

## COSC 1336 Homework 6

Relevant reading: Chapter 8

**Due: Nov. 15, 2:30 pm**

(Late date: Nov. 27, 2:30 pm (note unusual late date due to Thanksgiving))

50 Points

**Problem 1. [8 points]** For each, choose the best answer.

1. Which of the following is false?
  - a. The elements in a list do not necessarily store the same value.
  - b. The elements in a list do not necessarily store the same type.
  - c. The first element in a list has a index (or subscript) of 1 (one).
  - d. The first element in a list has a index (or subscript) of 0 (zero).
2. Elements in a list are identified by a unique \_\_\_\_\_.
  - a. initial value
  - b. data type
  - c. index
  - d. symbol
3. When the `*` operator's left operand is a list and its right operand is an integer, the operator becomes
  - a. the multiplication operator.
  - b. the repetition operator.
  - c. the initialization operator.
  - d. nothing – the operator does not support those types of operands.
4. Which of the following statements creates a five-element list named `population` with elements that all have the value zero?
  - a. `population = [0] * 4`
  - b. `population = [0] * 5`
  - c. `population = 0 * 4`
  - d. `population = 0 * 5`
5. This will happen if you try to use an index that is out of range for a list.
  - a. A `ValueError` error will occur.
  - b. A `IndexError` error will occur.
  - c. The list will be erased and the program will continue to run.
  - d. Nothing – the invalid index will be ignored.
6. If list variable `a = [1,2,3]`, what happens if the line `print(a[-1])` is executed?
  - a. Nothing is displayed and the program continues.
  - b. The last element of `a` (3) is displayed.
  - c. The data in memory just before the list variable is displayed.
  - d. An error occurs because the index is out of range.
7. If list variable `b` is created with the instruction `b = [3,4,5]`, which of the following shows `b` after the instruction `b += [7, 8]` is executed?
  - a. `[3,4,5]`
  - b. `[3,4,5,7, 8]`
  - c. `[3,4,5,6,7, 8]`
  - d. `[[3,4,5],[7, 8]]`

8. If the list variable `c` is created with the instruction `c = ["this", 14, False]`, which of the following shows `c` after the instruction `c[2] = 8.0` is executed?
- `["this", 8.0, False]`
  - `["this", 14, 8.0]`
  - `["this", 14, False, 8.0]`
  - None of the above. The statement is invalid and results in an error.

**Problem 2. [5 points]** The following questions all refer to the `sales` list created here:

```
sales = [10000, 12000, 900, 500, 20000]
```

- The statement `sales[3] = sales[3] + 10` will replace the number
  - 500 with 10.
  - 500 with 510.
  - 900 with 10.
  - 900 with 910.
- The statement `sales[4] = sales[4 - 2]` will replace the number
  - 20000 with 900.
  - 20000 with 19998.
  - 500 with 12000.
  - 500 with 498.
- Which of the following `if` clauses can be used to verify that the subscript stored in the variable `i` is valid for the `sales` list?
  - `if sales[i] >= 0 and sales[i] < 4:`
  - `if sales[i] >= 0 and sales[i] <= 4:`
  - `if i >= 0 and i < 4:`
  - `if i >= 0 and i <= 4:`
- Which of the following `if` clauses can be used to verify that the third element of the `sales` list is in the range 1000-2000?
  - `if 1000 <= sales <= 2000:`
  - `if 1000 <= sales[2] <= 2000:`
  - `if 1000 <= sales[3] <= 2000:`
  - `if 1000 <= sales[4] <= 2000:`
- Which of the following will correctly add the number 100 to each element in the `sales` list? The `i` variable was created using the statement `i = 0`.
  - ```
while i <= 4:
    i += 100
```
  - ```
while i <= 4:
    sales = sales + 100;
    i += 1;
```
  - ```
while sales < 5:
    sales[i] = sales[i] + 100
```
  - ```
while i <= 4:
    sales[i] = sales[i] + 100
    i += 1
```

**Problem 3. [20 points] Short answer**

1. Answer the following questions about the `numbers` list. If a statement would result in an error, describe the error.

```
numbers = [10, 20, 30, 40, 50]
```

- How many elements of the list have?
- Give two indices that will access the last element of the list.
- What value is stored in `numbers[2]`?

- d. What value is stored in `numbers[len(numbers)]`?
  - e. What value is stored in `numbers[len(numbers)-1]`?
  - f. What does the statement `print(numbers[1:3])` display?
  - g. After the previous statement is executed, what will `print(numbers)` display?
2. Write a statement that creates a list named `nums` that has 15 elements, all of which are zero. Then write two different statements that stores the value 11 in the last element in the list, one that uses the `len` function, and one that does not.
  3. Write the statement to create a list named `ratios` that has six elements: 0.8, 0.75, 0.2, 0.99, 0.0, and 1.0. Write two Python `for` loops that display each element of the list. One should use an index variable and one should not.
  4. Write Python code to find and display the largest number stored in the `ratios` list from the last problem. Write your code so that it would still work if the `ratios` variable were initialized differently (meaning either the values are different or the number of values is different).

**Problem 4. [8 points]** Consider the following Python code.

```
a = [5, 2, 4, 1, 7]
x = a[0]
for i in range(len(a)-1):
    a[i] = a[i+1]
a[-1] = x
```

- a. **[6 points]** Do a desk check that shows what happens when this code is executed. Your desk check should show the values of `i` and corresponding contents of `a`. You might consider re-writing `a` for each value of `i` instead of scribbling over the values to make it easier to read. Be sure the final contents of `a` are clear.
- b. **[2 points]** Describe (briefly) what the code does to the list.

**Problem 5. [4 points]** Write a function called `average_first_and_last` which receives a list and returns the average of the first and last elements in the array.

**Problem 6. [5 points]** Write a function called `list_times_two` that receives a list and replaces each element of the list with twice the original value.