Midterm Review & some sample questions

Procedural Matters Regarding the Midterm Exam

- The test is on:
- **Monday, Feb. 19th, 10:30AM - 11:50AM**
- **Please bring your AC Student ID**
- **The midterm counts for 20% of the final grade**

Type of Questions that Could Be on the Test

- Section I: **True/False questions + Matching/mapping**
- Section II: **Multiple choice questions**
- Section III: **QUESTIONs / ANSWERs**

  – **Pseudo-Code to Python & Correct the indentation**

  – **What is printed out (what's the output, what is it doing)?**

  – **What is the value of a variable after code executes?**
- Section IV: **ESSAY QUESTIONS**

  – **What is a variable? What's an expression? Etc… Give examples**

  – **compare/contrast, relationship, etc…**

  – **What are the _____? Give examples**

  What's an assignment statement and when to use it?, Difference between function call and function definition? Benefits of functions, three basic constructs are sufficient to implement any algorithm in Python, etc…)
- Section V: **Write functions that solve simple problems involving: user input, printing, calculating values, etc.**
- **Using Turtles questions**

Circle either T (True) or F (False) for each of the following statements [1 point each]

True or False: A variable name can start with the dollar sign $

True or False: Comments in Python begin with the # character

True or False: Every function header must start with **def** and end with **:**

True or False: In Python, the statement print 9 / 2 will display 4.0

True or False: In Python, the statement print "711"*3 will display 2133

True or False: A bit that is turned off is represented by the value 1.

True or False: In Python, math expressions are evaluated from left to right, no matter what the operators are.

True or False: False or not(False) or False

True or False: **def** is an example of a Python keyword (reserved word)

MULTIPLE CHOICE QUESTIONS – Circle the right letter [1 ½ points each]

1. Volatility is a property of _____.

(a) ROM

(b) RAM

(c) Disk

(d) Software

(e) Computer networks

2. Which of the following is a valid Python variable name?

(a) 2var_able

(b) #_variable

(c) variable$

(d) __name

(e) None of the above

3. A data item whose value may change during processing is a(n) _____

(a) defined value

(b) constant

(c) input

(d) variable

4. The process known as the _____ cycle is used by the CPU to execute instructions in a program.

(a) Decode- fetch-execute

(b) Decode-execute-fetch

(c) Fetch-decode-execute

(d) Fetch-execute-decode

5. RAM stands for _____.

(a) read access and memorize.

(b) randomly accessible memory

(c) random access memory

(d) readily accessible memory

6. What symbol is used to mark the beginning and end of a string?

(a) Slash

(b) Asterisk

(c) Question

(d) Quotation

7. The following is an example of an instruction written in which computer language?

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(a) C++

(b) Assembly language

(c) JAVA

(d) Machine language

8. Which of the following assignment statements is invalid?

(a) SALES = 1000

(b) 1000 = SALES

(c) SALES = SALES + 1000

(d) SALES = SALES1 + SALES2

9. The _____ function retrieves all keyboard input as a string.

(a) int(input())

(b) float(input())

(c) input()

(d) string_input()

(e) None of the above

10. What's the result of the following expression; 9/2+5*7?

(a) 39.0

(b) 66.5

(c) 63

(d) 39

(e) None of the above

11. What type of error produces incorrect results but does not prevent the program from running?

(a) syntax

(b) Logic (semantic)

(c) grammatical

(d) Human

(e) None of the above

12. The output of the following print statement is:

print 'I\'m ready to begin'

(a) Im ready to begin

(b) I\'m ready to begin

(c) I'm ready to begin

(d) 'I\'m ready to begin'

(e) None of the above

13. The most common input devices include _____

(a) printer and mice

(b) mice and keyboards

(c) monitors and keyboards

(d) monitors and mice

(e) None of the above

14. The primary output device for computers is a _____

(a) printer

(b) video monitor

(c) mouse

(d) keyboard

15. The CPU is also known as the
(a) secondary storage

(b) microprocessor

(c) primary storage

(d) random access memory

16. Binary means
(a) there are three options; 0, 1, and 2.

(b) there are two possibilities, on and off.

(c) that computers really need to have three or more options.
(d) the same as a byte, 8 bits.

Below, show the output of the following statements

a) x = 3
print("Value of x = ", x) ____ Value of x = 3_____

b) number = 5
print ("number = ") _____ number =_____

c)
print ("Result = ", " 18") _____ Result = 18_____

d) print ("4 + 9") _____4 + 9_____

Vocabulary Matching – put the corresponding letter in the left most column

Answer by including a letter from the rightmost column that corresponds to each digit on the leftmost column in the centered empty cells.				
		Put your answers in this column		
1.	The statements that a programmer writes in a	**(d)**	Function	a)

	high-level language are called _____ or simple code.			
2.	A name that represents a value stored in the computer's memory	(c)	Secondary storage	b)
3.	A piece of prewritten code that performs an operation and then returns a value back to the program.	(a)	Variable	c)
4.	A type of memory that can hold data for long periods of time, even when there is no power to the computer.	(b)	Source code	d)

Vocabulary Matching – put the corresponding letter in the left most column

Answer by including a letter from the rightmost column that corresponds to each digit on the leftmost column in the centered empty cells.				
		Put your answers in this column		
5.	Examples are str, int, float, char	(b)	Comment	e)
6.	Used to remind you of what the program does. The computer ignores them.	(a)	Data types	f)

Operators - Evaluate the following numerical expressions:

2 ** 10 **1024**	40 // 11 **3**
7 * 5 **35**	49.5 // 11 **4.0**
48 % 12 **0**	17 – 9 **8**
12 + 3 **15**	6 / 7 **0.8571428571428571 ~ 0.86**

Below, show the output of the following statements / expressions: [**½ point each**]

What is printed after the following statements? num = 6 num = num + 3 print (num) **9**	phrase = “she is a programmer!” print (phrase) ___ **she is a programmer!__**
number = 0 number = number - 5 number = number + 5 print ('Number = ', number) **Number= 0**	a = 36 b = 12 result = a % b print ('Result = ', result) **Result= 0**

Question - Correct the indentation of the following Python code:

```
def tryMe() :
x = "hi"
print(x)
print(x, x)
print(x, x, x)
# Main Program
tryMe()
```

Answer – Python code with Correct indentation:

```
def tryMe() :
    greet = "hi"
    print(greet)
```

```
    print(greet, greet)
    print(greet, greet, greet)
# Main Program
tryMe()
```

Pseudo-code to Python conversion

Question - Convert the following pseudo-code to a Python function:

Step 1: start

Step 2: write "Enter the temperature in degrees Celsius."

Step 3: read Celsius

Step 4: Fahrenheit ←32 + (9* Celsius/5)

Step 5: write "The temperature in Fahrenheit is:"

Step 6: write Fahrenheit

Step 7: stop

Answer - A Python function for the previous pseudo-code :

```
def tryMe():
    print("Enter the temperature in degrees Celsius.")
    Celsius =int(input())
    Fahrenheit = 32 + (9* Celsius/5)
    print("The temperature in Fahrenheit is:")
    print(Fahrenheit)
tryMe()
```

a) Complete the following function according to its docstring description.

```
def lengthString(str1):
        '''Given  a string str1, the function returns the length of a string (the number of characters in the string)
            For example, lengthString(['tomato')
            returns 6)'''
    _____ (Answer: return len(str1)  )
```

b) Write a docstring (Comments explaining what the function is trying to solve)for the following tryMe() function

```
def tryMe():
  '''
    _____
    _____
  '''
```

```
print(power(3, 4))
```

Answer: ‘’’ This function prints the value of 3 raised to the power of 4 which is 81’’’

More Questions

Write a function that asks a user for his/her name and movie watched. Then the function prints a greeting message.

A session should look like the following:

What is your name? Ahmed

Which movie have you seen? The Battle of Algiers

The printed message is: **"Today, I learned that Ahmed watched The Battle of Algiers movie!“ (Output)**

Note: User input is underlined.

Possible Answer:

```
def printingMessage():
    name = input("What is your name? ")
    movie = input("Which movie have you seen? ")
    print("Today, I learned that "+name+" watched "+movie+" movie!")
printingMessage()
```

Yet More Questions

Sample **Question A**:

output = '1'+'1'

Question: What does output equal to?

Answer: '11'

Note: Attention to detail is important. The quotes indicate that it is a string. Partial credit is possible. For example,

leaving out the quotes would have lost just a little bit, but answering 2, would have resulted in an incorrect answer.

Question 1:

addition = 1 + 1

concatenation = '1'+'1'

concat_addition = concatenation * addition

Question: What is the value of the variable concat_addition after the code above executes?

Answer: '1111'

Which variable name(s) below is/are invalid in Python?

a. 1st_num (Invalid since it starts with a digit)

b. num_1st

c. num-1st (Invalid since it includes -)

d. firstNum

e. checkMe

f. for (Invalid since it is a reserved word)

Question: What is wrong with the following program i.e.; What type of error(s) if any? And how to fix it (them)?

```
def foo()
    print("Hello,World!')
foo()
```

Answer:

a) Colon (:) missing from function header

b) Mismatched quotation marks “ and ‘

What you should know

- Topics: algorithm, program, programming language, function, operators, input, output, variable, scope, data types, etc.
- Know how to:

– Define functions

– Assign values to variables

– Return values from functions

– Use print statements, input statements, operators

– Import modules

– Write a simple function that works and is easy to understand, due to comments and variable/function names

– If/elif/else statements and basic decision making

Algorithms and Programs

- An Algorithm

– step by step plan for solving a problem

- Program

– Executable implementation of algorithm, written in a computer language

- Programming Language

– Formal language for writing computer programs

- Python

– High level computer language

– Popular for teaching and for writing programs

– Pseudo Code: a series of ordered statements

- Structured using line numbers, indents, bullets, etc.
- Connected by logical and temporal connectors
  - if, else, unless, not, until, when
- Flow Chart: Connected Series of Boxes
- circles/ovals = start/end
- Rectangles = steps in processing
- Diamonds = Decisions
- Arrows = Sequence of Steps

Functions

- Programming language Functions have 3 optional features:
  - Input
  - Output
  - Side effects
- print versus return
  - print is significant for its side effect—printing to the

computer screen

– return

- Exits block (function)
- Provides a value to a function call – Example:
  - **If**: function1(a) returns 5 and function2(b) returns 10
  - **Then**: function1(a) + function2(b) = 15

Data Types

- Floats and Integers
- Strings
- Boolean (True or False)
- Nonetype (Output of void functions, like print)

Numbers

- Integers:
  - No Decimal Place

- Float
  - Limited in Length
  - Used for numbers with decimals
  - Approximations using Scientific Notation
- Normal Division with Integer Input
  - Output is a float
- Integer Division (//)
  - Input/Output are integers (output is floor of answer)
- Import Math library (module) for many special functions/variables

Type Conversion Functions (Numbers)

- Float

– Converts Integers and compatible strings to floats

- Int
  - Converts floats (by truncation) to integer
  - Converts compatible string to integer
- Converted Strings can participate in math operations
  - 5 * int('5') **gives you 25**
  - 20 / float('5.5') **gives you 3.6363636363636362**

Converting Non-Strings to Strings

- str(5.55)
  - '5.55'
- Makes a string out of any type of object (using definition of that object)

- Once converted, non-strings can be combined with strings through concatenation
  - 'The number is '+str(5) **gives you *'The number is 5'***
  - output = 5+100 **assigns**105 to variable output
  - 'The sum of 5 and 100 is '+ output **gives you *'The sum of 5 and 100 is 105'***

Arithmetic Operators & the Assignment Operator

- Know all the mathematical operators and what they do: +, -, *, **, /, //, %
- Be familiar with the two equal signs
  - The assignment operator =
  - The test for equality operator ==
- Understand how most of the operators can be restated as functions
- Note that the assignment operator = cannot be simulated as a function

Making Code Readable

- Comments
  - ## Know How to use comments
  - ## Know Why to use comments
- Naming Variables and Functions
  - Choosing names that are self explanatory

Identifiers (variable names)

- Functions
  - How to define functions
  - Legal names for functions
  - Using colon, parentheses and indents
- Variables
  - Legal names of variables
  - Scope
- Python defaults regarding 2 variables with the same name, but

different scope properties

  - When a variable is passed as an argument of a

function, does the function use the actual variable or its value?

If/elif/Else Statements

- Syntax (elif and else parts optional)

```
If + boolean-expression + :
        body
elif + boolean-expression + :
        body
else:
        body
```

- Example:

```
def classify_integer(integer):
        if integer==0:
                return('zero')
        elif (integer%2) == 0:
                return('even')
        else:
                return('odd')
```

More Qs:

1. Write a function that given an integer number will return either “even” or “odd”

2. Write a function that given an integer number will return its absolute value. DO NOT USE the built-in function abs()

3. Write a function that given a string will return the same string where each character is doubled. For example:

Input: “Hello”

Output: HHeellllloo”