

AI-Based Number Guessing Game Report

Purpose: This report details the implementation of AI-Based Number Guessing game using Python.

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Introduction

The AI-Based Number Guessing Game is a Python-based program where the computer attempts to guess a number selected by the user. The AI intelligently narrows down its guesses based on user feedback using a **binary search algorithm**. The goal of the project is to demonstrate algorithmic efficiency and interactive gameplay.

Methodology

Development Approach:

- **Programming Language:** Python 3.x
- **Algorithm Used:** Binary Search
- **User Interaction:** The AI asks if its guess is correct, too high, or too low.
- **Efficiency:** The AI minimizes the number of guesses using a logarithmic approach.

Implementation Steps:

1. User Thinks of a Number

- The player selects a number within a given range (e.g., 1 to 100).

2. AI Makes an Initial Guess

- The AI starts with the middle value of the range.

3. User Provides Feedback

- The player responds with:

- 'h' (higher) if the number is greater than the guess.
- 'l' (lower) if the number is smaller than the guess.
- 'c' (correct) if the AI's guess is correct.

4. AI Adjusts its Guess

- If the number is **higher**, the lower bound is updated.
- If the number is **lower**, the upper bound is updated.
- The AI continues guessing until it finds the correct number.

5. Game Ends

- The AI displays the number of attempts taken to guess correctly

Code Typed

```
import random
```

```
# Function where AI tries to guess the number
```

```
def ai_guess_number(low, high):
```

```
    print(f"Think of a number between {low} and {high}, and I'll try to  
guess it!")
```

```
    input("Press Enter when you're ready...") # Wait for user confirmation
```

```
    attempts = 0 # Count the number of attempts
```

```
    while low <= high:
```

```
        guess = (low + high) // 2 # AI guesses the middle value using binary  
search
```

```
        attempts += 1 # Increment attempt counter
```

```
    # Ask user for feedback
```

```
    print(f"Is your number {guess}? (Enter 'h' if higher, 'l' if lower, or 'c' if  
correct)")
```

```
    feedback = input().strip().lower()
```

```
    if feedback == 'c': # If AI guessed correctly
```

```
        print(f"Yay! I guessed your number {guess} in {attempts}  
attempts!")
```

```
        break
```

```

elif feedback == 'h': # If the number is higher

    low = guess + 1 # Adjust search range to higher values

elif feedback == 'l': # If the number is lower

    high = guess - 1 # Adjust search range to lower values

else:

    print("Invalid input! Please enter 'h', 'l', or 'c'.") # Handle invalid
input

# Run the game with a number range of 1 to 100

if __name__ == "__main__":

    ai_guess_number(1, 100) # Adjust range as needed

```

Output Screenshots

```

Think of a number between 1 and 100, and I'll try to guess it!
Press Enter when you're ready...66
Is your number 50? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
h
Is your number 75? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
l
Is your number 62? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
h
Is your number 68? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
l
Is your number 65? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
h
Is your number 66? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
c
Yay! I guessed your number 66 in 6 attempts!

```



```
Think of a number between 1 and 100, and I'll try to guess it!
Press Enter when you're ready...34
Is your number 50? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
L
Is your number 25? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
H
Is your number 37? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
L
Is your number 31? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
H
Is your number 34? (Enter 'h' if higher, 'l' if lower, or 'c' if correct)
C
Yay! I guessed your number 34 in 5 attempts!
```
