Online Quiz System

Problem Statement

Educational institutions and online learning platforms often use quizzes to assess students' understanding of various subjects. An effective quiz system should allow users to answer multiple-choice questions, verify their answers, and provide instant feedback on their performance.

Your task is to develop a Python-based Online Quiz System that allows users to attempt a quiz, evaluate their responses, and display a final score at the end.

Objectives

The Online Quiz System should:

1. Store a set of multiple-choice questions in a question bank.
2. Allow users to select an answer for each question.
3. Verify the selected answer and update the user's score.
4. Display the final score at the end of the quiz.
5. Provide an option to restart the quiz, allowing users to retake the test if desired.

System Requirements

1. **Question Bank:** The system should contain a set of predefined questions with four multiple-choice options and a correct answer.

2. **User Interaction:** The user should be prompted to select an option (A, B, C, or D) for each

question.

3. **Score Calculation:** The system should compare the user's selected answer with the correct answer and keep track of the total score.

4. **Final Score Display:** At the end of the quiz, the system should show the user's score as a

percentage and provide feedback based on their performance.

5. **Restart Option:** The user should be given an option to retake the quiz if they want to improve their score.

Implementation Guidelines

- Use a dictionary or list to store quiz questions and answers.
- Use a loop to iterate through questions and collect user responses.
- Implement conditional statements to check if the selected answer is correct.
- Keep track of the user's score and calculate the final percentage.
- Use functions to modularize the quiz logic.

Expected Output

The program should display the quiz in the following format:

mathematica

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Question 1: What is the capital of France?

A) Berlin

B) Madrid

C) Paris

D) Rome

Enter your answer (A/B/C/D): C

Correct!

Question 2: Who developed the Python language?

A) Dennis Ritchie

B) Guido van Rossum

C) James Gosling

D) Bjarne Stroustrup

Enter your answer (A/B/C/D): B

Correct!

...

Final Score: 80%

Great job! You have passed the quiz.

Would you like to restart the quiz? (yes/no): yes

Challenges & Considerations

- How will you ensure that the user enters only valid inputs (A, B, C, D)?
- How will you handle randomizing questions to make each attempt unique?
- Can you extend the system to support multiple categories or difficulty levels?
- How can you improve user experience with timers, hints, or leaderboards?

Code:

```
import random


def get_questions():
    return [
        {"question": "What is the capital of France?", "options": {"A": "Berlin", "B": "Madrid", "C": "Paris", "D": "Rome"}, "answer": "C"},
        {"question": "Who developed the Python language?", "options": {"A": "Dennis Ritchie", "B": "Guido van Rossum", "C": "James Gosling", "D": "Bjarne Stroustrup"}, "answer": "B"},
        {"question": "What is the largest planet in our solar system?", "options": {"A": "Earth", "B": "Mars", "C": "Jupiter", "D": "Saturn"}, "answer": "C"},
        {"question": "Which element has the chemical symbol 'O'?", "options": {"A": "Gold", "B": "Oxygen", "C": "Osmium", "D": "Iron"}, "answer": "B"},
        {"question": "How many continents are there on Earth?", "options": {"A": "5", "B": "6", "C": "7", "D": "8"}, "answer": "C"}
    ]


def run_quiz():
    questions = get_questions()
    random.shuffle(questions)  # Shuffle questions for a unique attempt each time
    score = 0

    for q in questions:
        print(f"\n{q['question']}")
        for key, value in q['options'].items():
            print(f"{key}) {value}")
```

```
        while True:
            user_answer = input("Enter your answer (A/B/C/D): ").strip().upper()
            if user_answer in q['options']:
                break
            print("Invalid input. Please enter A, B, C, or D.")

        if user_answer == q['answer']:
            print("Correct!")
            score += 1
        else:
            print(f"Wrong! The correct answer was {q['answer']}) {q['options'][q['answer']]}")

    final_score = (score / len(questions)) * 100
    print(f"\nFinal Score: {final_score:.2f}%")
    if final_score >= 80:
        print("Great job! You have passed the quiz.")
    elif final_score >= 50:
        print("Good effort! Keep improving.")
    else:
        print("You need more practice. Try again!")

    return input("Would you like to restart the quiz? (yes/no): ").strip().lower() == "yes"

def main():
    while True:
        if not run_quiz():
            print("Goodbye! Thanks for playing.")
            break
```

```
if __name__ == "__main__":
    main()
```

Output:

```
Which element has the chemical symbol 'O'?
A) Gold
B) Oxygen
C) Osmium
D) Iron
Enter your answer (A/B/C/D): A
Wrong! The correct answer was B) Oxygen

Who developed the Python language?
A) Dennis Ritchie
B) Guido van Rossum
C) James Gosling
D) Bjarne Stroustrup
Enter your answer (A/B/C/D): B
Correct!

How many continents are there on Earth?
A) 5
B) 6
C) 7
D) 8
Enter your answer (A/B/C/D): C
Correct!

What is the capital of France?
A) Berlin
```

B) Madrid

C) Paris

D) Rome

Enter your answer (A/B/C/D): D

Wrong! The correct answer was C) Paris

What is the largest planet in our solar system?

A) Earth

B) Mars

C) Jupiter

D) Saturn