

**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 Thursday, November 21st and Wednesday, November 27 (I am giving you an extra day compared to prior CDs. But you must submit your results before Thanksgiving).

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)
```