CSCI046 Notes: Runtime Analysis

Example 1. Answer the questions below based on the following python code:

```
for i in range(10):
    print('x')
for i in range(0,10):
    print('x')

for i in range(10,20):
    print('y')
```

1. What is the exact number of times that the letter x will be printed?

2. What is the exact number of times that the letter y will be printed?

Example 2. Answer the questions below based on the following python code:

```
1
   for i in range(10):
        print('x')
print('x')
2
3
4
   for i in range(10):
5
        print('y')
for j in range(20):
6
7
             print('y')
8
9
             for k in range(30):
                 print('y')
10
11
   print('z')
12
13
   for i in range(10):
        print('z')
14
        for j in range(10):
15
             print('z')
16
             print('z')
17
        for j in range(10):
18
             print('z')
19
   for i in range(10):
20
        print('z')
21
```

1. What is the exact number of times that the letter x will be printed?

2. What is the exact number of times that the letter y will be printed?

3. What is the exact number of times that the letter **z** will be printed?

Example 3. Answer the questions below based on the following python code:

```
print('x')
2
   for i in range(n):
        print('x')
print('x')
3
4
        print('y')
5
        for j in range(n*2):
6
            print('y')
for k in range(n*3):
7
8
                 print('y')
9
10
   print('z')
11
   for i in range(n):
12
13
        print('z')
        for j in range(n):
14
             print('z')
15
             print('z')
16
17
        for j in range(n):
             print('z')
18
   for i in range(n):
19
        print('z')
20
```

1. What is the exact number of times that the letter x will be printed?

2. What is the exact number of times that the letter y will be printed?

3. What is the exact number of times that the letter **z** will be printed?

Example 4. Answer the questions below based on the following python code:

```
1
   for i in range(n):
2
       for j in range(0,i):
            for k in range(0,j):
3
                print('x')
4
5
   for i in range(n):
6
       for j in range(i,n):
7
            for k in range(j,n):
8
                print('y')
9
10
   for i in range(n):
11
       for j in range(i,n):
12
            for k in range(i,j):
13
                print('z')
14
```

1. What is the exact number of times that the letter x will be printed?

2. What is the exact number of times that the letter y will be printed?

3. What is the exact number of times that the letter **z** will be printed?