

Exercises – Loops

For loop

1. Write a program which prints a triangle of stars of a height given by the user, as in the following example input/output:

```
Enter the number of lines for the triangle: 7
```

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

2. Write another program which prints a triangle of stars of a height upside-down, as in the following example input/output:

```
Enter the number of lines for the triangle: 7
```

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

3. Write a program which prints a pyramid of stars of a height given by the user, as in the following example input/output:

```
Enter the number of lines for the pyramid: 7
```

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

Hint: the example answer makes the left-hand slope of the pyramid by printing an upside down triangle of spaces to the left of the pyramid.

4. Write a program that prompts the user for a starting whole number Celsius value, the number of lines required in the table, and the whole number difference between lines in Celsius. Your

program should be able convert the Celsius value to Fahrenheit and must exactly reproduce the following input/output:

```
Enter the first amount in Celsius: 35
Enter the number of lines for the table: 5
Enter a whole number difference between lines in Celsius: 2
```

CELSIUS	FAHRENHEIT
35	95.0
37	98.6
39	102.2
41	105.8
43	109.4

5. In a certain country, people are required to do jury service if they are between the ages of 18 and 65 (inclusive) and do not have a criminal record. Otherwise they are excluded from jury service. Rewrite the program you produced earlier so that you use a while loop to check whether the user has entered valid responses. The program should prompt for the user's age and checks whether they have a criminal record as in the following example input/output:

```
Enter your age: 19
Do you have a criminal record (y/n): p

Incorrect input.
```

or

```
Enter your age: 20
Do you have a criminal record (y/n): n

You are required to do jury service.
```

or

```
Enter your age: 35
Do you have a criminal record (y/n): y

You are excluded from jury service.
```

Cont.d over

Assessed Question: Leap Years

1. A year is a leap year if it is divisible by four, except that any year divisible by 100 is a leap year only if it is also divisible by 400. Write a program which works out the leap years between two years given by the user. The program should list 10 leap years per line, with commas between each year listed and a full stop at the end, as in the following example input/output:

```
Enter start year: 1000  
Enter end year: 1200
```

Here is a list of leap years between 1000 and 1200:

```
1004, 1008, 1012, 1016, 1020, 1024, 1028, 1032, 1036, 1040,  
1044, 1048, 1052, 1056, 1060, 1064, 1068, 1072, 1076, 1080,  
1084, 1088, 1092, 1096, 1104, 1108, 1112, 1116, 1120, 1124,  
1128, 1132, 1136, 1140, 1144, 1148, 1152, 1156, 1160, 1164,  
1168, 1172, 1176, 1180, 1184, 1188, 1192, 1196, 1200.
```

Hints: the answer uses a for loop to work through all the years from the start year to the end year, an extra variable as a leap year counter, and various if and if-else statements inside the loop to check if the year is a leap year, if a comma is needed, and if a new line is needed.

Further practice questions can be found in any of the course textbooks or at the following websites:

<https://codingbat.com/python>

<https://www.codestepbystep.com>