ICS 3UC1
Nested Loops

Nested Loops occur when a loop executes inside a second loop, such as shown below:

for i in **range**(1,4):
>   **for** j in **range**(1,4):
>   >   print (i, j)

Which loop is executed more often, the inside loop or the outside loop? How many times is each loop executed?

Example #1

What is the output of the following nested loop?
```
string = ""
for i in range(1, 3):
        for j in range(1, 4):
                string += str(i) + str(j) + " "
print (string)
```

Example #2

Write a **nested loop** that displays the following (you are allowed to display only one '*' at a time):

****
****

Nested Loop Questions

1) Write a program that displays each of the following on the screen using a nested loop:

    a)   34 35 36 44 45 46 54 55 56

    b)   15 16 17 18

             25 26 27 28

             35 36 37 38

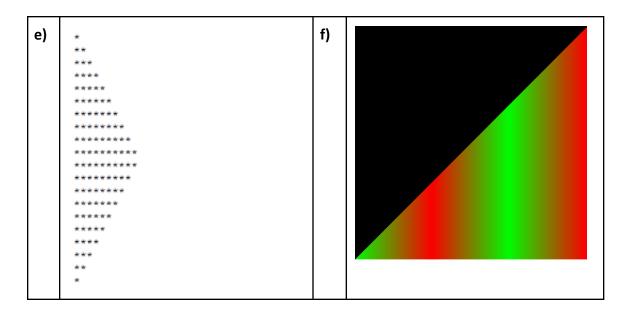2) Write a program that displays the following:

```
******
******
******
******
```

    Note: You are only allowed to display one '*' in your loop.

3) Write a program that displays as in question #2, except it is a 12 by 10 block.

4) Write a program that displays as in question #2 except the number of rows and columns are entered by the user.

5) For each of the following, write a program that displays it.
    NOTE: Not allowed multiplication of strings.

a)		b)	

`*`
`**`
`***`
`****`
`*****`
`******`
`*******`
`********`
`*********`
`**********`
		`**********`
		`*********`
		`********`
		`*******`
		`******`
		`*****`
		`****`
		`***`
		`**`
		`*`	

c)	`1`
	`12`
	`123`
	`1234`
	`12345`
	`123456`
	`1234567`
	`12345678`
	`123456789`
	`12345678910`
		d)	`987654321`
			`87654321`
			`7654321`
			`654321`
			`54321`
			`4321`
			`321`
			`21`
			`1`

e)	f)
| ```
*
**
***
****
*****
******
*******
********
*********
**********
**********
*********
********
*******
******
*****
****
***
**
*
``` |  |

NOTE: For f) above, you are only allowed to display one pixel at a time.

6) Challenge nested loop. Not for the faint of heart!

Generate the following pyramid of digits:

```
       1
      232
     34543
    4567654
   567898765
  67890109876
 7890123210987
```