Rock-Paper-Scissors Game

In this lesson we will be implementing the logic for a **Rock-Paper-Scissors** game, in which the computer is one player and the user is the other player. After implementing the basic game logic, we will keep score for the user and the computer, and determine the overall winner when the game is finished.

Lesson plan:

1. Introduce the logic rules of the Rock-Paper-Scissors game:
    - Rock breaks Scissors (rock wins)
    - Scissors cuts Paper (scissors wins)
    - Paper covers Rock (paper wins)

    We can express the logic rules of the game for who wins using the following table:

		Computer	
User	**Rock**	**Paper**	**Scissors**
Rock	**Tie**	Computer	User
Paper	User	**Tie**	Computer
Scissors	Computer	User	**Tie**

2. For each round, the computer will randomly select one of three items (rock, paper or scissors). Then, the user will be prompted to enter his/her item, and the program will determine the winner for that round (or tie if both selected the same item)
3. This will exercise the students' understanding of lists, looping (including how to exit gracefully from the loop), conditional processing, type-casting (integer-to-string), string concatenation, counter initialization & incrementation, console I/O, and incremental development & testing.
4. Although there are nine possible logic combinations, three of them result in a tie, so one single conditional statement can handle all three of those cases.
5. Judicious use of copy-and-paste with minor edits will reduce the amount of typing needed
6. Time permitting, we can hold a contest among all of the students to see how many "wins" they can get within a 3-minute period (or whatever time makes sense).

The Basic Code

```
import random
while True:
  comp_choice = random.choice(["rock", "paper", "scissors"])
  player_choice = input("Enter rock, paper or scissors: ")
  if player_choice == comp_choice:
     print ("You tied")
  elif player_choice == "rock" and comp_choice == "paper":
     print ("you lost")
  elif player_choice == "rock" and comp_choice == "scissors":
     print ("you won")
  elif player_choice == "paper" and comp_choice == "rock":
     print ("you won")
  elif player_choice == "paper" and comp_choice == "scissors":
     print ("you lost")
  elif player_choice == "scissors" and comp_choice == "paper":
     print ("you won")
  elif player_choice == "scissors" and comp_choice == "rock":
     print ("you lost")
```

7. After getting the initial logic working, add some code to reject any invalid user input and gracefully exit from the loop (newly-added code appears in **red**):

```
  player_choice = input("Enter rock, paper or scissors, or enter 'quit' to exit: ")
  if player_choice == "quit":
     break
(all of the other IF statements)
  else:
     print ("invalid input -- try again")
```

8. Add counters (initialization and incrementation) for the number of user-wins and computer-wins, then print out final statistics after quitting the game

The Final Code

```
import random
player_score = 0
comp_score = 0
while True:
   comp_choice = random.choice(["rock", "paper", "scissors"])
   player_choice = input("Enter rock, paper or scissors, or enter 'quit' to
exit.")
   if player_choice == "quit":
      break
   elif player_choice == comp_choice:
      print ("You tied")
   elif player_choice == "rock" and comp_choice == "paper":
      print ("you lost")
```

```
        comp_score += 1
    elif player_choice == "rock" and comp_choice == "scissors":
        print ("you won")
        player_score += 1
    elif player_choice == "paper" and comp_choice == "rock":
        print ("you won")
        player_score += 1
    elif player_choice == "paper" and comp_choice == "scissors":
        print ("you lost")
        comp_score += 1
    elif player_choice == "scissors" and comp_choice == "paper":
      print ("you won")
      player_score += 1
  elif player_choice == "scissors" and comp_choice == "rock":
      print ("you lost")
      comp_score += 1
  else:
      print ("invalid input -- try again")
print ("The final score is:")
print ("  Computer: " + str(comp_score))
print ("  Player: " + str(player_score))
if player_score == comp_score:
   print ("It's a tie")
elif player_score > comp_score:
   print ("You are the winner -- humans rule!!")
elif player_score < comp_score:
   print ("You are the loser -- computers rule!!!")
```