Practice Final Exam - CS 261

Here are questions similar to what will be on the final exam. You won't be able to use any outside material during the final exam (no notes, computers, etc.) so see how much you can answer without looking things up. Be sure to study any Python rules and terminology that you don't know.

1. What is the difference between `"True"` and `True` in Python?

2. Name three different sequence types. Describe how they differ.

3. Which of the following is a list method?

   A. `.items()`

   B. `.keys()`

   C. `len()`

   D. `.append()`

   E. `.length()`

4. What is the difference between a for-loop and a while-loop?

5. Write a function `near_and_far()` that accepts three ints `a`, `b`, and `c` as arguments. Return `True` if one of `b` or `c` is “close” to `a` (differing from `a` by at most 1), while the other is “far”, differing from `a` by 2 or more. Hint: you can use the `abs()` function to find the absolute value of any number.

6. Consider the following recursive function

```
def next_num(n):
    if n == 1:
        return 2
    elif n == 2:
        return 3
    else:
        return next_num(n-1) * next_num(n-2)
```

Calculate the values `next_num(3)`, `next_num(4)`, and `next_num(5)`.

7. Write a function called `separate(nums)` that inputs a list of integers and returns a tuple containing two lists, one containing the even elements in `nums` and the other containing the odd elements.

8. Suppose that Bob writes a program called `bob.py` that contains the following code:

```
-- bob.py ------------------------
print("What’s my name?")

if __name__ == "__main__":
    print("My name is __main__.")
elif __name__ == "bob":
    print("My name is bob.")
else:
    print("I don’t know my name.")
----------------------------------
```

If Alice creates a program called `alice.py` that contains the following single import statement and is in the same folder as `bob.py`, then what will happen when Alice runs her program?

```
-- alice.py ----------------------
import bob
----------------------------------
```

9. Describe at least three differences between dictionaries and lists.

10. What will the following code print?

```
def f(a, b):
    a += 1
    b.append(1)

a = 5
b = []
f(a, b)
print(a)
print(b)
```

11. Consider the following class.

```
class Mystery:
    def __init__(self, x, y, z):
        self.data = [x, y, z]
    def method1(self):
        self.data[0] += 2
        self.data[1] += 1
    def method2(n):
        return Mystery(n, 2*n, 3*n)
    def __str__(self):
        return f"Mystery({self.data[0]},{self.data[1]},{self.data[2]})"
```

(a) What will the following code print?

```
a = Mystery(1,2,3)
a.method1()
print(a)
```

(b) What will the following code print?

```
b = Mystery(4,5,6)
print(b.method1())
```

(c) How would you call `method2` if you wanted `n` to be 5?