INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING

ASSIGNMENT QUESTIONS

Course Name	:	**LINUX PROGRAMMING**
Course Code	:	**A70511(R15)**
Class	:	IV B. Tech I Semester
Branch	:	CSE
Year	:	2018 – 2019
Course Coordinator	:	Ms. Y Harika Devi, Assistant Professor, CSE
Course Faculty	:	Ms. G Geetha Reddy, Assistant Professor, CSE Ms. E Umashankari, Assistant Professor, CSE Ms. B Ramyasree, Assistant Professor, CSE

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-I		
1.	Discuss elaborately the Unix kernel architecture with neat block diagram.	Remember	1
2.	Differentiate windows and Linux operating system and analyze important system calls?	Understand	1
3.	Illustrate security concepts in both Linux and windows operating systems?	Remember	1
4.	Illustrate network commands with example?	Remember	1
5.	Explain cat, ls, mv, ln commands with examples?	Understand	1
6.	Illustrate by creating employee file with field eid, ename, designation, salary each field is separated with pipe(|).	Understand	1
7.	Write Linux commands for the following queries: i. 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.	Understand	1
8.	Illustrate awk command and write 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.	Understand	1
9.	**Discuss** how will you emulate wc -l using awk?	Understand	1
10.	Explain which character is used to search a pattern in the beginning of each line using grep command?	Understand	1

11.	**Explain** line addressing and content addressing using SED, each with an example.	Understand	1
12.	**Define** shell script? How shell programs are executed? Write different types of shells in Linux programming along with advantages.	Understand	2
13.	**Draw** a neat diagram and explain the relationship between the kernel and shell of the UNIX Operating system.	Understand	2
14.	**Write** briefly about case control structure in sh with examples. Write briefly about "‖" operator in sh.	Understand	2
15.	**Write** a shell script to create a menu which displays the list of files, current users, and contents of a particular file and process status of the system based on the user choice.	Remember	2
16.	Read a filename, take a variable c for count, and execute cat command in for loop, increment the variable till loop ends, and display the count/variable. Write a Shell program to count the number of words in a file.	Remember	2
17.	Read a number and initialize a variable res=1, and compute res=res*num, decrement num by one and perform the same action till num greater than zero. **Write** a shell program to calculate the factorial of a given number.	Remember	2
18.	Illustrate the Fibonacci numbers are generated by setting F0=0, F1=1, and then using the recursive formula Fn = Fn - 1 + Fn - 2 to get the rest. Thus the sequence begins: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34 …. Write a Shell program to generate above Fibonacci series.	Understand	2
19.	Write a shell program to count no of lines in a text file which starts with a specified letter (Use grep command).	Remember	2
20.	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.	Remember	2
21.	Write a shell script to read a file name and convert the content of a file to uppercase letters.	Remember	2
UNIT-II			
1.	Create file – student file with fields sid, sname, percentage of marks, address and store 10 lines of content and display last five lines. **Write** a program to implement tail command in C language.	Remember	3
2.	**Explain** the following functions with syntax: (a) stat() (b) read() (c) fcntl() (d) lseek()	Understand	3
3.	**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
4.	**Explain** about memory management functions malloc(), calloc(), realloc(), free() with suitable example.	Understand	3
5.	Create file – file5 and store 10 lines of content and display line number before each line. Implemental command in C language	Understand	3
6.	Illustrate to create file – file4 and store names of students. Display the content in descending order and also display number of lines in file4.	Remember	3
7.	Write a program that takes one or more file/directory names as command line input and reports the following information on the file. i. File type. ii.Number of links. iii.Time of last access.	Remember	3
8.	**Explain** about memory management functions malloc(), calloc(), realloc(), free() with suitable example.	Understand	3
9.	**Write** a C program for wc command using system calls or library functions.	Remember	3
10.	**Write** a C program that demonstrates redirection of standard output to a file. (ex: ls > f1)	Remember	3

	UNIT-III		
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.	Remember	4
2.	Explain difference between zombie processes and orphan process with example.	Understand	4
3.	Define Signals? Mention the different sources of signals. What are the three dispositions the process has when signals occur? List an four signals along with one or two line explanation. Write a program to setup handlers for SIGINT and SIGALARM signals.	Understand	4
4.	Illustrate to create a new process (using fork()) and find sum of odd numbers by child process, sum of even numbers by parent process in c language.	Understand	4
5.	Write a signal handler which catches SIGFPE and performs certain action.	Remember	4
6.	Explain difference between zombie processes and orphan process with example.	Understand	4
7.	Define region lock? What are the rules about the specification of the region to be locked or unlocked?	Understand	4
8.	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.	Remember	4
	UNIT-IV		
1.	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 tosender. Write a program to implement two way communication using pipes.	Remember	5
2.	Define FIFOs? How they are different from pipes? Give an example where FIFO can be used.	Understand	5
3.	Distinguish between pipes and named pipe.	Remember	5
4.	Write a c program to implement two way communication using fifo's to exchange information between sender and receiver. (Message="IARE").	Remember	5
5.	Explain about the "Message Queue structures in the Kernel"? 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.	Understand	5
6.	Illustrate difference between pipes and message queues IPC.	Remember	5
7.	Define semaphores? What is their purpose? List and explain the APIs used to create and control the semaphores.	Understand	5
8.	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	5
9.	Define Shared memory? Write various functions implemented in shared memory. Explain in brief about each function.	Understand	5
10.	Explain "how to control, attach and detach a shared memory segment.	Understand	5
11.	Write a program for shared memory forms of IPC using producer consumer relation in such a way that consumer should read only after the producer has written some text to the shared memory.	Remember	5
12.	Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores b) flock or lockf system calls.	Remember	5
	UNIT-V		
1.	Explain thread synchronization with Mutexes? Give example.	Understand	6
2.	Explain the following in thread with example: i. Thread identification ii. Thread creation iii. Thread termination iv. Thread synchronization.	Understand	6
3.	Discuss what happens if your main thread terminates before termination of child thread? How can you prevent a thread becoming a "zombie"?	Understand	6
4.	Explain thread synchronization with semaphore? Give example.	Understand	6

5.	Explain about IPV6 socket address structure and compare it with IPV4 and Unix socket address structures.	Understand	7
6.	Write a program to implement UDP client server application in which client takes a file name from the command line and sends to the server. Server returns the content of received file to the client.	Understand	7
7.	Define socket? Describe the socket API. 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.	Understand	7
8.	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 Implement the echo service.	Understand	7
9.	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.	Remember	7
10.	List well-known ports? List some well-known ports.	Remember	7
11.	Write a program to implement UDP client server application in which client take a file name from the command line and sends to the server. Server returns the content of received file to the client.	Understand	7

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