SAINIK SCHOOL AMARAVATHINAGAR
SERIES TEST - II

DATE: **COMPUTER SCIENCE (083)** **MAX MARKS : 70**

CLASS: XII **MAX TIME : 3h**

General Instructions:

1. ***Please check that this question paper contains 3 printed pages.***
2. ***Please check that this question paper contains 6 questions.***
3. ***Please write down the serial number of the question before attempting it.***
4. ***All questions are compulsory.***
5. ***Programming language: Python.***

1. Answer the Followings each carries one mark (1 x 4 = 04)

a) What is data file?

b) Define recursion

c) What is computational complexity of an algorithm?

d) Define Data Visualization?

2 Answer the followings each carries 2 marks (2 x 5 = 10)

a) Which factors affect an algorithm performance?

b) What do you understand by best case, worst case and average case complexities?

c) Write a function to count “computer” word in para.txt file

d) Calculate the runtime efficiency of the followings:

```
i=1
while i<=n:
    print(i)
    i=i+1
```

e) Write a recursive code to implement Fibonacci series up to n

3 Answer the followings each carries 2 marks (2 x 5 = 10)

a) Write a Python program to count the frequency of words in a file.

b) How file open( ) is different from close( )

c) Differentiate between binary files with text files.

d) Write a function to write and read a binary file. Implement it by writing **`Binary_Write()`** function and to read the same file **`write Read_File()`** function.

e) Compare bar( ) and barh( ) functions

4 Answer the followings each carries 3 marks (3 x 5 = 15)

a) What is the role of legends in graph/chart?

b) What do you understand by xlimit and ylimit?

c) Write a recursive function that takes a number and tests prime or not.

d) Write a Python recursive function to calculate the harmonic sum of n-1

Hint: The harmonic sum is the sum of reciprocals of the positive integers.

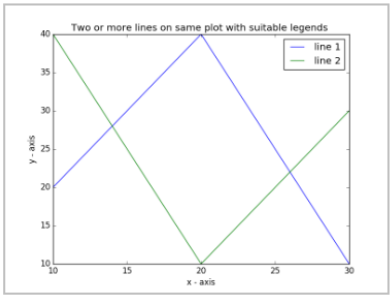
For Example: $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\cdots$

e) Write a Python recursive function to find the greatest common divisor (GCD) of two integers.

5 Answer the followings each carries 3 marks (3 x 5 = 15)

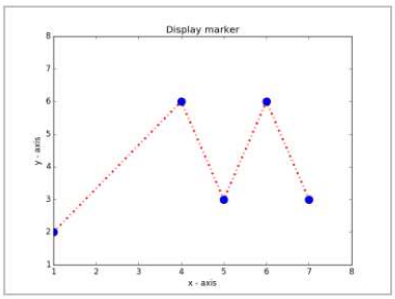
a) Write a Python program to plot two or more lines on same plot with suitable legends of each line.

The code snippet should give the output as shown in the following screenshot:



b) Write a Python program to plot two or more lines and set the line markers.

The code snippet should give the output as shown in the following screenshot:



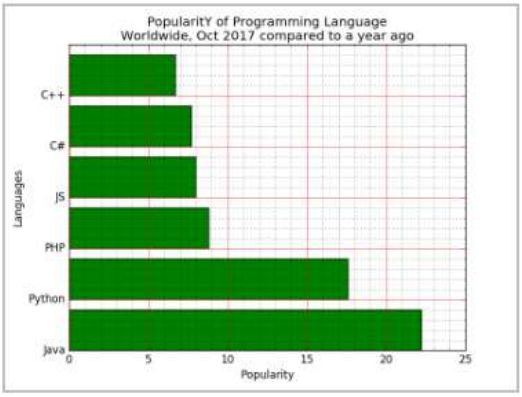
C) Write a Python programming to display a horizontal bar chart of the popularity of programming Languages.

Sample data:

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

The code snippet should give the output as shown in the following screenshot:



d) Write down the time complexity of followings

i) Insertion Sort ii) Binary Search iii) Linear Search

e) Given an integer variable x and list A of appropriate size, what is the complexity of following code in terms of n?

```
p = -1
q = n
while p + 1 < q:
    m = ( p + q ) / 2
    if a [ m ] < x:
        p = m
    else:
        q = m
```

6. **Answer the followings each carries 4 marks (4 x 4 = 16)**

a) What are ndarrays? How they are different from python lists?

b) Write a program to calculate the multiplication of two matrix using numpy

c) Write a program to find the row sum and column sum of a given matrix using numpy

d) Write a program to find the sum of primary diagonal elements of given matrix using numpy

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