

Homework #4 Introduction to Computing

Due: Oct 10, 2009 (Saturday at 11:59 PM)

Rock, 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 for a game

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” for the computer’s choice. You can do this by associating a number with each string (e.g., 0 is “rock”, 1 is “paper”, and 2 is “scissors”) and generating a random number between 0 and 2. Don’t display the computer’s choice yet.
2. Prompt the user to enter their choice of “rock”, “paper”, or “scissors” with a menu. Validate the input from the user to make sure that it is a valid choice.
3. Display the computer’s choice and declare a winner based on the above rules. If both players make the same choice, the process is repeated until there is a clear winner for the game.

Be sure to divide the program into functions that perform each major task.

When you write your program, be sure to use general conventions of good style:

- use meaningful variable names with good style, i.e., use CamelCase (or use underscores) (I like to declare them one per line with a following comment if necessary)
- use meaningful named constants (e.g, PI, STATE_SALES_TAX) where appropriate with good style (ALL_CAPS_AND_UNDERSCORES). Put your global constants where they can be found and changed easily in future versions of your program, e.g, after your initial comments describing the program and before your main function definition.
- use comments at the start of the program, before each function, and before any especially difficult section of code to understand (I like to label the closing set bracket, '}', with some indication of what's being closed)
- place the `main` function near the top of the program with user-defined functions below it
- use *white space* (spaces, indentation, blank lines) to make you program more readable by:
 - aligning the opening set/curly brace, '{', with the corresponding closing '}' one (I like to put the '{' on the same line with the programming construct (e.g., main function definition) with the closing '}' aligned with the start of the construct)
 - indent all the lines inside a set of of braces
 - you blank lines to separate logical units of the code, e.g., between variable declarations and executable statements

Submit your homework electronically at http://math-cs.cns.uni.edu/~schafer/submit/which_course.cgi

The steps for the homework submission system are:

1. Zip your project folder, say hw4, by right-clicking on it and selecting Send To | Compressed Zipped Folder which will create a file called hw4.zip. This hw4.zip file is what you want to submit via the on-line submission system.
2. Log on to the submission system at: http://www.cs.uni.edu/~schafer/submit/which_course.cgi
Use the same AD-ITS User name and password you use to log on the lab computers.
3. Select the course and section number of "810:051, Intro to Computer, Fienup". Click the "Continue" button.
4. Select the homework that you wish to submit: "HW 4 Rock, Paper, Scissors Game". 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 the hw4.zip file containing your project by Browsing and selecting hw4.zip. Click the "Continue" button.
7. The next page reports on the status of the upload(s). You can always continue to upload a newer version until the deadline. A newer file of the same name will replacing the older one.