CMSC 104 Section 2
Sample Quiz 3
Fall 2025

Section 1 - Multiple Choice and True/False - 32 points

8 questions; 4 points each. No partial credit

1. True or False: every loop in Python that can be written as a "for i" loop can also be written as a "while" loop, but the opposite is not true.
    a. True
    b. False

2. True or False: the following is a valid "if-else' construction:
   ```
   if x< 6:
    else:
       print("x was greater than 5")
   ```

    a. True
    b. False

3. What's a sentinel while loop?
    a. A loop that continues executing until the user enters the word "sentinel"
    b. There's no such thing
    c. A loop that executes until it sees a pre-defined value. This pre-defined value is called the "sentinel"
    d. All of the above are correct

4. What is "inheritance" with respect to object-oriented programming?
    a. When an object of a sub-class can also execute all the methods of its parent class
    b. When grandma gives you so much money that you can drop out of school and never work again
    c. When an object of a class can also execute all the methods defined for all of its sub-classes
    d. None of the above is correct

5. True or False; a "for each" loop was developed for those cases when you want to loop through each element of a list, one time each without skipping any, and do something.
    a. True
    b. False

6. What is the best way to develop software?
    a. Write a little; test a little. Like, write a function and test it. Then move on to the next function.
    b. Write the whole darned thing and hope like heck it works when you test it.
    c. Don't be ridiculous; the answer is a.
    d. I'm serious; just choose a.

7. Infinite loops Which of the following are reasons why a Python "while" loop may turn out to be an infinite loop?
    a. The boolean expression you use can never be False
    b. The boolean expression you use can never be True
    c. You change a variable in the boolean expression every time you loop.
    d. All of the above can cause infinite loops.

8. File read-write True/False: if you open a file for writing in Python (mode "w") and the file does not exist, Python will create a new empty file for you. But if you open a file for reading (mode "r") and the file does not exist, your program will crash
    a. True
    b. False

Section 2 - Short Answer - 48 points

8 questions, 6 points each. Partial Credit

For questions 9 and 10, use the following list definition:

```
states = ["Alabama", "Alaska", "Arizona", "Arkansas", "California", "Colorado",
"Connecticut",
        "Delaware", "Florida", "Georgia", "Hawaii", "Idaho", "Illinois",
"Indiana", "Iowa", "Kansas",
        "Kentucky", "Louisiana", "Maine","Maryland", "Massachusetts",
"Michigan", "Minnesota", "Mississippi", "Missouri",
        "Montana", "Nebraska", "Nevada", "New Hampshire", "New Jersey", "New
Mexico", "New York",
        "North Carolina", "North Dakota", "Ohio", "Oklahoma", "Oregon",
"Pennsylvania", "Rhode Island",
        "South Carolina", "South Dakota", "Tennessee", "Texas", "Utah",
"Vermont", "Virginia",
```

```
        "Washington", "West Virginia", "Wisconsin", "Wyoming"]
```

9. We can print out all the states that end with the letter "a" as follows:

```
        for state in states:
            if state[-1] == "a":
                print(state)
```

Rewrite this "for each" loop as a "while" loop that does the same thing - that is, prints out each state whose name ends with "a"

10. Now write a while loop that prints out each state between "Maine" and "New Jersey", inclusive.

11. What is the "constructor method" in a class definition for? That is,

```
    def __init__ (self,...)
```

12. Suppose we have the following class and subclass definition:

```
class Person:
    """Represents a general person."""

    def __init__(self, name, age):
        self.name = name
        self.age = age

    def introduce(self):
        """Print a short introduction."""
        print(f"Hi, my name is {self.name} and I am {self.age} years
old.")

# Another subclass
class Teacher(Person):
    """Represents a teacher, which is also a kind of person."""

    def __init__(self, name, age, subject):
        super().__init__(name, age)
        self.subject = subject
```

```python
    def teach(self):
        """Describe what the teacher teaches."""
        print(f"{self.name} is teaching {self.subject}.")
```

Suppose we assign
```python
mike = Teacher("Michael", 35, "CMSC201")
```

What does
```python
    mike.introduce()
```
Result in? Why?

13. It's bad programming, but you can write Python code using an if and an elif without a corresponding else. That is, the following is syntactically legal Python:
```python
age = int(input("Enter the person's age"))
if age > 21:
    print("this person is an adult")
elif age >18:
    print("this person is not a minor")
```

What happens if both the if and elif fail? That is, what happens if the user enters 16 for the age?

14. Explain why the following code results in an infinite loop:
```python
i = 5
while i%4 != 2:
    print("The next number is", i)
    i = i + 2
```

15. Suppose we have the following Python code:
```python
name = input("enter the next name; enter 'q' to quit")
while name.lower() != 'q':
    print("The next name is", name)
    name = input("enter the next name; enter 'q' to quit")
```

Explain why this is a "sentinel loop" and identify the sentinel value.

16. Suppose we have the following string:
```python
city = "Escondido, California"
```

How could you print out just the state name from this string?

Section 3 - Coding - 20 points

2 questions, 10 points each. Partial Credit.

17. Write a program that asks the user for an integer. If the integer is divisible by 3, print "That's a multiple of 3." If the integer is even, print "Hey, that's an even number." Otherwise print "This just might be prime."

18. Write a program that prompts the user for an integer between 20 and 30, inclusive. Read in the number. Use a while loop to implement the following logic:
- Print the number
- If the number is even, divide by 2
- If the number is odd, add 1
- Either way, print the number that results from your operation above
- Stop when the number is equal to 1