

Practice on Loops

Code as many of the following as you have time for.

Exercise 1 – Lines

Draw some lines of * on the screen. Ask the user for an integer that represents the number of asterisks in a line. Then produce each of the following patterns below. Each pattern will be done in a single while loop.

How long shall the line be? 5

Horizontal:

```
*****
```

Vertical:

```
*  
*  
*  
*  
*
```

Diagonal:

```
*  
 *  
  *  
   *  
    *
```

Diagonal again!

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

Exercise 2 – Harmonic Mean

The Harmonic Mean of a set of numbers is the number of scores, N, divided by the reciprocals of each number. As an example, the harmonic mean of 7,8,7,3,6,2 is:

$$6 / (1/7 + 1/8 + 1/7 + 1/3 + 1/6 + 1/2) = 4.3$$

Write a C++ program that asks the user for a number, N, between 1 and 10 inclusive. Once you get a value from the user, allow the user to enter N values from the keyboard one at a time. Print the harmonic mean of the values entered by the user.

| Numbers | Reciprocal |
|---------|-------------|
| 7 | 0.142857143 |
| 8 | 0.125 |
| 7 | 0.142857143 |
| 3 | 0.333333333 |
| 6 | 0.166666667 |
| 2 | 0.5 |

Harmonic Mean = 4.253165

Exercise 3 – Vee!

Draw some Vs with * on the screen! Ask the user for an integer and draw four Vs. Use only one loop per V! You may need a few ifs.

How long shall the lines be? 4

V1:

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

V2:

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

V3:

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

V4:

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