Introduction to Problem Solving and Programming

Answer all the Questions

Q. No.	Question Description	Marks
	PART - A – (3 x 10 = 30 Marks)	
1(a)	Write an algorithm, Pseudo Code and Flowchart to print the prime numbers from 0 to N.	**10**
	OR	
1(b)	Write a Python program for the following scenario, You are given a number A which contains only digits 0's and 1's. Your task is to make all digits same by just flipping one digit (i.e. 0 to 1 or 1 to 0) only. If it is possible to make all the digits same by just flipping one digit then print 'YES' else print 'NO'. **Input Format:** The first line contains a number made up of 0's and 1's. **Output Format:** Print 'YES' or 'NO' accordingly without quotes. **Example:** Input: 101 Output: YES Explanation: If you flip the middle digit from 0 to 1 then all the digits will become same. Hence output is YES.	**10**
2(a)	Discuss about the role of looping statements in a programming language and also, Illustrate the use of loop control statements with suitable example.	**10**
	OR	
2(b)	Write an algorithm and a python program to find the square root of a given perfect number by using prime factorization scheme.	**10**
3(a)	Illustrate the List methods and operations with suitable example.	**10**

OR

3(b) Given an array A of N numbers (integers), you have to write a program which prints the sum of the elements of array A with the corresponding elements of the reverse of array A. **10**

Input Format:
The first line of the input contains a number N representing the number of elements in array A.
The second line of the input contains N numbers separated by a space. (after the last elements, there is no space)

Output Format:
Print the resultant array elements separated by a space. (no space after the last element)

Example:
Input:
4
2 5 3 1
Output:
3 8 8 3

Part - B – (2 x 10 = 20 Marks)

4 Write a Python program for the following scenario, **10**

Arun is working in an office which is N blocks away from his house. He wants to minimize the time it takes him to go from his house to the office. He can either take the office cab or he can walk to the office.

Arun's velocity is **V1 m/s** when he is walking. The cab moves with velocity **V2 m/s** but whenever he calls for the cab, it always starts from the office, covers N blocks, collects Arun and goes back to the office.

The cab crosses a total distance of **N** meters when going from office to Arun's house and vice versa, whereas Arun covers a distance of **(√2*N)** while walking.

Help Arun to find whether he should walk or take a cab to minimize the time.

Input Format:
A single line containing three integer numbers N, V1, and V2 separated by a space.

Output Format:
Print 'Walk' or 'Cab' accordingly

Constraints:
1<=V1, V2 <=100
1<=N<=200

Example:
Input:
5 10 15
Output:
Cab

5 Write an algorithm and python code to find the GCD of two numbers by using prime factorization. **10**

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