Homework #3 - Make a Magic 8 Ball Program

For this assignment, you will be writing a *Magic8Ball* class with the following:

- **A constructor (*__init__*) method**: The constructor will initialize a new ***Magic8Ball*** object from the passed list of all possible answers (`answer_set`).
    - Set ***answer_list*** to `answer_set` (the argument of the method).
    - Set ***question_history_list*** to an empty list. This will hold all the questions that have been asked.
    - Set ***answer_history_list*** to an empty list. This will hold the indices of all of the answers that have been generated.
- ***__str__*** **method**: It should return a string with all of the answers in ***answer_list*** separated by commas.
- ***get_random_answer*** **method**: This method randomly picks an answer from the ***answer_list***. It first randomly chooses an index and appends that index to the ***answer_history_list***. Then it returns the answer at the randomly picked index from ***answer_list***.
- ***shake*** **method**: The method takes a question and first checks if the question is already in the ***question_history_list***. If so, it returns a string, `"I've already answered that question"` Otherwise, it adds the question to the ***question_history_list*** and returns the answer from ***get_random_answer***.
- ***print_question_history*** **method**: If there are no items in the ***answer_history_list***, it prints `"None yet"`. Otherwise, the method prints `"[answer index] question - answer"` for each of the indices in the ***answer_history_list***, each on a separate line.
- ***main()*** **function**: Loops until the user types `"quit"` getting a question from the user, calls the ***shake*** method, and prints the question and response from ***shake*** as "*question - answer*" as shown below.

```
Ask a question or type quit: Should I eat salad today?
Should I eat salad today? - Definitely
Ask a question or type quit: quit
```

- Example Output From HW3.py

Sample output from the main method:

```
Ask a question or type quit: Should I have pizza today?
Should I have pizza today? - Definitely
Ask a question or type quit: Should I have salad today?
Should I have salad today? - Cannot predict now
Ask a question or type quit: Should I have salad today?
Should I have salad today? - I've already answered that question
Ask a question or type quit: Will it rain today?
Will it rain today? - Most likely
Ask a question or type quit: quit
```

Sample output from the test method:

```
==============================
Testing Magic 8 Ball:
* Testing the __str__ method
['Definitely', 'Most likely', 'It is certain', 'Maybe', 'Cannot predict now', 'Very doubtful', "Don't count on it", 'No']

* Printing the history when no answers have been generated yet
None yet

* Asking the Question: Will I pass this semester?
Definitely

* Asking the Question: Should I study today?
Cannot predict now

* Asking the Question: Should I study today? (again)
I've already answered that question

* Asking the Question: Is SI 206 the best class ever?
Don't count on it

==============================
* Printing the history
[0] Will I pass this semester? - Definitely
[4] Should I study today? - Cannot predict now
[6] Is SI 206 the best class ever? - Don't count on it

* Testing answer_frequency method with 200 responses
Definitely: 29
Most likely: 24
It is certain: 26
Maybe: 26
Cannot predict now: 30
Very doubtful: 19
Don't count on it: 26
No: 20

The most common answer was neither affirmative nor negative.
```

NOTE: Your output will not look *exactly* like this because we are using *random* and can't predict what it will return.

Grading Rubric - Total of 60 points

- 5 points - the ***__init__*** method sets the object's ***answer_list*** correctly to the passed argument and sets both the object's ***question_history_list*** and ***answer_history_list*** to an empty list
- 5 points - the ***__str__*** method returns a string with all answers in ***answer_list*** separated by commas
    - Correct answers for a list `['Yes', 'No', 'Maybe']`:
        - "['Yes', 'No', 'Maybe']"
        - Yes, No, Maybe
        - Yes,No,Maybe
- 5 points - the ***shake*** method returns *"I've already answered that question"* if the question has already been asked
- 10 points - the ***shake*** method calls the ***get_random_answer*** method and returns the answer when the user asks a new question and adds the passed question to the ***question_history_list***.
- 10 points - the ***get_random_answer*** method returns a random answer and saves the index in the ***answer_history_list***
- 5 points - the **print_question_history** method prints `"None Yet"` when there are no items in ***answer_history_list***
- 10 points - ***print_question_history*** prints `"[index] Question - Answer"` for each of the questions in the ***question_history_list*** and ***answer_history_list*** in order and on a separate line.
- 10 points - the ***main()*** function loops until the user enters `"quit"` and each time asks the users for a question and prints the `"question - answer"`.

This grading rubric shows how you will gain points, but not all the ways you could lose points.

Extra Credit - 6 points

Create the ***answer_frequency*** method. It takes as an argument: n, an integer. The method implements the following:

(1) It calls get_random_answer an 'n' number of times and records the random answer in a list.

(2) It then prints the frequency of each answer in each line.

For example, it will print

```
Definitely: 27
Most likely: 32
It is certain: 25
   ... and so on.
```

(3) It prints whether the most common answer was "affirmative", "negative", or "neither affirmative nor negative".

Please feel free to use these predefined lists:

```
affirmative = ["Definitely", "Most likely", "It is certain"]
negative = ["Very doubtful", "Don't count on it", "No"]
```