Swift Assignment #1
Loops

CS275 Fall 2021
15 points
due Tuesday, Sept. 14th, 11:59 pm

1 Fizz Buzz

Fizz Buzz is a game that is used to teach division. Create a version of the game that works like this: for every value in a given range, print out FIZZ if the current number is evenly divisible by 3. If the number is evenly divisible by 5, then print out BUZZ. If the number is evenly divisible by both 3 and 5, then print out FIZZ BUZZ. If the number is not divisible by 3 or 5, then simply print out the number.

For example, over the range 1 through 16, the output should be:

```
1, 2, FIZZ, 4, BUZZ, FIZZ, 7, 8, FIZZ, BUZZ, 11, FIZZ, 13, 14, FIZZ BUZZ, 16
Done.
```

Do this for the numbers 1...50. Format your output exactly as shown above: all on one line, with commas, and with a newline character at the end and a second line that has just `Done.` Note that there should be no comma between FIZZ and BUZZ for numbers that are divisible by both 3 and 5, and there should be no comma at the end of the first line.

2 Geometric Patterns

2.1 First Pattern

Use nested for-loops to print out this exact pattern:

```
    X
   X-X
  X---X
 X-----X
X-------X
 X-----X
  X---X
   X-X
    X
```

It's OK to use hard-coded values for the loop bounds. But do not put any print statements either before or after your outside for-loop.

2.2   A Chessboard

Use nested for-loops to print out this exact pattern (an ugly ASCII checkers/chessboard!):

```
+-+-+-+-+-+-+-+-+
| |X| |X| |X| |X|
+-+-+-+-+-+-+-+-+
|X| |X| |X| |X| |
+-+-+-+-+-+-+-+-+
| |X| |X| |X| |X|
+-+-+-+-+-+-+-+-+
|X| |X| |X| |X| |
+-+-+-+-+-+-+-+-+
| |X| |X| |X| |X|
+-+-+-+-+-+-+-+-+
|X| |X| |X| |X| |
+-+-+-+-+-+-+-+-+
| |X| |X| |X| |X|
+-+-+-+-+-+-+-+-+
|X| |X| |X| |X| |
+-+-+-+-+-+-+-+-+
```

Here, it's OK to print before and after the outside for loop if you'd like.

3   Graduate Students

Students taking the course for graduate credit, and undergraduates for a little extra credit: use the Babylonian Method for computing the square root. Pick $x = 100$ and let $s_{i+1} = (s_i + \frac{x}{s_i})/2$. Pick $s_0 = x/2$, and continue the iteration until $|s_i^2 - x| < tol \times x$, where $tol = 1 \times 10^{-8}$.

After each iteration, print the value of s_i and print $|s_i^2 - x|/x$.

Note: it makes a great story to say that the Babylonians invented this method, but unfortunately there's no proof of this. It is true though that a Greek mathematician named Hero of Alexandria described this in the year 60 CE. The method is equivalent to using Newton's method to solve the nonlinear equation $x^2 - s = 0$.

4   What to Submit

Work alone to do all of these.

Do all of these in a single Xcode Playground. Submit just your Swift file. You can see your .swift file in your Playground directory, with the name `Contents.swift`. Rename it `assignment-one.netid.swift`, using your netid.