# THEORY OF EVOLUTION 04

Now we are done with the prerequisites required for to run screen cast of evolution. So let us start with the programme of evolution. Here we are given a dna file name dna underscore data has explained earlier every evolution process happens through dna and it has some coded information in the form of zeros and ones so we are this particular information zeros and ones so first of all we have to read this file that has the coded information i hope that we have watched the previous programming screen cast in which we explained how to handle files through python. So i will be using that straight away, so i will just write with open my file name is dna underscore txt dna underscore data dot txt as my file. So i will just read it, i read it bit by bit and store it in x so i just write my file dot read as explained read is used to read the file, read function is used to read the file here i will also make x as a list so that we can use it as a list. We have a list of zeros and ones we need to store it in list so i will just convert it into list. We have ten thousand beds given in that DNA file so i will call it function on this ten thousand bits so i will just write for i in range zero to ten thousand, i will call a function evolve here evolve X. Now that we are done with reading the file we have also created a list x that stores the dna information i will just call the function evolve on that particular list and that is x so i will just define it, define evolve this is called on the function this is called on the list x so i will just write index here i want to generate an index randomly in the list x i repeat i want to generate an index randomly in the list x so to generate randomly we use as i explained random library so i will just write random dot randint we have to generate from zero to length of the X as explained in random dot randint we have to specify the range and for that range the both limits the upper limit and lower limit they both are inclusive. Then i also need to generate another variable randomly here i will call it P, i will again use a random int function here random dot randint and i too i need to generate it from one to hundred so algorithm that we are using here is if this particular variable P if it will be equal to one then only the change will takes place so i will just write here if P is equal to is equal to one then only the change will take place if the bed at index position at ind is equal to is equal to zero then it will be changed to one is equal to is equal to one. Else it will be changed to zero obviously, so i will explain again what we are doing here is we are generating two variables randomly here first is the index of the variable of the particular bed in which change has to take place this change actually depends on the variable P which will which will generate randomly if this particular variable P will be equal to one then only the change at this particular index ind will takes place if X at ind is equal to is equal to zero then it will be change to one otherwise it will be changed to zero so first of all it all depends on P. If the P that has been generated randomly here is equal to one then only the particular bed at Ind position in X will be changed the change will takes place. This is how we are using we are using the evolve function here. So now we are done with reading the file we are also done with the defining the evolve function here so i will just print here again i will just print X again so let me do that let me run it again so there is some error that is list index out of range so i will just look into it, we have ind here and we are generating it from zero to length of X so here is the problem we generating till length of the X we should generate it from length of

X minus one since we all know that randrange generates the random value in which the both ints of the range are inclusive the upper limit and the lower limit are inclusive and we have in list the numbers that are generated the indices values are always from zero to length minus one i repeat in list we always have indices values from zero to length minus one ok. If we have given a list of length five then we have indices in list as zero one two three or four we don't have five here and random dot randed generates random values in which both the ints of range are inclusive so we have to write length as X minus one in this particular case the problem will be solved so let us run it again so we have an array here again the array the list that we read from that particular file it has come out here so you can actually print the P and ind values and check whether the changes taken palace or not so i will just print the P value and see whether the changes are taking part or not so let me print it so it is generating ten thousand times so let me see whether it is whether the value is one at the particular instance are not so let us look at it we have seventy eight, eighty five, eighty one till now we have a i haven't encountered one oh here we have one so in this particular case we have one so this particular case the change would have taken place ok you can always try run it and check whether the change is taking place or not we have one again so in this particular case the change will take place otherwise the change will not take place so please note down the fact in mind so i don't think we have another one here let us check it again so you can try run this particular algorithm this particular programme and see whether the change is taking place or not i hope this programming screen cast is useful to you guys have a nice day happy leaning.