TIMED MATH QUIZ - CASE STUDY

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ABSTRACT:

The Python script presents a math quiz with 5 levels each containing 5 progressively challenging questions. Users must answer questions with each level , with scores and completion time displayed afterwards. Upon completing all levels , the user receives output of his scores in the form of pie chart and bar graph.

CODE:

```python
import random
import time
import matplotlib.pyplot as plt

# Function to generate a math question based on the given level
def generate_question(level):
    # Define the range for numbers based on the level
    if level <= 2:
        num1 = random.randint(1, 10)
        num2 = random.randint(1, 10)
    elif level <= 4:
        num1 = random.randint(10, 50)
        num2 = random.randint(10, 50)
    else:
        num1 = random.randint(50, 100)
        num2 = random.randint(50, 100)

    # Choose a random operator
    operator = random.choice(['+', '-', '*', '/'])

    # Ensure that division questions have integer solutions
```

```python
    if operator == '/':
        num1 = num1 * num2

    # Construct the question string
    question = f"What is {num1} {operator} {num2}? "
    return question, eval(str(num1) + operator + str(num2))

# Main function to run the math quiz
def main():
    print("Welcome to the Math Quiz!")
    total_score = 0
    scores = []  # List to store scores for each level

    # Loop through 5 levels
    for level in range(1, 6):
        print(f"\nLevel {level}:")
        print("Answer the following questions:")

        # List to store questions and answers to avoid repetition within a
level
        questions_answers = []
        level_score = 0

        # Start the timer
        start_time = time.time()

        # Generate 5 unique questions for each level
        for _ in range(5):
            # Generate a unique question
            question, answer = generate_question(level)
            while question in questions_answers:
                question, answer = generate_question(level)

            print(question)
            user_answer = input("Your answer: ")

            try:
                user_answer = float(user_answer)
                if user_answer == answer:
                    level_score += 1
```

```python
        except ValueError:
            print("Invalid input! Please enter a number.")

        # Add question to the list to avoid repetition
        questions_answers.append(question)

    # End the timer
    end_time = time.time()

    # Calculate the time taken for the level
    level_time = end_time - start_time

    # Display the score and time taken for the level
    print(f"Score for Level {level}: {level_score}/5")
    print(f"Time taken for Level {level}: {level_time:.2f} seconds")

    # Add the level score to the total score
    total_score += level_score
    scores.append(level_score)

    # Display feedback message after completing each level
    print(random.choice(["Bravo!!", "Smart!!", "Great!!", "Well
done!!", "Fantastic!!"]))

    # Display final message if the game is completed without errors
    print("\nCongratulations on completing the game! Well done!")

    # Plotting bar graph
    plt.figure(figsize=(7, 5))
    plt.bar(range(1, 6), scores, color='skyblue')
    plt.title('Scores for Each Level')
    plt.xlabel('Level')
    plt.ylabel('Score')
    plt.xticks(range(1, 6))
    plt.grid(True)
    plt.show()

    # Plotting pie chart
    plt.figure(figsize=(7, 7))
```

```python
    plt.pie(scores, labels=[f'Level {i}' for i in range(1, 6)],
autopct='%1.1f%%', startangle=140)
    plt.title('Scores Distribution')
    plt.axis('equal')
    plt.show()


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

OUTPUT

```
Welcome to the Math Quiz!

Level 1:
Answer the following questions:
What is 14 / 7?
Your answer: 2
What is 27 / 3?
Your answer: 9
What is 5 / 5?
Your answer: 1
What is 6 - 4?
Your answer: 2
What is 9 + 2?
Your answer: 11
Score for Level 1: 5/5
Time taken for Level 1: 11.08 seconds
Fantastic!!
```

```
Level 2:
Answer the following questions:
What is 24 / 3?
Your answer: 8
What is 5 * 6?
Your answer: 30
What is 2 - 10?
Your answer: -8
What is 9 / 9?
Your answer: 1
What is 4 + 5?
Your answer: 9
Score for Level 2: 5/5
Time taken for Level 2: 13.01 seconds
Smart!!
```

```
Level 3:
Answer the following questions:
What is 50 * 22?
Your answer: 1100
What is 20 + 34?
Your answer: 54
What is 19 - 16?
Your answer: 3
What is 38 + 31?
Your answer: 69
What is 1140 / 30?
Your answer: 380
Score for Level 3: 4/5
Time taken for Level 3: 36.40 seconds
Great!!

  Level 4:
  Answer the following questions:
  What is 27 + 38?
  Your answer: 8
  What is 25 * 21?
  Your answer: 525
  What is 31 - 45?
  Your answer: 8
  What is 1271 / 31?
  Your answer: 3
  What is 36 - 20?
  Your answer:
  Your answer: 7
  Invalid input! Please enter a number.
  Score for Level 4: 1/5
  Time taken for Level 4: 34.55 seconds
  Great!!

Level 5:
Answer the following questions:
What is 91 - 55?
What is 58 + 68?
Your answer: 9
What is 5110 / 70?
Your answer: 9
What is 61 * 59?
Your answer: 4
What is 91 * 73?
Your answer: 3
Score for Level 5: 0/5
Time taken for Level 5: 7.00 seconds
Bravo!!
```

Scores for Each Level

Scores Distribution