

Coin Toss Game - Short Description

You will implement a coin toss game where two computer players each repeatedly toss a coin and try to match a human's call. The result - head or tail - of each toss is randomly generated by your program. In each *try*, first the human user “calls out” *head* or *tail*, then the coins are tossed. A computer player *wins* a try if its coin matches the call.

There are four tries in each *round*. After each round, your program provides feedback about which player won the whole round of four tries. Finally, your program asks the user if they want to play another round.

Learning Outcomes

- Practice basic programming skills
- Discover new language features
- Practice using iterative statements (*for* and *while* loops)
- Practice using sequences (*lists* and *strings*)

Detailed Explanation and Things To Do

- Design and write code for a program that implements the Coin Toss Game, as described in more detail below. Each coin flip should be chosen randomly from a sequence of Head and Tail maintained by the program.
- Your code must implement the major logical tasks, such as displaying instructions, interacting with the user through input statements, running the main game loop and tracking game statistics which are updated after all rounds are done.
- It is recommended that you build the coin toss game incrementally, in four versions, by following the guidelines provided below.
- Make sure you are following the applicable code quality standards outlined in the [Software Quality Tests](#). Ignore the requirements relating to functions and having a main function - none of those are needed in this exercise.
- To create this game, you may need to use a few programming language features that have not been used yet in class. Discovering new language features and how to use them is an integral part of problem-solving in computing science and an essential skill that you should learn. Think about what you need to do, search the web for Python 3

programming examples, and/or use the Python documentation to help you find the programming constructs that you need. If you get stuck, ask your TA for help/hints about the programming constructs you need to use.

Resources

- Instructions for the game should be loaded from the file [instructions.txt](#)
- Refer to the guidelines below for how versions 1 - 4 of the Coin Toss Game should function.

Version 1

Write a program that tosses a coin randomly for two players. If a player's coin matches what was called out by the user, it is a win for that player. One round of the game consists of four tries. In each try, the user enters the call for this try, and the two computer players each toss a coin. *The letter entered by the caller is not case sensitive i.e. if the caller enters a lower case letter (h or t) instead of an uppercase letter (H or T) the program converts the letter into uppercase. You may assume that the caller never enters a letter other than upper/lower case H or upper/lower case T. **This statement applies to all four versions of the lab.***

Your program should:

- Display the instructions for the game before the player begins playing. Instructions should be read from the `instructions.txt` file.
- Prompt the user to enter the call
- Randomly generate H (Head) or T (Tail) for each computer player.
- Provide feedback after every toss by showing what each player has tossed and if they won.
- Follow the formatting shown in the sample run.

Sample run 1 of Version 1:

```
Welcome to the Coin Toss Game!
This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >H
Player 1 has tossed T
Player 2 has tossed H
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 has tossed H
Player 2 has tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 has tossed H
```

```
Player 2 has tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 has tossed H
Player 2 has tossed H
ROUND STATS
Player 2 wins this round
```

Sample run 2 of Version 1:

```
Welcome to the Coin Toss Game!
This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >h
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >t
Player 1 tossed H
Player 2 tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed H
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed H
ROUND STATS
Player 2 wins this round
```

Version 2

Modify your program so that in addition to all it currently does, it tracks the total number of wins that each player has achieved in the round. At the end of the round, the program should display which player won the round and how many wins did each player get. If the number of wins of both players is equal, it is a tie.

Sample run of Version 2 (the difference between this version and the previous version is formatted in bold. You do not need to reflect this formatting in the output):

```
This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed H
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed H
ROUND STATS
Player 2 wins this round
Player 1 points 1
Player 2 points 3
```

Version 3

Modify your program so that in addition to all it currently does, it tracks the sequence of Head and Tail tosses for each player. The program should also search how often the sequence H H occurred within each player's sequence.

Sample run of Version 3 (the difference between this version and the previous version is formatted in bold. You do not need to reflect this formatting in the output):

```

This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed H
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed H
ROUND STATS
Player 2 wins this round
Player 1 points 1
Player 2 points 3
Player 1 tossed ['T', 'H', 'H', 'H']
Player 2 tossed ['H', 'T', 'H', 'H']
H H found in the player 1 sequence 2 times
H H found in the player 2 sequence 1 times

```

Version 4

Enhance your program so that the user can play **multiple rounds**. At the end of a round, the program should ask if the user wants to play again.

Summary statistics should be displayed **only after the user decides to quit the game**. These statistics are only displayed once, at the end. The statistics should show the overall results of all rounds played in the current run of the program, as follows:

- *Number of ties*
- *Number of wins for player 1*
- *Number of wins for player 2*

If the player enters lower case y or upper case Y the game restarts. If the player enters any letter other than 'y' or 'Y' the program terminates.

Sample run of Version 4 - user quits after 1 round (the difference between this version and the previous version is formatted in bold. You do not need to reflect this formatting in the output):

```
This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed H
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed H
ROUND STATS
Player 2 wins this round
Player 1 points 1
Player 2 points 3
Player 1 tossed ['T', 'H', 'H', 'H']
Player 2 tossed ['H', 'T', 'H', 'H']
H H found in the player 1 sequence 2 times
H H found in the player 2 sequence 1 times
Do you want to play another round? y/n >n
SUMMARY STATS
number of ties 0
number of player 1 wins 0
number of player 2 wins 1
```

Long sample run of Version 4 (user quits after three rounds):

```
This is a simple game where two computer players toss a coin.
In each round, each player gets 4 tries to toss a coin.
After the last try, "ROUND STATS" show how well each player did in
that round!
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed T
Player 1 wins
Heads or Tails ? Type H or T >T
Player 1 tossed T
Player 2 tossed H
Player 1 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
ROUND STATS
Player 1 wins this round
Player 1 points 4
Player 2 points 2
Player 1 tossed ['H', 'T', 'H', 'H']
Player 2 tossed ['T', 'H', 'H', 'H']
H H found in the player 1 sequence 1 times
H H found in the player 2 sequence 2 times
Do you want to play another round? y/n >Y
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >T
Player 1 tossed H
Player 2 tossed T
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed T
```

```
Player 1 wins
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed H
Player 2 wins
ROUND STATS
Player 2 wins this round
Player 1 points 2
Player 2 points 3
Player 1 tossed ['H', 'H', 'H', 'T']
Player 2 tossed ['H', 'T', 'T', 'H']
H H found in the player 1 sequence 2 times
H H found in the player 2 sequence 0 times
Do you want to play another round? y/n >Y
Heads or Tails ? Type H or T >H
Player 1 tossed T
Player 2 tossed T
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed H
Player 1 wins
Player 2 wins
Heads or Tails ? Type H or T >H
Player 1 tossed H
Player 2 tossed T
Player 1 wins
Heads or Tails ? Type H or T >T
Player 1 tossed T
Player 2 tossed T
Player 1 wins
Player 2 wins
ROUND STATS
Player 1 wins this round
Player 1 points 3
Player 2 points 2
Player 1 tossed ['T', 'H', 'H', 'T']
Player 2 tossed ['T', 'H', 'T', 'T']
H H found in the player 1 sequence 1 times
H H found in the player 2 sequence 0 times
Do you want to play another round? y/n >N
SUMMARY STATS
number of ties 0
number of player 1 wins 2
number of player 2 wins 1
```


Submission Information

- You are required to submit the solution for this lab exercise by the due date provided. For submission purposes, the file with your code should be named:

`coin_toss.py`