marks)**

b. List all the attributes of UNIX or POSIX file along with their meaning. Which are the attributes that remains unchanged for the entire life of the file and why? **(08 Marks)**

c. Differentiate between hard link and symbolic link. **(04 Marks)**

3 a. Explain the following API's along with their prototype definition and possible cause for failure:
(i) open (ii) write (iii) fcntl (iv) stat **(12 Marks)**

b. How do you access and modify the time stamps of a file? Explain the prototype used for that. Write a program to illustrate the usage of the above prototype. **(08 Marks)**

4 a. Explain the use of setjmp and longjmp functions, with examples. **(08 Marks)**

b. With related data structure, explain the Unix kernel support for a process. **(08 Marks)**

c. What are the different ways in which a process can terminate normally? **(04 Marks)**

PART – B

5 a. List and explain the different forms of exec function with prototype declaration along with meaning. Write a program to echo all its command line arguments and environment variables. **(12 Marks)**

b. What is process accounting? Write a program to illustrate the generation of accounting data. **(08 Marks)**

6 a. What are signals? List any four signals along with brief explanation. Write a program to setup signals handler for SIGALRM and SIGINT signals. **(08 Marks)**

b. What are daemon processes? Explain the BSD facility adopted by daemon processes for error handling. **(08 Marks)**

c. Write a C++ program to illustrate the implementation of the Unix Kill command using the Kill API. **(04 Marks)**

7 a. What are pipes? Explain the different ways to view a half duplex pipe. Write a program to create a pipe between a parent and its child and to send data down the pipe. **(10 Marks)**

b. Discuss with an example, the client-server communication using FIFO. **(06 Marks)**

c. List along with prototype declaration and meaning, the different types of system calls available to create and manipulate semaphore. **(04 Marks)**

8 a. What is a socket? Describe the socket API. Explain the different API's used for establishing connection between two system using socket? **(10 Marks)**

b. Write a short notes on the following :

(i) Race condition (ii) File and Record locking. **(10 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
UNIX System Programming

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the major differences between K and R 'C' and ANSI 'C' with examples. **(08 Marks)**

b. List all feature test macros along with their effect if defined in a system. **(05 Marks)**

c. Explain why calling API's is more time consuming than calling library functionary? List any six error status codes returned by API's with their meaning. **(07 Marks)**

2 a. Explain the different file types supported by UNIX/ POSIX systems. **(08 Marks)**

b. Explain UNIX Kernel support for files, with a neat diagram. **(07 Marks)**

c. What are hard link and symbolis links? Write any four differences between them. **(05 Marks)**

3 a. Explain the following API's along with prototypes
i) open ii) stat( ) & fstat( ) iii) read( ). **(09 Marks)**

b. Describe the use of fcntl( ) function for file and record locking. **(06 Marks)**

c. Explain device and FIFO file API's with prototype. **(05 Marks)**

4 a. With a neat diagram, explain how a 'C' program is stated and how it is terminated. **(06 Marks)**

b. Explain memory layout of a 'C' program, with a neat diagram. **(06 Marks)**

c. Explain the use of getrlimit( ) and setrlimit( ) functions along with prototypes. What are the rules that govern the changing of resource limits? **(08 Marks)**

PART – B

5 a. Explain fork( ) along with prototype write a program to illustrate the use of fork( ). **(07 Marks)**

b. Explain wait( ) and waitpid( ) functions along with prototypes. **(05 Marks)**

c. What is job control? What support is need for job control? Briefly summarize job control features along, with a diagram. **(08 Marks)**

6 a. Discuss signal concept. Explain any five signals briefly. **(07 Marks)**

b. Explain the following signal functions :
i) Sigprocmask( ) ii) Sigaction( ). **(06 Marks)**

c. Explain Daemon process? What are its coding rules? Write a program that initializes itself as a daemon. **(07 Marks)**

7 a. What are pipes? What are its limitations? Write a program to send data form parent to child over a pipe. **(07 Marks)**

b. With a neat diagram, explain interprocess communication using FIFO. **(06 Marks)**

c. What are the different system calls available to create and manipulate semaphores? **(07 Marks)**

8 a. Along with prototype, explain the following functions related to shared memory :
i) shmget ii) shmctl( ). **(08 Marks)**

b. What are stream pipes? Write a program to drive the add2 filter using stream pipe. **(12 Marks)**

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10CS62

Sixth Semester B.E. Degree Examination, June/July 2013
UNIX System Programming

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting atleast TWO questions from each part.*
2. Write comments for all the programs.

PART – A

1 a. What is POSIX standard? Explain the different subsets of POSIX standards. **(05 Marks)**

b. Write a C/C++ POSIX complaint program to check the following limits :
i) Number of clock ticks
ii) Maximum number of child processes
iii) Maximum path length
iv) Maximum characters in a filename
v) Maximum number of open files per process. **(10 Marks)**

c. Explain the common characteristics of API and describe the error status code. **(05 Marks)**

2 a. Explain the different file types available in UNIX or POSIX systems. **(10 Marks)**

b. Describe the UNIX kernel support for files. **(06 Marks)**

c. Differentiate between hard links and symbolic links. **(04 Marks)**

3 a. Explain the importance of file and record locking in UNIX. Show how "fcntl" API can be used for file and record locking. **(10 Marks)**

b. Write a C/C++ program to emulate ln command in UNIX. **(05 Marks)**

c. Write a C/C++ program to emulate mv command in UNIX. **(05 Marks)**

4 a. Explain with a neat block diagram, the memory layout of a C program. **(05 Marks)**

b. For the following given C program, identify the various segments when the program is executed :

```
# include <stdio.h>
int a = 5;
int b;
int data [10];
const int i = 5;
int main( )
{
int X;
char * ptr = malloc(50);
return 0;
}
```

(05 Marks)

c. Explain the setjmp( ) and longjmp( ) functions with an example C/C++ program illustrating their usage. **(10 Marks)**

PART – B

5 a. What do you mean by fork( ) and vfork( ) functions? Explain both functions with example programs (write-separate programs). **(10 Marks)**

b. What is job control? Summarize the job control features with the help of neat diagram. **(10 Marks)**

6 a. Explain the sigaction( ) function by giving the prototype and discuss its features. **(08 Marks)**

b. Briefly explain the kill( ) API and the alarm( ) API. **(06 Marks)**

c. What is a daemon process? Discuss its characteristics. **(06 Marks)**

7 a. What is FIFO? Explain how it is used in IPC. Discuss with an example C/C++ program the client –server communication using FIFO's. **(10 Marks)**

b. Write short notes on the following :
   i) Message queues
   ii) Semaphores. **(10 Marks)**

8 a. Explain the concept of shared memory with an example C/C++ program. **(10 Marks)**

b. What do you mean by passing file descriptors between processes? Explain. **(10 Marks)**

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