Bonus Project: Cows and Bulls

Specifications: Create a program that will play the "cows and bulls" game with the user. The game works like this:
1. Randomly generate a 4-digit number.
2. Ask the user to guess a 4-digit number.
3. For every digit that the user guessed correctly *in the correct place*, they have a "cow".
4. For every digit the user guessed correctly *in the wrong place* is a "bull." Every time the user makes a guess, tell them how many "cows" and "bulls" they have.
5. Once the user guesses the correct number, the game is over. Keep track of the number of guesses the user makes throughout the game and tell the user at the end.

For example, say the number generated by the computer is 7903. An interaction could look like this:

```
Welcome to the cows and bulls game!
Guess a 4-digit number or type exit to leave: 0124
You have 0 cows and 1 bulls.
Try again!
Guess a 4-digit number or type exit to leave: 7124
You have 1 cows and 0 bulls.
Try again!
Guess a 4-digit number or type exit to leave: 7034
You have 1 cows and 2 bulls.
Try again!
Guess a 4-digit number or type exit to leave: 7903
You have 4 cows and 0 bulls.
You won the game after 4 guesses.
```

Pseudo-Code

```
# initialize variables
import random library
set number to random 4-digit number, saved as a string
set playing to True
set guesses to 0

print welcome message

# start game loop
while playing is True:
        set user-input to user input of a 4-digit number
```

```
# exit game if user types exit
if the user-input is equal to “exit”:
        break the loop

# convert strings to lists
create empty list guess
create empty list answer
for each num in range(length of guess):
        append user-input at index num to guess
        append number at index num to answer

# initialize variables
set cows equal to 0
set bulls equal to 0

# find number of bulls
for each num in range(length of guess):
        if guess at index num is equal to answer at index num:
                add 1 to cows
                set guess at index num to a symbol (like “%”)
                set answer at index num to a different symbol (like “*”)

# find number of bulls
for each x in guess:
        set counter equal to 0
        for each y in answer:
                if the x and y are equal:
                        add 1 to bulls
                        set answer at index counter to same symbol (like “*”)
                        break the inner for-loop
                add 1 to the counter

# update guesses & give the user feedback
add 1 to the guesses
print out the number of cows and bulls

# decide whether to end or continue the game
if the number of is cows 4:
        set playing to False
        print out a message saying that they won the game with the number of
        guesses
else:
        print a message asking the user to try again
```