Lesson 6

For - Loops

1. **For Loops**
2. A for loop in Python is illustrated as follows:

for counter in range(1, 5):

print("hello")

1. Note that the loop will print “hello” four times – it goes from the start value (1, in this case) to the end value (5) minus 1. That is, the loop repeats 1, 2, 3, 4 times, NOT 1, 2, 3, 4, 5 times!!
2. for loops are used when you know exactly how “long” your loop is, say from StartNumber to EndNumber. while loops, which we will discuss in our next lesson, are used when you only know when the loop will end, but not how long it will run. However, you can always convert from one loop to another.
3. **An Example**

An example that we did earlier in the algorithms section is to determine if a number is prime or not. This would be as follows:

a = 8

p = True

for counter in range(2, a):

if (a % counter == 0):

print("Not Prime")

p = False

break;

if (p == True):

print("Prime")

Note that we want to “break” the loop as soon as we find a divisor of a, since it is no longer necessary to continue checking for divisors.

1. **Programming Projects**
2. Write a program to find the GCD of two numbers.
3. The factorial of n (denoted n!) is defined as n\*n-1\*n-2\*n-3…\*3\*2. Write a program to calculate factorials.
4. A number, n, is called **fat** if the sum of it’s divisors > 3 \* n. Write a program to determine if a number is fat.
5. Suppose a piece of paper has an area equal to one square meter and a thickness of 0.090 millimeters. It is cut in half, the pieces stacked together and cut again repeatedly. What will the area and thickness be after 40 cuts?