

MINI PROJECT-1

PROBLEM STATEMENT: Build a number Guessing Game in which the user selects a range. Assume the user selected a range from X to Y where both X and Y are integers. So a random number in that range is selected by the system where the user needs to guess the minimum number of guesses.

Analysis of the Problem Statement:

- Get the range from the user (X and Y)
- Generate a random number in the range [X, Y]
- Implement a guessing algorithm that minimizes the number of guesses
- Provide feedback to the user based on their guesses

Algorithm:

Step 1: Initialize

- Set low to the lower bound x and high to the upper bound y.
- Initialize num_guesses to 0.

Step 2: Generate Secret Number

- Generate a random number secret_number within the range [x, y].

Step 3: Binary Search Loop

- While the game is not over:
 1. Calculate Midpoint:
 - Calculate the midpoint mid of the range [low, high].
 2. Make a Guess:
 - Set the guess to mid.
 - Increment num_guesses by 1.
 3. Print Guess:
 - Print the current guess and the number of guesses made so far.
 4. Check if Guess is Correct:
 - If guess is equal to secret_number:
 - Print a congratulatory message and the number of guesses made.
 - Exit the loop.
 - Else:
 - If guess is less than secret_number:
 - Print "Too low! Try again."
 - Update low to mid + 1.
 - Else:
 - Print "Too high! Try again."
 - Update high to mid - 1.

pseudo code:

```
function number_guessing_game():  
    input X and Y from user  
    generate random number secret_number in range [X, Y]  
    low = X  
    high = Y  
    num_guesses = 0  
  
    while true:  
        mid = (low + high) / 2  
        guess = mid  
        num_guesses += 1  
  
        if guess == secret_number:  
            print "Congratulations! You've guessed the number in", num_guesses, "guesses."  
            break  
  
        elif guess < secret_number:  
            low = mid + 1  
  
        else:  
            high = mid - 1
```

Code:

```
import random  
  
def number_guessing_game():  
    print("Welcome to the Number Guessing Game!")  
    print("Please select a range by entering two integers, X and Y, where X is the lower  
bound and Y is the upper bound.")  
  
    while True:  
        try:  
            x = int(input("Enter the lower bound X: "))  
            y = int(input("Enter the upper bound Y: "))  
            if x >= y:  
                print("Invalid range! X should be less than Y. Please try again.")
```

```
        else:
            break
    except ValueError:
        print("Invalid input! Please enter integers for X and Y.")

print(f"Great! You've selected a range from {x} to {y}.")

# Generate a random number in the selected range
secret_number = random.randint(x, y)

print("I've generated a random number in the selected range. You can start guessing now!")

low = x
high = y
num_guesses = 0

while True:
    mid = (low + high) // 2
    guess = mid
    num_guesses += 1

    print(f"Guess {num_guesses}: {guess}")

    if guess == secret_number:
        print(f"Congratulations! You've guessed the number in {num_guesses} guesses.")
        break

    elif guess < secret_number:
        print("Too low! Try again.")
        low = mid + 1

    else:
        print("Too high! Try again.")
        high = mid - 1

if __name__ == "__main__":
```

number_guessing_game()

OUTPUT:

```
PS C:\Users\sandhya> & C:/Users/sandhya/AppData/Local/Programs/Python/Python312/python.exe "c:/Users/sandhya/OneDr
Welcome to the Number Guessing Game!
Please select a range by entering two integers, X and Y, where X is the lower bound and Y is the upper bound.
Enter the lower bound X: 0
Enter the upper bound Y: 10
Great! You've selected a range from 0 to 10.
I've generated a random number in the selected range. You can start guessing now!
Guess 1: 5
Too low! Try again.
Guess 2: 8
Too high! Try again.
Guess 3: 6
Congratulations! You've guessed the number in 3 guesses.
```

Git Repository:

<https://github.com/sandhyakuram/Number-guessing.git>