IIT Madras

ONLINE DEGREE

Programming in Python
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Indian Institute of Technology, Ropar
For Loop to Add the First n Numbers

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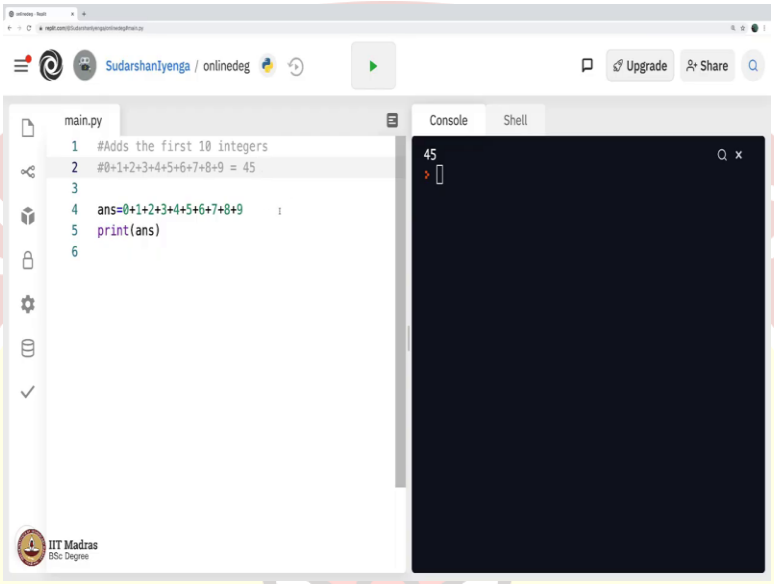

Let us now try to write a piece of code that does the following sums, the first 10 integers. What do I mean by that? By sums, I mean adds the first 10 integers. What do I mean by that? I say 0 plus 1, plus 2 plus 3 plus 4 plus 5 plus 6 plus 7 plus 8 plus 9. These are the first 10 integers. Of course, we can start from 1 and go to 10 or start from 0 and go to 9.

For some reason, I would like to start from 0. That is my choice and go up to 9. So, what is this equal to? Let me add 0 plus 1 is 1, 1 plus 2 is 3, 3 plus 3 is 6 plus 4 is 10 plus 5 is 15 plus 16 is 21 plus 7 is 28, 8, 36 plus 9 is 45. I am sorry, if I am wrong here. We can use a calculator and then check if we are right or not. Mostly I am right.

Let me write a program to see if I am right or wrong. I manually tried adding these numbers here, add up to 45. But is it really 45? So, what do I do? I say, answer is equal to 0 plus 1 plus 2 plus 3 plus 4 plus 5 plus 6 plus 7 plus 8 plus 9 and then I say, print answer. Let us try executing this. Boom, I get 45 as the answer, as you can see here. So, I am right. My addition skills are intact. It is indeed 45.

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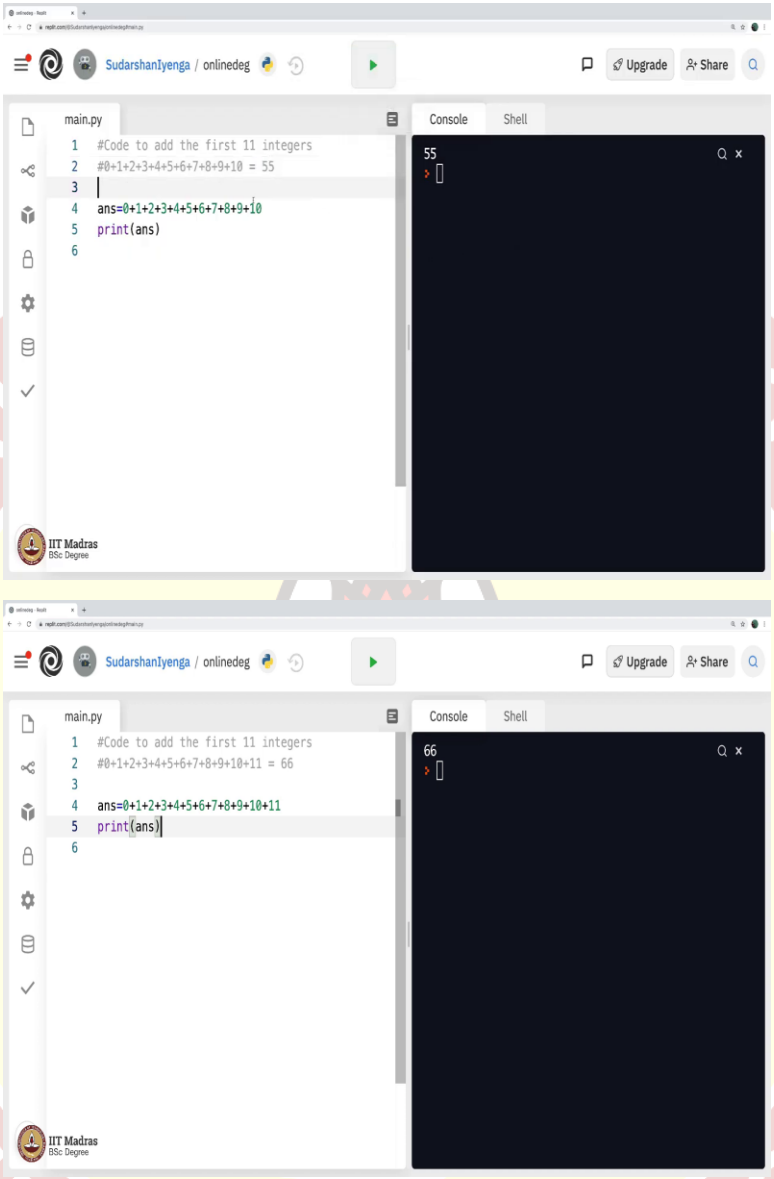

What if I add the first 11 numbers, adds the first 11 integers code, to add the first 11 integers. What is this? 45 plus 11 will be help me out, 56. So, let me just write plus 10 here and see if I execute it, if I get 50, 45 plus 10. What am I doing? There is a mistake here. 10 is 55. So now, what if I were to add the first 12 numbers? What will the answer be? Let me see the answer and then write it here. 55 plus 12 that is 11, that is 66. It should be 66 and it indeed is 66.

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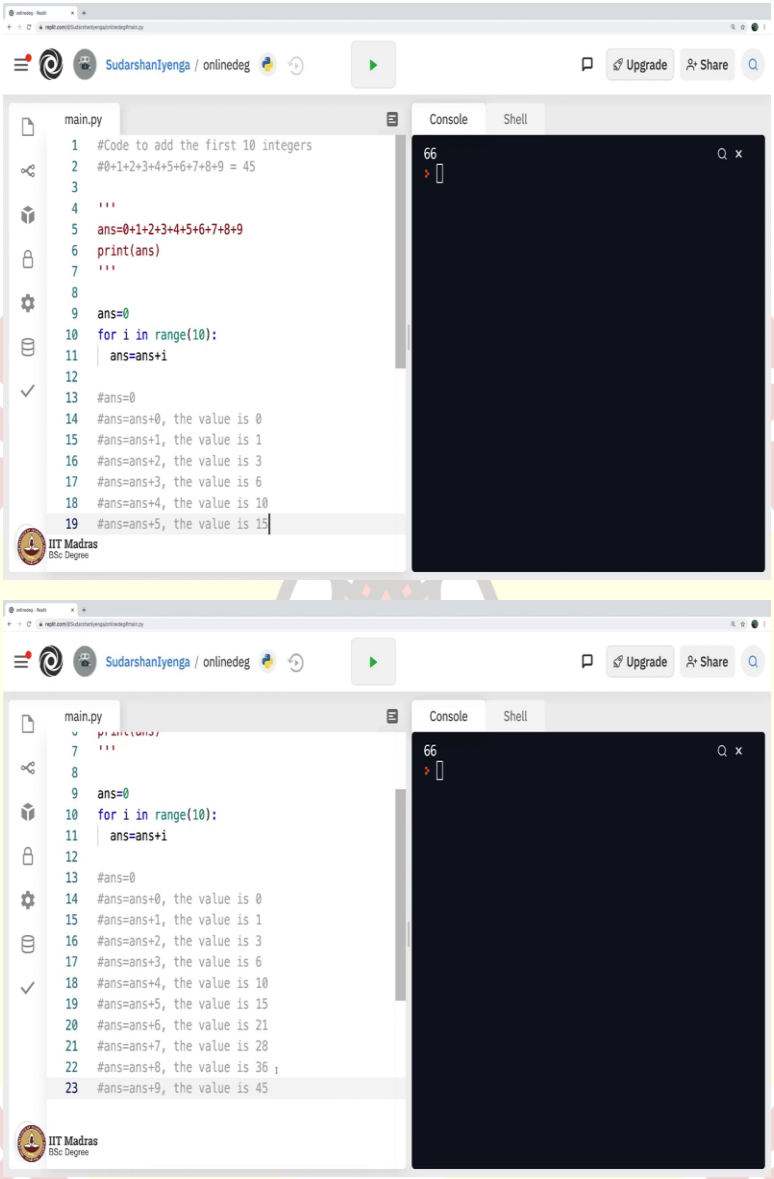

As you would have rightly guessed, there is a nice way to do the same program using for loop, what we do is this very addition, we capture it in the form of a for loop. How do we do that? Let us go ahead, comment this part. This, so that we have the previous code to and go ahead and write the brand-new code.

So, what I do is, I say for i in range 10. So, what I want is, I want to add the first let us stick to the first 9 numbers, which we know was 45, first 10 integers 0 to 9 is 10 integers, the answer was 45. Let me also change this, just to stay consistent for i in range 10, I am going to sum answer equals answer plus i, what is that? That sounds confusing.

So, give me a minute, let me explain what I have done. What I have done is I first declare answer to be 0 and then I say as i ranges from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 I add for my, for my ans, that is 0, I add 0 to it correct and then assign it to answer and then I cycle, as you know for loop means it is cyclic, right it is a loop and then answer will be equal to, the previous answer plus i which will now be 1, so on and so forth.

Let me try illustrating it here. What it does, is initially ans will be equal to 0 and when I say ans equals ans plus i, i will again be 0. The final answer, the value of ans will be value is 0. But then if I do ans equals ans plus, i will next be 1, the value will be 1, because ans was 0, ans equals ans plus 1 will make it 1. If you find it complicated, do not worry, this is one program that you may want to relook multiple times to get what is happening. Then what is next?

Next is ans equals ans plus 2 ans is already 1, which means the value will become 1 plus 2, which is 3. So, let me patiently do this throughout and then the next in the for loop, i becomes 3, which means ans equals ans plus 3, the value is for 3, you add 3, which is 6, so on. Let me just type without explaining, the value is 6 plus 4 is 10. It is a good practice, good exercise to type it for the whole thing. The value will be 10 plus 4, 10 plus 5 rather, which is 15.

Then, so on and so forth. Answer plus 6, the value is 15 plus 6, which is 21. Answer is equal to answer plus 7, the value is 21 gets added up with 7 thus giving you 28. Answer equals answer see it is very tiring, your computer actually does all these things. 28 plus eight is 36 and then ans equals answer plus 9, the value is 36 plus 9, 45 and I am indeed tired. Well, a computer does it in in no time, let us see if it actually does it in no time.

Word of rather a tip, hash stands for comment, all these things are comments here, will not get executed. Anything inside these three quotes will not get executed. I am just reminding you people of course, we have seen commenting before itself, right from our first week. But I am just helping you recollect it. So, what this code does is, this are all comments, it will just execute this part. What is it? Precisely what we have stated here.

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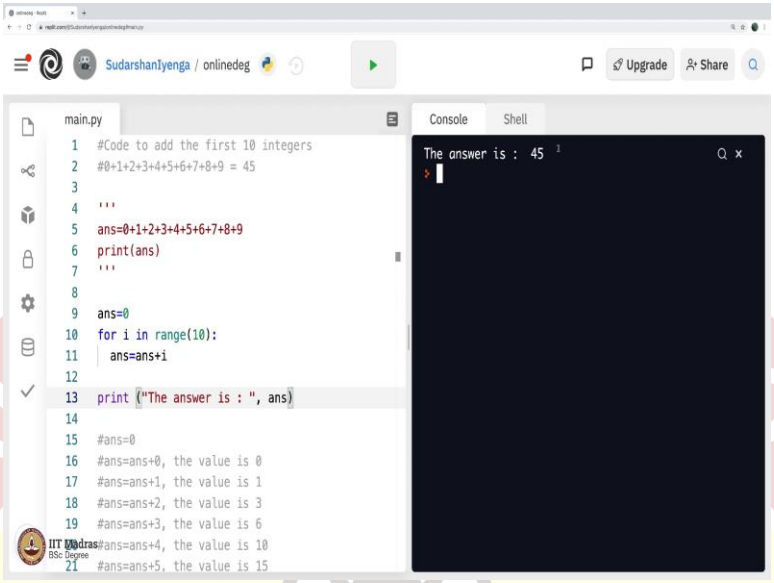

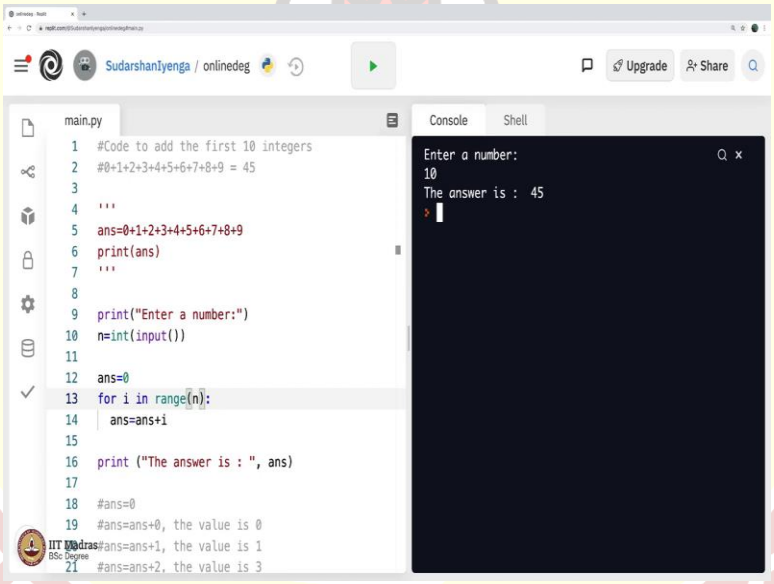

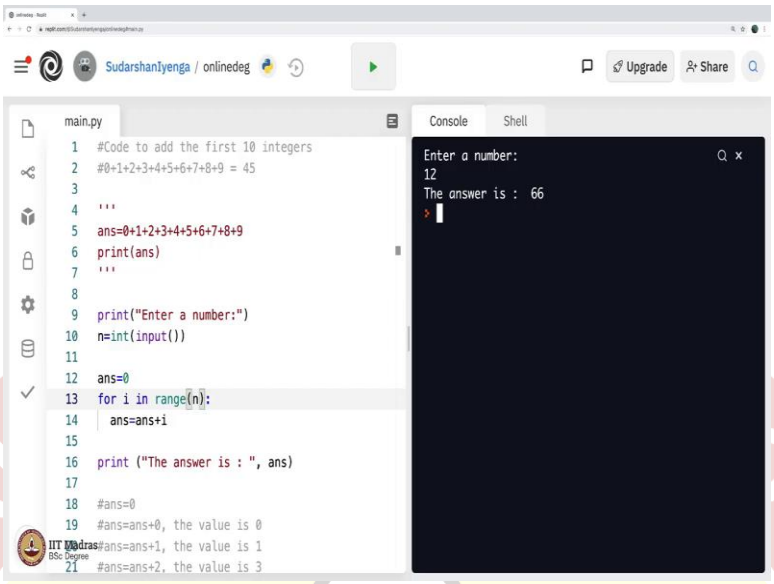
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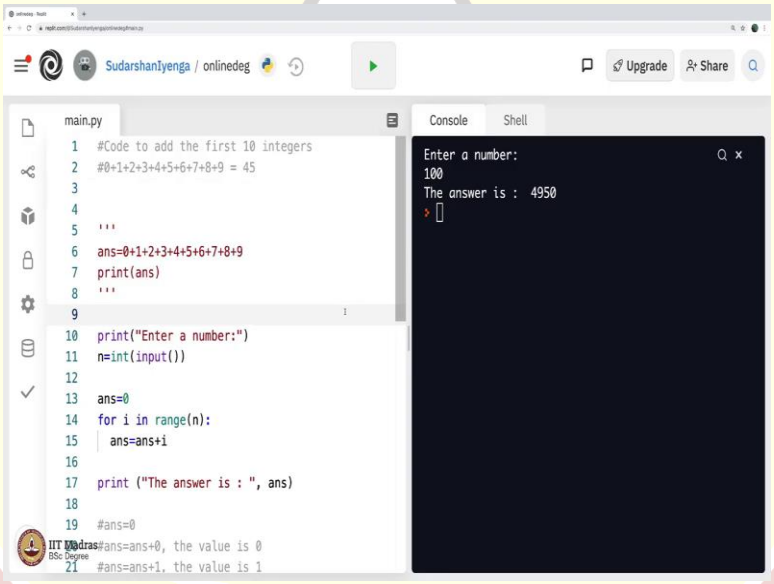
Upgrade
Share
main.py
Console
Shell
#Code to add the first 10 integers
#0+1+2+3+4+5+6+7+8+9 = 45
'''
ans=0+1+2+3+4+5+6+7+8+9
print(ans)
'''
print("Enter a number:")
n=int(input())
ans=0
for i in range(n):
ans=ans+i
print ("The answer is : ", ans)
#ans=0
#ans=ans+0, the value is 0
#ans=ans+1, the value is 1
#ans=ans+2, the value is 3
Enter a number:
12
The answer is : 66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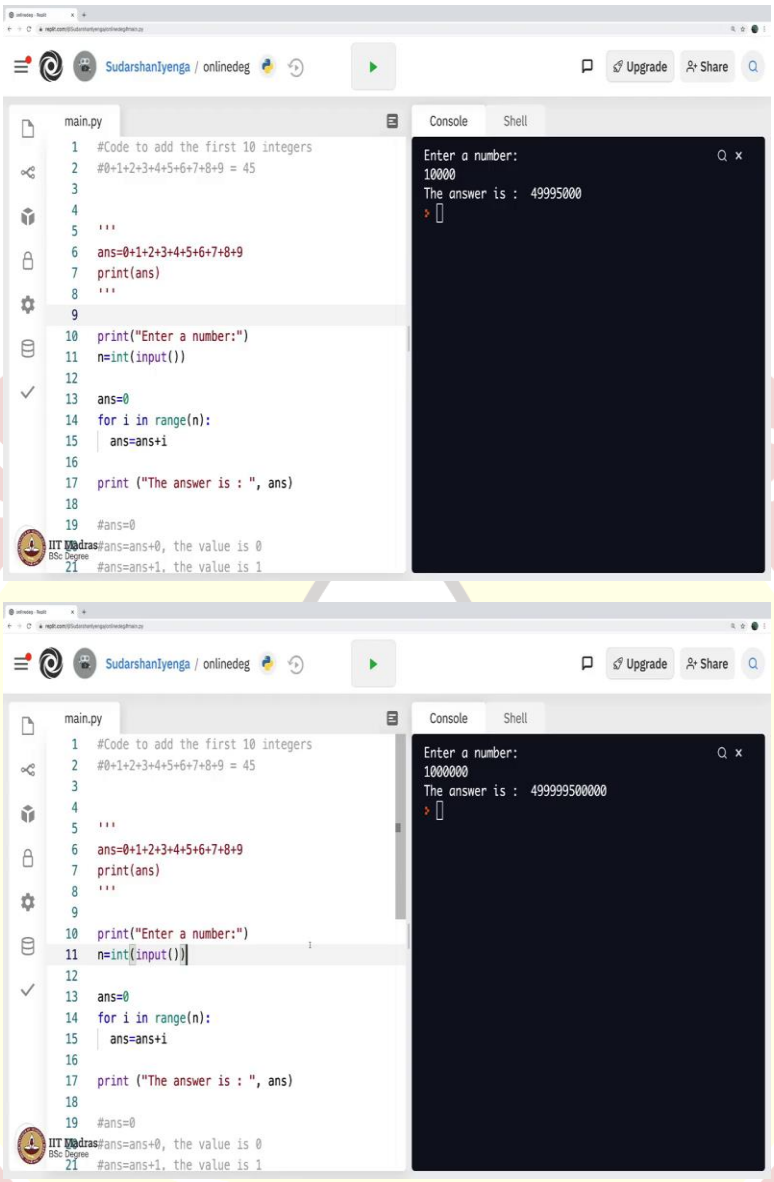
print(ans)
'''
print("Enter a number:")
n=int(input())
ans=0
for i in range(n):
ans=ans+i
print ("The answer is : ", ans)
#ans=0
#ans=ans+0, the value is 0
#ans=ans+1, the value is 1
Enter a number:
100
The answer is : 4950



So, let us see. At the end, I would like to print the answer is ans. So, let us try our luck and execute this. The answer is 45. Bingo. So, we got the right answer. Our code works fine. So, now let me make a small modification to this. Let me say, print enter a number. As always, we have been doing this, n equals int input, which means it takes a number n and I am going to input that here.

Which means, which means, which means what? You will see what this means. If I put n equals 10, I will get 45. If I put n equals well let us say 12, I will get to some of first 12 numbers 0, 1, 2, 3, up to 11. What is that? 66 and let me do something complicated. What if I put 100, some of first 100 numbers, 0 plus 1 plus 2 up to 99? Is 4950 it seems, you may want to check that, you

can use the, there is a shortcut formula, as you know, some of n numbers, whatever that is, you can look up and then write the formula, this is a very famous story of Gauss.

Let me just type that for you. Look at the story of Gauss, a mathematician, a mathematician used the formula to compute this. Anyway. Let me not digress. Let me delete this. So, you can look up the history? The answer is 4950. Let me find the answer for the first 10000 numbers in no time you get the answer. It is in the order of how much is this 50000000, close to 50000000 is the answer and that is the best part about computers. You see, you did. I was tired looping for the answer, for the first nine numbers and the computer did precisely this, not for just the first ten numbers, 0 to 9 numbers.

But for the first ten thousand numbers, the answer is so much. In fact, you can even do for 1000000. I am sure it will not take a lot of times. Let me play a safe bet here and put 1000000 and see if this program will, wow look at that. That is like a less than a second's time. It showed us the answer. That is the power of, for loops. You may want to practice more and more of this very program. Try understanding what we have done here and I am sure you will be able to use for loop like a pro.