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Question Paper Code: AIT005



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## MODEL QUESTION PAPER – I

B.Tech VI Semester End Examinations, May -2020

Regulation: R16

LINUX INTERNALS

Time: 3 Hours

Max Marks: 70

Answer any ONE question from each Unit

All questions carry equal marks

All parts of the question must be answered in one place only

### UNIT – I

- 1 a) Illustrate by creating employee file with field eid, ename, designation, salary each field is separated with pipe ( | ). Write Linux commands for the following queries: [7M]
  - i) Display part of information i.e eid, salary of all employees using Linux Commands.
  - ii) Count and display of employee in employee file using Linux command
  - iii) Search for “manager” in employee file and display all details of employee.
- b) 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. [7M]
- 2 a) Discuss elaborately the Linux kernel architecture with neat block diagram. [7M]
- b) 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. [7M]

### UNIT – II

- 3 a) Explain the following functions with syntax: [7M]  
(a) stat() (b) read() (c) fcntl() (d) lseek()
- b) Emulate the wc command using file API System Calls. [7M]
- 4 a) Explain File System structure of Linux operating system. [7M]
- b) Write a C Program to list all files in a directory, including the hidden files using directory system calls. [7M]

### UNIT – III

- 5 a) Write the differences between threads and processes. [7M]
- b) 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. [7M]
- 6 a) What are the signals that are not ignored or blocked? Explain the reason behind it with an example. [7M]
- b) Write a C program that illustrates suspending and resuming processes using signals. [7M]

### UNIT – IV

- 7 a) Illustrate pipes? Explain their limitations. Explain how named pipes are replaced to overcome the drawback of pipe in IPC with an example. [7M]
- b) Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers. [7M]
- 8 a) Describe about synchronization and how synchronization is achieved with Semaphores. [7M]
- b) Write a C program to displays no of messages in queue, last message send, last message read time in a given message queue. [7M]

## UNIT – V

- 9 a) Explain the system functions associated for creating and destroying a shared memory. [7M]  
b) Write a C 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. [7M]
- 10 a) Discuss the structure of a shared memory and kernel data structure with a neat diagram. [7M]  
b) Write a C program for echo server and echo client using 6666 port in TCP style. [7M]



# INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

## COURSE OBJECTIVE

The course should enable the students to

<b>I</b>	Familiarize students with the Linux environment, and able to run commands on a standard Linux operating system.
<b>II</b>	Provide the skills needed to develop and customize Linux shell programs and to make effective use of a wide range of standard Linux programming and development tools.
<b>III</b>	Able to write moderate C programs utilizing common system calls.
<b>IV</b>	Develop the skills necessary for system programming and inter and intra process communication programming.

## COURSE OUTCOMES

The course should enable the students to

<b>CO 1</b>	Understand the basic commands of linux operating system and can write shell scripts.
<b>CO 2</b>	Create file systems and directories and operate those using programs.
<b>CO 3</b>	Understand the processes background and fore ground by process and signals system calls.
<b>CO 4</b>	Create shared memory segments, pipes, message queues and can exercise inter process communication.
<b>CO 5</b>	Create sockets and semaphores to interact between process of different system.

## COURSE LEARNING OUTCOMES

Students, who complete the course, will have demonstrated the ability to do the following:

AIT005.01	Learn the importance of Linux architecture along with features.
AIT005.02	Identify and use Linux utilities to create and manage simple file and text processing operations.
AIT005.03	Develop shell scripts to perform more complex tasks in shell programming environment.
AIT005.04	Illustrate file processing operations such as standard I/O and formatted I/O.
AIT005.05	Illustrate memory management of file handling through file/region lock.
AIT005.06	Design and Implement in C some standard linux utilities.
AIT005.07	Understand process structure, scheduling and management through system calls.
AIT005.08	Implement C programs to control process using system calls and identify difference between process and threads.
AIT005.09	Generalize signal functions to handle interrupts by using system calls.
AIT005.10	Design and implement inter process communication (IPC) in client server environment by using pipes and named pipes system calls.
AIT005.11	Design and implement inter process communication (IPC) in client server environment by using message queues systems calls.
AIT005.12	Illustrate client server authenticated communication in IPC through shared memory.
AIT005.13	Familiarity with Inter Process Communication using Semaphores.
AIT005.14	Demonstrate various client server applications on network using TCP or UDP protocols.
AIT005.15	Design custom based network applications using the Sockets Interface in heterogeneous platforms.

## MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES

SEE Question No.	Course Learning Outcomes		COs	Blooms' Taxonomy Level	
1	a	AIT005.02	Identify and use Linux utilities to create and manage simple file processing operations.	CO 1	Understand
	b	AIT005.03	Develop shell scripts to perform more complex tasks in shell programming environment.	CO 1	Remember
2	a	AIT005.01	Learn the importance of Linux architecture along with features.	CO 1	Remember
	b	AIT005.02	Identify and use Linux utilities to create and manage simple file processing operations.	CO 1	Remember
3	a	AIT005.04	Illustrate file processing operations such as standard I/O and formatted I/O.	CO 2	Understand
	b	AIT005.06	Design and Implement in C some standard linux utilities.	CO 2	Remember
4	a	AIT005.04	Illustrate file processing operations such as standard I/O and formatted I/O.	CO 2	Understand
	b	AIT005.06	Design and Implement in C some standard linux utilities.	CO 2	Remember
5	a	AIT005.08	Implement C programs to control process using system calls and identify difference between process and threads.	CO 3	Remember
	b	AIT005.07	Understand process structure, scheduling and management through system calls.	CO 3	Remember
6	a	AIT005.09	Generalize signal functions to handle interrupts by using system calls.	CO 3	Understand
	b	AIT005.09	Generalize signal functions to handle interrupts by using system calls.	CO 3	Remember
7	a	AIT005.10	Design and implement inter process communication (IPC) in client server environment by using pipes and named pipes system calls.	CO 4	Remember
	b	AIT005.11	Design and implement inter process communication (IPC) in client server environment by using message queues systems calls.	CO 4	Remember
8	a	AIT005.13	Familiarity with Inter Process Communication using Semaphores.	CO 4	Understand
	b	AIT005.11	Design and implement inter process communication (IPC) in client server environment by using message queues systems calls.	CO 4	Remember
9	a	AIT005.12	Illustrate client server authenticated communication in IPC through shared memory.	CO 5	Understand
	b	AIT005.14	Demonstrate various client server applications on network using TCP or UDP protocols.	CO 5	Remember
10	a	AIT005.12	Illustrate client server authenticated communication in IPC through shared memory.	CO 5	Understand
	b	AIT005.15	Design custom based network applications using the Sockets Interface in heterogeneous platforms.	CO 5	Remember

**Signature of Course Coordinator**

**HOD, IT**