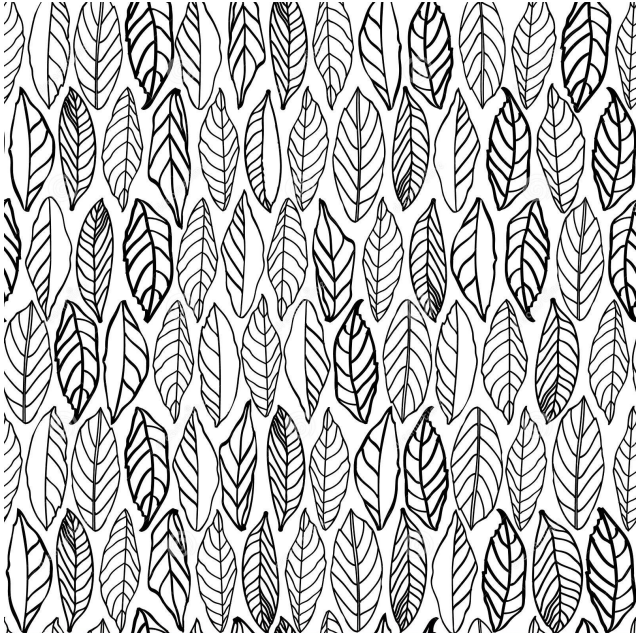
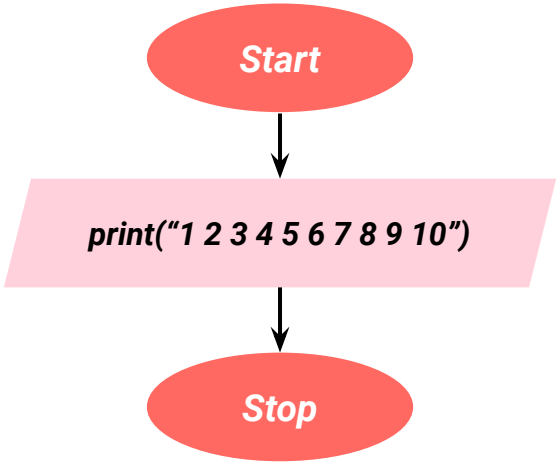
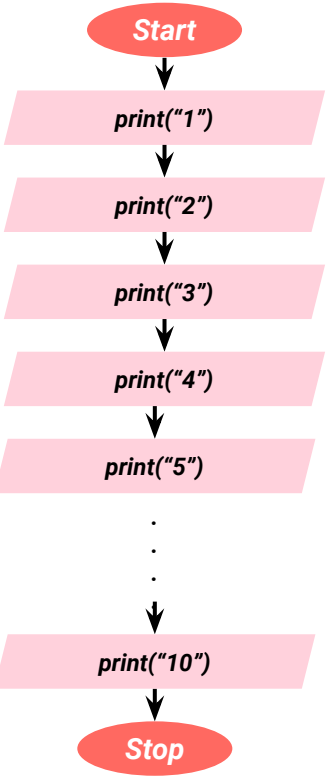


PERFORMING A TASK - REPETITIVELY

Write a flowchart displaying the numbers 1 to 10 on the screen.

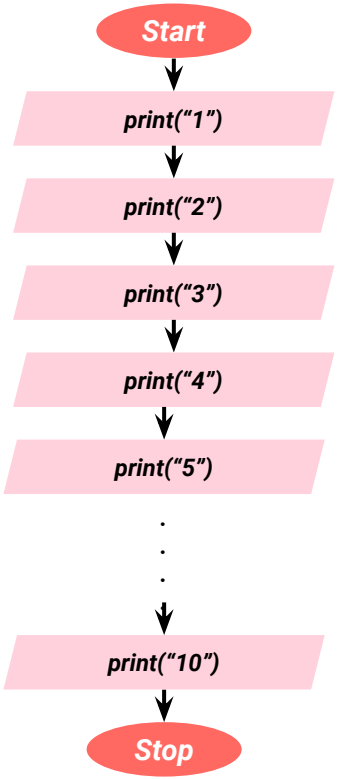
Write a flowchart displaying the numbers 1 to 10 on the screen.



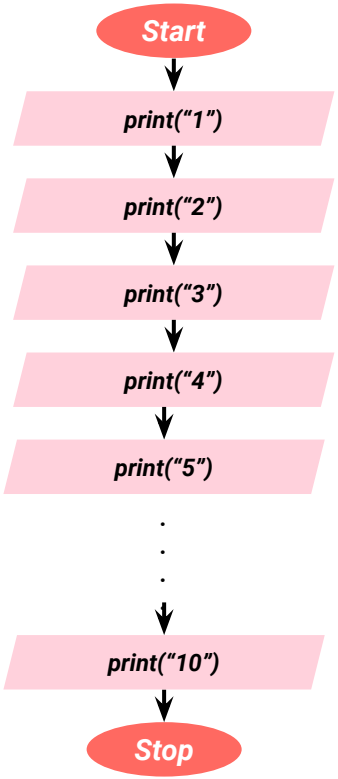


Now let's say we want to draw a flowchart to print all the numbers between 1 to 500. How would you do so?

Now let's say we want to draw a flowchart to print all the numbers between 1 to 500. How would you do so?



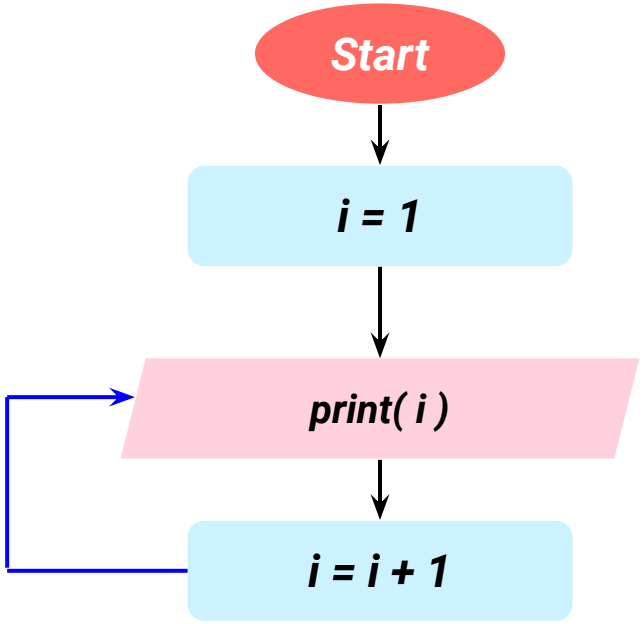
In this flowchart, do we have an instruction/box that is repeating again and again? What is this instruction?



In this flowchart, do we have an instruction/box that is repeating again and again? What is this instruction?

Yes, the print(" ") - Output box is repeating again and again almost 10 times.

LOOPING IT

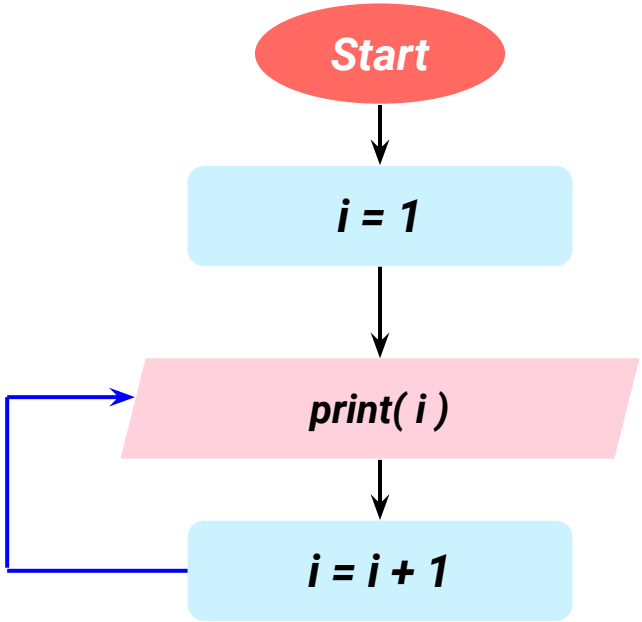


Have we introduced a variable here? What is its name and starting value?

What is happening after initialising the variable? What will display on screen here?

After printing the value of i. We have the next step - which is the process box. What is happening in this box?

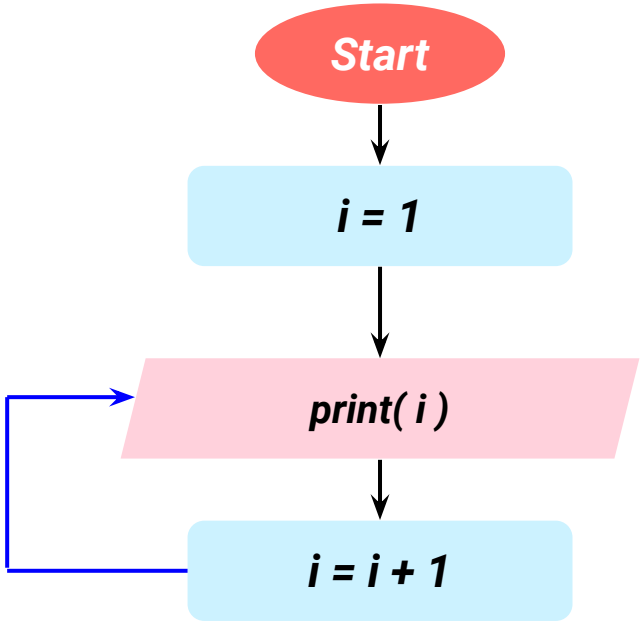
LOOPING IT



After increasing the value of i by 1, it's value is now 2!!!! Where are we going from this step?

What will print now on the screen?

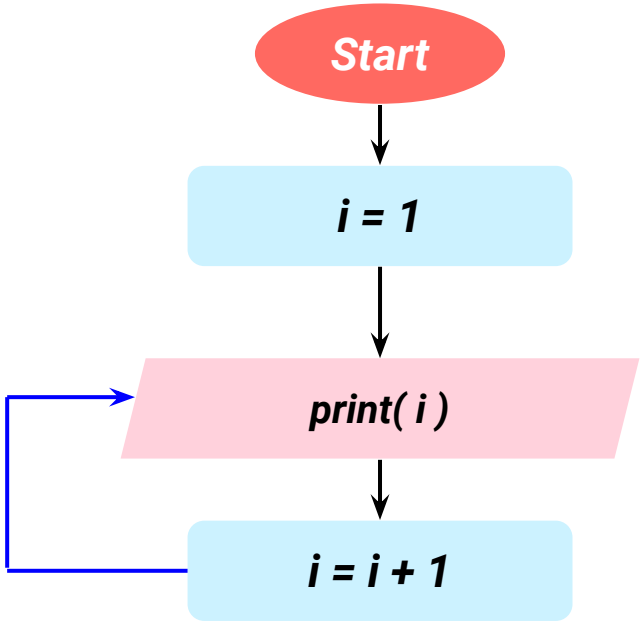
LOOPING IT



Let's say the value of i has now become 10 and we have printed it. After printing it, will the program stop or continue changing the value of i to 11 and continue printing the next numbers too?

Remember, we wanted to print ONLY the first 10 numbers.

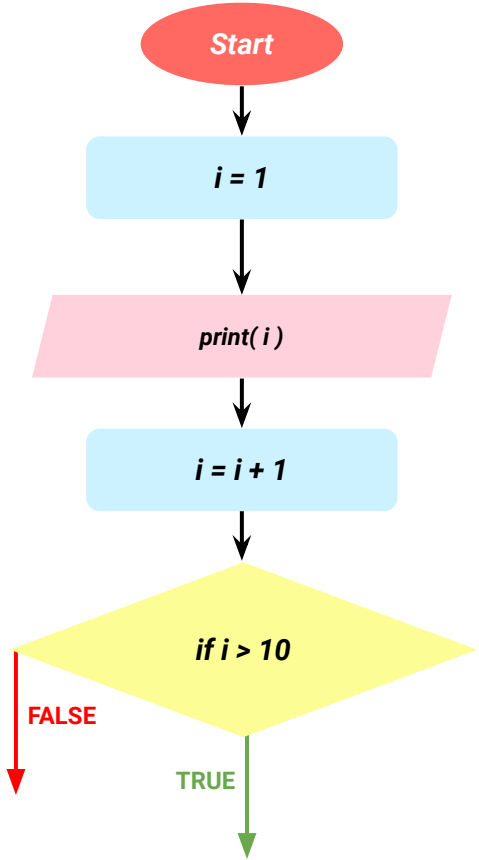
LOOPING IT



When do you think we should stop the flowchart?

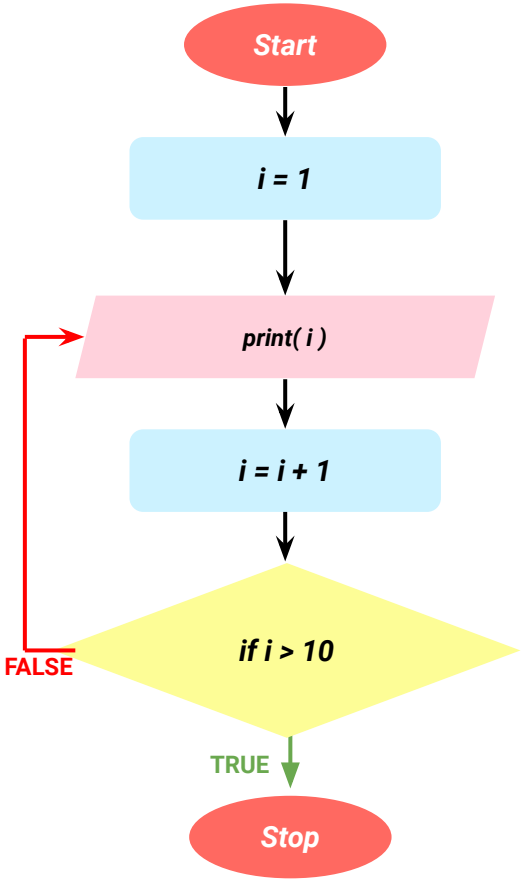
We should stop the program when we have printed 10 and the value of i becomes 11.

What kind of a box will you use to check the value of i?



If i isn't greater than 10, (CONDITION IS FALSE), where do you think the program should go? We want to continue printing the numbers.

And if i>10 is TRUE? The value of i has become more than 10, what do we do in this case?

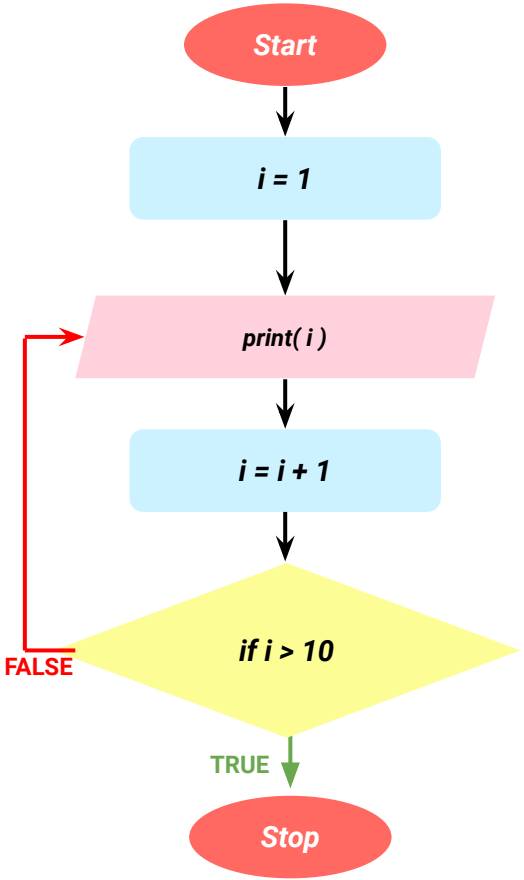


If i isn't greater than 10, (CONDITION IS FALSE), where do you think the program should go? We want to continue printing the numbers.

The No branch should go to the print statement as we still want some more values of i to print.

And if i>10 is TRUE? The value of i has become more than 10, what do we do in this case?

We need to stop printing and stop the flowchart as well.

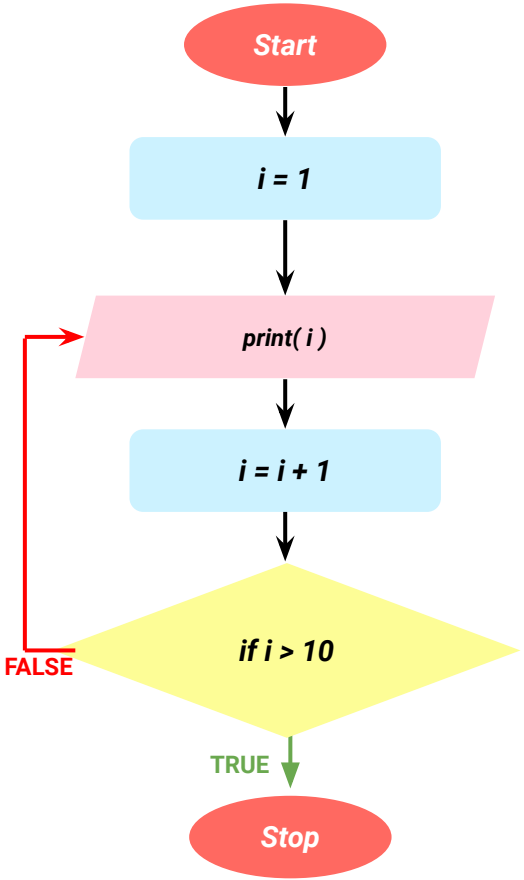


PRACTICE

If we wanted to print only 1 to 150 numbers, what one change would you make to this flowchart?

If you wanted to print numbers between 5 and 10, what one change would you make to this flowchart?

You want to print only alternative numbers till 10, what one change would you make in this flowchart?(1, 3, 5, 7, 9)

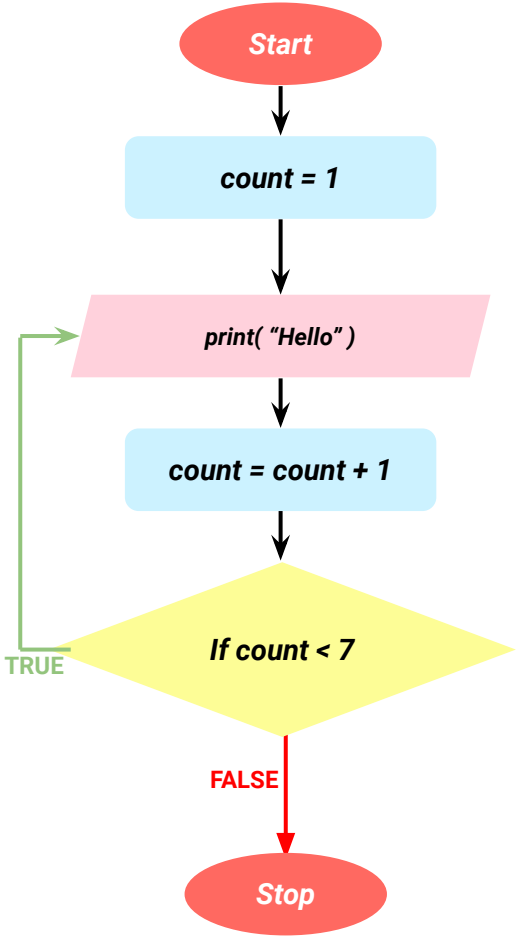


PRACTICE

1. Change the condition to i > 150 & quit the loop
2. Change the starting value of i to 5 instead of 1.
3. To print alternate numbers, instead of increasing the value of i by 1, we increase it's value by 2. So i = i + 2.

Let’s make a flowchart to print the following -
Hello
Hello
Hello
Hello
Hello
Hello

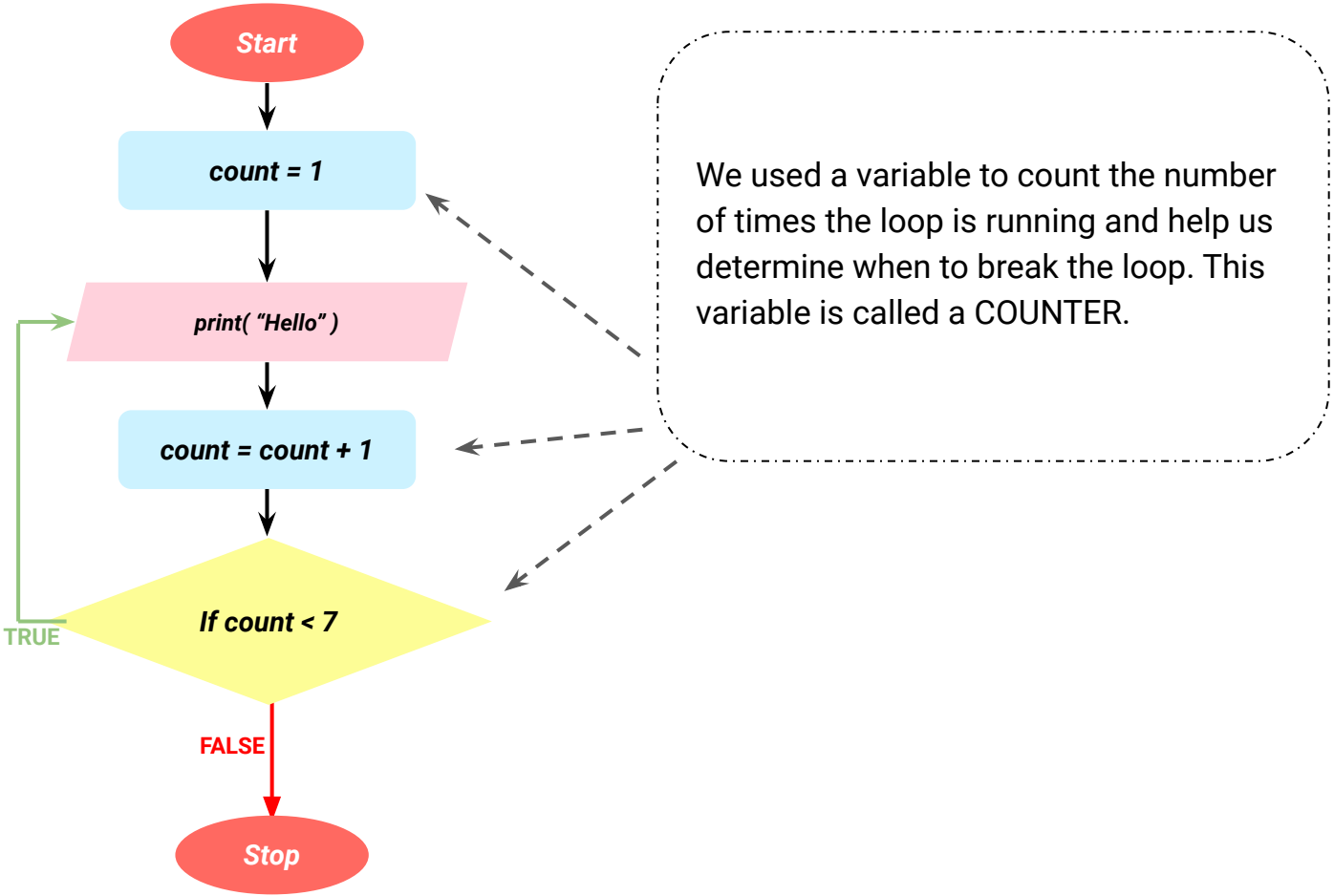
How many times do you think this loop should run?

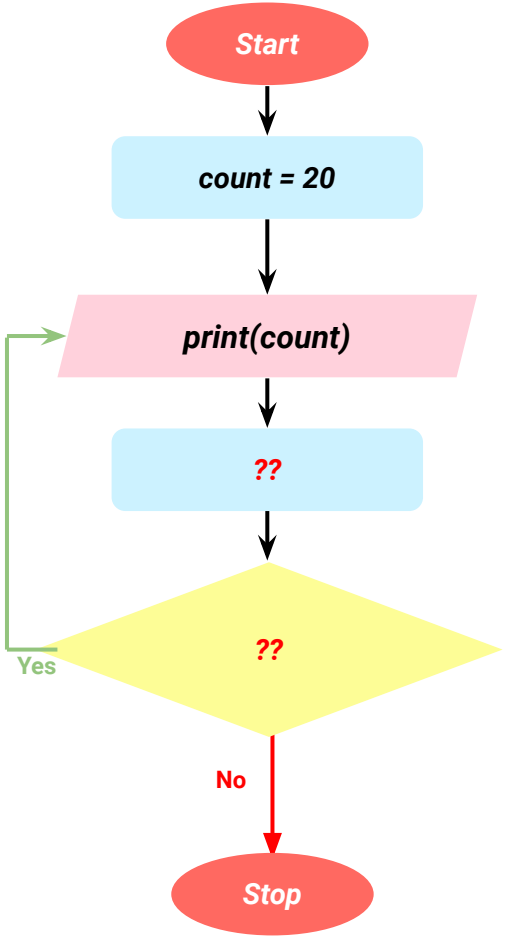


Here we need a variable that checks how many times the instruction has been executed -

1. After every once we print the instruction, the value of the variable will increase by one.
2. Once the variable value becomes more than six, we have to stop the execution.

When does the Loop break?

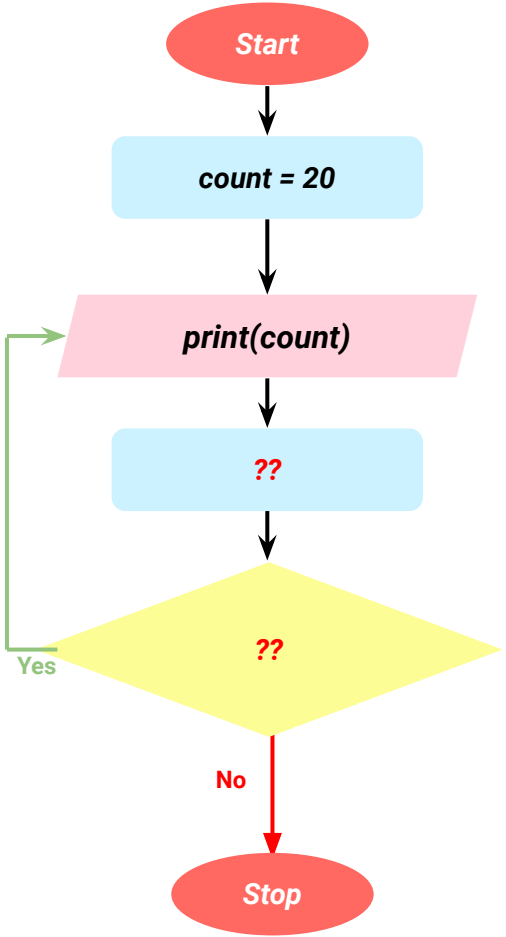

Start
count = 1
print(“Hello”)
count = count + 1
If count < 7
TRUE
FALSE
Stop
We used a variable to count the number of times the loop is running and help us determine when to break the loop. This variable is called a COUNTER.



PRACTICE

What variable we are using to print the digits AND maintain as the counter?

The first time, what will print in the Output box we are using?



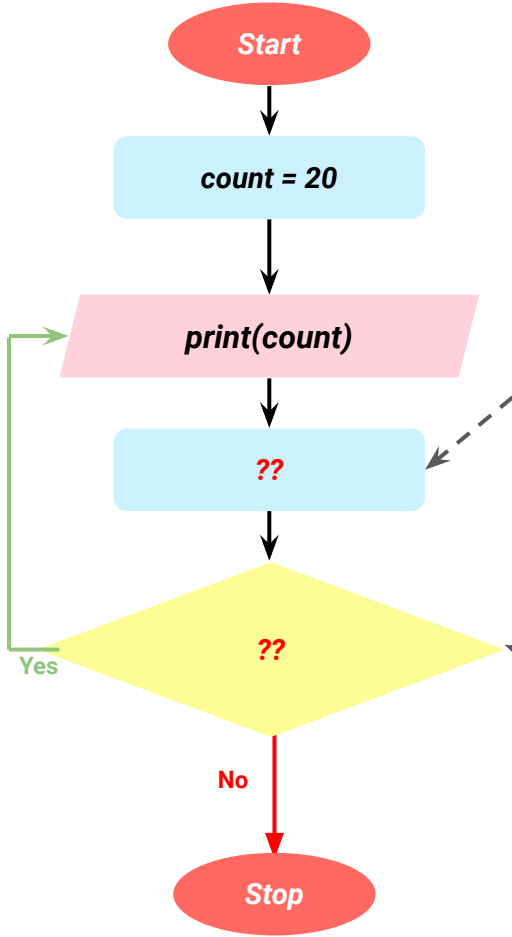
PRACTICE

What variable we are using to print the digits AND maintain as the counter?

The variable ‘count’

The first time, what will print in the Output box we are using?

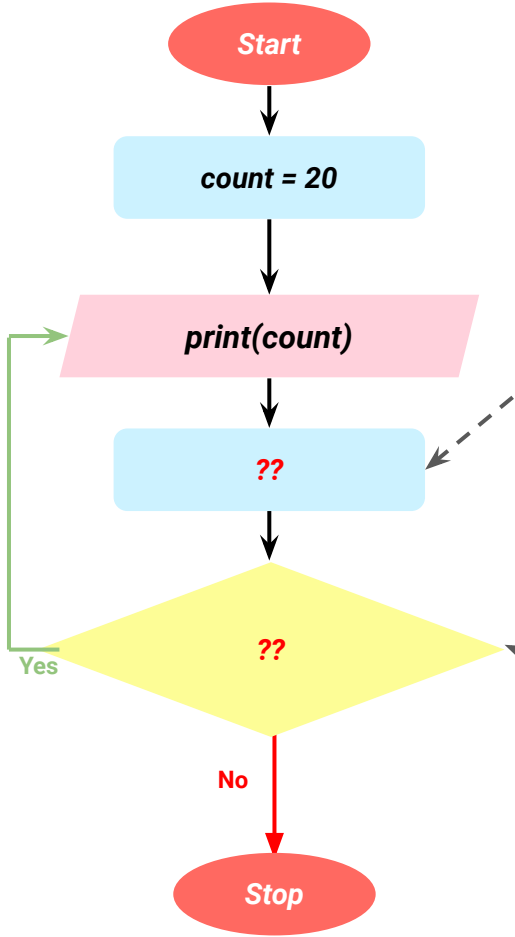
‘20’



PRACTICE

What do you think we should do in the process box, remember we printed 20, and now we want to print 19 next.

Next we have the decision box, we want the condition to be true till the counter has the value of 1. Till when should we run the loop?



PRACTICE

What do you think we should do in the process box, remember we printed 20, and now we want to print 19 next.

We should reduce the value of count by 1.
So count = count - 1

Next we have the decision box, we want the condition to be true till the counter has the value of 1. Till when should we run the loop?

The condition should be count > 0. The moment count is 0 or less than it, we need to stop the flowchart.

PRACTICE

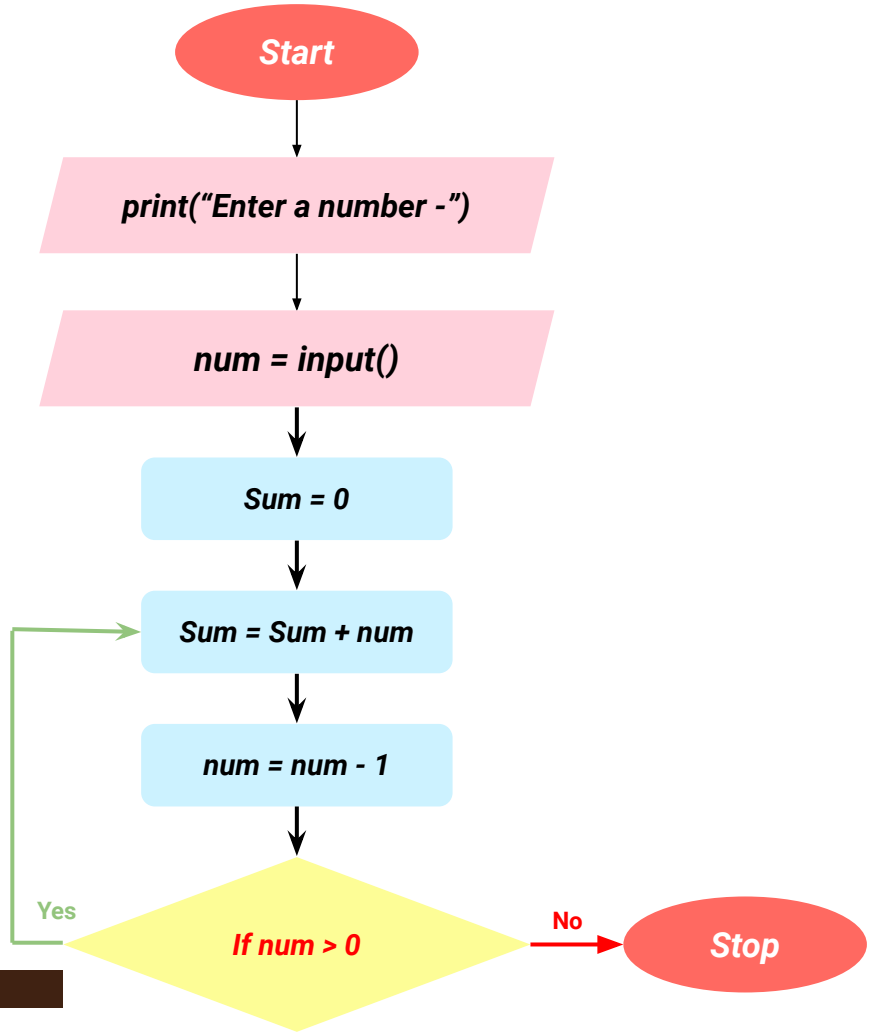
Write a program to print the sum of numbers from 1 to N, where N is given as an input from the user.

Sample input:

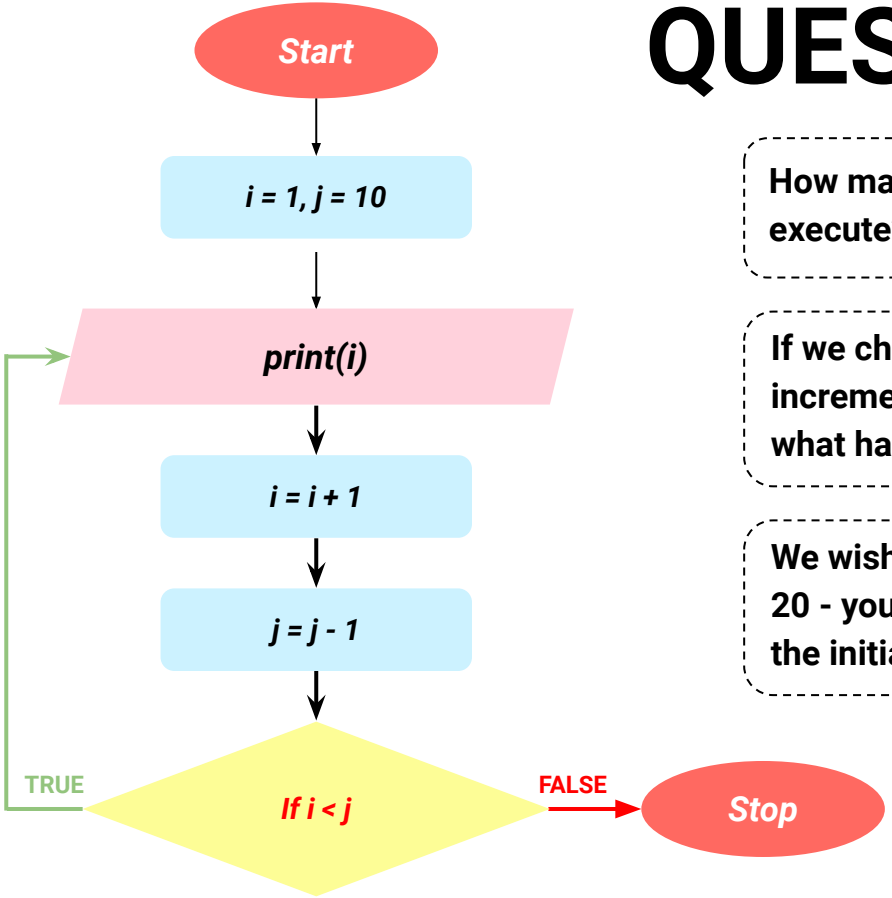
5

Sample output:

15 *(1+2+3+4+5)*


Start
print("Enter a number -")
num = input()
Sum = 0
Sum = Sum + num
num = num - 1
If num > 0
Yes
No
Stop

QUESTION

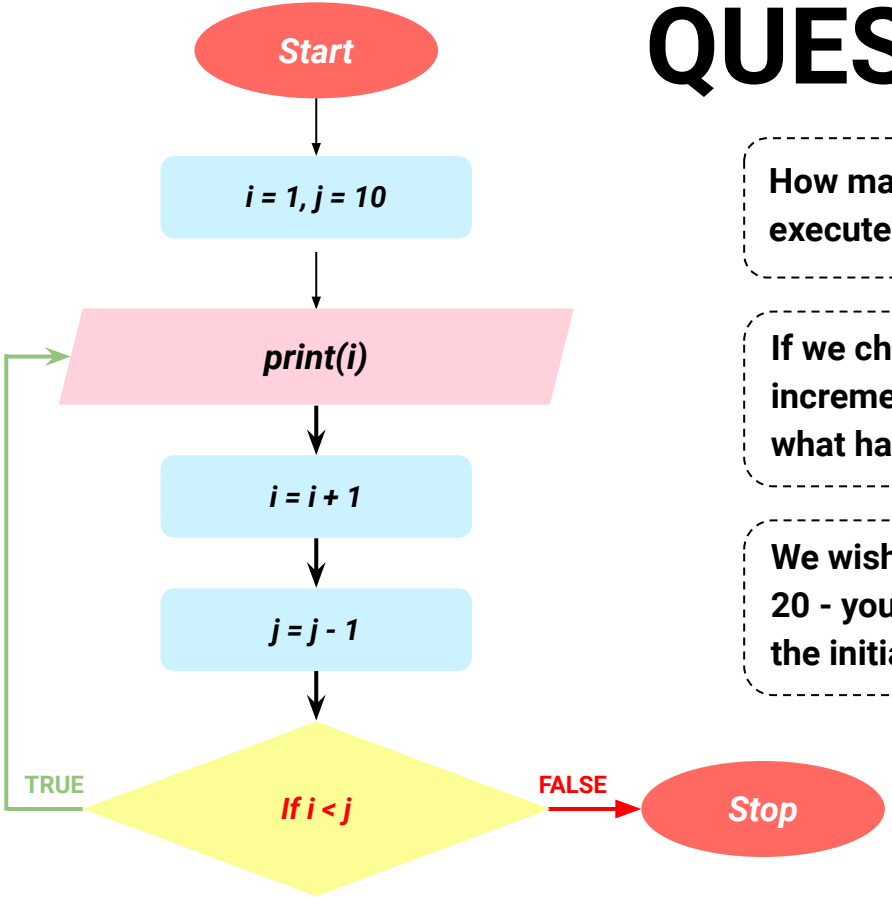


How many times will the given loop execute?

If we change the program and increment the value of j by 1 (j=j+1), what happens to the loop?

We wish to print the values from 1 to 20 - you're only allowed to change the initial values of i and j.

QUESTION



How many times will the given loop execute?

The loop executes only 5 times because the upper limit keeps on decreasing.

If we change the program and increment the value of j by 1 (j=j+1), what happens to the loop?

This change will make the loop an infinite one. Value of i never reaches value of j.

We wish to print the values from 1 to 20 - you're only allowed to change the initial values of i and j.

Update the value of j from j=10 to j=40.

SPECIAL PROBLEMS

EXTRACTING LAST DIGIT

We want to extract and print the last digit of a number. How can we do so?

Given a number like 1098, we want to get the last digit(8) and assign it to a variable. Think of an operation + - x / % that will help us do so.

EXTRACTING LAST DIGIT

We want to extract and print the last digit of a number. How can we do so?

Given a number like 1098, we want to get the last digit(8) and assign it to a variable. Think of an operation + - x / % that will help us do so.

Lastdigit = 1098%10

REMOVING THE LAST DIGIT

We want to remove the last digit of a number and assign it to a variable.

For example - Given a number like 1098, we want to remove the last digit and make it 109.

NewNumber = 1098//10

SPECIAL PROBLEMS

REVERSING A NUMBER

Given a number like 134, we have to reverse it - 431 and assign it to another variable.

Variable name is reverse.
In 134, we remove 4 first, and send it to **reverse(4).** Then we remove 3 and send it to **reverse(43)**. Now we remove 1 and send it to **reverse (431)**

When reverse has value 4, how will you append 3 to make it 43?

SPECIAL PROBLEMS

REVERSING A NUMBER

Given a number like 134, we have to reverse it - 431 and assign it to another variable.

Variable name is reverse.
In 134, we remove 4 first, and send it to **reverse(4).** Then we remove 3 and send it to **reverse(43)**. Now we remove 1 and send it to **reverse (431)**

When reverse has value 4, how will you append 3 to make it 43?

4x10+3
reverse = 43

SPECIAL PROBLEMS

REVERSING A NUMBER

Given a number like 134, we have to reverse it - 431 and assign it to another variable.

Variable name is reverse.
In 134, we remove 4 first, and send it to **reverse(4).** Then we remove 3 and send it to **reverse(43)**. Now we remove 1 and send it to **reverse (431)**

How can you now join 43 with 1 and make it 431

43x10+1
reverse = 431

SPECIAL PROBLEMS

REVERSING A NUMBER

Write a flowchart to reverse a given number.

Write a flowchart to check if a given number is a palindrome or not.

SPECIAL PROBLEMS

FACTORS

A factor of a number is any number that can divide that number thoroughly.
Example - Factor of 18 are - 1, 2, 3, 6, 9, 18 as these numbers can divide 18.

Write down the factors of 26, 19, 23, 45, 60

Given a number N, we have to write a flowchart to find it's factors and print it.

SPECIAL PROBLEMS

PRIME NUMBERS

A prime number is a number that can be divisible by only itself and 1. No other number can divide this number.

Can you mention some such numbers?

Using a flowchart, How will you check if a number is prime or not using loops?

SPECIAL PROBLEMS

PRIME NUMBERS

Now, if we consider a number - let's say - 103. How many times will this loop run?

What are the halves of the following numbers, do they have a factor greater than their halves?

20 25 39 65

SPECIAL PROBLEMS

PRIME NUMBERS

Hence, for a number N, we need not check all the way till N. We can check till N/2

What are the factors of 100

SPECIAL PROBLEMS

PRIME NUMBERS

What are the factors of 100

1 - 2 - 4 - 5 - 10 - 20 - 25 - 50 - 100

If you notice, most of these numbers come in pairs.

1 and 100

2 and 50

4 and 25

5 and 20

10

It means that if I check whether 2 is a factor or not, I need not check if 50 is a factor or not. And along with it, all the numbers after 50. If I check whether 4 is a factor or not, I need not check if 25 is a factor and long with all numbers after 25.

I will end up with 10, And if I check if 10 is a factor, I need not check if all the numbers after that are factors or not. So now my number of repetitions went from 2 to 99, to just 2 to 10. I made my program very efficient by running the loop until 10 which is the square root of 100

Hence, we don't need to check the numbers after √n.

Write a flowchart to check if 36 is a prime number or not.

SPECIAL PROBLEMS

LCM

LCM or Least common multiple, is the smallest number that comes in the tables of both the given numbers N & M

Can you mention the LCM of 5&6, 15 and 12, 10 and 11?

Given two number N and M, write a flowchart to calculate their least common multiple.

SPECIAL PROBLEMS

HCF

HCF or Highest Common Factor is the biggest number that can divide both the numbers N & M.

Can you mention the HCF of 5 and 20?

Given two number N and M, write a flowchart to calculate their highest common factor.

SPECIAL PROBLEMS

FACTORIAL

Factorial of a number is the multiplication of all numbers from 1 to N.

What is the Factorial of the Number 6?

Design a Flowchart - Given a number N, calculate and print it's factorial.

SPECIAL PROBLEMS

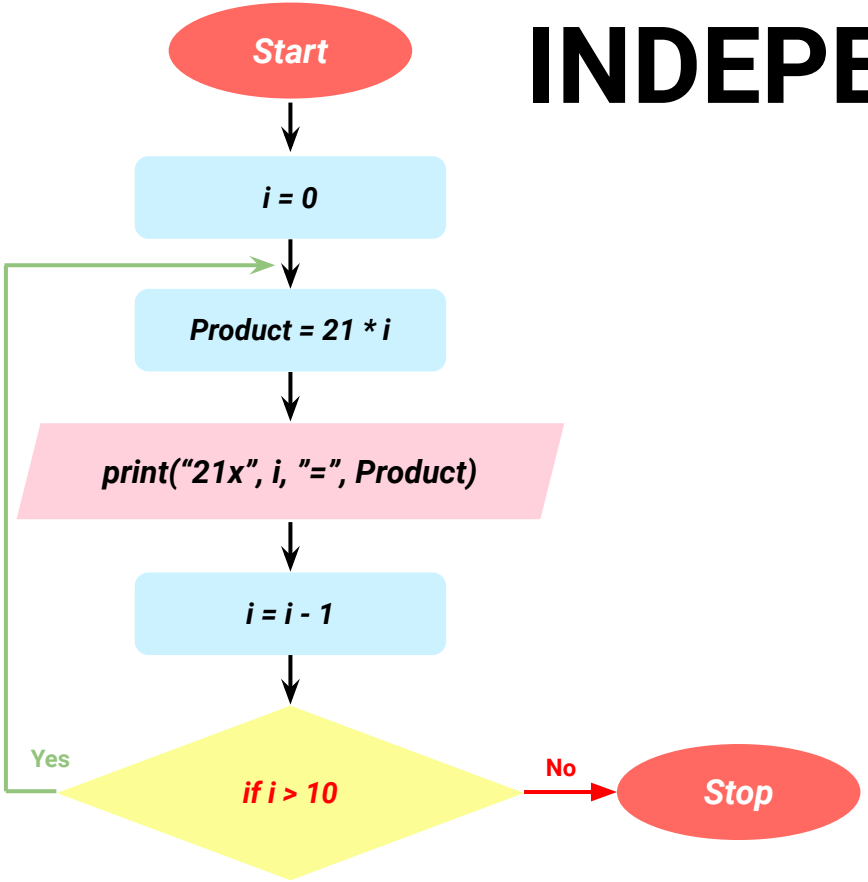
PERFECT NUMBERS

A perfect number is a number whose sum of all factors results in the original number.

Can you check if 6 is a perfect number or not?

Design a Flowchart - Given a number N, check and print if the number is a Perfect number or not.

INDEPENDENT PRACTICE



Correct the following flowchart to get the required output -

Output -

21 X 1 = 21
21 X 2 = 42
21 X 3 = 63
21 X 4 = 84
21 X 5 = 105
21 X 6 = 126
21 X 7 = 147
21 X 8 = 168
21 X 9 = 189
21 X 10 = 210

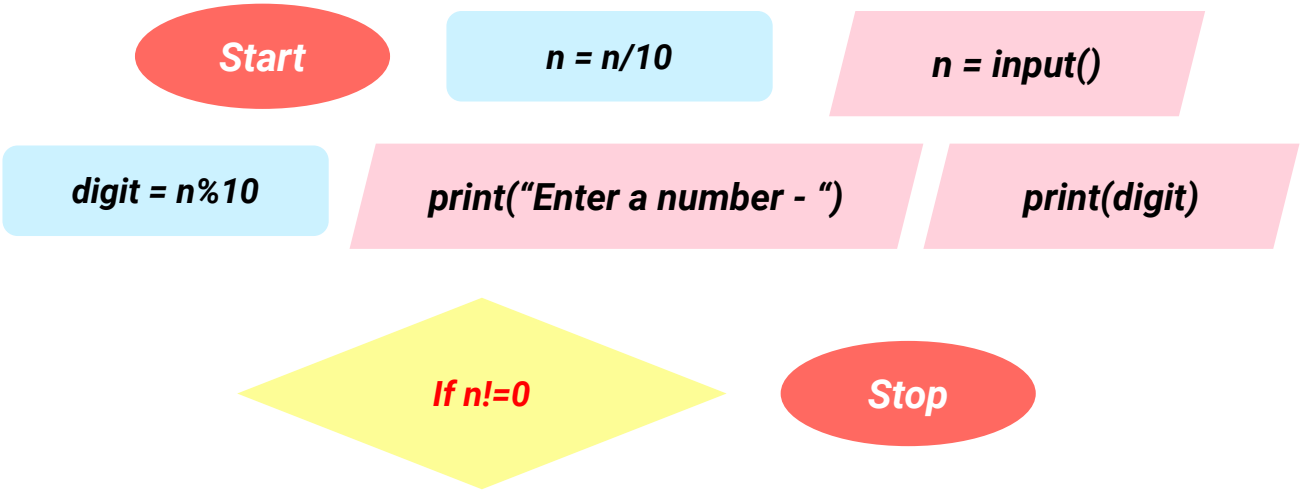
INDEPENDENT PRACTICE

Problem - Rishi teaches Math in multiple classrooms across multiple grades. Write a Program for Rishi to enter a number whose table he wants printed, to show the classroom. The program must also accept the limit till where he wants the tables to be printed. (for example, till 10 times, till 15 times, etc.)

Problem - Write a program to enter two numbers and print all the odd/even numbers between them.

INDEPENDENT PRACTICE

Arrange the following units in the correct order to get the desired output -
Problem - Write a program to accept a number from the user and print each of its digits separately.



INDEPENDENT PRACTICE

Problem - Draw a flowchart to take a number N as input and print the sum of digits of that number.
Sample Input
3425
Sample Output
14 (3+4+2+5)

Problem - Draw a flowchart to input a number, print all of its factors.

Problem - Write a program to check if a given number is a prime number or not.