CIS 210 Winter 2018
Midterm 1 Example Questions - KEY

Concept: Python objects have types.
What is the result when the following Python code is executed:

1. >>> type(99.9)
   a) <class 'int'>   b) <class 'float'>  c) <class 'bool'>
   d) <class 'str'>  e) <class 'python'>

2. >>> type(True)
   a) <class 'int'>   b) <class 'float'>  c) <class 'bool'>
   d) <class 'str'>  e) <class 'python'>

3. >>> type('false')
   a) <class 'int'>   b) <class 'float'>  c) <class 'bool'>
   d) <class 'str'>  e) <class 'python'>

4. >>> type(len('hello') == len('goodbye'))
   a) <class 'int'>   b) <class 'float'>  c) <class 'bool'>
   d) <class 'str'>  e) <class 'python'>

Concept: Objects are stored in memory.
5. Given the following:
>>> id(99.9)
4298470336
4298470336 refers to a
   a) Python type   b) Python built-in function   c) memory location   d) None type

Concept: Python assignment associates a name with a Python object (the value of the expression on the rhs of the = assignment operator. Assignment is not an expression/does not return a value.
6. >>> a = 1200 is an example of a Python
   a) expression   b) assignment statement   c) conditional   d) loop

Concept: Objects are combined in expressions. Expressions are evaluated and return a value.
7. >>> len('CIS 210') is an example of a Python
   a) expression   b) assignment statement   c) conditional   d) loop
Concepts: Operators have an order of operation. Objects have types. Reading sequential code.

8. Given the following:

1 - >>> ftemp = 212
2 - >>> ctemp = (ftemp - 32) * 5/9
3 - >>> ctemp = ftemp - 32 * 5/9

The value of ctemp will [??] from line 2 to line 3; The type of ctemp will [??] from line 2 to line 3

a) stay the same/change  b) change/stay the same  c) stay the same/stay the same  d) change/change

Concept: Assignment associates variable names with objects (only).

9. Given the following Python code, what will be printed in the Shell:

    >>> b = 20
    >>> a = b + 1
    >>> b = 30
    >>> a

a) 20  b) 21  c) 30  d) 31  e) nothing will be printed

Concepts: Python for loop, accumulator pattern; dynamic typing can lead to logic errors.

10-11. What will be printed when the following Python code is executed?

    yellow_ct = 0
    for ctr in range(3):
        yellow ct = yellow_ct + 1
    print(yellow_ct)

10.  a) 0  b) 1  c) 2  d) 3  e) nothing will be printed

11. The code in question 10 does not work as intended. This is due to Python’s

a) static typing  b) dynamic typing  c) strong typing  d) weak typing

Concepts: reading/executing code: for loop, tracking updates to variables.

12. What are the values of a and b after the following Python code executes:

    a = 10
    b = 3
    t = 0
    for i in range(1, 4):
        t = a
        a = i + b
        b = t - 1

a) 10, 3  b) 11, 3  c) 6, 10  d) 10, 11  e) 3, 11
Concept: accumulator pattern.
13. Order the lines of Python code to implement an accumulator pattern (ignore lack of indents):

\[
\begin{align*}
1 & - p = p \times i \\
2 & - p = 1 \\
3 & - \text{for } i \text{ in range(10):}
\end{align*}
\]

a) 1, 2, 3       b) 2, 3, 1       c) 3, 1, 2       d) 3, 2, 1       e) 2, 1, 3

Concepts: calling a function; parameter passing; functions return values; return statement; indefinite iteration.
14. What value is returned when the following Python code is executed:

```python
def qx(n):
    '''(integer) -> ??
    Test function.
    '''
    ctr = 0
    while n > 1:
        n = n // 2
        ctr += 1
    return 'The end.'
qx(7)
```

a) 1   b) 2   c) 3   d) 'The end.'   e) None

Concepts: calling a function; parameter passing; functions return values; return statement; indefinite iteration.
15. What value is returned when the following Python code is executed:

```python
def qx(n):
    '''(integer) -> ??
    Test function.
    '''
    ctr = 0
    while n > 1:
        n = n // 2
        ctr += 1
    return ctr
qx(7)
```

a) 1   b) 2   c) 3   d) 'The end.'   e) None
Concepts: type contract; returning a Boolean value; lazy ("short circuit") evaluation.

16. Given the following Python code:

```python
def q16(age, salary):
    '''
    (number, number) -> ??
    Test function.
    >>> q16(18, 5000)
    ??
    return (age < 18) and (salary < 10000)
    '''
```

16. Complete the type contract:
   a. number  
   b. integer 
   c. float   
   d. Boolean

17. What value is returned when `q16(18, 5000)` is executed?
   a. 18     
   b. 5000   
   c. 5018   
   d. True   
   e. False

18. To determine this value, Python evaluated
   a. (age < 18) 
   b. (age < 18) 
   c. (salary < 10000) 
   (salary < 10000)

Concepts: implementing an algorithm, type contract, accumulator pattern, for loop.

19. Given the following Python code:

```python
def mysqrt(n, k):
    '''(integer, integer) -> ??
    Generates an approximate square root of n, a positive number, via an iterative process that runs k times.
    The approximate square root is returned.
    >>> mysqrt(25, 5)
    5.0
    '''
    approx_val = 1
    for ctr in range(k):
        approx_val = .5 * (approx_val + n/approx_val)
    return round(approx_val, 2)
```

19. """(integer, integer) -> ??"

`mysqrt(25, 5)`
19. Complete the type contract:
   a. bool/float          b. float/None    c. integer/integer          d. integer/float

20. The first time the for loop executes, the value of k is
    a. 0             b. 1             c. 4             d. 5                 e. k is not defined

21. The first time the for loop executes, the value of ctr is
    a. 0             b. 1             c. 4             d. 5                 e. ctr is not defined

22. After the for loop has finished executing, the value of n is
    a. 0             b. 1             c. 4             d. 25                e. n is not defined

Concepts: Python namespaces; variable scope.
23-26. Given the following Python code:

1 - def twice(x):
2    '''(int) -> int
3    Return x multiplied by 2.
4    >>> twice(3)
5    6
6    '''
7    y = 2
8    result = y * x
9    return result

What will the result be when the following Python code is executed?

```>>> y = 5  then
23.  >>> twice(y)
```

a. 0             b. 2             c. 5             d. 10                e. NameError

```24.  >>> y
```

a. 0             b. 2             c. 5             d. 10                e. NameError

```25.  >>> x
```

a. 0             b. 2             c. 5             d. 10                e. NameError

26. When the following Python code is executed
```$>>> z = 10$
$>>> twice(z)$
```

what is the value of x at line 8 of the `twice` function?

a. 0             b. 2             c. 5             d. 10                e. error
Concepts: Using Python standard library; docstring; turtle graphics.
27-28. You are given the following Python code:

```python
from turtle import *

def square():
    '''()
    -> None
    Use Python turtle graphics to
draw a square.
>>>
[draw square on turtle Canvas]
'''
    for i in range(4):
        fd(100)
        lt(90)

    return None

with the assignment to make changes so the function can draw any polygon shape.
Some progress has already been made; finish the work:

def poly(s):
    '''(int)
    -> None
    Use Python turtle graphics to
draw an s-sided polygon.
>>>
[draw square on turtle Canvas]
'''
    for i in range(??-28):
        fd(100)
        lt(360 / s)

    return None
```

27. a. `poly`  b. `poly()`  c. `poly(4)`  d. `poly(s)`

28. a. 4  b. s  c. `ctr`  d. 10
Given the following Python code:

def q29(s):
    '''
    (??) -> ??
    
    Test function.
    
    >>> q29('The quick brown fox')
    5
    >>> q29('Hello, world.')
    3
    '''
    vowels = 'aeiou'
    result = 0
    for i in range(len(s)):
        if s[i] in vowels:
            result += 1
    
    return result

29. Complete the type contract:

   a) str/str   b) int/int   c) str/float
   d) str/bool   e) str/int

30. Executing this function will

   a) Return count of vowels in s.
   b) Return count of characters in s.
   c) Print count of vowels in s.
   d) Print count of characters in s.
   e) Causes an infinite loop.