AI report

REPORT

Student name	Aditya Singh
Branch/Section	CSE(AI)/A
University Roll no.	202401100300021

INTRODUCTION

Q) AI-Based Number Guessing Game

In this game, the user tries to guess a randomly selected number between 1 and 100. After each guess, the AI provides feedback on whether the guessed number is too high, too low, or correct. The process repeats until the user correctly guesses the number.

Methodology

1. **Random Target Selection**:

   - The AI (computer) generates a random number between 1 and 100 using `random.randint(1, 100)`.
   - This number serves as the hidden target that the user must guess.
2. **User Guessing Loop**:

   - The program enters a loop where the user inputs their guess.
   - The guess is compared to the target number.
3. **Feedback Mechanism**:

   - If the guess is **too low**, the program prints `"Too low."` and prompts the user to guess again.
   - If the guess is **too high**, the program prints `"Too high."` and prompts for another guess.
   - If the guess **matches the target**, the program congratulates the user and displays the number of attempts taken.
4. **Counting Attempts**:

   - A counter variable (`attempts`) starts at 0 and increments each time the user makes a guess.
   - When the user guesses correctly, the total number of attempts is displayed.
5. **Loop Termination**:

   - The loop runs until the user correctly guesses the target number.
   - Once the correct number is guessed, the program exits with a `"Game Over."` message.

   Complexity Analysis:

- **Best Case**: The user guesses correctly on the first try →O(1).
- **Worst Case**: The user takes all 100 possible guesses (linear search) →O(N), where N = 100.
- **Average Case**: Around O(log N) if the user follows an efficient strategy (binary search-like guessing).

Code

```python
Import random
def user_guess_number(target):
    attempts = 0
    while True:
        guess = int(input("Enter your guess: "))
        attempts += 1

        if guess < target:
            print("Too low.")
        elif guess > target:
            print("Too high.")
        else:
            print(f"Congratulations! You guessed the number in {attempts} attempts!")
            break

def main():
    target = random.randint(1, 100)
    print("Guess the number between 1 and 100!")
    user_guess_number(target)
    print("Game Over.")

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

Output

```
⟳▾   Guess the number between 1 and 100!
     Enter your guess: 6
     Too low.
     Enter your guess: 45
     Too high.
     Enter your guess: 30
     Too low.
     Enter your guess: 40
     Too high.
     Enter your guess: 35
     Too high.
     Enter your guess: 33
     Too low.
     Enter your guess: 34
     Congratulations! You guessed the number in 7 attempts!
     Game Over.
```

References & Credits for AI-Based Number Guessing Game

1. Python Official Documentation

- **Python Random Module** - Used for generating random numbers.
- **Python Input and Output** - Guides for handling user input.