# MINI PROJECT 1

* Build a number guessing game in which the user selects the 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 number in minimum number of guesses

## Algorithm:

1 User should input the lower bound and upper bound of the range.
2 The compiler selects a random integer between the range and stores it for future use.
3 A while loop is used.
4 If the user guesses a number which is greater than the device selected number, the user gets an output “Try Again! You guessed too high“
5 If the user guesses a number which is smaller than the device selected number, the user gets an output “Try Again! You guessed too small”
6 And if the user guesses the device selected number in a minimum number of guesses, the user gets a “Congratulations! ” Output.
7 Else if the user didn’t guess the integer in the minimum number of guesses, they will get “Better Luck Next Time!” output.

## Pseudo code:

Importing ‘math’ and ‘random’ module

Asking for lower and upper bounds from the user

Calculating minimum number of guesses

Helping user to guess number

If the number is guessed correctly display ‘congratulations’ else display ‘try again’

Analysis:

When the user inputs a range the compiler selects a number from that range. If the user enters a number smaller than the selected one as their first guess the compiler will show, “Try Again! You guessed too small”. That’s mean the integers less than the guessed one. For the user, the guessing range is getting smaller by each guess. So, the new guessing range for users will change

So, the minimum number of guesses depends upon range. And the compiler must calculate the minimum number of guessing depends upon the range, on its own. For this, we have a formula:-

Minimum number of guessing = $\log_2$(Upper bound − lower bound + 1)

Code:

```
import random
import math

lower = int(input("Enter Lower bound:- "))
upper = int(input("Enter Upper bound:- "))
x = random.randint(lower, upper)

print("\n\tYou've only ",
      round(math.log(upper - lower + 1, 2)),
      " chances to guess the integer!\n")

count = 0
while count < math.log(upper - lower + 1, 2):
    count += 1
    guess = int(input("Guess a number:- "))
    if x == guess:
        print("Congratulations you did it in ",
              count, " try")
        break
    elif x > guess:
        print("You guessed too small!")
    elif x < guess:
        print("You Guessed too high!")

if count >= math.log(upper - lower + 1, 2):
    print("\nThe number is %d" % x)
    print("\tBetter Luck Next time!")
```

main.py Save Run Output

```python
import random
import math

lower = int(input("Enter Lower bound:- "))
upper = int(input("Enter Upper bound:- "))
x = random.randint(lower, upper)

print("\n\tYou've only ",
    round(math.log(upper - lower + 1, 2)),
    " chances to guess the integer!\n")

count = 0
while count < math.log(upper - lower + 1, 2):
    count += 1
    guess = int(input("Guess a number:- "))
    if x == guess:
        print("Congratulations you did it in ",
            count, " try")
        break
    elif x > guess:
        print("You guessed too small!")
    elif x < guess:
        print("You Guessed too high!")

if count >= math.log(upper - lower + 1, 2):
    print("\nThe number is %d" % x)
    print("\tBetter Luck Next time!")
```

```
Enter Lower bound:- 0
Enter Upper bound:- 100

    You've only  7  chances to guess the integer!

Guess a number:- 18
You guessed too small!
Guess a number:- 55
You guessed too small!
Guess a number:- 89
You guessed too small!
Guess a number:- 99
You Guessed too high!
Guess a number:- 95
You Guessed too high!
Guess a number:- 90
You guessed too small!
Guess a number:- 91
You guessed too small!

The number is 93
    Better Luck Next time!

=== Code Execution Successful ===
```