1. a) Write a shell script to calculate the value of the series: $x + x^2/2! + x^4/4! + \ldots$

b) Solve the classical producer consumer problem. Consider the buffer is bounded. Create at least 3 producers and 3 consumers.

2. a) Write a shell script to calculate the value of the series: $1 + (x/2)^2 - (x/2)^3 + (x/2)^4 - (x/2)^5 + \ldots$

b) Solve the classical reader writer problem. Create 5 readers and 2 writers then synchronize it.

3. a) Write a shell script to find out palindrome numbers from a list of numbers (Numbers should be taken as command line argument)

b) Write a C program where the parent process sends a number to child process using PIPE and child process computes whether that number is an odd or even number.

4. a) Write a shell script to calculate the first n numbers of the Fibonacci series .i.e. 0 1 1 2 3 5 8… and store the result in an output file.

b) Write a C program that will create a child process by using the fork() system call , then forcefully create a zombie process and display the corresponding process id from process table.

5. a)Write a shell script to find out the palindrome word from a file (omit . or ; or , after the word)

b) Write a C program that will create a child process using the *fork()* system call. Draw the process tree by generating different child process.

6. a) Write a Shell Script to collect *n* numbers from command line argument and check which are the Armstrong numbers. $153 = 1^d + 5^d + 3^d$, where d is number of digit.

b) Write a C program where parent process send a number to child process using PIPE and child process compute whether that number is a prime number or not.

7. a) Write a shell script to find the number of characters, words and lines in a set of files given by user through the command line argument.

b) Write a C program where parent process send a number to child process using PIPE and child process compute whether that number is Armstrong number or not.

9. a) Write a shell script to find the numbers of files are present within a directory and their names. Store the output in a file and display it.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many, alphabet, numeric and special characters (#, &) are there?

10. a) In an input file, there are some records of students (Roll | Name | Marks). Find the student name and roll number of the student who gets the highest marks.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many, alphabet, numeric and special characters (#, &) are there?

11. a) Write a shell script to select greatest and lowest numbers from a set of numbers which are present in a file.

b) Write a C program using fork() system call that generates the Fibonacci sequence in the parent process and prime checking in the child process.

12. a) Write a shell script to collect *n* number of years from command line argument and calculates which years are leap years.

b) Solve the classical dining philosophers(5 philosophers) problem.

13. a) Write a shell script to display the process which are sleeping(The status of process is S)

b) Write a shell script to take student records (Roll|Name|Marks) as an input file and update one record from that file according to the user choice.

14. a) Write a shell script to find the value of y using

$$Y(x, n) = \{1+x^2 \text{ when } n=1$$

$$\{1+x/n \text{ when } n=2$$

$$\{1+2x \text{ when } n=3$$

$$\{1+nx \text{ when } n>3 \text{ or } n<1$$

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many, alphabet, numeric and special characters(#, &) are there?

15. a) Write a shell script to determine the Grade as per WBUT rule. Students name, roll no and marks are taken from an input file and output will store as student name , roll no, marks and grade format in a file.(using **case)**

b) Consider 3 threads running simultaneously. First thread1 read a number a. After that thread2 reads a number b then thread3 will do addition of a and b. Synchronize it using semaphore.

16. a) Write a shell script to check if a given date is valid or not.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will check the string is palindrome or not.

17. a) Write a shell script to take student records (Roll, Name, Marks) as a input file and update the marks of a student according to the user choice.

b) Write a C program that will create a child process by using the fork() system call , the parent process will print the PID of itself, as well as the PID of the child. The child process will also print the PID of its parent as well as the PID of itself.

18. a) Write a shell script to determine the Grade as per WBUT rule. Students name, roll no and marks are taken from an input file and output will store as "student name, roll no, marks and grade" format in a file. (Using **if-else)**

b) Write a shell script to check whether a number is EVEN or ODD using switch-case statement.

19. a) A file contains day_name & temperature for some days. Write a shell script which takes that file name as command line argument. Then it reads day_name & temperature from that file and broadcast the weather as follows. Store the weather report in a file.

Temperature	Weather
<15	Very cold
>=15 && <25	Cold
>=25 && <35	Hot
>=35	Very hot

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many, alphabet, numeric and special characters (#, &) are there?

20. a) Write a shell script where you enter birthday in **dd/mm/yyyy** format. Your age is calculated in years, months & days.

b) Write a C program that will create a child process. The parent process will announce that it is the parent process and taking a input from user it will send it to the child process. The child will announce that it is the child process and will display the Fibonacci series of the number (Up to the range).

21. a) Write a Shell Script to find the GCD & LCM of two numbers using function.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many vowel and consonant are there?

22. a) Write a shell script which receives any number of filenames as command line argument. The shell script should check whether every argument supplies are a file or a directory.

i) If it is a directory then it should be appropriately reported.

ii) if it is a file name then name of the file as well as the no. of lines, words present in it should be reported.

iii) Check the file permission for the group. If group has no write permission then gives the write permission or vice versa.

b) Write a C program where parent process send a number to child process using PIPE and child process compute the Fibonacci series upto that number.

23. a) Write a shell script to take student records (Roll | Name | Marks) as an input file and insert n number of new records to the file according to the user choice.

b) Create two threads one thread will take the input of a matrix and 2nd thread will check the matrix is symmetric or not.

24. a) Write a shell script, which shows all prime numbers within a given range. (take the lower & upper range through command line argument)

b) Solve dining philosopher problem(with 5 philosopher)

25. a) Write a shell script which check the file permission of that file and change it for different users.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will check the string is palindrome or not.

26. a) Write a shell script to take student records (Roll | Name | Marks) as an input file and delete one record from that file according to the user choice.

b) Write a C program that will create a child process using the *fork()* system call. Draw the process tree by generating different child process.

27. a) Write a shell script to find out palindrome numbers from a list of numbers provided through an input file.

b) Write a C program where parent process send a number to child process using PIPE and child process compute the Fibonacci series upto that number.

28. a) Write a shell script to check how many files in your current directory and display the name of the largest file.

b) A variable count is shared by 3 threads. Each thread will increment the variable. Write a C

program to synchronize the threads.

29. a) Write a shell script to take two directories as a input and check which directory has the highest number of files.

b) Write a C program to create two threads 1st thread will take input of an array and 2nd thread will perform sorting i.e after 1st threads 2nd threads start execution.

30. a) Write a shell script to take student records (Roll, Name, Marks) as a input file and insert n number of new records to the file as sorted by their marks.

b) Write a C program to create two threads. 1st thread will take input of a matrix and 2nd thread will perform Transpose of the matrix i.e after 1st thread, 2nd thread will start execution.

31. a) Write a shell script to take student records (Roll, Name, Marks) as a input file and delete one records from that file according to the user choice.

b) Write a C program to create two threads. 1st thread will take input of two matrixes and 2nd thread will perform subtraction i.e after 1st thread, 2nd thread will start execution.

32. a) Write a shell script to take student records (Roll, Name, Marks) as a input file and update the marks of a student according to the user choice.

b) Write a C program to create a child process. Parent process send a string to child process using PIPE then child process will calculate how many, alphabet, numeric and special characters (#, &) are there?

 33. a) Write a shell script to calculate the sum of 5 numbers. Write another program from where you have run the first one.

   b) a count variable is shared among two threads, each thread will increment the count. show the output if the threads are not synchronized.

34. a) Write a shell script to find out palindrome numbers from a list of numbers (Numbers should be taken as command line argument)

b) A book is shared among 5 friends.each friend will read the book but at a time the book can not be read by any two persons. Show how the book is read by the friends.