CS 211

Spring 2023

Midterm Exam

May 4th, 2023

Remember the following exam rules:

- This exam is personal. Your answers must reflect your knowledge of the course topics examined here.
- The exam is closed-book, with no internet or cell phones, but you may use one notes sheet.
- You have one hour to finish the exam.
- Fill out your scantron with your answers. You may not use ink on scantrons.
- Those who cheat will receive an F in the course.

1) Which of the following statements is incorrect (false) about the following code segment?

```
class People():
  def __init__(self, name):
    self.name = name
  def namePrint(self):
    print(self.name)

p1 = People("Sally")
p2 = People("Louise")
p1.namePrint()
```

A) person1 and person2 are two different instances of the People class.
B) The __init__ method sets initial values for attributes.
C) 'self' is not required in def namePrint(self):
D) person2 has a different value for 'name' than person1.

2) What is the output of the following code snippet?

```
class A:
    def test(self):
        print("A.test")
class B(A):
    def test(self):
        print("B.test")
        super().test()

a_B = B()
a_B.test()
```

A) B.test
A.test
B) A.test
B.test
C) A.test
D) B.test

3) Assume the file lib.py contains class A, whose constructor does not take any arguments. If the file client.py imports lib.py using the form import lib
How would you create object x of class A?
A) x = A()
B) x = lib.A()
C) x = A.lib()
D) x = lib()

4) What is the correct form to declare that the class Dog inherits from Canine?
A) from Canine import Dog
B) class Dog(Canine)
C) an = Dog(Canine)
D) Dog = Canine()

5) What is the output of the following code snippet?

```
class Add:
    def __init__(self, x, y, z):
        self.sum = x+y+z

x = Add(1, 2, 3)
y = x.sum
x.sum = y + 1
print(x.sum)
```

A) 6
B) <__main__.Add object at 0x1043645e0>
C) 7
D) None

6) By convention, _____ is used to refer to the current instance (aka, calling object) of a class.
A) class
B) def
C) self
D) init

7) What is the output of the following code snippet?

```
class A:
    def m1(self):
        return self.m2()
    def m2(self):
        return 'A'

class B(A):
    def m2(self):
        return 'B'

a = A()
b = B()
print(a.m1(), b.m1(),a.m2(),
b.m2())
```

A) A B A A
B) A B A B
C) A A A B
D) A B B A

8) What is the output of the following code snippet?

```
a=1
b=0
index=7
a_list=[1,2,3]

try:
    c=a/b
    print(a_list[index])
except IndexError as e:
    print("index out of range")
except ZeroDivisionError as z:
    print("b is 0")
```

A) division by zero
B) b is 0
C) list index out of range
D) None of above

9) What statement is false about the following execution sequence?

```
>>> a
[1, 2, 3]
>>> type(a)
<class 'list'>
>>> a.pop()
3
>>> a
[1, 2]
```

A) pop is an in-place method
B) pop deletes and returns the last list element
C) [].pop() returns []
D) Lists are mutable objects

10) What of the following statements about the following code snippet is false?

```
def fun(name):
    print(f"Hello {name}")

cheer = fun

cheer('Geeks')
```

A) It prints “Hello Geeks”
B) The function cheer is undefined
C) cheer and fun are aliases of the same function

11) What does the __init__(self) method do in Python?
A) It initializes the class for use.
B) It executes when a new object is instantiated.
C) It initializes all the data attributes to zero when called.
D) It sets self to None.

12) Which of the following code uses the inheritance feature of Python?
A) class Foo: Pass
B) class Foo(object): pass
class Bar(object): pass
C) class Foo: pass
class Bar(Foo): pass
D) None of the above.

13) Which of the following is the correct way to define a constructor?
A) def __init__(title, author):
B) def __init__(self, title, author):
C) def __init__():
D) __init__(self, title, author):

14) Can an abstract parent class have non-abstract subclasses?
A) No—an abstract class must have only abstract subclasses.
B) No—an abstract class must have no subclasses at all.
C) Yes—all children of an abstract class must be non-abstract.
D) Yes—an abstract class can have both abstract and non-abstract subclasses.

15) What does the last statement print?

```
x = [1, 2, 3]
x.append([4, 5, 6])
print(len(x))
```

A) 6
B) 4
C) Error, cannot append a list to a list

16) What is an *abstract* class?

A) An abstract class is one without any child classes.
B) An abstract class is any parent class with more than one child class.
C) An abstract class is a class that cannot be instantiated but can be a base class.
D) abstract class is another name for "base class."

17) What is the term to describe this code?

```
a, b, c = (2, 'apple', 3.5)
```

A) Tuple processing
B) Tuple unpacking
C) Tuple matching
D) Syntax Error

18) What built-in list method would you use to remove items from a list?

A) .delete() method
B) pop(my_list)
C) del(my_list)
D) .pop() method

19) What built-in Python data type do programmers commonly use to represent a stack?

A) set
B) list
C) None
D) dictionary
E) You must implement a stack as a class.

20) What happens if you do not explicitly return a value from a function?

A) It will raise a RuntimeError if you do not return a value.
B) It will return None.
C) It will return True.
D) The function will enter an infinite loop because it will not know when to stop executing its code.

21) If all functions from expr.py from Project 4 are defined, consider the following program execution and output:

```
>>> a = IntConst(7)
>>> b = IntConst(5)
>>> sub_1 = Plus(a, b)
>>> c = IntConst(3)
>>> sub_2 = Times(sub_1, c)
>>> print([sub_2])
[Times(Plus(IntConst(7),
IntConst(5)), IntConst(3))]
>>> print(count_nodes(sub_2))
5
```

Write a function that implements count_nodes; this function receives an expression and returns the number of nodes in the expression.