CSCE 110: Programming I

Lab #8 (100 points)

Due: Sunday, October 23 by 11:59pm

1 Please make sure you understand the following.

> **For this assignment, you are only allowed to use what we have discussed during the last 8 weeks of class. If we haven't discussed it, you cannot use it in your program. Your programs must be composed of user-defined functions. If your program does not have user-defined functions, you will receive a 0 for that program.**
>
> Please label your Python programs `q<num>.py`, where `<num>` is the question number. Take your time and make sure you understand everything in this lab before getting started. Also, make sure your programs match the output EXACTLY as given for each question.

2 Lab Questions

1. *Integer to English word.* Write a Python program (called q1.py) that, given an integer value, outputs a string with the equivalent English text of each digit. For example,

   - 4 is four,
   - 12 is one two, and
   - 8382 is eight three eight two.

   `q1.py` has been provided for you. In particular, the user interface in the `main()` function has been written for you. Your goal is to complete the `convert(number_str)` function, where `number_str` holds the number (stored as a string) to convert to the equivalent English text of each digit. See comments in the `q1.py` code.

Example. User input is shown on lines with the > symbol. On line 1, the user enters 4 and the computer outputs 'four' on line 2. Next, the user enters 12 (line 3) and the computer outputs 'one two' (line 4). For a user input of 8382 (line 5), the computer outputs 'eight three eight two' (line 6). A user input of 979 (line 7) returns 'nine seven nine' (line 8). A user input of 123459876 outputs 'one two three four five nine eight seven six'. Finally, the user types 'quit' (line 9) and the program terminates.

```
1  > 4
2  four
3  > 12
4  one two
5  > 8382
6  eight three eight two
7  > 979
8  nine seven nine
9  > 123459876
10 one two three four five nine eight seven six
11 > quit
```

Programming tips. If you used a lot of if-elif-else statements in your program, you can shorten your solution by using lists. That is, make sure to take advantage of a list such as

```
['zero', 'one', 'two', 'three', 'four', 'five', 'six', 'seven', 'eight', 'nine']
```

in your program.

2. *Integer to English word (Part 2).* Write a Python program (called q2.py) to convert an integer from 0 to 1,000 into its English word equivalent. That is, 4 is four, 181 is one hundred eighty one, etc.

Example. User input is shown on lines with the > symbol. On line 1, the user enters the number 4 and the computer outputs 'four' on line 2. Next, the user enters 181 (line 3) and the computer outputs 'one hundred eighty one' (line 4). For a user input of 1000 (line 5), the computer outputs 'one thousand' (line 6). On line 7, the user enters 773 and the computer outpus 'seven hundred seventy three' (line 8). Finally, the user types 'quit' (line 9) and the program terminates.

```
1  > 4
2  four
3  > 181
4  one hundred eighty one
5  > 1000
6  one thousand
7  > 773
8  seven hundred seventy three
9  > quit
```

3. *Four is magic.* Write a Python program (called q3.py) that given an integer from 0 to 1,000 does the "4 is magic" transformation. The steps are as follows.

   a) Convert the integer n into English and count the number of letters (i.e. 21 is "twenty one" and consists of 9 letters, 102 is "one hundred two" and consists of 13 letters, 1000 is "one thousand" and consists of 11 letters).

   b) Let n_{len} be the length of the English word equivalent for the integer n.

      i. If n_{len} is 4, output "four is magic." Then, terminate the transformation process.

      ii. Otherwise output "<English word equivalent of integer n> is <n_{len}>." Repeat step (a), where the integer n is set to n_{len}.

   Suppose the user inputs the integer 26. Then, the transformation proceeds as follows.

   - twenty six is 9. , where twenty six is the 9-letter English word equivalent of 26.

   - nine is 4. , where nine is the 4-letter English word equivalent of 9.

   - four is magic.

   Example. User input is shown on lines with the > symbol. On line 1, the user enters 26 and the computer outputs the results of the transformation process (lines 2–4). The user then enters 3 (line 5) and the program outputs the result of the transformation process (lines 6–8). The user enters 843 (line 9) and the resulting output is shown (lines 10–13). Finally, the user types quit (line 14) and the program terminates.

```
1   > 26
2   twenty six is 9.
3   nine is 4.
4   four is magic.
5   > 3
6   three is 5.
7   five is 4.
8   four is magic.
9   > 843
10  eight hundred forty three is 22.
11  twenty two is 9.
12  nine is 4.
13  four is magic.
14  > quit
```