SHELL SCRIPT RELATED PROBLEM

1. Write a shell script to calculate the value of the series: $x + x^2/2! + x^4/4! + ...$
2. Write a shell script to calculate the value of the series: $1+ (x/2)^2 –(x/2)^3 + (x/2)^4 –(x/2)^5+...$
3. Write a shell script to calculate the value of the series: $1+ (2/x)^2 –(4/x)^3 + (6/x)^4 –(8/x)^5+...$
4. Write a shell script to find the GCD and LCM for a set of numbers. (Numbers should be taken as command line argument)
5. Write a shell script to find out palindrome numbers from a list of numbers (Numbers should be taken as command line argument)
6. 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.
7. Write a shell script to find out the palindrome word. Input should consider from a file with some punctuations. (omit . or ; or , after the word)
8. 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.)
9. Write a shell script to sort list of numbers in ascending order. The numbers are provided as command line argument. Output should be written in a file.
10. 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.
11. 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.
12. Write a shell script for the following menu driven program
    - i) List of files in your current directory with their permissions.
    - ii) List of user Process
    - iii) Today's date (dd-December 2025)
    - iv) List of users in the system
    - v) Exit
13. Write a shell script to calculate the sin*θ, cosθ* and *tanθ* (in radian) for a given value of *θ*.
14. Write a shell script where you enter birthday in **dd/mm/yyyy** format. Your age is calculated in years, months & days.
15. 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.
16. Write a shell script to display the Pascal Triangle.

```
                1
            1       1
        1       2       1
    1       3       3       1
```

17. Write a shell script to draw the figure where line number is provided by the user.

```
* * * * * * * *
* * *     * * *
* *       * *
*         *
```

18. Write a shell script to draw the figure where line number is provided by the user.

```
1
1 2 4
1 2 4 8
```

19. Write a shell script to select the greatest and the lowest numbers from a set of numbers which are present in a file.
20. Write a shell script, which shows all the prime numbers between a lower and upper range.
21. Write a shell script to make a calculator using switch case (+,-,*,/,%). The calculator should calculate the fractional numbers.
22. 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.
23. Write a shell script to draw the following circle where radius is provided by user.

24. Write a shell script to calculate the Pay-slip of n number of employees assuming
    D.A=45% of Basic pay, H.R.A=15% of Basic pay, P.F=10% of Basic pay
    Basic pay is given by user. Store Pay slip in a file with fields…
    Basic pay D.A H.R.A P.F Gross salary
25. Write a shell script to draw a triangle where number of lines of the triangle is provided by user to the command line argument.

```
          *
        *   *
      *       *
    *           *
  * * * * * * * * * *
```

26. Write a shell script to find all factors of a number (except 1 and that number).
27. Write a shell script for following: An electric distribution companies arranges its domestic consumer as follows:
    Consumption in Units Rate of charge
    First 0 - 200 unit Rs. 0.50 per unit
    Next 201 – 400 unit Rs. 0.65 per unit plus Rs. 100
    Next 400 – 600 unit Rs. 0.80 per unit plus Rs. 250
    Above 600 unit Rs. 1.25 per unit plus Rs. 425
    Print the amount to be paid by the consumer.
28. 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

29. 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.
30. 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.
31. 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.
32. Write a shell script to check how many files in your current directory and display the name of the largest file.
33. Write a shell script to take two directories as an input and check which directory has the highest number of files.
34. 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.
35. Write a shell script to find out palindrome numbers from a list of numbers provided through an input file.

Process related problem

36. Solve the classical producer consumer problem using semaphore. Consider the buffer is bounded. Create at least 3 producers and 3 consumers.
37. Write a C program where the parent process sends a number to child process using PIPE and child process computes the factors of that number.
38. 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.
39. Solve the classical reader writer problem using semaphore. Create 5 readers and 2 writers then synchronize it.
40. Write a C program where parent process send a number to child process using PIPE and child process compute all the prime numbers from 1 to that number.
41. Write a C program to create two threads. One thread will take input of an array and 2nd thread will perform the bubble sort to sort those numbers.(Apply mutex lock and unlock)
42. 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.
43. 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?
44. 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.
45. Write a C program to create multiple threads and check the memory address of a variable before and after modification by all the threads. Synchronize the threads using mutex lock-unlock.
46. Write a C program to create two threads. One thread will take input of an array and 2nd thread prints those numbers in reverse order. (Apply semaphore)
47. Write a C program to create three threads. A shared variable will be increased by all of them such that no race condition will arise. (Apply mutex lock and unlock)
48. Write a C program to create three threads. A value will be taken by one thread. 2^{nd} thread will calculate the factorial of that number and third thread will calculate that the number is prime number or not. No race condition should arise. (Apply mutex lock and unlock)
49. Write a C program to implement reader-writer problem using Semaphore. (Writer has the highest priority).
50. Write a C program to create two threads. One thread will take input of an array and 2nd thread performs the linear search operation. (Apply semaphore)
51. Write a C program to create two threads. 1st thread will take input of two matrixes and 2nd thread will perform the multiplication of those matrices. (Apply mutex lock and unlock)
52. Write a C program to create two threads. 1st thread will take input of two matrixes and 2nd thread will perform addition operation of those two matrices. (Apply semaphore)
53. Write a program to implement Dining philosopher's problem using Semaphore.
54. Write a C program to implement Producer-Consumer problem using Semaphore.
55. Write C program to take n integer numbers as input of an array through one thread and find the prime numbers from the array by another thread using Semaphore.