

National University of Computer and Emerging Sciences



Lab - 10

For

Programming Fundamentals

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Instructions:

1. Make a word document with the naming convention “SECTION_LAB#_ROLLNO” and put all your source code and snapshots of its output in it. Make sure your word file is formatted properly.
2. Plagiarism is strictly prohibited.
3. Do not discuss solutions with one another.
4. Late submissions are not allowed.
5. Use of Arrays is not allowed.

Topic: Nested Loops

Question#1

An Armstrong number (also known as a narcissistic number, plenary number, or plenary narcissistic number) is a number that is equal to the sum of its own digits each raised to the power of the number of digits in the number.

For example, let's consider the number 153:

- The number of digits in 153 is 3.
- The individual digits are 1, 5, and 3.
- If we raise each of these digits to the power of 3 (the number of digits), we get: $1^3 + 5^3 + 3^3 = 1 + 125 + 27 = 153$.

Since the sum of the cubes of the digits is equal to the original number (153), 153 is an Armstrong number.

In general, an n-digit number is an Armstrong number if the sum of its own digits each raised to the power of n equals the original number.

Some other examples of Armstrong numbers include 370 and 9474. It's named after Michael F. Armstrong, who is credited with discovering them.

You are tasked with writing a program that prompts the user to enter n number of positive integers through the console. You must ensure that each input is a positive integer. If an invalid input is provided, the user must be prompted to re-enter a valid positive integer.

Once a valid input is received, the program will check if the number is an Armstrong number, if it is one then its explanation will be printed on screen as to how it is an Armstrong number.

Sample Run:

```
Please enter how many numbers you want to run this problem for: 4
Please enter a number: -3
Invalid input! Please enter a number: 153
Entered number is an Armstrong number because  $1^3 + 5^3 + 3^3 = 153$ 
Please enter a number: 90
Please enter a number: 9474
Entered number is an Armstrong number because  $9^4 + 4^4 + 7^4 + 4^4 = 9474$ 
Please enter a number: 947

Input ended! Out of given inputs there was 1 invalid input, and 4 valid inputs.
2 were Armstrong numbers and the rest were not.
```

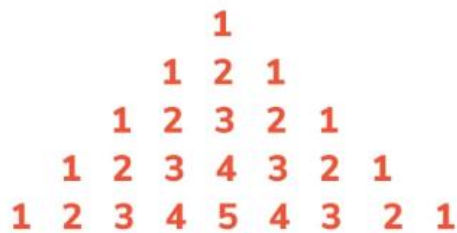
Question#2

Attempt the following patterns using nested loops:



Hollow Full Pyramid

1.



2.



Solid Half
Diamond

3.

Question#3

You are to take n inputs from the user, your task is to remove even digits from the given inputs, and then print square of the transformed number.

Sample Input:

Enter number of inputs: 5

Please enter a number: 23

Square of 3 is 9

Please enter a number: 441

Square of 1 is 1

Please enter a number: 22

Number had no even digits

Please enter a number: 786

Square of 7 is 49

Please enter a number: 413

Square of 13 is 169

All inputs received; program is ending now.