Time Complexity:

**Imagine a classroom of 100 students in which you gave your pen to one person. You have to find that pen without knowing to whom you gave it.**

**O(n2):** You go and ask the first person in the class if he has the pen. Also, you ask this person about the other 99 people in the classroom if they have that pen and so on,   
This is what we call O(n2).

**O(n):** Going and asking each student individually is O(N).

**O(log n):** Now I divide the class into two groups, then ask: “Is it on the left side, or the right side of the classroom?” Then I take that group and divide it into two and ask again, and so on. Repeat the process till you are left with one student who has your pen. This is what you mean by O(log n).

The **O(n2)** searches if **only one student knows on which student the pen is hidden**.

The **O(n)** if **one student had the pen and only they knew it**.

The **O(log n)** search if **all the students knew**, but would only tell me if I guessed the right side.

Space Complexity:

*Auxiliary Space* is the extra space or temporary space used by an algorithm.

*The space Complexity*of an algorithm is the total space taken by the algorithm with respect to the input size. Space complexity includes both Auxiliary space and space used by input.