SI 106 – Midterm Fall 2015 **Name: _____**

Written Midterm Exam

This exam is closed book - you are allowed only one page of notes (double-sided). If a question seems unclear - please write down any assumptions you feel are needed. If you think that there is a just-plain mistake/typo - check with an instructor.

Anywhere we ask you what will be printed out, if you think an error will be generated, you may write "error". You do not need to write out what the whole error message would be.

1. (75) Write a statement to print the **second** character from any string s (assuming it has at least two characters). When s is defined as follows, it would print just the letter e.

```
s = 'hello'
```

2. (75) After the following Python code is executed, what will be the type of `n[3:]`?

```
n = "34567"
```

   a. Integer
   b. Float
   c. String
   d. List
   e. Tuple
   f. None of the above; there will be an error

3. (75) After the following Python code is executed, what will be the type of `n[2] + n[4]`?

```
n = "34567"
```

   a. Integer
   b. Float
   c. String
   d. List
   e. Tuple
   f. None of the above; there will be an error

4. (75) The code below yields an error.

```
myvar = "the value of x is "

x = 10

y = myvar + x

print y
```

Fix the code above so that it prints out

```
the value of x is 10
```

5. (75) What is the type of z after this code is executed?

```
x = 3
y = 4
y += 1
z = (x == y)
```

   a. integer
   b. string
   c. boolean
   d. dictionary
   e. None of the above; there will be an error

Suppose that a file called "test.txt" has the following contents

```
This file has four lines.
This is the second line.
Line three has five words.
The last line has no period
```

6. (75) What will the following code print out?

```
fname = 'test.txt'
print fname[0]
```

7. (75) What will the following code print out?

```
fname = 'test.txt'
print 'fname'
```

8. (75) What will the following code print out?

```
fname = 'test.txt'
f = open(fname, 'r')
print f[0]
```

9. (100) What will the following code print out?

```
fname = 'test.txt'
f = open(fname, 'r')
lines = f.readlines()
print lines[1][1]
```

10. (75) What will the following code print out?

```
s = 'Line three has five words.'
print len(s.split('r'))
```

11. (150) What will the following code print out?

```
s = 'Line three has five words.'
print s.split('r')[1].find('ha')
```

12. (150) Consider two files. File A contains the first 1000 letters (omitting spaces and punctuation) of the short story, "A Study in Scarlet", all converted to upper case. File B also contains 1000 characters, where each character is randomly selected from the English capital letters. Assume you have a good text compression program available. If you run the program on both files, which compressed file will be larger? Justify your answer in 1-2 sentences.

13. (150) Consider a potential strategy for Brian Christian to use as a confederate in the Loebner prize competition. The strategy is to *never* give a "book response". Instead, at each conversational turn, he would take a word or phrase from the judge's last turn and say something interesting about that. Would Christian argue that that's an effective strategy? Briefly justify your answer in 1-2 sentences.

14. (150) You are currently connected to the directory ~/Documents/Courses/106/F15/Exams/. The directory ~/Documents/Courses/106/F15/ contains a file called test.txt. Write one or more unix commands that will display all the lines of test.txt that contain the word hello.

15. (100) What would the following Python code print out?

```
L = ["First", "Second", "Third"]
for x in L:
    y = x[-1]
print y
```

16. (100) What would the following Python code print out?

```
L = ["First", "Second", "Third"]
for L in z:
    print z[-1]
```

17. (100) What would the following Python code print out?

```
L = ["First", "Second", "Third"]
for x in L:
  print x[0] in L[0]
```

18. (150) What will the following code print out?

```
x = 7
if x < 10:
   print "one"
elif x < 20:
   if x > 15:
      print "two"
   else:
      print "three"
if x < 30:
   print "four"
```

19. (150) What will the following code print out?

```
x = 7
if x < 10:
   print "one"
elif x < 20:
   if x > 15:
      print "two"
   else:
      print "three"
elif x < 30:
   print "four"
```

20. (150) What would this code print out?

```
L = []
L.append(2)
L.append(3)
L.append(4)
L[2]=5
print L
```

21. (150) What would this code print out?

```
d = {}
d[1] = 'a'
d[2] = 'b'
d['c'] = 3
print 'b' in d
```

22. (150) What would this code print out?

```
for x in range(4):
  print x * 2
```

23. (75) What does the following code print out?

```
(x, y, z) = (30, 40, 50)
print z
```

24. (75) What does the following code print out?

```
(x, y, z, w) = (30, 40, 50)
print w
```

25. (150) What value prints?

```
def g(x, y=0):
   y = y + x
   return y
y = 10
z = g(y, 5)
print y
```

a. 5
b. 10
c. 15
d. 20
e. None
f. There will be an error

26. (150) What will the following code print out?

```
x = -1
y = -2
z = -3
def h(x, y = 2, z = 3):
   print x, y, z

h(1, z=4)
```

The next two questions assume the following code has been executed.

```
L = [{'a':1, 'b':2, 'd':11},
     {'a':4, 'b':5, 'd':12},
     {'a':7, 'b':8, 'f':11}
    ]
```

27. (225) Write code to print each of the keys that have the value 11 in any of the dictionaries. It should print

```
d
f
```

28. (250) Define a function **only_with_d** that takes a list of dictionaries as input and returns a potentially shorter list containing only those dictionaries that have a value associated with key 'd'. Thus, for example, we should get the output in bold with the code below. Make sure that your function works for any L, not just the one given.

```
L = [{'a':1, 'b':2, 'd':11},
     {'a':4, 'b':5, 'd':12},
     {'a':7, 'b':8, 'f':11}
    ]
print only_with_d(L)
```

[{'a':1, 'b':2, 'd':11}, {'a':4, 'b':5, 'd':12}]

29. (250) Write code that repeatedly asks the user to input numbers. Keep going until the user enters a negative number. Add them all up (excluding the negative number) and print out the answer. Thus, if the user entered the numbers 5, 5, 4, and -1, the output from running your code would be:

    14

30. (250) Define a function **total_value**. It takes a dictionary as input where all of the values in the dictionary are integers. It returns a single number, the sum of all the values. Thus, for example, once you've defined the function, the code below will produce the output 70.

```
d = {'alpha': 10,
     'bravo': 30,
     'delta': 20,
     'charlie': 10}

print total_value(d)
```

```
70
```