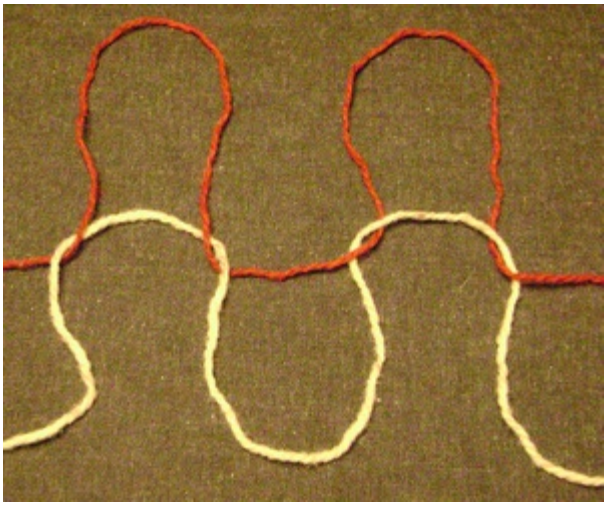
PLTW COMPUTER SCIENCE

Activity 1.3.7b

For Loops

Introduction

As you've learned in the previous activities, computers can calculate and make decisions. A single calculation or decision would be unimpressive. Computers (and brains!) are impressive because they can make billions of calculations and decisions per second. Most programs don't have billions of instructions. A small handful of instructions repeated in a loop can be very powerful. In *Python*®, for and while loops are two of the control structures for iteration.



Iteration is a powerful idea even without computers. In knitting for example, a simple pair of stitches (knit and purl shown above) can be repeated with iteration in various patterns. What is something you enjoy doing that relies on iteration?

Materials

- Computer with Enthought Canopy distribution of *Python*® programming language

Procedure

1. Form pairs as directed by your teacher. Meet or greet each other to practice professional skills and establish norms.

2. Launch Canopy and open an editor window.
3. If your teacher directs you to turn in your work with an IPython log, set the working directory for the IPython session and turn on session logging.

```
In []: %logstart -ort JDoeBSmith1_3_7.log
In []: # Jane Doe 1.3.7 IPython log
```

4. Start a new program in the code editor by choosing **File > New > Python file**. Save the file as `A137b.py`.

5. Complete each of the following.

    - Define a function `roll_hundred_pair()` that produces a histogram of the results of 100 rolls of two 6-sided dice.
    - Define a function `dice(n)` that returns the sum of a random roll of `n` 6-sided dice. Example output shown here:

```
In []: dice(5)  # roll 5 dice
Roll was 16.
Roll was the sum of 5, 1, 6, 1, 3.
```

The code inside a for loop occurs once for each element in the iterable.

```
for element in iterable:
```

Do not write code that changes the iterable inside the for loop.

Conclusion

1. Sometimes code using an iterative loop can be written without a loop, simply repeating the iterated code over and over as separate lines in the program. Explain the disadvantages of developing a program this way.
2. Name a large collection across which you might iterate.
3. What is the relationship between iteration and the analysis of a large set of data?