

CIS 4930 - 002: Fall 2017
Final

Total Points: 115 (15 point extra credit)
Monday 12/11/2017

Name: _____

Instructions

- The exam has 8 pages (including this page).
- You have 2 hours to solve 4 problems.
- The exam is closed book, closed notes. Cheat sheets are not allowed.
- Partial credit will be given for Problem 1 if compelling reasons are given for your choice.
- Please be as specific as possible when answering short answer questions.
- You can use the backs of the sheets as scratch paper.
- You have an opportunity to earn 15 extra credit points (2.25 overall percentage points).

Grade Summary

- Problem 1: _____ / 40.
- Problem 2: _____ / 15.
- Problem 3: _____ / 20.
- Problem 4: _____ / 40.

- **Total:** _____ / 100.

Problem 1: Multiple choice Questions. 2x20 = 40 points

1. Which Python library/module contains modules for operations like integration, optimization and interpolation?
 - (a) numpy
 - (b) scipy
 - (c) pandas
 - (d) twisted
2. Suppose B is a subclass of A, to invoke the `__init__` method in A from B, what is the line of code you should write?
 - (a) `A.__init__(B)`
 - (b) `B.__init__(self)`
 - (c) `A.__init__(self)`
 - (d) `B.__init__(A)`
3. Which of the following is a valid variable name in Python?
 - (a) `with`
 - (b) `_underscore`
 - (c) `$$cashMoney`
 - (d) `9lives`
4. Which of the following is NOT a python sequence data type?
 - (a) `set`
 - (b) `string`
 - (c) `bytearray`
 - (d) `list`
5. If a function does not return a value, by default, it returns
 - (a) `integer`
 - (b) `None`
 - (c) `double`
 - (d) `string`
6. Which of the following is NOT a built-in constant?
 - (a) `None`
 - (b) `True`
 - (c) `NotImplemented`
 - (d) `quit`
7. Any imports from `__future__` should be the first line in the file/program.
 - (a) `True`
 - (b) `False`

8. Which of the following is NOT a Python keyword?
- (a) `global`
 - (b) `assert`
 - (c) `local`
 - (d) `break`
9. Which of the following function of dictionary gets all the keys from the dictionary?
- (a) `getKeys()`
 - (b) `key()`
 - (c) `printKeys()`
 - (d) `keys()`
10. How are variable length arguments specified in the function heading?
- (a) one star followed by a valid identifier
 - (b) one underscore followed by a valid identifier
 - (c) two stars followed by a valid identifier
 - (d) two underscores followed by a valid identifier
11. What do the following lines return?
- ```
>>>s = 'no, this is PATRICK!'
>>>print(s.capitalize())
```
- (a) No, This is Patrick!
  - (b) NO, THIS IS PATRICK!
  - (c) NO, THIS IS patrick!
  - (d) No, this is patrick!
12. Which of the following is NOT a Python operator?
- (a) `<=`
  - (b) `+=`
  - (c) `*`
  - (d) `||`
13. Which of the following statements is FALSE?
- (a) `frozenset` is a mutable data type.
  - (b) `frozenset` can be used as keys to dictionaries.
  - (c) `frozenset` is a data type with unordered values.
  - (d) `frozenset` is a hashable data type.
14. Which of the following operators has the highest precedence (evaluated first)?
- (a) `**` (exponentiation)
  - (b) `*` (multiplication)
  - (c) `%` (modulus)
  - (d) `<<`(bit shift)

15. While using the `re` library, which metacharacter matches strings that end with the sequence of characters that precedes it?
- (a) `.` (dot)
  - (b) `$` (dollar)
  - (c) `^` (hat/caret)
  - (d) `*` (star)
16. The Python built-in constant `self` is similar to `this` in C++.
- (a) True
  - (b) False
17. Which of the following logging levels are not logged?
- (a) error
  - (b) warning
  - (c) debug
  - (d) critical
18. If we do a deep copy, changes to the source list do not affect the copied list.
- (a) True
  - (b) False
19. which of the following is not a built-in library?
- (a) `itertools`
  - (b) `scipy`
  - (c) `copy`
  - (d) `random`
20. Please answer Patrick's question.



- (a) Yes
- (b) No

## Problem 2: Read through the code and indicate what the output would be. 3 x 5 = 15 points

You can assume this code snippet is a part of a larger program that will run.

1.

```
x = "abcdef"
i = "a"
while i in x:
 x = x[:-1]
 print(i, end = " ")
```

2.

```
s=["new york", "san francisco", "austin"]
[(w.upper(), len(w)) for w in s]
```

3.

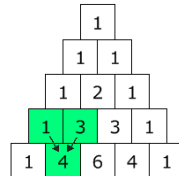
```
a={1:"A",2:"B",3:"C"}
b=a.copy()
b[2]="D"
print(a)
```

### Problem 3: The scary, code writing problem. 20 points

#### Pascal's Triangle

Write a Python program to create a class called `Pascal`. Use the constructor for the class to initialize the instance data member called `rows`. Then, define a function called `printTriangle` to print the Pascal's Triangle with `row` number of rows. In main, read an integer 'N' from the user, create an object of `Pascal` with 'N' rows and call the `printTriangle` function to print the Pascal's Triangle.

Pascal's Triangle is an arithmetic and geometric figure first imagined by Blaise Pascal. To build the triangle, start with "1" at the top, then continue placing numbers below it in a triangular pattern. Each number is the numbers directly above it added together. It is usually written with the rows staggered like in the picture below.



You can assume the number entered will be at least 3. You can also just print the triangle like the sample run, instead of staggering the rows. **Sample Run:**

Enter the number of rows: 8

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
```

**Problem 4: Short answer questions. 5 x 8 = 40 points**

1. What is the Twisted Reactor Loop? How is it useful for writing network based applications?

2. What is Tensorflow? What type of machine learning (supervised/unsupervised) benefits most from Tensorflow?

3. What are Widgets? List a few PyQt widgets here.

4. Numpy uses n-dimensional array objects. How are they different from Python lists?

5. What are sockets? What are the 2 things (parameters) we need to connect to a server using a socket?

6. What is the advantage of using a Python virtual environment?

7. What is the difference between a list and a tuple?

8. What is event driven programming? How do signals and slots help with event driven programming?