Hyperion Development

Task: Capstone Project II - Nested Loops

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Introduction

Welcome to the Second Capstone Project!

Now that you have experience using loops we are going to consolidate that knowledge by introducing you to nested loops. A nested loop, simply put, is a loop inside a loop. This task will help you understand what nested loops are and how they are implemented.

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The best way to get help is to login to www.hyperiondev.com/support to start a chat with your mentor. You can also schedule a call or get support via email.

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What is a Nested Loop?

As previously stated, a nested loop is simply a loop within a loop. Each time the outer loop is executed, the inner loop is executed right from the start. That is, all the iterations of the inner loop are executed with each iteration of the outer loop.

Take a look at the syntax for nested loops below:

```
for iterating_var in sequence:
   for iterating_var in sequence:
      statements(s)
   statements(s)
```

```
while expression:
   while expression:
      statement(s)
   statement(s)
```

The loops that make up a nested loop don't have to be the same, you can put any type of loop inside of any other type of loop. For example, a for loop can be inside a while loop or vice versa.

The following program shows the potential of a nested loop:

```
for x in range(1, 6):

    for y in range(1, 6):

        print(str(x) + " * " + str(y) + " = " + str(x*y))

    print("")
```

When the above code is executed, it produces following result :

```
1 * 1 = 1
1 * 2 = 2
1 * 3 = 3
1 * 4 = 4
1 * 5 = 5

2 * 1 = 2
2 * 2 = 4
2 * 3 = 6
2 * 4 = 8
2 * 5 = 10
```

```
3 * 1 = 3
3 * 2 = 6
3 * 3 = 9
3 * 4 = 12
3 * 5 = 15

4 * 1 = 4
4 * 2 = 8
4 * 3 = 12
4 * 4 = 16
4 * 5 = 20

5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
```

A note from Masood...

Sorry to interrupt, but did you know that the programs that NASA used in the Apollo mission to the moon were less powerful than a pocket calculator. Yes, you read that right!

These ingenious computer systems were able to guide astronauts across 356,000 km of space from the Earth to the Moon and return them safely. Today, a USB memory stick is more powerful than the computers that put man on the moon.

The Apollo Space Shuttle

- **Masood Gool**

Instructions

Before you get started we strongly suggest you start using Notepad++ or IDLE to open all text files (.txt) and python files (.py). Do not use the normal Windows notepad as it will be much harder to read.

First read example.py, open it using Notepad++ (Right click the file and select 'Edit with Notepad++') or IDLE.

- example.py should help you understand some simple Python. Every task will have example code to help you get started. Make sure you read all of example.py and try your best to understand.

- You may run example.py to see the output. Feel free to write and run your own example code before doing the Task to become more comfortable with Python.

- You are not required to read the entirety of Additional Reading.pdf, it is purely for extra reference.

Compulsory Task

Follow these steps:

- Create a new Python file in this folder called "TriTable.py."
- Write a program that uses nested for loops to create the following number pyramid.

```
1
2   4
3   6    9
4   8    12   16
5   10   15   20   25
6   12   18   24   30   36
7   14   21   28   35   42   49
8   16   24   32   40   48   56   64
9   18   27   36   45   54   63   72   81
```

Things to look out for:

1. Make sure that you have installed and setup all programs correctly. You have setup **Dropbox** correctly if you are reading this, but **Python or Notepad++** may not be installed correctly.
2. If you are not using Windows, please ask your mentor for alternative instructions.

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