# NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

DEPARTMENT OF ELECTRICAL ENGINEERING

I B.Tech., I Semester

Exam-2, January 2023

Sub : Problem Solving and Computer Programming (CS131) Date: 11-01-2023

Time : 1 Hr 15 Mins. Max. Marks: 20

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→ **Answer all questions: Each question carries 4 marks.**

→ **Note that don't use arrays for any question, if you write the program using arrays you won't get any marks for that.**

1 The number of events that the company organizes every month is recorded sensibly and is seemed to have followed a specific series like: 30, 32, 36, 42, 47, 49 ...
Write a program which takes an integer N as the input and will output the series till the Nth term.
**Example-1: N is 9:** then output is: 30, 32, 36, 42, 47, 49, 61, 69, and 67.
**Example-2: N is 15:** then output is 30, 32, 36, 42, 47, 49, 61, 69, 67, 91, 102, 94, 142, 156, 140

2 A Chapathi Maker is used in my household. The capacity of the chapathi maker is 'M' chapathis at one time. When I invite 'N' people, (**and each guest is served one after another**). each of them takes a minimum and maximum of 1 and 5 chapathis. The guests are started with 1 chapathi, and when they have finished it, as per their wish they are given more but upto a maximum of 5 chapathis. The condition is that no guest should go with an empty stomach and they should be fully satisfied. If the chapathis get over in between then I will prepare another batch of 'M' chapathis. Write a program for N guests and show

(i) Total number of chapathis prepared,
(ii) The number of times of preparation and
(iii) The number of chapathis left at the end of the meal.

The program should also display how many guests ate 1 chapathi, 2 chapathis and so on till 5 chapathis. Lastly, the count of the number of guests who had the maximum number of chapathis should be shown.
[***NOTE: You should not use arrays in the program***. And ***also note that***, initially one chapati given and based on his/her request one more will be given upto a maximum of 5. Some may fell stomach full after eating 1, some may feel after 2,...once it is 5 no more chapatis, we assume that he is fully satisfied.]

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**Example-1:** If M=20 and N=6 and if the chapatis taken by each of these six guest are as shown here

| Guest Number | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| No. of chapatis ate by the guest | 3 | 5 | 4 | 5 | 2 | 5 |

OUTPUT:
Total number of chapatis prepared is: 40
The number of times preparation is: 2
The number of chaptis left: 16
No. of guest who ate 1 chapati: 0
No. of guest who ate 2 chapati: 1
No. of guest who ate 3 chapati: 1
No. of guest who ate 4 chapati: 1
No. of guest who ate 5 chapati: 3
No. of guest who ate maximum number of chapatis: 3

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**Example-2:** If M=10 and N=7 and if the chapatis taken by each of these seven guests are as shown here

| Guest Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| No. of chapatis ate by the guest | 4 | 2 | 4 | 4 | 3 | 3 | 2 |

Total number of chapatis prepared is: 30
The number of times preparation is: 3

The number of chaptis left: 8
No. of guest who ate 1 chapati: 0
No. of guest who ate 2 chapati: 2
No. of guest who ate 3 chapati: 2
No. of guest who ate 4 chapati: 3
No. of guest who ate 5 chapati: 0
No. of guest who ate maximum number of chapatis: 3

3 In a University, a department has N batches, where batch 1 is considered as the most senior batch. The number of students in each batch are user input. Write a program to assign the roll number to each student such that, the students in intra-batch follow sequential numbering. Inter-batch roll numbers start with cumulative count of the number of students and follow the same sequential numbering for the particular batch.
For example, if the number of batches are 6 and the number of students in those batches are: 3, 4, 5, 1, 2 and 3 respectively. Then the roll numbers of all the students are: 1.1, 1.2, 1.3, 4.1, 4.2, 4.3, 4.4, 8.1, 8.2, 8.3, 8.4, 8.5, 13.1, 14.1, 14.2, 16.1, 16.2, and 16.3.

4 Our NIT Warangal offer ***n*** undergraduate programmes (CSE, EEE, …). Moreover, let us assume that for each program, intake of students is ***m*** based on JEE mains rank. Write a program to read the JEE mains rank of students in each branch and display the starting rank and ending rank for each branch.
Example:
Enter the number of undergraduate programs in NITW: 3
Enter the number of students in program 1: 4
Enter the student 1's rank in program 1: 524
Enter the student 2's rank in program 1: 124
Enter the student 3's rank in program 1: 555
Enter the student 4's rank in program 1: 444
Starting rank and ending rank for program 1 is 124 and 555

Enter the number of students in program 2: 3
Enter the student 1's rank in program 2: 5524
Enter the student 2's rank in program 2: 5124
Enter the student 3's rank in program 2: 5444
Starting rank and ending rank for program 2 is 5124 and 5524

Enter the number of students in program 3: 5
Enter the student 1's rank in program 3: 5
Enter the student 2's rank in program 3: 9
Enter the student 3's rank in program 3: 1
Enter the student 4's rank in program 3: 7
Enter the student 5's rank in program 3: 6
Starting rank and ending rank for program 3 is 1 and 9

5 Write a C++ program to display the leap years that contain the digit '***x***' given by the user, between two given year ***n1*** and ***n2*** both inclusive and also the count of such leap years.
For example, if *n1* and *n2* are 2020 and 2050 and if the digit '***x***' is 3, the outputs need to be:
The number of leap years between 2020 and 2050 that contains the digit 3 are: 2032, 2036 and The number of such leap years are:2