UNITED INTERNATIONAL UNIVERSITY
Department of Computer Science and Engineering (CSE)
Course Title: Structured Programming Language Laboratory
Trimester & Year: Summer 2023
Course Code: CSE 1112
Assignment 1
Marks: 30

1. Write a Program which will take an input from the user and determine whether it is a 'Pixie' Number or Not. A 'Pixie' number has following properties:

- Sum of First and Last Digit is Less than 7 and
- Sum of the Factors of the Given input is less than 2* (Given input)

Sample Input	Sample Output	Explanation
301	Pixie	- Sum of 3 (First Digit) + 1 (Last Digit) = 4 is less than 7 - Factors are 1,7, 43, 301 and Total Sum of Factor is 352 which is Less than (2 * 301) = 602 Thus, 301 is a Pixie Number Satisfying all Rules
245	Not Pixie	- Sum of 2 (First Digit) + 5 (Last Digit) = 7 is not less than 7 - Factors are 1,5,7, 35,49, 245 and Total Sum of Factor is 342 which is Less than (2 * 245) = 490 Thus, 245 is not a Pixie Number as it violates Rule 1

2. WAP to print the following pattern

Sample Input	Sample Output
5	1 232 34543 4567654 567898765
3	1 232 34543

3. Write a program in C to convert a binary number into a decimal number using a loop and calculate the number of '1' in the Binary number.

Sample Input	Sample Output
1001	9	2
110010	50	3

4. Harry Potter is worried about the recent outbreak of Dementor from the Prison of Azkaban. Every Dementor is marked with a specific number. Write a Program to Assist Harry identify all of the Dementor Numbers between two ranges. Dementor numbers are those numbers which have following CONDITIONS:

- Starts and ends with 1
- is not a palindrome number
- Square of the sum of the digits are divisible by 8

Sample Input	Sample Output
1000 1241	1021 1061 1151 1191 1201 1241
1345 1641	1371 1421 1461 1511 1551 1591 1601 1641

5. WAP that take an odd integer and prints the pattern shown in the Samples. [Hints: Check the Order of the Output closely to find the logic, maybe it is increasing and decreasing :3]

Sample Input	Sample Output
9	1$$$$
	23$$$
	456$$
	7898$
	76543
	2123
	456
	78
	9
5	1$$
	23$
	454
	32
	1

6. Write a program (WAP) that will print the factorial (N!) of a given number N. Please see the sample input output.

Sample Input	Sample Output
5	5! = 5 X 4 X 3 X 2 X 1 = 120
3	3! = 3 X 2 X 1 = 6

7. Write a program in C that asks for two numbers a and b as input and calculates whether the two numbers are coprime or not. If the numbers are coprime, print "Yes", otherwise, print "No". [Two numbers are coprime if their only common factor is 1]

Sample input	Sample output
31 14	Yes
35 91	No
2 1	Yes

8. Write a program in C that asks for a positive number N as input. After that, the program will take N numbers (can be decimal) and save them in an array. Your program should count the number of elements in the array that are greater than the average of all the numbers in the array.

Sample input	Sample output
5 1 2 3 4 5	2
7 0.5 2 12 -4 3.5 0 5	2
1 4	0

Explanation for 1st input:

The average of the 5 elements in the array is (1+2+3+4+5)/5 = 3. There are two numbers that are greater than 3 in the array (4 and 5). Thus, the program outputs "2".

9. You are given an input array where half of the elements are even. Output an array of same length where the even index will have the even element from the input array and the odd index will contain the odd element from the input array.

Input: [6, 8, 4, 3, 5, 7]

Output: [6, 3, 8, 5, 4, 7]

10. You are given an input array. Rearrange the same array without taking help from another array in such a way, the element and index become the same. The element will be in [0, length(input_array) - 1]

Input: [1, 3, 2, 0]

Output: [0, 1, 2, 3]