

**Fundamentals of Programming**  
**Study Guide**  
**Competency Demo #4**

Like the second Competency Demo, this CD will be on Blackboard and will mostly feature true/false and multiple-choice questions with the possibility of a few short answer questions.

The Competency Demo is closed-notes, closed-book, etc.

You will take it on your time and on your honor between Friday, November 17th and Sunday, November 26.

1. Given a pre-defined range() function indicate what values are in the list produced by the function.
  - What list is produced by the following commands?
    - i. range(10)
    - ii. range(5,10)
    - iii. range(10,30)
    - iv. range(10,30,2)
    - v. range(10,30,3)
  
2. Given a snippet of code containing a for loop, indicate how many times that loop will execute. Alternately, indicate the result of running the code.

```
total = 0
for counter in range(10,15):
    total = total + counter
print(total)
```

3. Given a snippet of code containing a while loop, indicate how many times that loop will execute. Alternately, indicate the result of running the code.

```
#Example1

counter = 0
total = 10
while counter <= 15:
    total = total + counter
    counter = counter + 1
print(total)
```

```
#Example 2

number = 0
while number < 8:
    print("Number: " + str(number) )
    number = number + 1
```

4. Given a problem statement and a non-working Python function that attempts to solve the problem, identify where the function is incorrect and explain how to fix it.

# The following program is supposed to calculate the factorial operator where  $5! = 1*2*3*4*5 = 120$  and  $6! = 1*2*3*4*5*6 = 720$ . But it doesn't work. What is wrong and how would you fix it? [Note, there are two different changes, both necessary]

```
def factorial(n):
    total = 0
    for value in range(n):
        total = total * value
    return total
```

5. Identify the result when using the len() function on lists and strings.

```
x = "Lang Hall"
y = ["Lang", "Wright", "Seerley", "Curris"]
print(len(x))
print(len(y))
```

6. Identify what is returned when using square brackets to access single items or slices of lists and strings.

```
x = "Lang Hall"
y = ["Lang", "Wright", "Seerley", "Curris"]
print( x[1] )
print( y[2] )
print( x[-1] )
print( y[-2] )
print( x[1:6] )
```

```
print( y[:2] )
```

7. Identify what is produced when using + with Strings and append() with lists.

```
x = "Lang Hall"
y = ["Lang", "Wright", "Seerley", "Curris"]
print( x + "Society" )
print( y + "Society" )
x.append("Sabin")
print( x )
y.append("Sabin")
print( y )
```

8. What is returned by the following function?

```
def list_transformation():
    alist = [7, 8, 1, 9, 6]
    blist = [ ]
    for index in range(1,len(alist)):
        item = alist[index]
        blist.append(index)
    return blist
```

9. What is printed by the following script?

```
x = "good"
x[2] = "l"
print(x)
y = ["good" ,"bad", "ugly"]
y[2] = "awesome"
print(y)
```