

Rock, Wall, Paper, Scissors Program

Write a program that lets the user play the game of Rock, Paper, Scissors against the computer. When two people play, each person pumps an arm up and down three times in unison while counting to three (“1”, “2”, “3”) out loud. On “3”, both players independently shape their hand to resemble either:



rock



paper



scissors

The winner is determined by the following rules:

“Rock smashes scissors”	If one player chooses rock and the other player chooses scissors, then the player with rock wins.
“Scissors cut paper”	If one player chooses scissors and the other player chooses paper, then the player with scissors wins.
“Paper covers rock”	If one player chooses paper and the other player chooses rock, then the player with paper wins.

If both players make the same choice, the process is repeated until there is a clear winner.

On the computer, we’ll need to substitute the text “rock”, “paper”, or “scissors” for the hand gestures. Your program should allow a human player to play rock-paper-scissors against the computer repeatedly. After each game, prompt the user with a question like: “Do you want to play again (Y/N)?”. When they ultimately quit, your program should output the following statistics:

- the number of times the human player won
- the number of times that the computer won
- the percentage of times that the computer won
- the average number of “gestures” needed to determine a winner overall

For each game the general algorithm you’ll need to follow is:

1. Have your program randomly chose one of the strings “rock”, “paper”, or “scissors” by using the rand() function to generate a random number 0 for “rock”, 1 for “paper”, and 2 for “scissors”. Don’t display the computer’s choice yet.
2. Prompt the user to enter their choice of “rock”, “paper”, or “scissors” at the keyboard
3. Display the computer’s choice and declare a winner based on the above rules.

ADDITIONAL REQUIREMENTS:

Before you start writing your program, I want you to actually design your program. Split your program up into well-defined functions by doing a top-down design and developing a structure chart.

When you write your program, be sure to use:

- meaningful variable names with good style (i.e., useCamelCase or use_underscores)
- comments at the start of the program **and** before the definition of each function which describing what task it performs (not how they perform their task).
- a main function located at the “top” of program since it is the outline of the program
- global constants where appropriate with good style (ALL_CAPS_AND_UNDERSCORES).

Save your program in a file called `rockPaperScissors.cpp` in a subdirectory/folder called `hw4`.

Submit a single file, `hw4.zip` containing the following:

- **`rockPaperScissors.cpp`** (your C++ program)
- **`out.txt`** script file demonstrating the features of your program as it runs (recall the UNIX/Linux command “`script out.txt`” starts capturing everything that goes across the screen, then run the program, and finally `Ctrl-d` stops the script)
- **`design.doc`** (or `design.pdf`, or `design.txt`, or `design.rtf`) a document describing the design of your program including a **structure chart showing which functions call each other with parameters and returned values shown**, and a sentence or two describing each function.

The steps for the homework submission system are:

1. Design, write, debug, and test your program in a new `hw4` subdirectory on `student.cs.uni.edu`. When you are ready to submit your homework, copy it back to your computer using FileZilla (or WinSCP) program, zip the whole `hw4` folder on your computer by right-clicking on it and selecting `Send to | Compressed (zipped) folder`. This will create a new file called `hw4.zip` which you will submit electronically. (This assumes Windows OS....)
 2. Log on to the submission system at: https://www.cs.uni.edu/~schafer/submit/which_course.cgi
(It is very likely that you will get some security certificate warnings when trying to use this. You may add an exception and accept the existing security certificate.) Use the same CatID user-name and password you use to log on the lab computers.
 3. Select the course and section number of "CS 1160, C/C++ Programming, Fienup". Click the "Continue".
 4. Select the homework that you wish to submit: "HW 4: Rock, Paper, Scissors". Click the "Continue" button.
 5. Specify how many extra files you want to submit. Just leave it at 0. Click the "Continue" button.
 6. Upload your program by Browsing and selecting your `hw4.zip` file. Click the "Continue" button.
 7. The next page reports on the status of the upload(s). You can always continue to upload a better version of the program until the deadline. The newer file will replace an older file of the same name.
- (If you miss the deadline, you'll need to submit it as above, but select “Late Homeworks” in step 4 above.)