

SORTING AND SEARCHING – 20 QUESTIONS GAME - 07

Hello every one so today we are going to write a program for searching, actually our main objective is to understand the binary search, you saw the play how a person can easily get a search a number in a list of numbers sorted numbers very easily in a less number of steps, will see why binary search works but before that we must understand how to simply search a number in list of list of given numbers for that we will use the linear search it is a conventional simple search will go through each values and try to find our element which we want to find in that list and we will see how many numbers of steps it takes and then we will switch to binary search. So i will start my spyder i will type spyder in my terminal and wait for it, ok i will write my programme in a new file entitle zero i will change the name so what i want first i want first as list of numbers for this programme we will take the numbers in sorted order in ascending order, the numbers will always be this one two three four five six something like that i means it should always be sorted i mean the numbers will always been ascending order, first i have to create a list of numbers for that i will write i will write a for i in range let's say i want numbers from one to thousand one thousand one in range if i want a number from let's say one to n then i have to i have to give the argument as n plus one because it always prints up to number less than the given number, i will write here let me save this as linear search ok awesome, for that i need a list so let me write the name as element if i gives the simple bracket to create a list i will use this, so in order to add elements into a list there is a function name append i will just write elements dot see it will show you all the functions which you can use with the list that is the beauty with spyder so it is just tap it will give you the append and i will write here that's it i created the list ok that's it i can just run this to see my list ok i will run the program i will just type element and it will show me the numbers from one to thousand, you can see all the numbers from one to thousand awesome! So we recommend you write all the programmes in function, let me create a function here which i can easily call def linear search and i will give the range here that's 'n' so that the 'n' i can give here also i will give the parameter 'x' i want to find now let's see this. I will give the indentation ok awesome this is done i have created my list of numbers now what i want? I want to search this element 'x' in this list for that i write another loop for i in see now my list is complete i have created the list i can just iterate through the elements of this list which is very easy just i have to write since list is iterative what do i mean by iterative? You can just goggle it you will understand what is iterative, there are some elements in python which are iterable and some are not iterable if it is iterable you can go through it like a loop i will write for i in the list name which is the element ok see here element was created i can for i can go though it here also i can element if i just print it, it will give me the elements so i can iterate through the elements through the elements of element ok for i in element ok now i am iterating over the well use of element i will write its only one if condition, if i is equal equal to my number 'x' which i want to find and i will just print yes! I found my number position str ok since in this example the numbers are sorted from one to n i can just write str i minus one or i can simply i can write str i ok so we have to call a name ok i have to also print that whether found the number or not, if i didn't find any number so for that

i will use the flag value let say flag is equal to zero ok, initially the value is zero, if i found this number then i will put the flag value to one after that i write a if condition if flag is equal to zero i print number is not found that's it good so my programme is complete now let me just run this and that's it. I will call the function linear search see whenever i type this it will show me that it needs to 'n' and 'x' so n is my range so here i will put thousand one next what number let's say i want to search fifty ok just type it will show me yes i found the number at position fifty because the number has sorted. Ok cool now i want to know how many iteration it took for me to get to this number for that what i will do? I will create a variable count here zero its initial value and whenever i am going through an element here i will do count plus is equal to one i am increasing the value by one and if i don't need to whenever i find a number and the list i don't need to go again go through the other elements of the list so i will just break the loop here because i don't need to go to find go to look at other numbers because i already got my number so here i will break and if flag is zero it will find and i will print the count that's it let me write here number of iterations is equal to plus str because i need to change this into string awesome! This is done let me check. Linear search give me one thousand sorry the number is fifty seven say ok now you can see, yes i found my number at position fifty seven number of iteration it taking is fifty seven because before fifty seven i have to check all the numbers one two three four five six seven eight nine up to then i will go to the fifty seven so you can see that if the number of elements in the list are very huge let's say one million and you want to search a number which is very far end let's say the number i want to search is one million only then it will take one million near one million iteration to find that number which is the very huge, in the game we saw that when we can use the advantage of sorted number whenever the number is elements in an array or list is sorted we can use that extra information for searching a particular number easily that is the correct for binary search so will see how we can use this extra information to search an number in a list of sorted numbers and drastically decrease the number of iteration so that we can in very less number of iteration or to say the very less number of time in less time we can search the number so in next video will see the binary search and will see how we can iterate