UNIX Shell Programming

General Programs

1. Write a shell program to display the name of the month and date.
2. Write a shell program to read a name from standard input and display on the standard output with greetings.
3. Write a shell program to demonstrate the use of Command line Arguments.
4. Write a shell program to check whether the command line argument (number) is positive, negative or zero.
5. Write a shell program to read two number and then compute their addition, subtraction, multiplication, division and modulo storing each result in a separate variable and print the result sequentially with proper messages.
6. Write a shell that will accept two numeric values through the command line and produce the average of their squares.
7. Write a shell program to find out whether a given integer is even or odd.
8. Write a shell program that will accept two integers through command line and find out whether first integer is divisible by the second one.
9. Write a shell program that will accept three integers through command line and find out largest of them.
10. Write a shell program to check whether an inserted character is vowel or consonant.
11. Write a shell program to create simple menu like following and take action according to that selected

    ---
    Main Menu
    ---
    [1] Show Today's date/time
    [2] Show files in current directory
    [3] Show calendar
    [4] Start editor to write letters
    [5] Exit/Stop
12. Write a shell program to display the table of numbers of any number taken as user input either from standard input or as command line argument.
13. Write script to print given number in reverse order, for eg. If no is 123 it must print as 321. Also find the sum of digits of the given number.
14. WAS that will find the roots of a quadratic equation of the form $ax^2 + bx + c = 0$.
15. Write a shell script which will test whether an inserted year is a leap year or not.
16. WAS reads an integer and checks whether it is divisible by 11 or not without dividing it by 11.
17. WAS that calculates summation of $sqrt(sin(x))$ where $x = 1$ to n where n is given by user.
18. Write a shell script to find the sum of the following series

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a. $1 + 4 + 7 + \ldots + n$

b. $1 + x + x^2 + \ldots + x^n$

c. $\frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \ldots + \frac{1}{n!}$

d. $\frac{1}{1^1} + \frac{1.2}{2^2} + \frac{1.2.3}{3^3} + \cdots + \cdots + \frac{1.2.3 \ldots n}{n^n}$

e. $\frac{1}{1!} - \frac{1}{2!} + \frac{1}{3!} - \ldots + (-1)^{n-1}\frac{1}{n!}$

19. Write a shell script that print the following shape

```
1          1          1          1          1 2 3 4 5        1          5 5 5 5 5
1 2        2 3        1 1        0 1        1 2 3 4          2 2        4 4 4 4
1 2 3      4 5 6      1 1 1      1 0 1        1 2 3            3 3 3      3 3 3
1 2 3 4    7 8 9 10   1 1 1 1    0 1 0 1        1 2          4 4 4 4    2 2
1 2 3 4 5  11 12 13 14 15 1 1 1 1 1  1 0 1 0 1      1        5 5 5 5 5  1

8 8 8 8 8 8 8 8 8  g g g g g g g  g          4 4 4 4    8 8 8 8 8 8 8 8 8
8           8        g g g g g      g g g      3 3 3      8 8 8 8 8 8 8 8
8           8          g g g        g g g g g    2 2      8 8 8 8 o 8 8 8 8
8 8 8 8 8 8 8 8 8        g          g g g g g g g  1      8 8 8 8 8 8 8 8 8
                                                          8 8 8 8 8 8 8 8 8

          1                    1                  5 6 7 8 9 8 7 6 5
        1   1                2 3 2                4 5 6 7 6 5 4
      1   2   1            3 4 5 4 3                3 4 5 4 3
    1   3   3   1        4 5 6 7 6 5 4                2 3 2
  1   4   6   4   1    5 6 7 8 9 8 7 6 5                1
(Pascal's triangle)  (Pyramid of numbers)  (Reverse pyramid )
```

20. Write a shell program by using shift command to convert a decimal number either to its hexadecimal, octal or binary equivalent.

    Or WAS to perform any base to any base conversion.

21. WAS that takes an integer from the user and converts it to corresponding binary equivalent.
22. How to write script, that will print, Message "Hello World" , in Bold and Blink effect, and in different colors like red, green, blue etc using echo command.
23. Write script that will print any one of the following messages – **Good Morning** or **Good Afternoon** or **Good Evening**, according to system time.
24. Write script to implement background process that will continually print current time in upper right corner of the screen , while user can do his/her normal job at $ prompt.
25. Write a shell script to check whether a user account exists or not. Also display the default shell and default home directory of the user.
26. Write a shell script to check whether the password is missing or not for a given user.
27. WAS to find whether a user is logged in or not. If the user is already logged in print a message else wait for the user to log in.

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28. Write a script to determine whether given command line argument ($1) contains "*" symbol or not, if $1 does not contains "*" symbol add it to $1, otherwise show message "Symbol is not required".
29. WAS to evaluate a valid Postfix expression with operators +, -, *, / and $ (exponentiation).
30. WAS to evaluate a valid Postfix expression with operators +, -, *, / and $ (exponentiation) and containing parenthesis types ( ), { }, [ ].
31. WAS to perform hexadecimal addition / subtraction of two numbers given in hexadecimal format.
32. WAS to perform addition / subtraction of two binary numbers using 2's complement method.
33. WAS to interchange two numbers (i) using a temporary location (ii) without using a temporary location.
34. WAS to generate the Lucas sequence which is as follows
    a. $1, 3, 4, 7, 11, 18, 29, \ldots$
35. WAS to read three (x, y) coordinates of three points and test whether they form a triangle or not. If they form a triangle then what type of triangle is it?
36. WAS to read four vertices (x, y) of a polygon and to find out whether the polygon is a square, rectangle or a parallelogram.
37. WAS that reads the coordinate of a point $P(x, y)$ and checks whether the point lies on the circle, outside the circle or inside the circle.
38. WAS to take four points A, B, C, D. Check whether the line segments AB and CD are parallel or intersecting.
39. WAS that will change the $ prompt to the current directory name in which you are working.
40. WAS that determines the period for which a specific user is working on a directory.
41. WAS that finds the gross and net salary of an employee where his basic salary is given.
42. WAS to generate all possible combinations a, b, c, d.

Programs on simulation of various commands

43. WAS that takes two optional parameters (-m and –d). When run with –m it should produce memory statistics and when with –d it should produce disk space statistics. An additional parameter –h Is used to produce the output in a html file. –h should be followed by a filename.
44. WAS that will perform the functions of 'wc' command & it should be able to accept the switches –c, -l and –w. (The program should not use 'wc' command internally)
45. WAS to simulate 'DIR' command of DOS.
46. WAS to simulate the TYPE command of DOS.

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47. WAS to modify the 'cal' command of UNIX so that it prints the calendar of the corresponding month and year when the month is given in Roman form I, II, III, … XII. You may assume I for September, II for October, and so on.

Programs on Array

48. WAS to take n natural numbers from the user and display them in forward and reverse order. Also find the sum of them.
49. WAS which will add the values of two 1D arrays of same length?
50. WAS that will find the maximum and minimum values in an array?
51. WAS to display the 2^{nd} largest and 2^{nd} smallest element from a list of n elements. (preferably without using any sorting algorithm)
52. WAS that will perform linear search on an array?
53. WAS that will perform binary search on an array?
54. WAS that will perform bubble sort in an array?
55. WAS that will perform insertion sort in an array?
56. WAS that will perform selection sort in an array?
57. WAS that will merge two arrays into a new array?
58. WAS that will read the values of a matrix from the user and store it in a 2D array. Display the matrix and also its transpose. Also find the trace and saddle point of the matrix.
59. WAS that will read two matrices from the user and find the sum of them. Also find the result of their multiplication.
60. A file contains a list of numbers one per line. WAS to take that filename as argument and display the lowest and highest element from the file.

Programs on shell functions

61. Write a shell program to compute the factorial of a given positive integer from the user.
62. Write a shell program to find out whether an inserted integer is a prime number or not using
    a) A function
    b) **factor** command
63. Also generate the prime numbers within two given limits.
64. Write a shell script generates twin-prime numbers within two given limits.
65. WAS to generate the Fibonacci sequence up to n.
66. Write a shell script that generates Prime – Fibonacci elements within two given limits.
67. Write a shell script to find the GCD of two numbers.

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Programs on string handling

68. WAS to check whether an input string is Palindrome or not?
69. WAS to count the no of words, spaces, characters and vowels in a body of text.
70. WAS this will accept a string from the terminal and echo a suitable message if it does not have at least 10 characters?
71. WAS that will generate abbreviation of someone's name given as input?
72. WAS using commandline argument to check how many arguments are starting with a vowel and how many arguments are staring with consonants?
73. WAS to reverse each of the strings given at command line.

Programs on file handling

74. WAS that appends a forward slash (/) to a directory name, a star (*) to an executable file name of files in a directory. The directory name should be supplied as command line argument. If the directory name is not supplied then the current directory should be assumed.
75. WAS to copy the contents of multiple files given as command line argument to the last command line argument.
76. WAS which deletes all the lines containing the word "Linux" from a given text file.
77. WAS that will add angular braces to the beginning and ending of each line of a file given as commandline argument?
78. WAS that calculates the occurrence of words of different length in a file.
79. WAP to reverse the contents of a file and store it into another file.
80. WAS that takes the filename as input from commandline argument and gives the no of lines in the file.
81. WAS to display the files' names whose sizes are between m bytes to n bytes?
82. WAS that will convert the contents of a file to uppercase or lowercase using a menu driven program?
83. WAS that search for a string in a given file and count the no of occurrences of a string, if it is found?
84. WAS that will change the extension of the files where the extensions are given as input through commandline argument?
85. WAS to find the permission of a file where the filename is given as input by the user?
86. WAS that will display the last modification time and last access time of a file where the filename is given as input?

87. WAS that will display the last 3 lines of each file in the current working directory duly preceded by filename?
88. WAS to append a new line to a given filename?
89. WAP that will display the names of regular files and directory files in a directory. Also count the no of files and directories in the directory. If no valid directory name is given then assume current working directory.
90. WAS that will receive a no of filenames? Suppose four filenames are given. Then the first file will be copied to second, second will be copied to third and so on.
91. WAS to display the set of line no, of a given word in a given file.
92. WAS that will read two filenames as arguments and concatenates their contents to a new file?
93. WAS that prints a text file in reverse order that is the last line becomes first, the second last line becomes the second line and so on?
94. WAS that takes a directory name as an argument and displays the sizes and line numbers of each of the files in that directory. If the argument is not a directory then proper error message should be displayed.
95. WAS that creates a directory called XYZ inside $HOME. Populate this directory with two sub directories, bin and scripts.
96. WAS that creates a database having the fields –
97. Stream, Year, Name and DOB
98. WAS that receives any number of arguments in the form of filenames. If an argument is a file, display number of lines, if it is a directory display contents accordingly.
99. WAS that receives certain filenames as arguments and searches for a specific word on these files one by one. It stops as soon as the word is found in a file and displays the name of the file, otherwise displays suitable message.
100. A file contains runs scored by players as - *Name, Test Matches, Test Runs, ODI Matches, ODI Runs, T20 Matches, T20 Runs.* Compute the average for different formats. Add these averages and divide by 3 to find overall average and grade of a batsman. If $\text{overall average} \geq 45$ then grade A, if $38 \leq \text{overall average} < 45$ then grade B, $30 \leq \text{overall average} < 38$ then grade C and otherwise grade D.