SORTING AND SEARCHING – 20 QUESTIONS GAME - 02

You saw what just happened we played a beautiful game and even we wrote a piece of code for it. Let me now bring in a small variation to the game, in the variation is the following. I will tell you that i have a number in my mind and that number is less than one lack common guess the number, how this difference is this game from the previous game so, assume you keep the number six hundred in your mind, i know it is less than one lack, right? How do I? How on earth will i guess that it's going to be six hundred? I should ask you this question is it greater than five hundred? Is it greater than ten thousand? Is it greater than twenty thousand? And so on right? is there a smart way of doing this? Think about it. I am going to tell you something which looks like very different from the game i have been discussing a number one to one lack guess what the number is? A variant of what we did just now right. i am going to give you an example which looks very different but these two things are the same, example is that of how would you search for a word in English dictionary? Let's say you want to see the word proclaim p r o c l a i m proclaim how will search for this in the dictionary? You will open the dictionary in the middle, why middle? You do not know whether proclaim is in the first half of the dictionary or the second half of the dictionary, the moment you open the dictionary in the middle you will get words starting from 'n' letter 'n' so you know for sure that first half of the dictionary is all those words is starting from a b c d efghijklm n because you saw the word when you open the dictionary in the middle, so your word proclaim should be in the second half of the dictionary so what you do is you discard the first half and only look at the second half and again go to the centre of it centre of second half will now be let's say 's' words starting from s, now what can you conclude? From 'a' to 'n' was first half of the dictionary which you discarded and now when you take the midpoint of the second half you are seeing 's' which means your word proclaim should be in the first half of this little cut down dictionary, in the second half its in the first half if you know what i mean. Right? Think about it, every time you open the dictionary by half you are discarding one part of it and retaining other part of it, correct? And so on and so forth you finally reached the word proclaim in no time because your dictionary size is reducing by half correct? What is this to do with the problem that we were discussing? Keep a number in your mind from one to one lack and i will guess what the number is. Can use the way i searched through a English dictionary that same method here, think about it, it is indeed possible. What you do is ok; do you have a number in your mind? Is it less than fifty thousand? Or greater than fifty thousand? You see what i am doing, like the dictionary i am trying to see, you see this line, is it on the left side of the, is it the first half of one to one lack or is it in the second half. If a number is in the first half you will say "less than fifty thousand" if your number is in the second half then you will say "it is greater than fifty thousand" and there i am, i know for sure i can now reduce my search space by half and now i will ask you id your number less than twenty five thousand or greater than twenty five thousand. Do you see that this method is exactly the same as searching through an English dictionary? Let us now go ahead and try to write a piece of code for this. Whatever we did just now is popularly called the binary search, the binary search words look complicated but there is nothing here. Binary means

cutting into two pieces and search in only one piece and continue doing it your space where you are searching will get halved and very very very quickly note the usage of the word very very very it is indeed so quick very very very quickly you will narrow down to your search key in no time this is called binary search.