CS 140 Final Exam Review Problems

This is a **cumulative** final exam, so please review all of the practice problems as well as your quizzes and exam. There is some material that you haven't been tested on yet (images, strings, and lists), so most of the following practice problems are focused on those topics.

1. Write a function **`increase_red`** that takes an image as an argument and increases the red in the image by 10%. Write a complete Python program that class **`increase_red`** and displays the resulting image. Use any image in the gallery as an example.

2. Write a Python program that opens a pygame window and draws a random colored circle of radius 10 wherever the user clicks the mouse button (the click should be the center of the circle). The name of the event for a mouse click is MOUSEBUTTONDOWN. The program should also quit when the user clicks the X in the upper left of the pygame window.

3. List practice
    a. What are the two ways to add something to a list? How are they different?
    b. What are the two ways to remove something from a list? How are they different?
    c. What is the difference between a list and a tuple?
    d. In the Python shell, do the following:
        i. Define a variable named **`states`** that is an empty list
        ii. Add **`Iowa`** to the list
        iii. Now add **`Nebraska`** to the end of the list
        iv. Define a variable **`states2`** that is initialized with **`New York`**, **`Vermont`**, and **`New Hampshire`**
        v. Add **`Maine`** to the beginning of the list
        vi. Add **`Massachusetts`** so that it is the third state in the list
        vii. Add **`Pennsylvania`** to the list so that it appears before **`New York`**. Do this as if you DO NOT KNOW where **`New York`** is in the list
        HINT: See what **`states2.index("New York")`** does. What can you conclude about what **`listname.index(item)`** does?
        viii. Remove the 5th state from the list and print that state's name

4. Write a short Python code segment that adds up the lengths of all the words in a list and then prints the average (mean) length. Use the final list from Problem 3 to test your program.

5. Write a short Python code segment that prints the longest word in a list. Again, use your final list from Problem 3 to test your program.

6. Write a program that creates a list of all the integers less than 100 that are multiples of 3 or 5.

7. Define two variables **`first`** and **`second`** so that **`first = "Jim"`** and **`second = "Dwight"`**. Write a short Python code segment that swaps the values assigned to these two variables and prints the results.

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8. Errors
    a. Does the program below have an error? If so, why?

```
t = (1, 'a', 9.2)
t[0] = 6
```

    b. Does the program below have an error? If so, why?

```
t = [1, 'a', 9.2]
t[0] = 6
```

    c. Does the program below have an error? If so, why?

```
t = [1, 'a', 9.2]
t[4] = 6
```

    d. Does the program below have an error? If so, why?

```
t = 'hello'
t[0] = 'H'
```

    e. Assuming words is a valid list of words, the program below tries to print the list in reverse. Does it have an error? If so, why? (Hint: there are two problems with the code.)

```
for i in range(len(words), 0, -1):
    print words[i],
```

9. Again, make sure you review the material that was covered on the midterm exam!