Simple Game AI for Rock-Paper-Scissors

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Introduction

Rock-Paper-Scissors is a classic hand game played between two players, where each player simultaneously forms one of three shapes with their hand: Rock, Paper, or Scissors. The game follows these rules:

- Rock beats Scissors
- Scissors beats Paper
- Paper beats Rock

This report presents a Python-based AI that plays Rock-Paper-Scissors against a human player. The AI makes decisions using a simple random selection strategy or can be improved using a frequency-based prediction model to counter the player's moves.

Scope and Methodology

The AI for Rock-Paper-Scissors follows these steps:

1. The player selects an option: Rock, Paper, or Scissors.
2. The AI generates a response using a random choice or a prediction model.
3. The game determines the winner based on the rules.
4. The score is updated and displayed.
5. The game repeats until the player decides to stop.

The AI initially selects moves randomly but can be improved by analyzing the player's previous choices and adjusting its strategy accordingly.

Output

```python
import random  # Import the random module to generate AI's choice

def get_user_choice():
    """Get the player's choice of rock, paper, or scissors."""
    print("Enter your choice (rock, paper, or scissors):")  # Prompt the user to enter their choice
    user_choice = input().lower()  # Take input from the user and convert it to lowercase for consistency

    # Loop to ensure the user enters a valid choice
    while user_choice not in ["rock", "paper", "scissors"]:
        print("Invalid choice. Please choose rock, paper, or scissors:")  # Inform the user of an invalid choice
        user_choice = input().lower()  # Take the input again and convert it to lowercase

    return user_choice  # Return the valid user choice

def get_ai_choice():
    """AI randomly selects between rock, paper, or scissors."""  # Function docstring explaining its purpose
    return random.choice(["rock", "paper", "scissors"])  # AI randomly selects one option from the list

def determine_winner(user_choice, ai_choice):
    """Determine the winner of the game."""
    if user_choice == ai_choice:
        return "It's a tie!"
    elif (user_choice == "rock" and ai_choice == "scissors") or \
         (user_choice == "paper" and ai_choice == "rock") or \
         (user_choice == "scissors" and ai_choice == "paper"):
        return "You win!"
    else:
        return "AI wins!"
```

```
def determine_winner(user_choice, ai_choice):
    """Determine the winner of the game."""  # Function docstring explaining its purpose

    if user_choice == ai_choice:  # Check if both choices are the same
        return "It's a tie!"  # If so, it's a tie

    # Check all conditions where the user wins
    elif(user_choice == "rock" and ai_choice == "scissors") or\
        (user_choice == "paper" and ai_choice == "rock") or\
        (user_choice == "scissors" and ai_choice == "paper"):
        return "You win!"  # Return a win message for the user

    else:  # If none of the above conditions are met, AI wins
        return "AI wins!"  # Return a win message for the AI

if name == "main":
    play_game() # Call the main function to start the game
```

Output/Result

(Sample Output)

```
Rock-Paper-Scissors AI Game
Enter Rock, Paper, or Scissors (or 'quit' to stop): rock
AI chose: paper
AI wins!
Enter Rock, Paper, or Scissors (or 'quit' to stop): scissors
AI chose: rock
AI wins!
Enter Rock, Paper, or Scissors (or 'quit' to stop): paper
AI chose: rock
You win!
Enter Rock, Paper, or Scissors (or 'quit' to stop): quit
Game Over!
```

(Insert screenshots of the program running here)

References/ Credits

- Python documentation for the `random` module.
- Game theory concepts related to Rock-Paper-Scissors.
- (Include any additional sources used)