

CS21 Chapter 4 Lab

This lab is lengthy and you may not finish, therefore, we have broken it into incremental steps. If you run out of time, that's ok – you'll have some of the functionality complete.

1. Write a program that plays a guessing game with the user. The computer “picks” a number between 1 and 100. The user is given 5 tries to guess the number. You may not have time to finish this program, so proceed as follows, so you can leave with something that functions – even if it's not robust.

a) Write a program that generates a random number between 1 and 100. Use constants for 1 and 100. To generate a random number, you need to import the random module. This is done with the following statement:

```
import random
```

at the top of your program. Then, to generate a random number, use the randint function.

```
number = random.randint(LOW, HIGH)
```

At this point, your program should generate one number between 1 and 100. Run it a few times to convince yourself it is generated random numbers.

b) Now, allow the user to enter a single guess. Issue an appropriate message. At this point, I am still outputting the computer's random number so I know if my messages are correct (eventually we'll take this out).

A few sample runs:

```
Enter a guess: 50
Too high
13
>>>
Enter a guess: 50
Too low
73
>>>
Enter a guess: 50
Just right
50
>>>
```

c) Now put a loop in to continue to ask for guesses until they get it right, giving them a too high/ too low message each time. Here's a sample run:

```
>>>
Enter a guess: 50
Too high
Enter a guess: 25
Too low
Enter a guess: 35
Too high
Enter a guess: 30
Too low
Enter a guess: 32
Too high
Enter a guess: 31
31
>>>
```

d) Now, add a counter to let the user know how many guesses it took them to guess it:

```
>>>
Enter a guess: 50
Too high
Enter a guess: 25
Too high
Enter a guess: 15
Too low
Enter a guess: 20
20
It took 4 tries
>>>
```

e) Declare a constant `MAX_TRIES = 5`. Add a condition to your loop, to stop if they have guessed 5 times and it is not right. Take a look at these two program runs (note, in the 2nd run, the loop exits, even though the number wasn't guessed).

```
Enter a guess: 50
Too low
Enter a guess: 75
75
It took 2 tries
>>>
Enter a guess: 50
Too high
Enter a guess: 25
Too low
Enter a guess: 35
Too low
Enter a guess: 40
Too low
Enter a guess: 45
48
It took 5 tries
>>>
```

(note, in the last run, they didn't guess it, they exited the loop because they ran out of tries)

f) Add an if statement after your loop to let the user know why the program terminated (either they guessed it or they ran out of tries).

```
>>>
Enter a guess: 50
Too low
Enter a guess: 75
Too high
Enter a guess: 60
Too high
Enter a guess: 55
Too low
Enter a guess: 56
Sorry, you're out of tries. The number was 59
```

```
>>>
Enter a guess: 50
Too high
Enter a guess: 40
Too high
Enter a guess: 30
Too low
Enter a guess: 38
Congratulations! You guessed it in 4 tries
>>>
```

g) Still have time left? Allow the user to play multiple games.

```
>>>
I am thinking of a number between 1 and 100
You have 5 tries to guess it. Good luck!
Enter a guess between 1 and 100: 50
Too high
Enter a guess between 1 and 100: 25
Too low
Enter a guess between 1 and 100: 30
Too low
Enter a guess between 1 and 100: 40
Too high
Enter a guess between 1 and 100: 35
Sorry, you are out of tries! The number was 36
Play again? (Y or N)y
I am thinking of a number between 1 and 100
You have 5 tries to guess it. Good luck!
Enter a guess between 1 and 100: 50
Too low
Enter a guess between 1 and 100: 75
Too low
Enter a guess between 1 and 100: 85
Too low
Enter a guess between 1 and 100: 90
Too low
Enter a guess between 1 and 100: 95
Sorry, you are out of tries! The number was 100
Play again? (Y or N)n
>>>
```

h) still time left?

Validate each user's guess, ensuring it's between 1 and 100. Notice in the sample run that invalid guesses don't count against their 5 guess limit:

```
>>>
I am thinking of a number between 1 and 100
You have 5 tries to guess it. Good luck!
Enter a guess between 1 and 100: 50
Too low
Enter a guess between 1 and 100: 110
Invalid input
Enter a guess between 1 and 100: 75
Too high
Enter a guess between 1 and 100: 65
Too high
Enter a guess between 1 and 100: -10
Invalid input
Enter a guess between 1 and 100: 60
Too high
Enter a guess between 1 and 100: 55
Sorry, you are out of tries! The number was 59
Play again? (Y or N)n
>>>
```