



PROGRAMMING TEST

Aug 2023

Programming Test – Level 1 and Level 2

PictelAI Programming Test: Level 1

1. Write a program to find the Factorial of a given number using Recursion.
2. Write a program to sort the elements of an array in descending order without using built-in functions.
3. Write a program to check if a given year is a leap year.
4. Remove invalid parentheses.

Given a string 's' that contains parentheses and letters, remove the minimum number of invalid parentheses to make the input string valid.

Ex: Input = "()())"
Output: "()()"

5. For a given 2D Matrix, calculate its histogram.

Histogram is a graph where the x axis represents unique values in the matrix and the y axis represents the counts of each unique element.

Matrix:

```
110 45 200 5 150 175 25 200 90
70 220 90 175 30 110 135 5 255
255 120 80 10 190 70 200 215 110
50 160 135 65 240 45 75 90 10
25 100 215 140 75 50 175 200 30
175 255 10 110 80 45 140 5 90
200 30 215 175 70 160 110 135 50
120 75 5 90 10 240 45 70 215
255 135 175 200 110 25 90 140 50
```

Output should contain a key value pair where key is the unique element and value is its count.

6. Write a function to compress a stream of characters.

AAAAAAAABBBBBBCCCCCDDDD1111111111DDDDDD3333333333DDDEEEEEFF

- a) Currently the string takes n chars to store. Target is to store it using less than n chars.
- b) Is there any case where instead of compression, expansion will take place?