



INSTITUTE OF AERONAUTICAL ENGINEERING (AUTONOMOUS)

Dundigal, Hyderabad - 500 043

INFORMATION TECHNOLOGY

QUESTION BANK

Course Name	:	LINUX PROGRAMMING
Course Code	:	A50517
Class	:	III B. Tech I Semester
Branch	:	Information Technology
Year	:	2017- 18
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OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
UNIT-1			
Linux Utilities and Shell Programming			
Part - A (Short Answer Questions)			
1.	List the advantages of Linux Programming?	Knowledge	1
2.	List all unix operating system releases?	Knowledge	1
3.	Explain which command is used to get details of any command?	Understand	1
4.	Discuss how do you display last 8 lines of the employee.txt file contents?	Understand	1
5.	Write a command to find all the files modified in less than 2 days and print the record count of each.	Knowledge	1
6.	Explain significance of 'tee' command.	Understand	1
7.	Explain which character is used to search a pattern in the beginning of each line using grep command?	Understand	1
8.	Given a file, replace all occurrence of word "ABC" with "DEF" from 5th line till end in only those lines that contains word "MNO".	Knowledge	1
9.	Give examples for command substitution.	Knowledge	1
10.	Explain how can you set the read, write permissions to all users on every file which is created in the current session?	Understand	1
11.	Explain which operator is used for piping?	Understand	1

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
12.	Discuss how will you emulate wc -l using awk?	Understand	1
13.	Distinguish symbolic link and hard link	Knowledge	1
14.	Explain how to print the 10th line in a file using sed?	Knowledge	1
15.	Explain how will you find the total disk space used by a specific user?	Knowledge	1
16.	Explain briefly about shells available in Unix.	Understand	1
17.	Define Unix shell. Explain shell environment.	Knowledge	1
18.	How to remove duplicate lines from a file using sort?	Remember	1
19.	Write a shell script to display first n numbers of Fibonacci series.	Knowledge	2
20.	List shell responsibilities in Linux?	Knowledge	2
21.	Define shell script in Linux System?	Knowledge	2
22.	Discuss 3 standard streams in Linux	Understand	2

Part - B (Long Answer Questions)

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
1.	Explain the salient features of Unix operating system.	Understand	1
2.	Discuss elaborately the unix kernel architecture with neat block diagram.	Understand	1
3.	Discuss file attributes? Explain how to change basic file permissions with examples.	Understand	1
4.	Explain the grep command with the help of an example. Mention some options that are permitted to use with it and the purpose of these options.	Understand	1
5.	Discuss the permissions that are associated with Unix files on their creation? example, show any two different ways of changing these permissions to required values.	Understand	1
6.	Differentiate between Hardlinks and symbolic links with an example	Knowledge	1
7.	Create a file – file5, display the column from 2 to 4, and file 5 consists of roll number, name, designation, department, salary and date of joining, each field is separated with pipe (' ').	Knowledge	1
8.	Write an awk program to print the fields 1 and 4 of a file that is passed as a command line argument. The file contains lines of information that is separated by "," as delimiter. The awk program must print at the end the average of all 4th field data.	Knowledge	1
9.	Write a command to display the lines which ends with letter 't' and starts with 'c' and total 5 Characters.	Knowledge	1
10.	Give an example and explain following commands : cat, cp, rm, wc	Knowledge	1
11.	Create a file-file1 employee which stores ename, epid, designation, salary. Write a command to display the details ename, epid, and salary whose designation is "Manager" of given file-file1.	Knowledge	1
12.	Create file – file5 and store 10 lines of content. Write a command to display content in descending order of given file-file5.	Knowledge	1
13.	Create file – file4 and store names of students. Analyze and display the content in descending order and also display number of lines in file4.	Knowledge	1
14.	Analyze and search for "manager" in employee file and display all details of employee.	Analyze	1
15.	Write a shell script to create a menu, which displays the list of files, current date, process status and current users of the system.	Knowledge	2
16.	Write a shell program to read two non-negative numbers from command line argument \$1 and \$2 and compute \$1 to the power of \$2. For example \$1\$2	Knowledge	2
17.	Write a shell script to read starting number and ending number and display prime numbers in between two numbers using shell script. For eg. 1 to 20 is 2 3 5 7 11 13, 17, 19	Knowledge	2

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
18.	Define shell script? How shell programs are executed? Write a note on read statement.	Knowledge	2
19.	Draw a neat diagram and explain the relationship between the kernel and shell of the UNIX Operating system.	Understand	2
20.	CAT command is used to display content of file, Write a C program to implement CAT Command using system calls.	Knowledge	2
21.	Write in detail the features of test command.	Understand	2
22.	Write briefly about case control structure in sh with examples. Write briefly about " " operator in sh.	Knowledge	2
23.	Discuss the command expansion features provided in sh with examples	Understand	2
24.	Illustrate different methods of providing input values to a shell script and explain.	Knowledge	2
25.	Write a program to read a value '0', b value '1' and positive integer value 'n' from standard input stream. Display Fibonacci series to standard output stream using shell script.	Knowledge	2
26.	Write a shell script to read a file name and convert the content of a file to uppercase letters	Knowledge	2
27.	Write a program to read Positive integer number "num1" and find sum of individual digits using shell script. (eg. 135=9).	Knowledge	2
28.	Write a shell script to create a file which consists of 10 lines and display all the lines in between 4 and 8 line.	Knowledge	2

UNIT-II

FILE AND DIRECTORY SYSTEM CALLS

Part - A (Short Answer Questions)

1.	Define file descriptor and file pointer?	Knowledge	3
2.	Define the use of sticky flag?	Knowledge	3
3.	Explain the meaning of . and .. with respect to directory ?	Understand	3
4.	Write parameter which limits the use of number of files that can be opened by a user process?	Knowledge	3
5.	Illustrate different types of locks can Knowledge on file.	Knowledge	3
6.	Discuss the two components of the directory file?	Understand	3
7.	Discuss to count the number of directories in the directory tree /home/mca01?	Understand	3
8.	Illustrate calloc() and malloc() functions?	Knowledge	3
9.	Discuss setjmp() and longjmp() functions?	Understand	3
10.	Define the structure used to set lock on a specified region of a file.	Knowledge	3
11.	Explain about realloc() system call with syntax.	Understand	3
12.	Define deadlock with example?	Knowledge	3
13.	Explain the differences between fgets, gets system call.	Understand	3
14.	What is fcntl function? What is the purpose of using it?	Remember	3
15.	What is the difference between internal and external commands?	Remember	3
16.	Write the syntax of fflush system call give an example.	Knowledge	3
17.	What are fflush and fseek functions? Explain.	Remember	3
18.	Write the syntax of creat function.	Knowledge	3
19.	Differentiate between stat, fstat and lstat functions	Remember	3
20.	Write about unlink system call and give an example.	Knowledge	3

Part - B (Long Answer Questions)

1.	Write a c program to read a directory and display all the files in the given directory.	Knowledge	3
2.	Explain the following functions with syntax: (a) stat() (b) read() (c) open() (d) fstat()	Understand	3
3.	List and briefly describe the functionalities of standard i/o library.	Knowledge	3
4.	Discuss the characters that are used as wild cards by the shell. Explain their meaning and illustrate their usage. Write a note on character class.	Understand	3
5.	Explain about memory management functions malloc(), calloc(), realloc(), free() with suitable example.	Understand	3
6.	Write a C program for wc command using system calls or library functions.	Knowledge	3
7.	Display line number before each line of file - file5. Analyze and Implement nl command in C language.	Analyze	3
8.	Write a C Program to simulate mv command.	Knowledge	3
9.	Write a C Program to simulate ls command.	Knowledge	3
10.	Write a C program to simulate cp command.	Knowledge	3
11.	Display line number before each line of file - file5. Analyze and Implement nl command in C language.	Knowledge	3

UNIT-III**PROCESS AND SIGNALS****Part - A (Short Answer Questions)**

1.	Explain process ID of init process?	Understand	4
2.	Discuss return values of the fork() function call?	Understand	4
3.	Illustrate difference between fork() and vfork()?	Knowledge	4
4.	Define daemon processes?	Knowledge	4
5.	Define Zombie process? How can we know the status of zombie process?	Knowledge	4
6.	Write the difference between reliable and unreliable signals.	Understand	4
7.	Illustrate the difference between zombie process and orphan process?	Knowledge	4
8.	Explain the use of wait() and waitpid() functions.	Understand	4
9.	Explain signal() function and how to handle signal?	Understand	4
10.	Distinguish between alarm(), sleep(), pause() functions?	Knowledge	4
11.	Explain how to terminate process normally or abnormally?	Understand	4
12.	What is a process.	Understand	4
13.	Write the syntax of following functions. Explain each argument. kill raise alarm exit	Knowledge	4
14.	Explain difference between threads and process.	Understand	4
15.	Write the system calls for process termination in detail.	Knowledge	4

Part - B (Long Answer Questions)

1.	Write a program to find sum of odd numbers by child process and sum of even numbers by parent processes of given range numbers using fork function.	Knowledge	4
2.	Explain difference between zombie processes and orphan process with example.	Understand	4
3.	Explain the function of following signals i) SIGQUIT ii) SIGCHLD iii) SIGHUP	Understand	4
4.	(a) Write in detail about the interrupted system calls.	Knowledge	4
5.	Suppose a process does not wish to block until its children terminate. How can it ensure that child processes are cleaned up when they terminate?	Understand	4

6.	Define region lock? What are the rules about the specification of the region to be locked or unlocked?	Understand	4
7.	Write about F GETLK, F SETLK and F SETLKW	Knowledge	4
8	Explain how fcntl API can be used for file and record locking	Understand	4
9.	Write a note on process table and process scheduling.	Knowledge	4
10.	Write the difference between pause(), sleep(), abort() function systems calls.	Knowledge	4
11.	What is a deadlock? Discuss the reasons for the deadlock.	Knowledge	4
12.	Write about the kill and raise functions.	Knowledge	4
13.	Write a C program to illustrate exec() function.	Knowledge	4
14.	Define Signals. What do you mean by Unreliable Signals? Explain.	Knowledge	4
15.	Explain the following with example: (a) Process Creation (b) Process Termination (c) Signal function (d) Reliable signals.	Understand	4
16.	Signal handlers are used to catch the signal and do some action after catching signal. So, catch signal "SIGINT" and call function to solve and display fibonacci series of given number.	Knowledge	4
17.	Write a program to create a new process (using fork()) and find Armstrong number by child process, sum of individual digits of given number by parent process in c language.	Knowledge	4
18.	Write a program to create a new process (using fork()) and find factorial of given number by child process, sum of n numbers of given number by parent process in c language.	Knowledge	4

UNIT-IV

INTER PROCESS COMMUNICATION (Same Host)

Part - A (Short Answer Questions)

1.	Define Inter Process Communication (IPC) in Linux System?	Knowledge	5
2.	Write few Inter Process Communication mechanisms.	Knowledge	5
3.	Discuss which is best Inter Process Communication for exchange information? Why?	Understand	5
4.	Explain the use of FIFO file?	Understand	5
5.	Define mknode() function in UNIX?	Knowledge	5
6.	Illustrate difference between pipe and named pipe?	Knowledge	5
7.	Define message queue.	Knowledge	5
8	Draw the structure of message queue for storing 3 messages in message queues.	Understand	5
9.	Discuss limits on messages queue.	Understand	5
10.	Explain how to create and remove messages from message queue?	Understand	5
11.	Define semaphore?	Knowledge	6
12.	Explain the use of semctl() function and write various operations on semaphore?	Understand	6
13.	Explain the use of binary semaphore?	Understand	6
14.	Explain semop() function with arguments in semaphores	Understand	6
15.	Write about popen, pclose library functions.	Knowledge	6

Part - B (Long Answer Questions)

1.	Define FIFOs? How they are different from pipes? Give an example application where FIFO can be used.	Knowledge	5
2.	Write a program to read message "hello" from process 1 and write to fifo file.	Knowledge	5

	Read message from fifo file written by process 1 and display to output terminal by process 2. Implement one way communication using fifos.		
3.	Write a c program to send and receive message using pipes. Implement two way communication using pipes.	Knowledge	5
4.	Describe pipe? Discuss the parent and child processes.	Understand	5
5.	Distinguish between pipes and named pipe.	Knowledge	5
6.	Write a program to read a value 'n' from standard input at sender side and send to receiver to find reverse of given number, Receiver receives the number 'n' and finds reverse of given number and sends result to sender. Implement two way communication using pipe's.	Knowledge	5
7.	Illustrate difference between pipes and message queues IPC.	Knowledge	5
8	Write a c program to send 3 messages by sender and read 3 messages by receiver using same message queue id. Implement one way communication using message queues.	Knowledge	5
9.	Explain about the "Message Queue structures in the Kernel" with an example, and explain in detail about the process of Reading a Message from the Queue.	Understand	5
10.	Write a c program to send and receive message using pipes. Implement two way communication using pipes.	Knowledge	5
11.	Read message "HELLO" at sender side and send to receiver through pipe. Receiver reads and display at receiver side. Analyze and Implement one way communication using fifos.	Knowledge	5
12.	Write a program demonstrating, handling of sum of n integers done by a child process and send result to the parent process using fifos. Parent read result from fifo and display to the standard output stream.	Knowledge	5
13.	Write three messages to new message queue and give its priority / type of message number in sequence 3, 9, 11 by sender. At receiver side only read whose message has priority / type is 9.	Knowledge	5
14.	Analyze and Create employee file with field eid, ename, designation, salary each field is separated with pipe(). Display part of information i.e eid, salary of all employees using unix commands. ii. Count and display of employee in employee file using unix command iii. Search for "manager" in employee file and display all details of employee.	Knowledge	5
15.	Explain about the "Kernel data structure for a semaphore set". Write about the semaphore adjustment on "exit". Explain about the importance of SEM UNDO.	Understand	6
16.	Define semaphores? What is their purpose? List and explain the APIs used to create and control the semaphores.	Understand	6

UNIT-V

INTER PROCESS COMMUNICATION USING SOCKETS

Part - A (Short Answer Questions)

1.	Write the advantage of shared memory.	Knowledge	6
2.	Explain how to handle shared memory in IPC.	Understand	6
3.	Discuss how to attach and detach to shared memory.	Understand	6
4.	Explain shmctl() function with arguments in shared memory.	Understand	6
5.	Discuss how to control shared memory with semaphores?	Understand	6
6.	Define socket and write the proto type of socket system call.	Knowledge	7
7.	Explain the use of bind() in socket programming	Understand	7
8	Discuss which protocol is used by TELNET programme ?	Understand	7
9.	Discuss wellknown ports.	Understand	7
10.	Write primitive is used by server for waiting the client connection requests.	Knowledge	7
11.	Draw the structure of TCP/IP for exchange information between client and server.	Understand	7
12.	List the attributes in socket address functions	Knowledge	7

13.	Define connect primitive	Knowledge	7
14.	Discuss accept() function.	Understand	7
15.	Define internet IPV4 socket address structure.	Knowledge	7
16.	Distinguish between IPV4 and IPV6.	Knowledge	7
17.	Explain return type of listen() function?	Understand	7
18.	Write about getsockopt, setsockopt functions	Knowledge	7
Part - B (Long Answer Questions)			
1.	Define Shared memory? What are the various functions implemented in shared memory. Explain in brief about each function.	Understand	6
2.	Explain “how to control, attach and detach a shared memory segment.	Understand	6
3.	Explain which function is required to establish and disconnect the connection between client and server using socket primitives?	Understand	7
4.	List and briefly discuss the ports and addresses supported by socket address function.	Knowledge	7
5.	Explain each Elementary Socket Functions illustrate in TCP/IP socket API.	Understand	7
6.	Write a program to design a UDP client-server application which takes file name as input in client side and transfers the file to the server.	Knowledge	7
7.	Define socket? With the help of socket write a simple client / server application for verifying user authenticity.	Understand	7
8.	Explain in detail about byte ordering and manipulation functions.	Understand	7
9.	Write a program to design a TCP client – server application which takes IP address, Port number and string to be echoed as command line inputs in client application and implements echo service.	Knowledge	7
10.	Write a program to implement TCP client server application in which client takes an integer value from the command line and sends to the server. Server returns the factorial of the received integer value to the client.	Knowledge	7
11.	List well-known ports? List some well-known ports.	Knowledge	7
12.	Write a program to implement UDP client server application in which client takes an file name from the command line and sends to the server. Server returns the content of received file to the client.	Knowledge	7
13.	Write a C program to illustrate the process of creating socket, initializing the socket address structure and establishing a connection from 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 of reverse of same string.	Knowledge	7
14.	Read a value ‘n’ from standard input at sender side and send to receiver to find power(n,2). Receiver receives the number ‘n’ and finds power(n,2) and sends result to sender. Analyze and Implement two way communication using UDP	Knowledge	7

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