

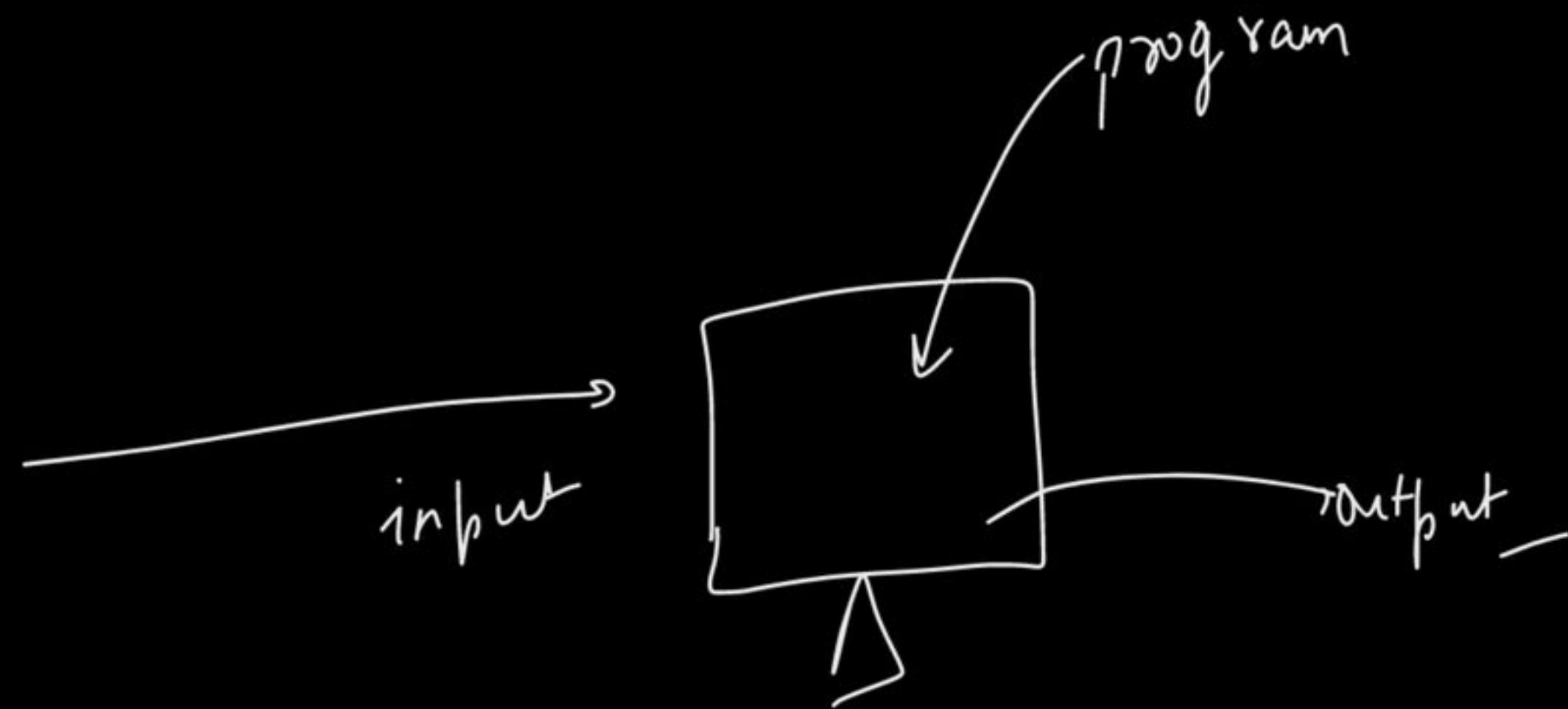
L1-Basics of Programming

Special class

L1 - Basics of Programming

Flowcharts and PseudoCode

What is Programming ?



What is Algorithm ?

Maggi →

Shrey Vohra
Algorithm → sequence of steps to solve problem

- Step 1 → Water → Boil
- 2 → Maggi → Pan
- 3 → Masala → Pan
- 4 → 2 min wait
- 5 → plate —
- 6 →

Algorithm

Namkeen
chawal



5i oil → Jeera

onion →

tomato

→ haldi / Lahsun / Spice /

→ chawal

→ Water

→ salt

Algorithm

Pasta → ?

==



How to approach a Problem ?

Thought process

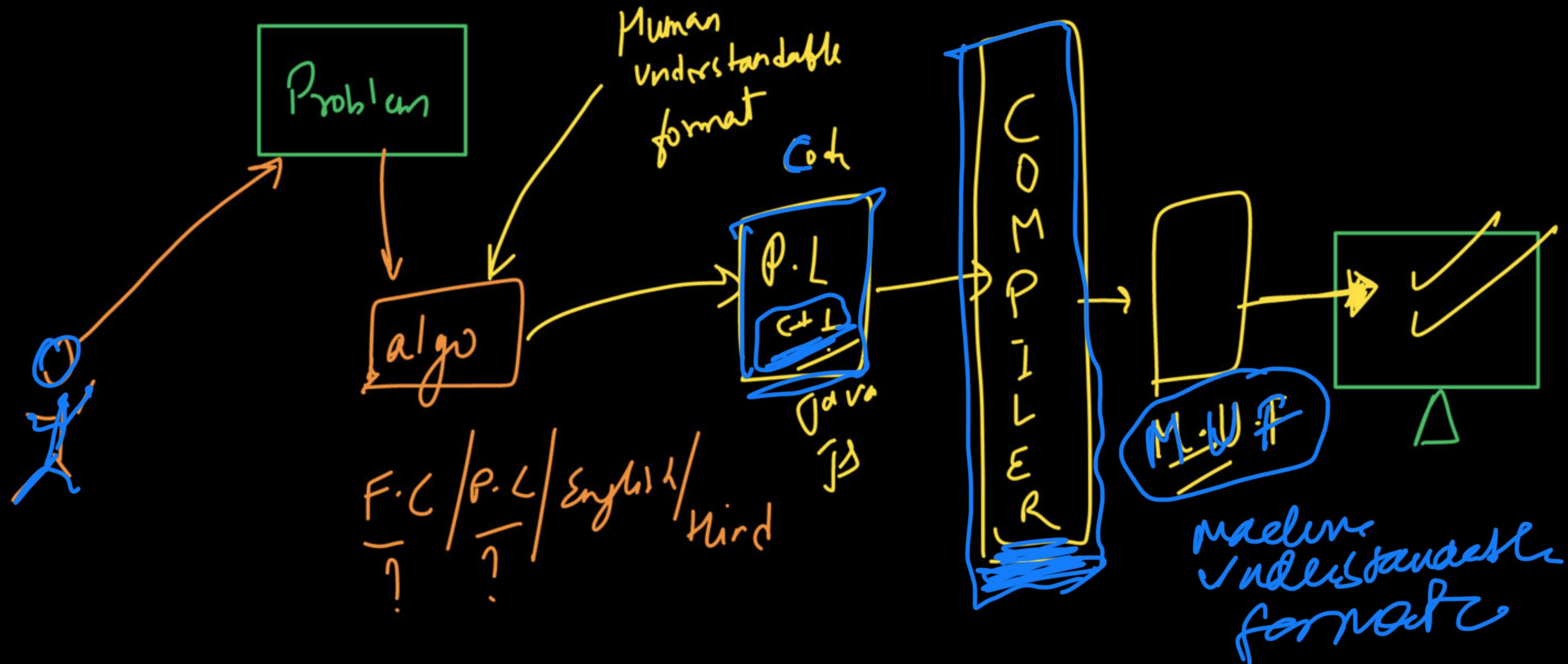
- ① Let's understand the Problem
- ② Analyse problem →
 - given values
 - useful formulae
 - constraints

$\text{side} = 4 \text{ cm}$
- ③ Create a approach →
 - Algorithm
 - ~~Flowchart~~
 - Optimisation

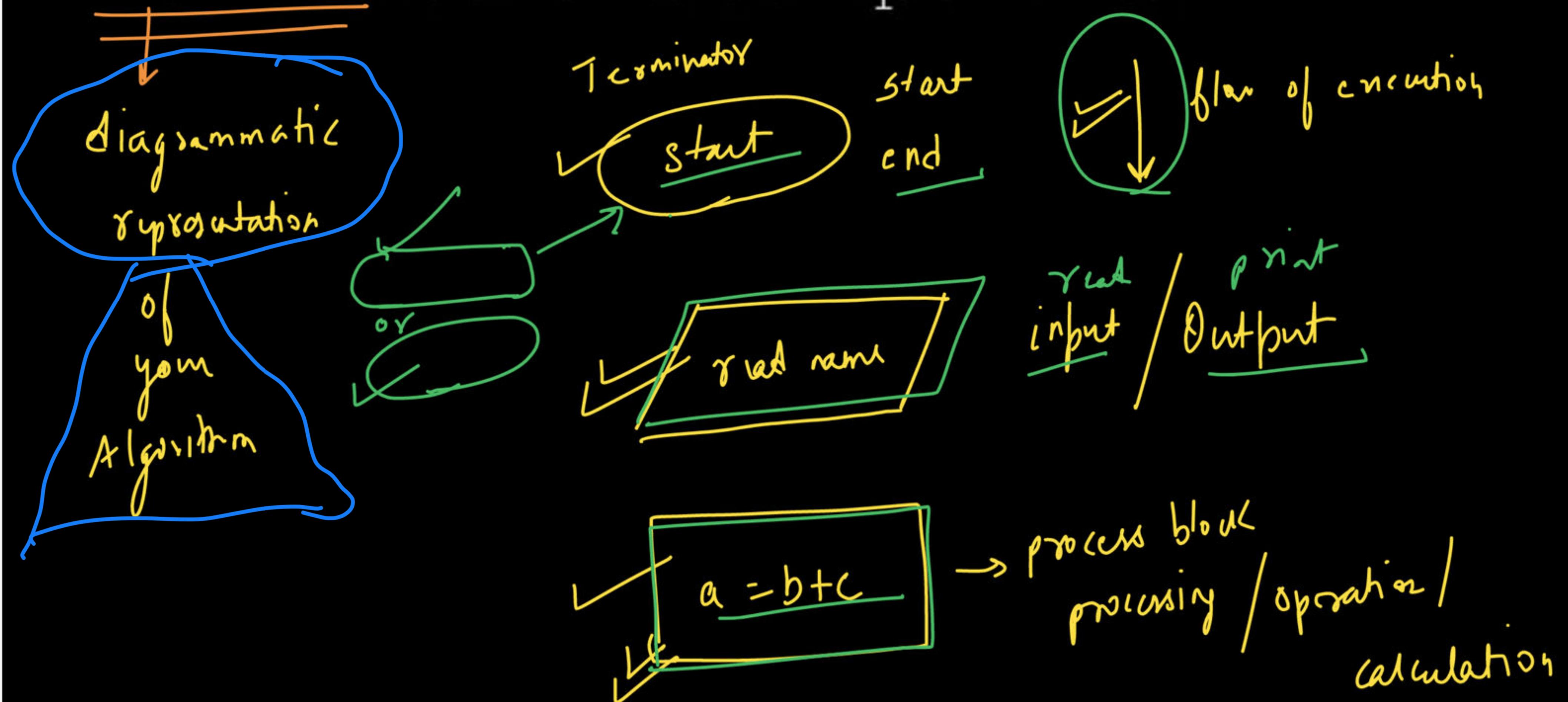
$\text{area} = s \times s$
 $= 4 \times 4$
 $= 16$

Using a computer to solve a problem

↳ ?



Flowchart and its components:



1

•

•

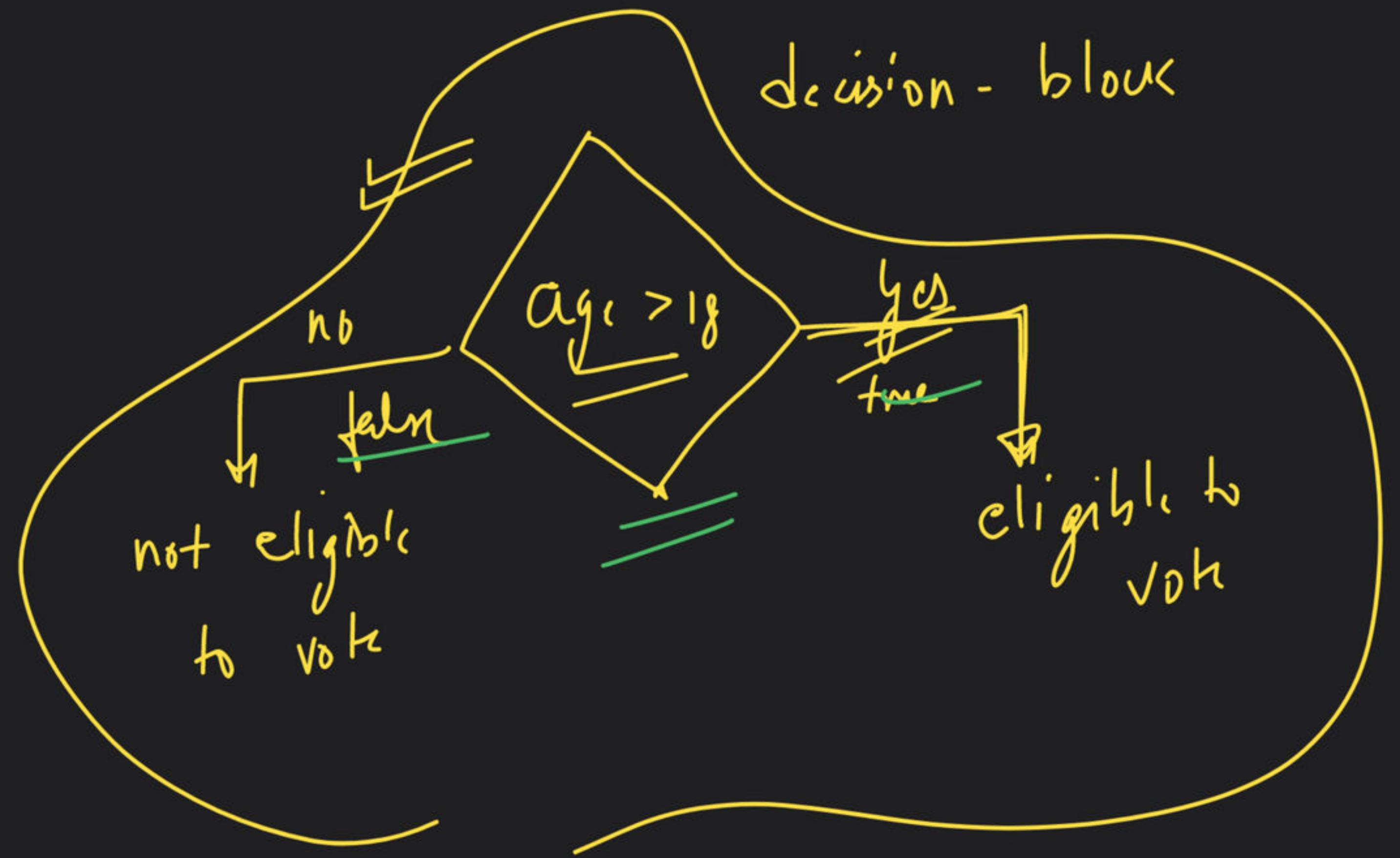
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Flowchart and its components:



good
placement





Pseudocode: friends

Nakli

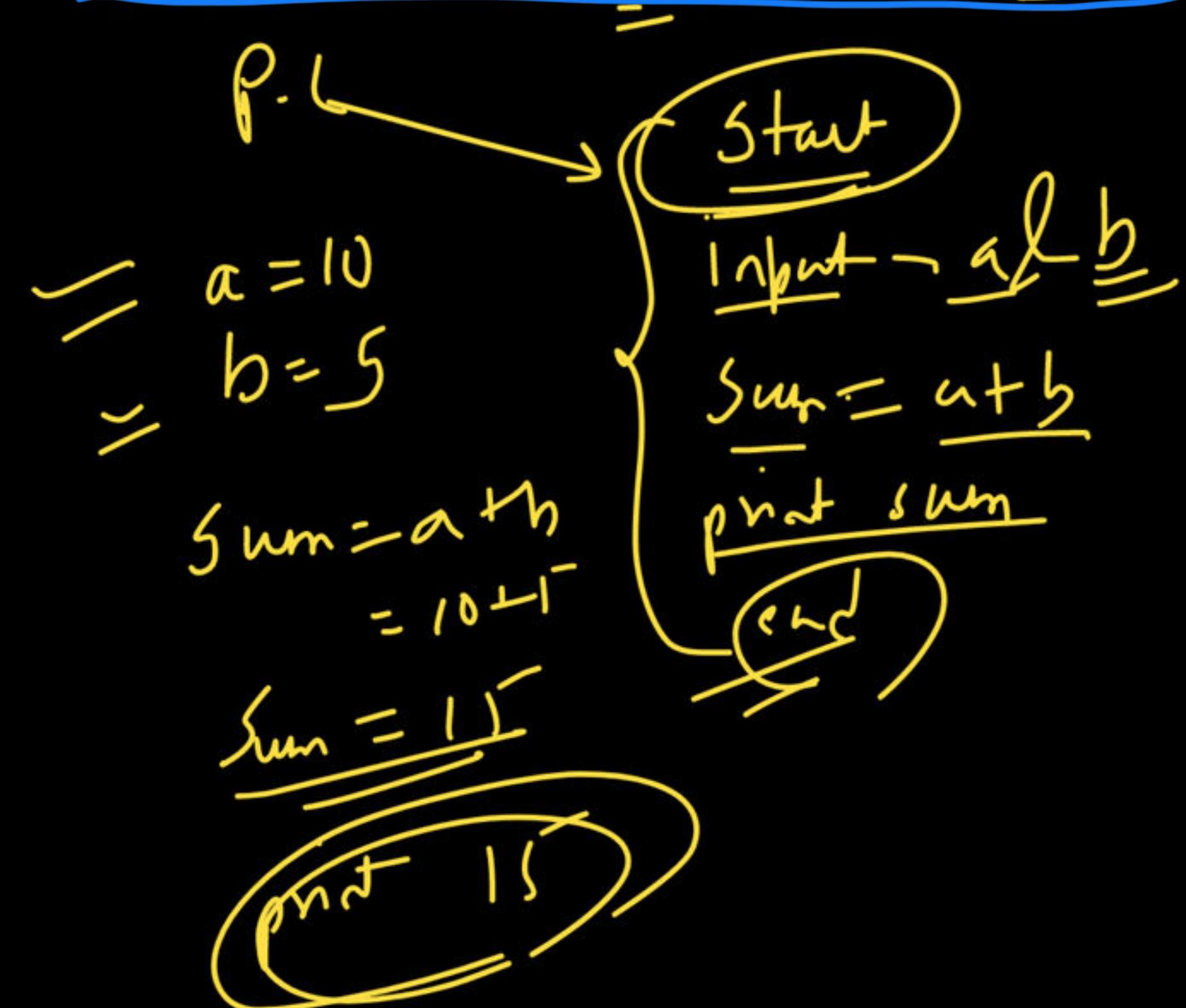
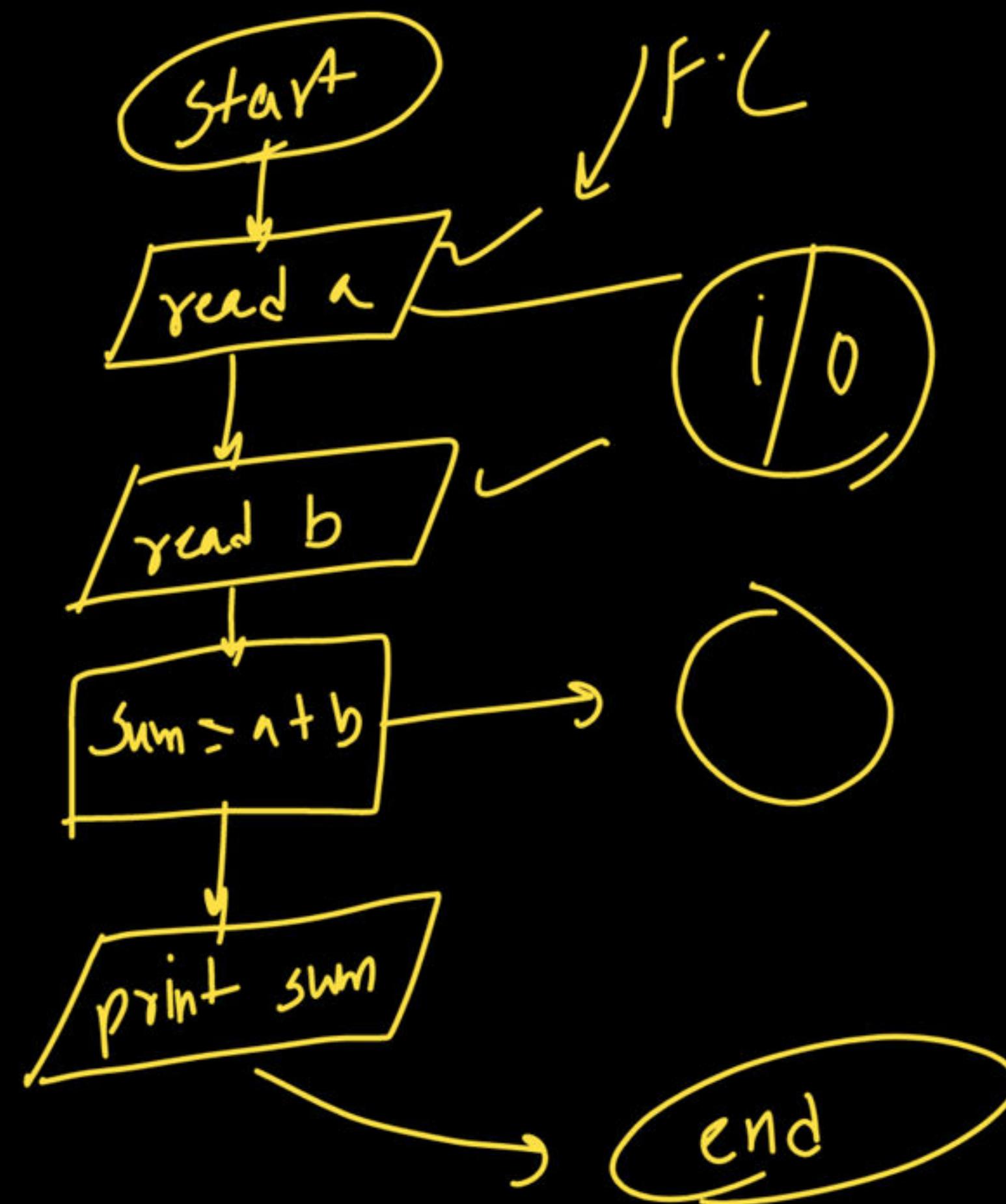
Code \rightarrow denote \rightarrow dui bhasha

Sum of 2 no.

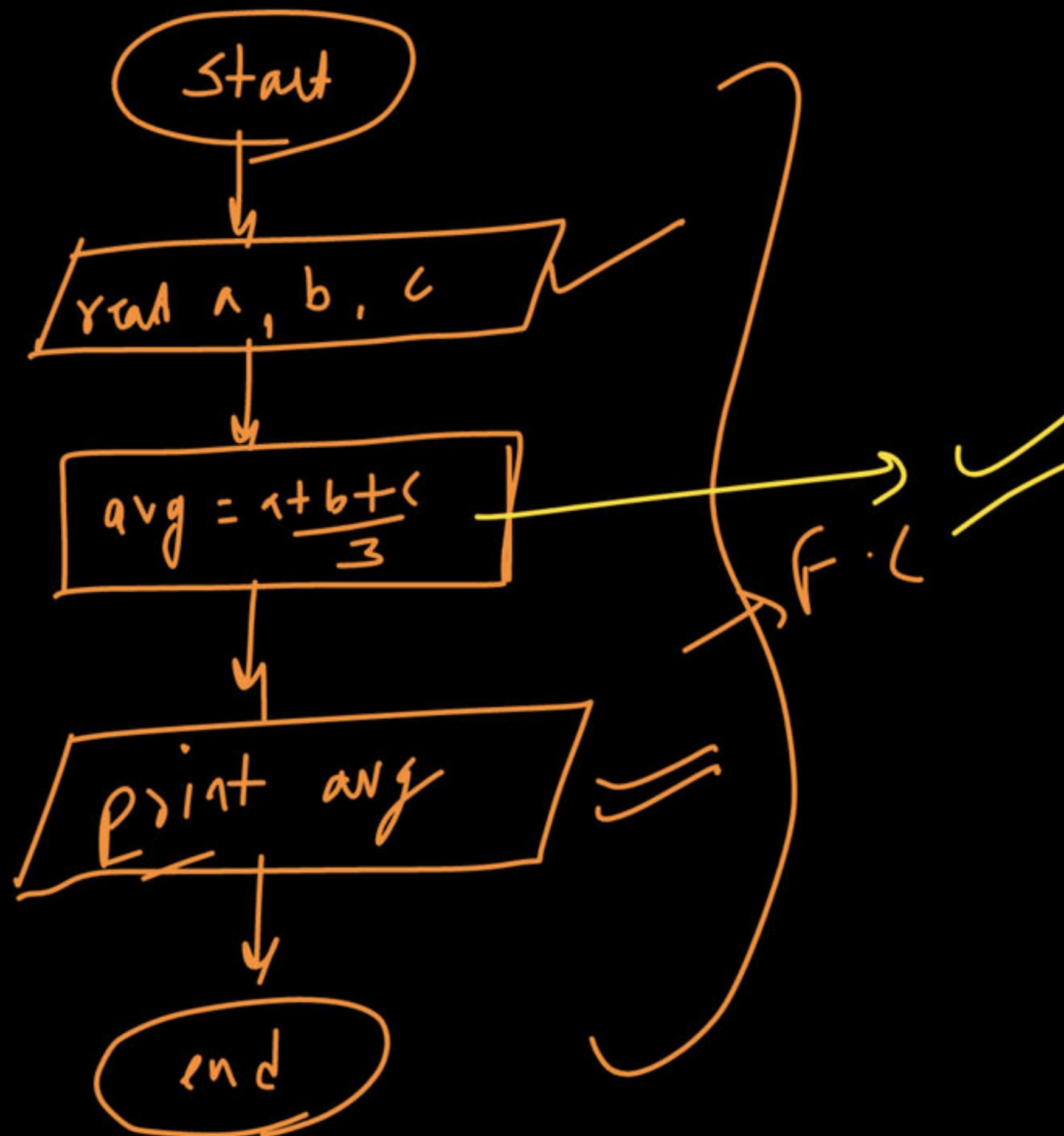
{
→ Start
→ read the value of a & b
→ sum = a + b
→ print sum
→ end}

→ Start
→ read first name
→ read middle name
→ read last name }
→ f·n = f + m + l
→ print full name
→ end

Design Flowchart - Print Sum of a and b



Design Flowchart - Print Average of a, b and c



Start

Given $a=10, b=12, c=14$

$$\text{avg} = \frac{a+b+c}{3}$$

$$= \frac{10+12+14}{3} = \frac{36}{3} = 12$$

A vpath
path

avg = 12

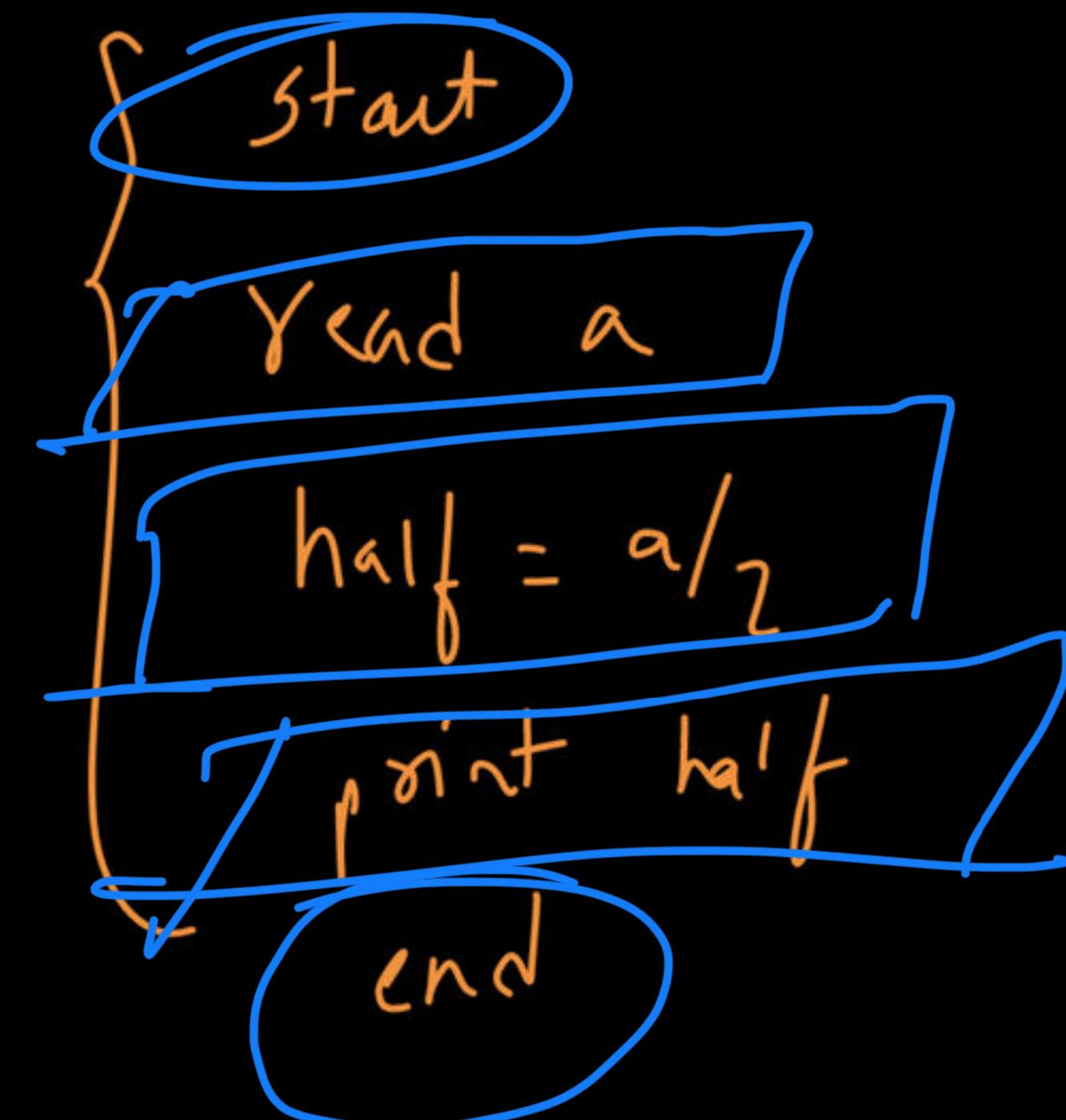
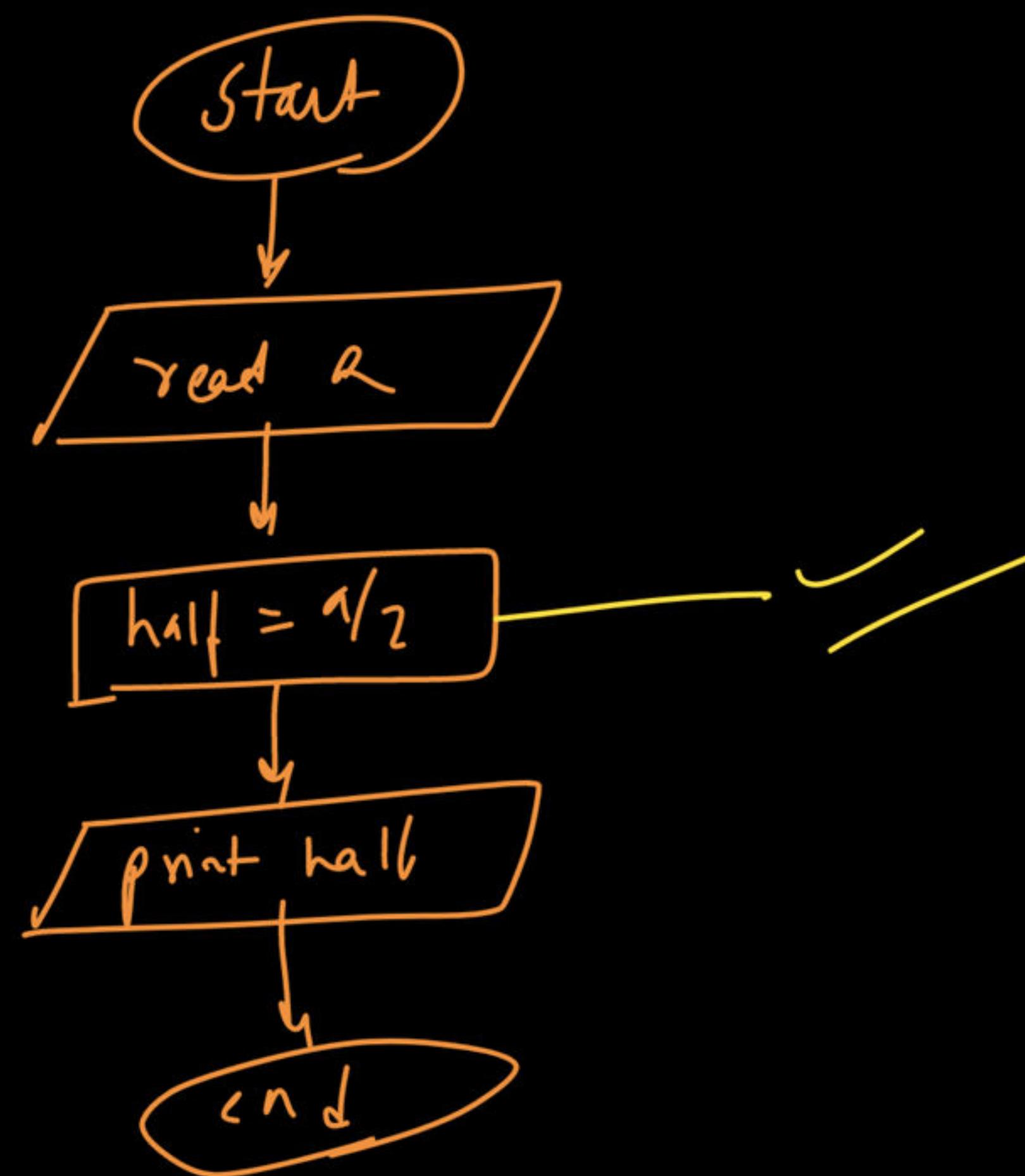
Print avg

end

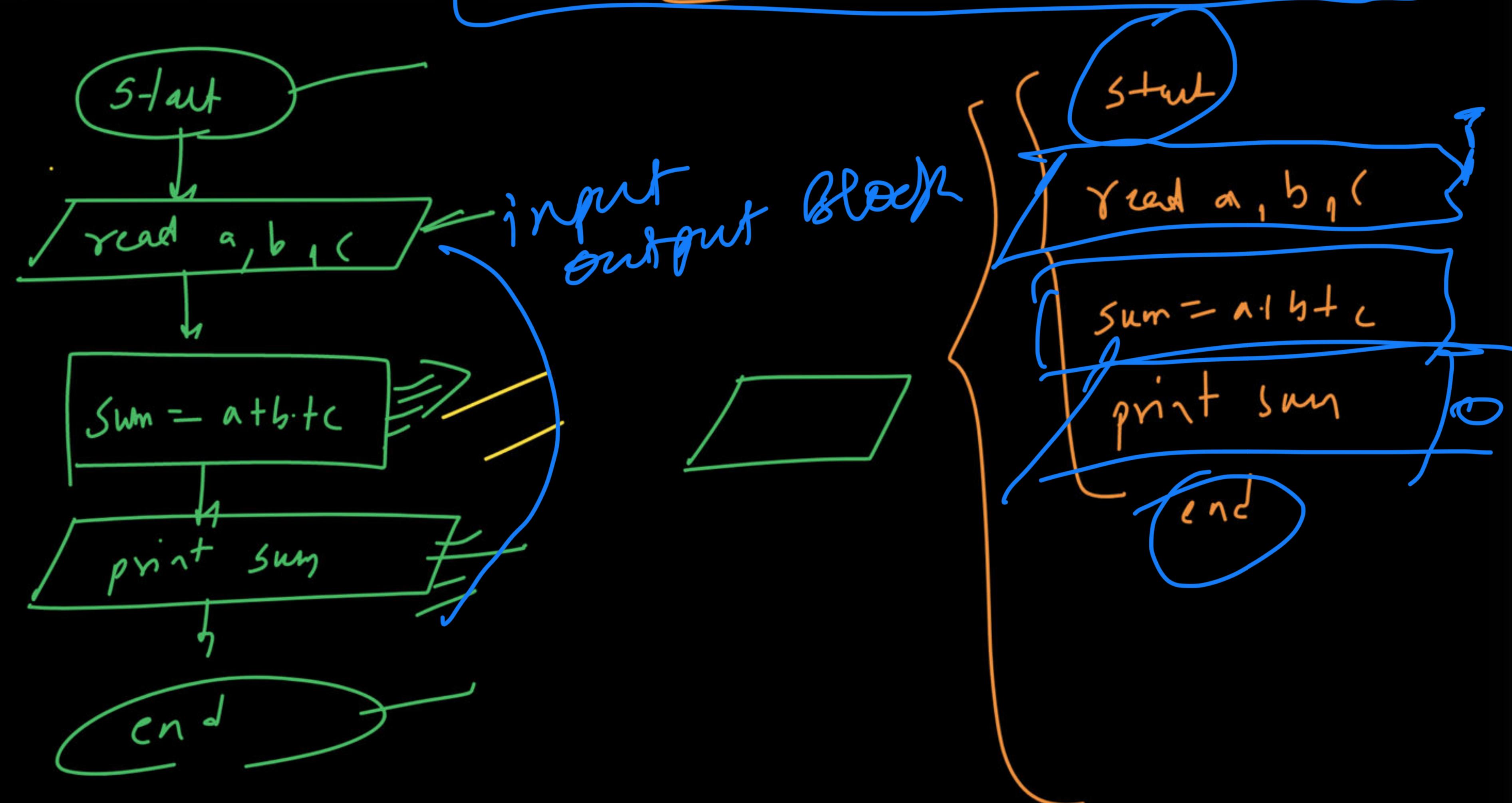
A handwritten note "A vpath" is written vertically next to the calculation.

Design Flowchart - Print half of a

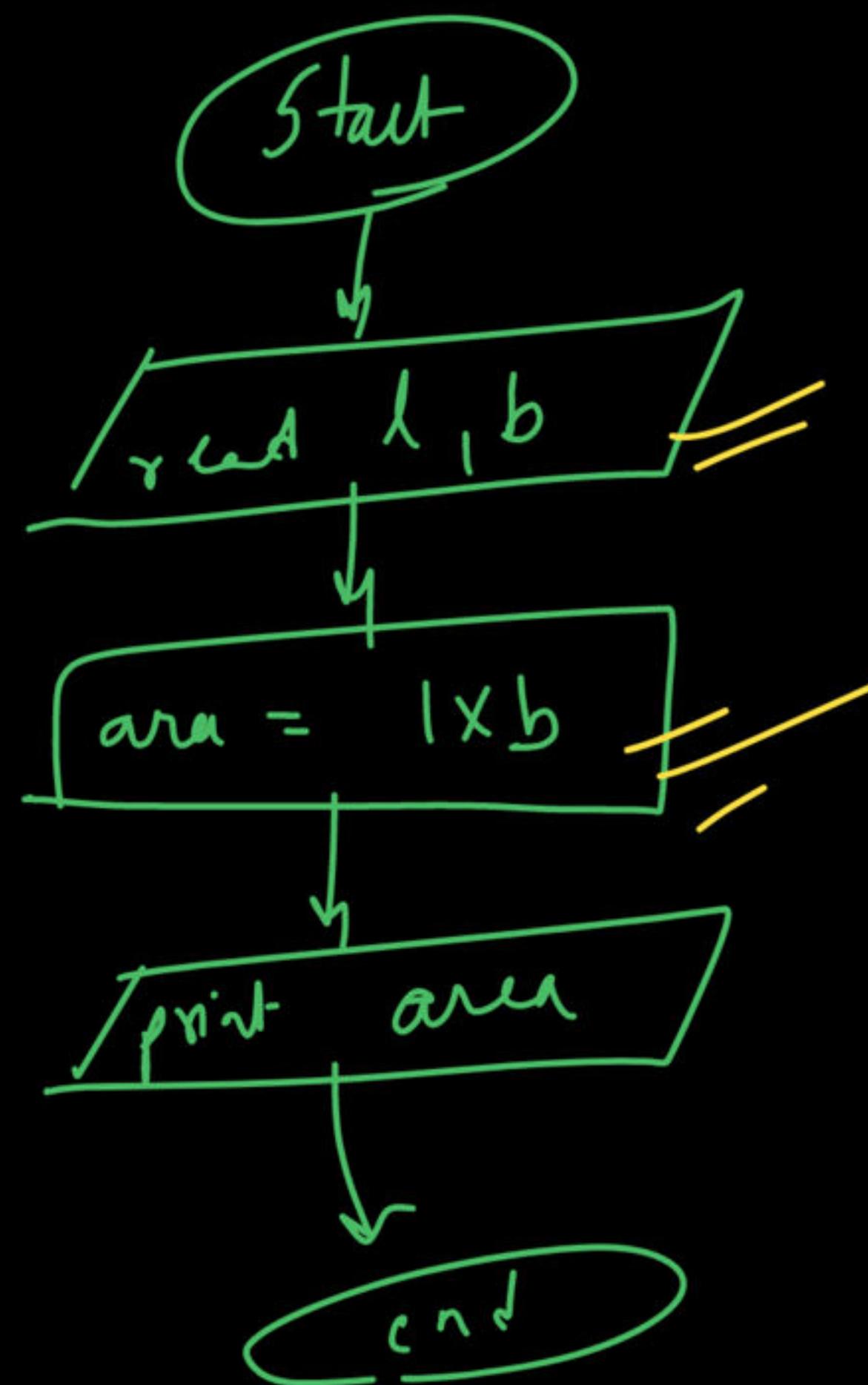
u1
u2



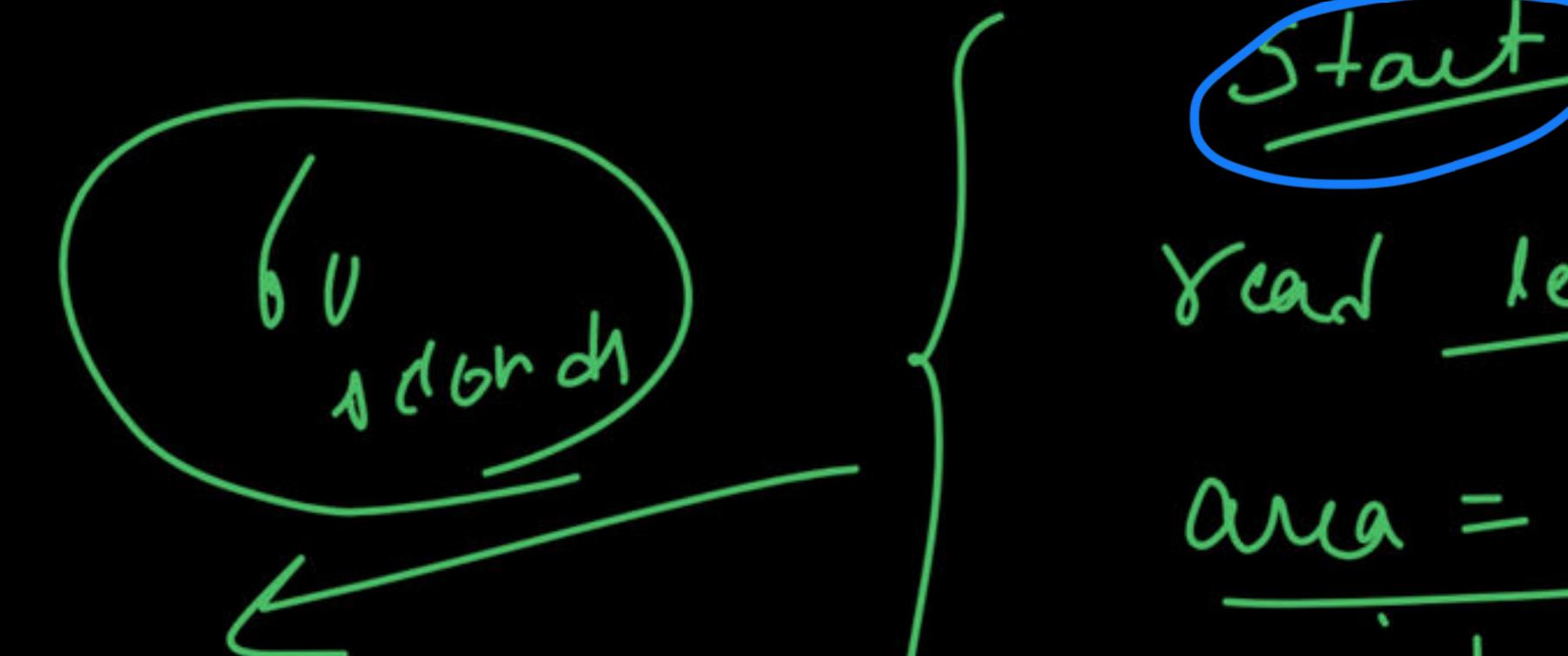
Design Flowchart - Take Input and add 3 numbers



Design Flowchart - Area of Rectangle



$$\text{area} = \underline{\text{len}} \times \underline{\text{br}} =$$

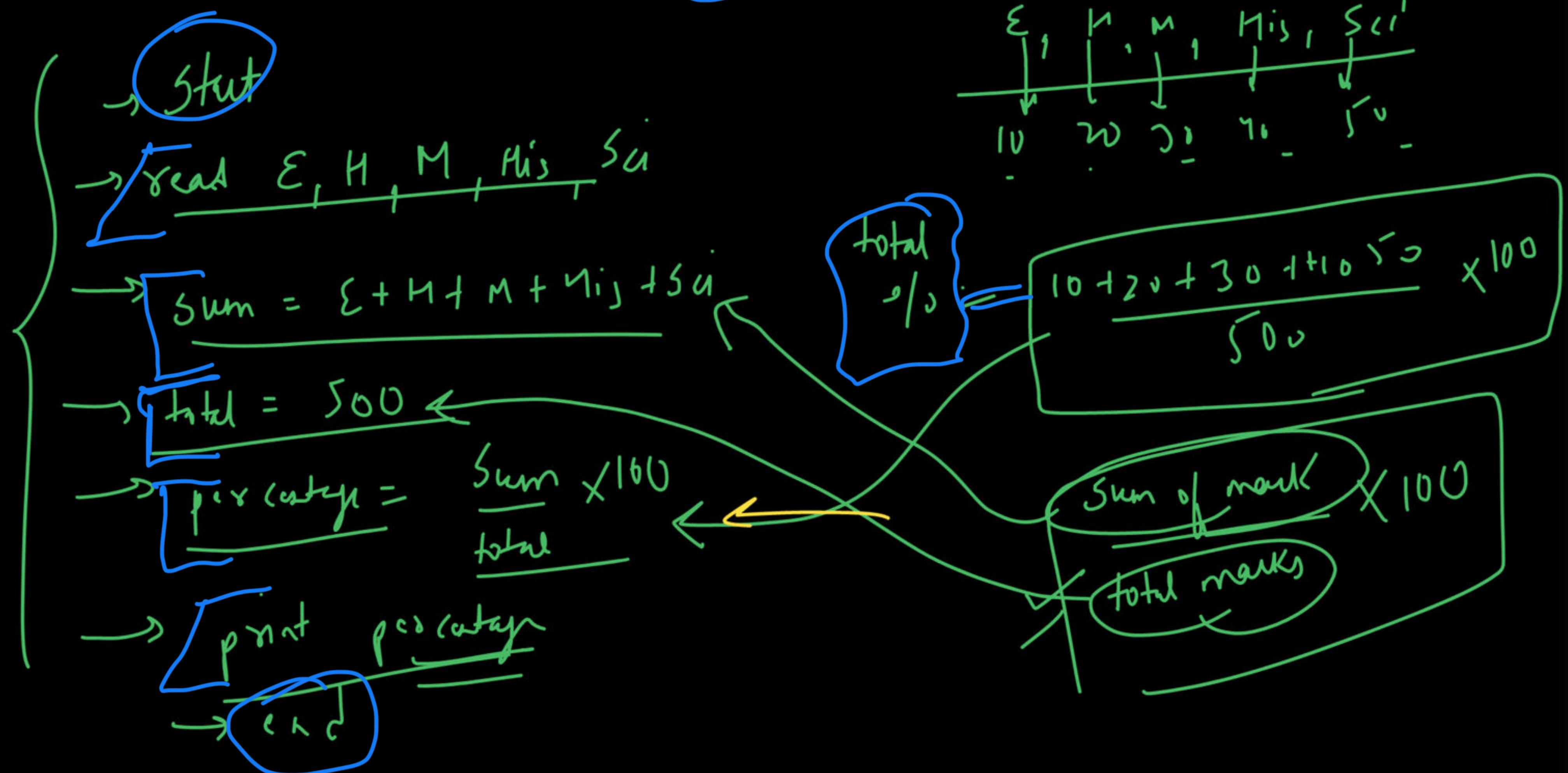


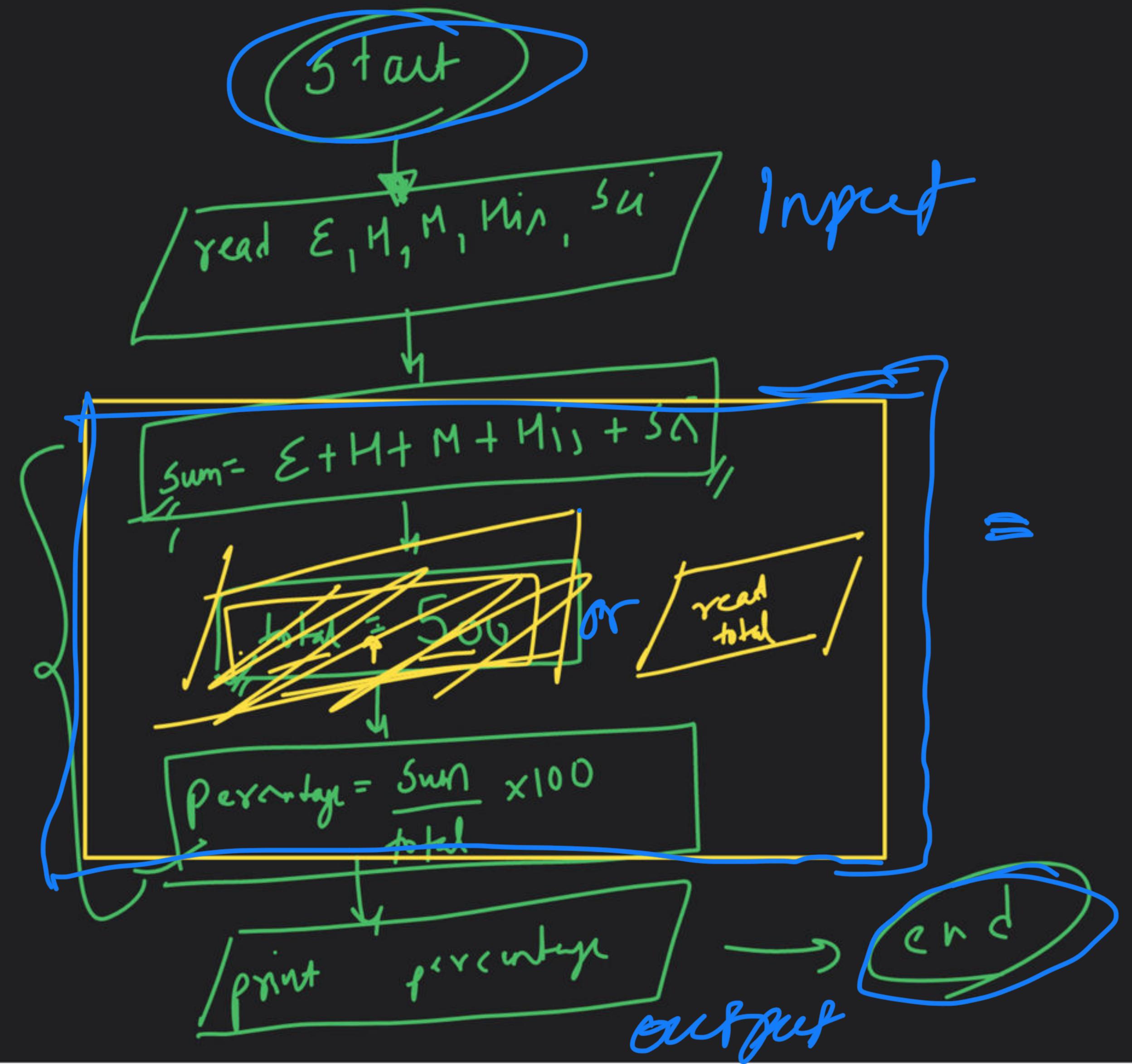
Start
read len, br
 $\text{area} = \underline{\text{len}} \times \underline{\text{br}}$
print area

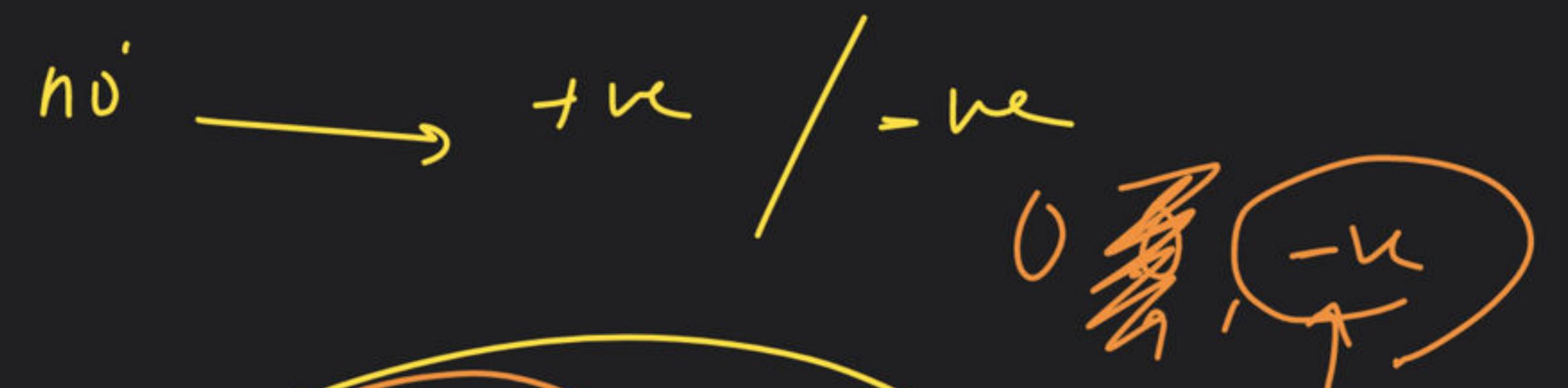
end

2 min

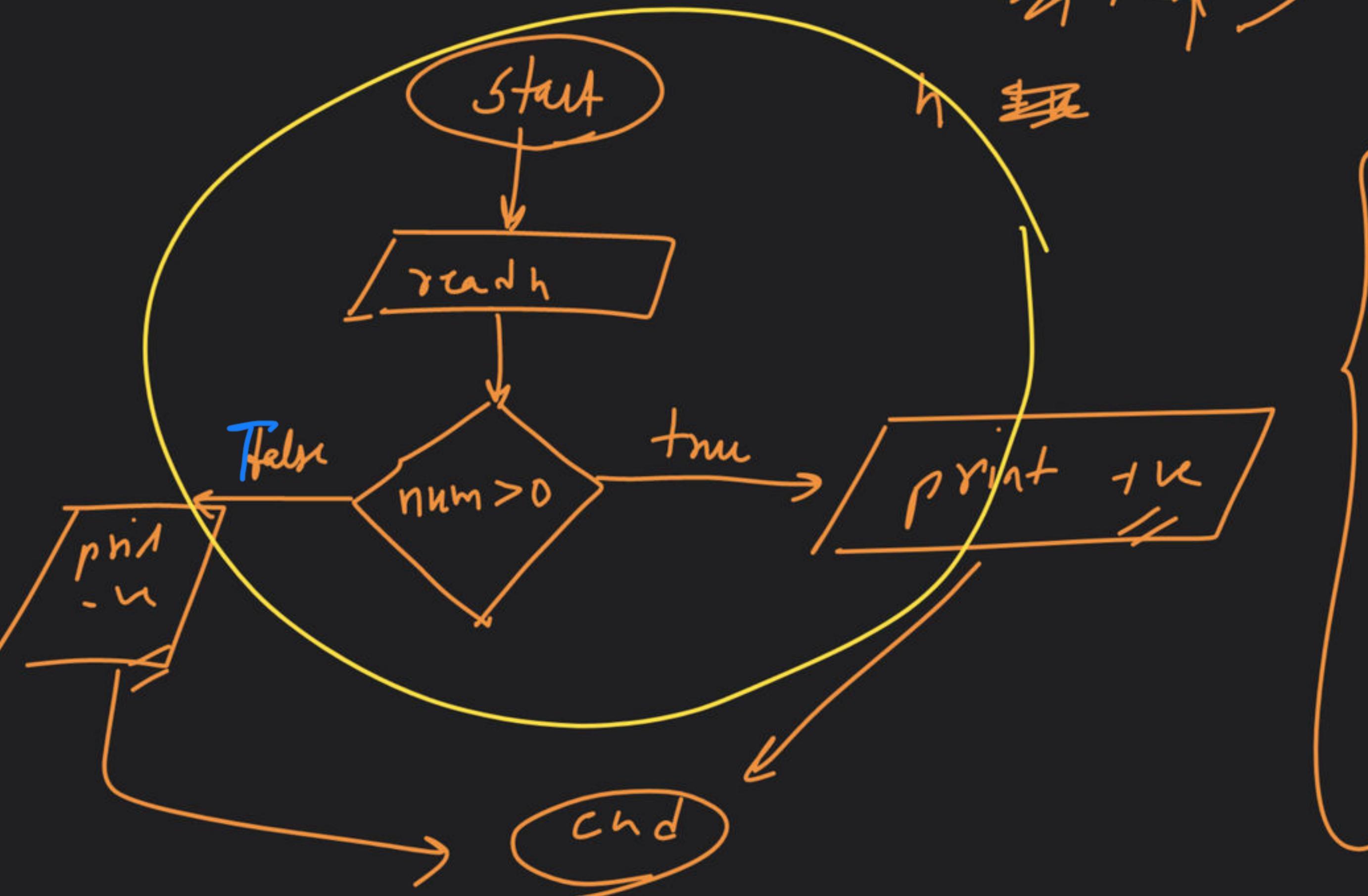
Design Flowchart -

Calculate Percentage

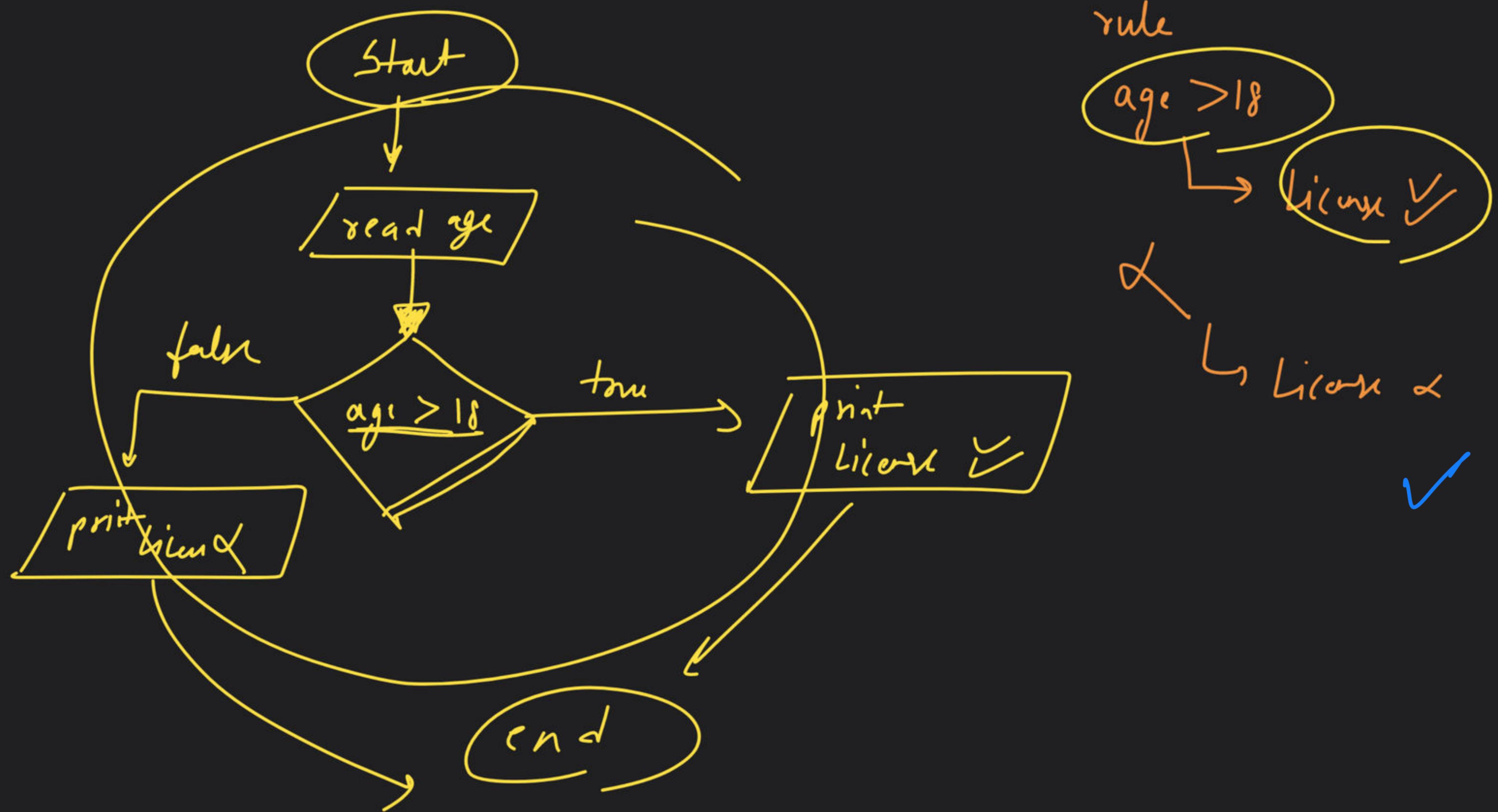




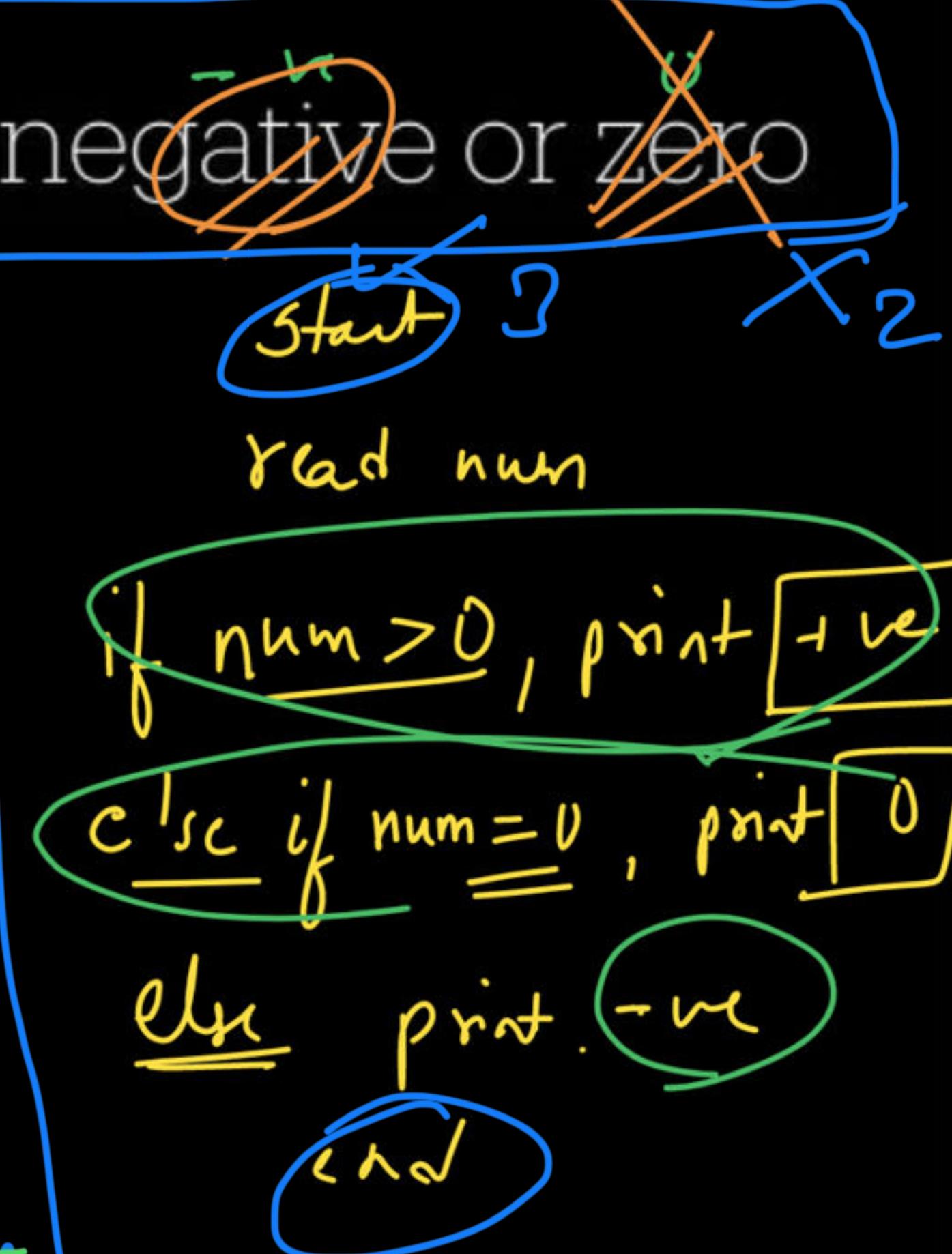
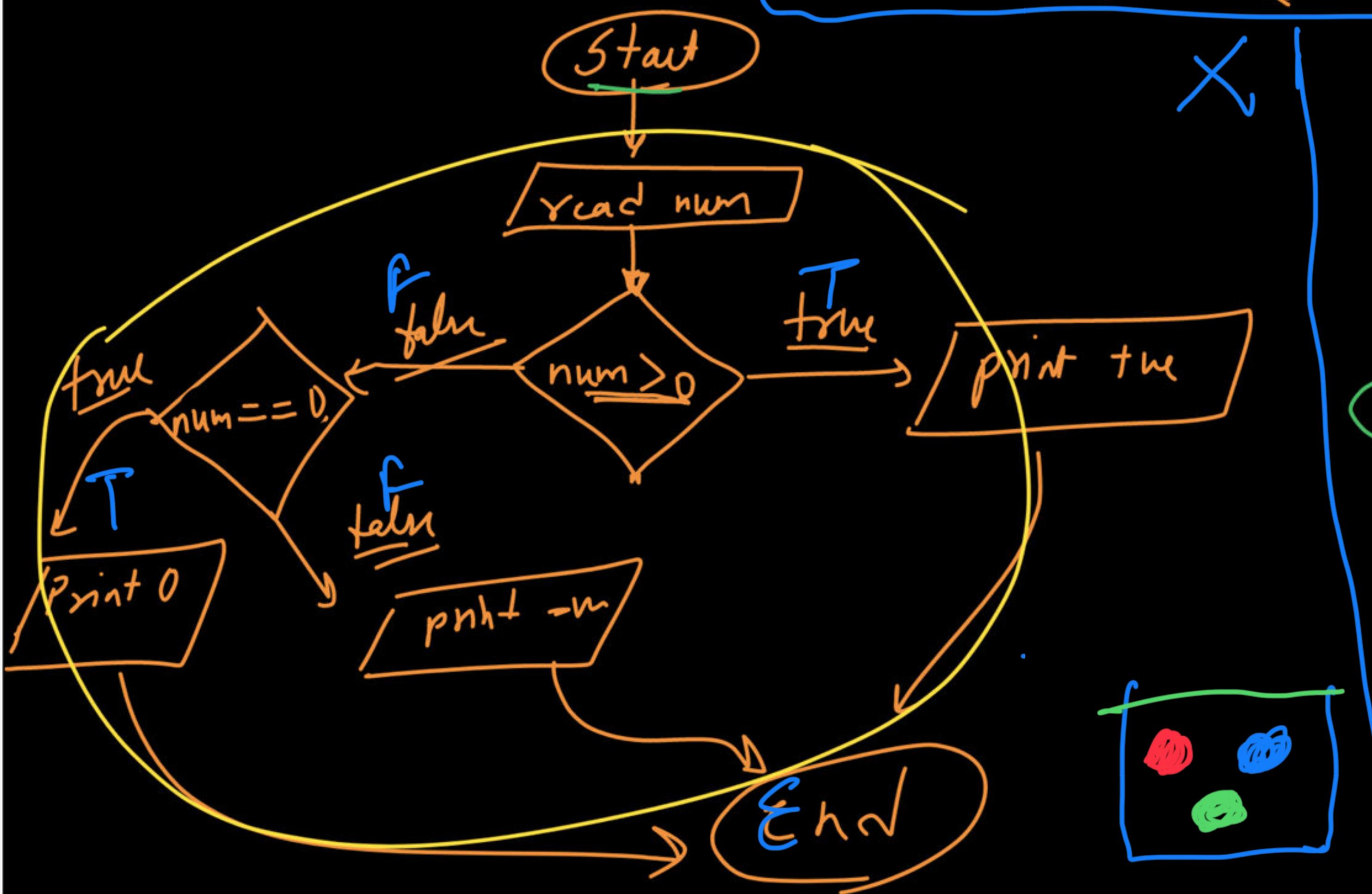
✓

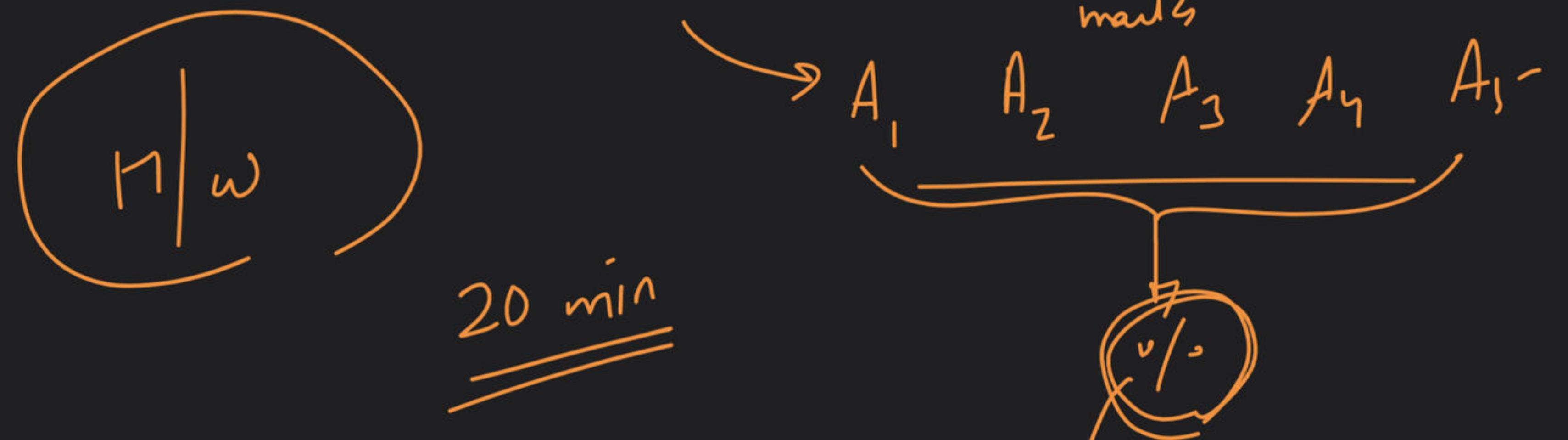


Start
Read num
if num > 0 , print +ve
if num < 0 , print -ve
End



Design Flowchart - Check positive, negative or zero





α } $A \rightarrow > 90\%$
 $\beta \rightarrow 80 - 90$
 $c \rightarrow 70 - 80$
 fail $\downarrow < 70$

rule
t



~~count = 0 + 1 <= 5~~

~~limit = 5~~

Babbar

Babbar

Babbar

Babbar

Bath

Name \rightarrow 5 print

① start

② read name = Babbar

③ limit = 5, $2 \leq i \leq 5$

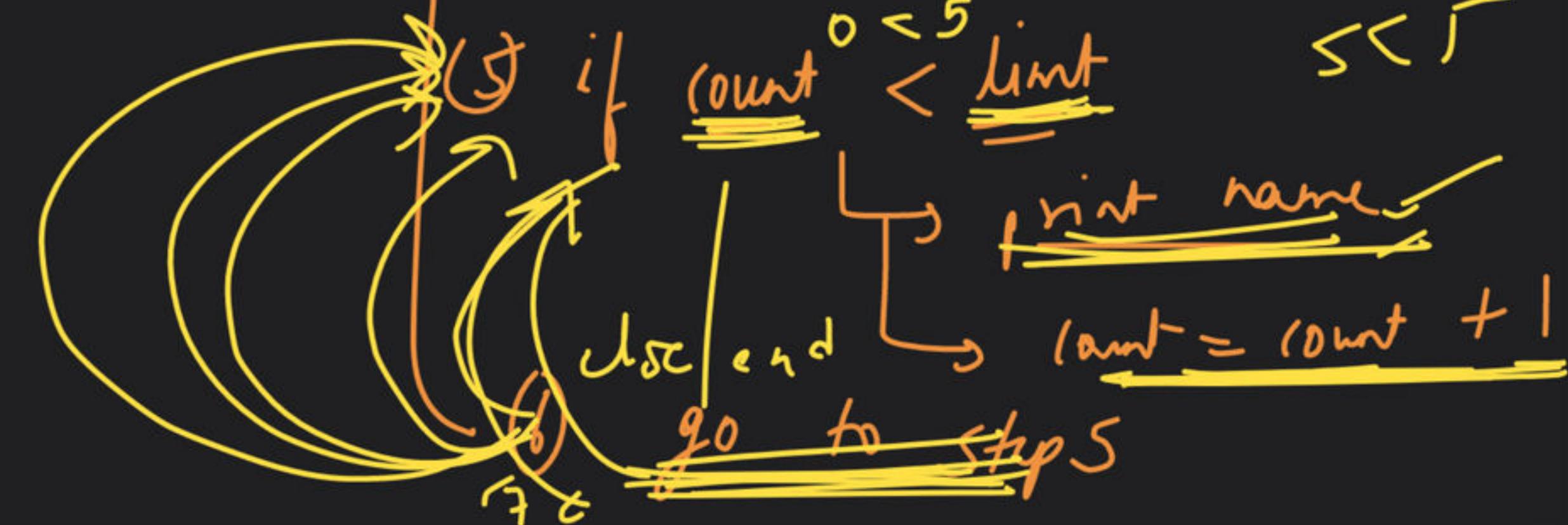
④ count = 0, $1 \leq j \leq r$

⑤ if $0 \leq j < limit$

 print name

 count = count + 1

 step 5



① Start
② read name
③ limit = 5
④ ~~count = 0~~

⑤ if count < limit
 → print name
 → count = count + 1
 use go to step 7
⑥ go to step 5
⑦ end

name = Babbar

limit = 5



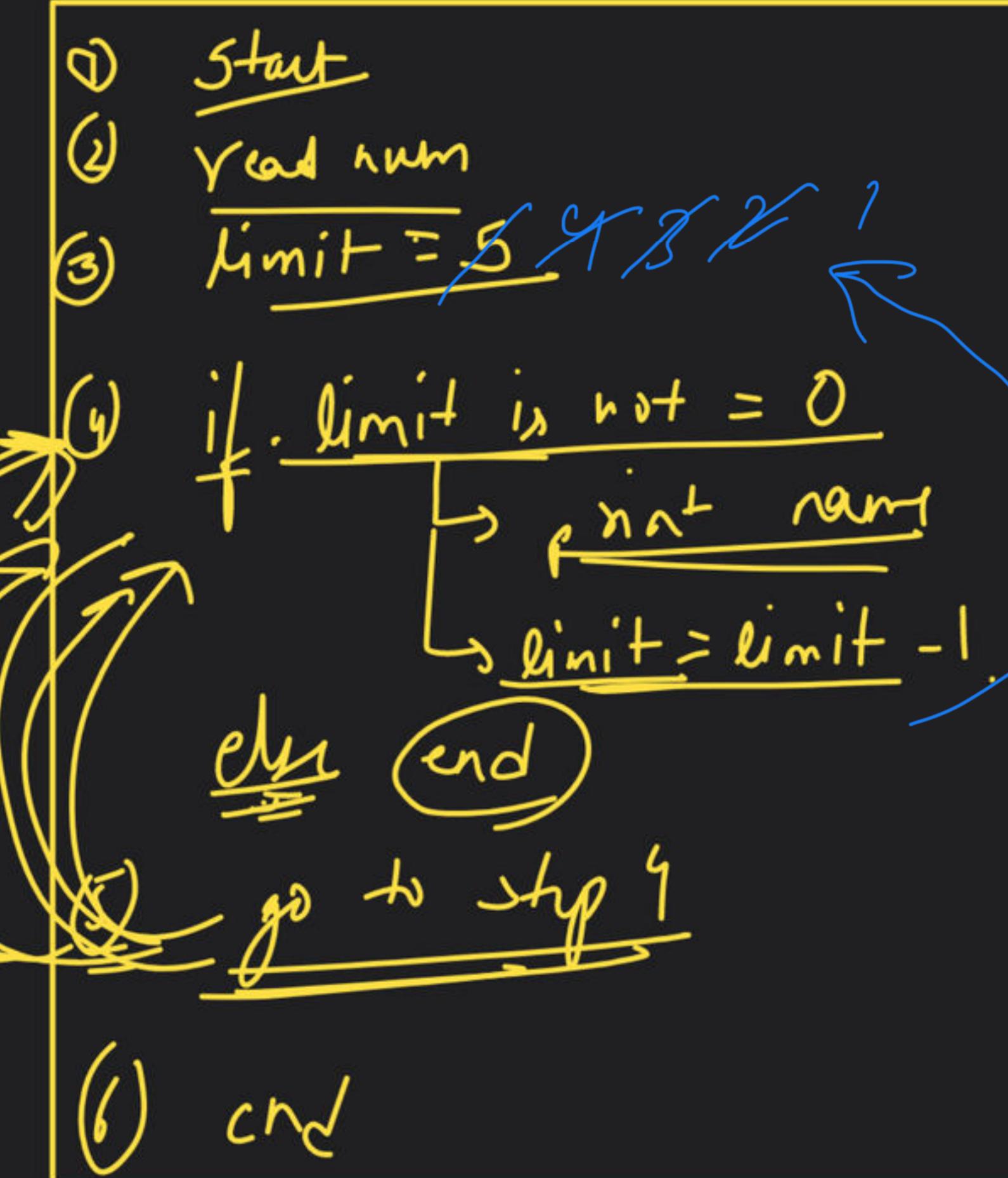
Babbar

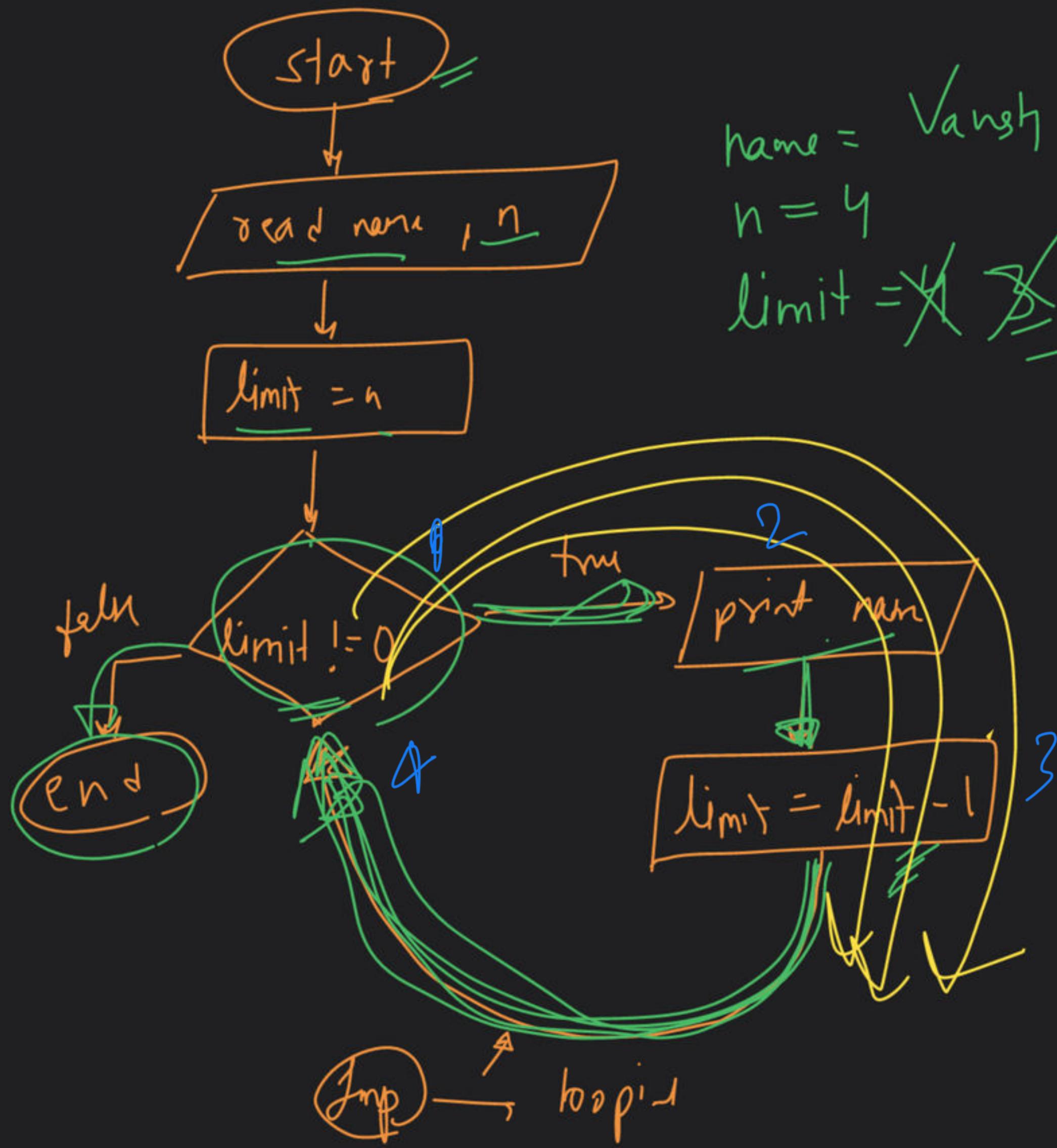
Babbar

Babbar

Datler

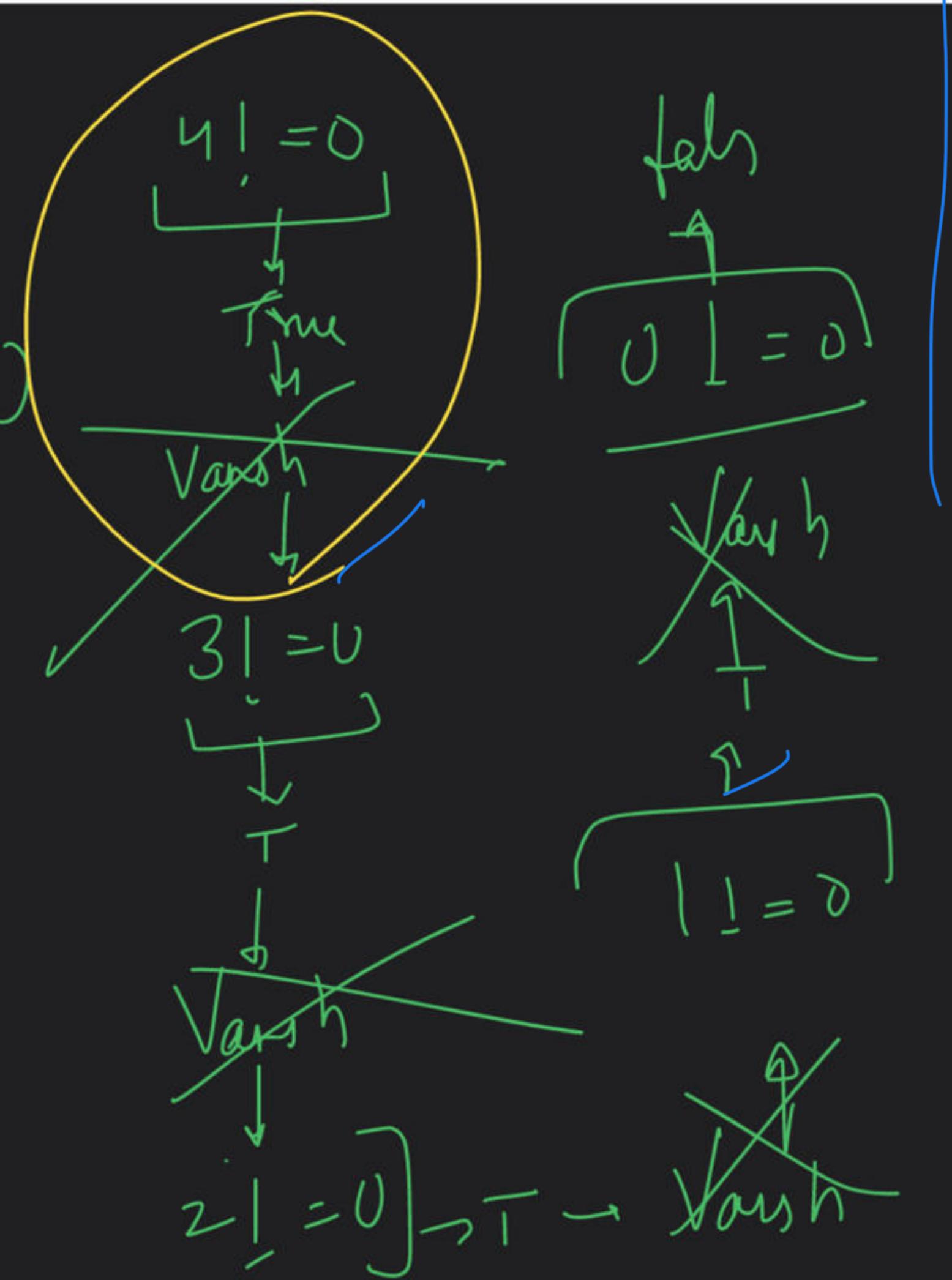
Babbar





Variables:

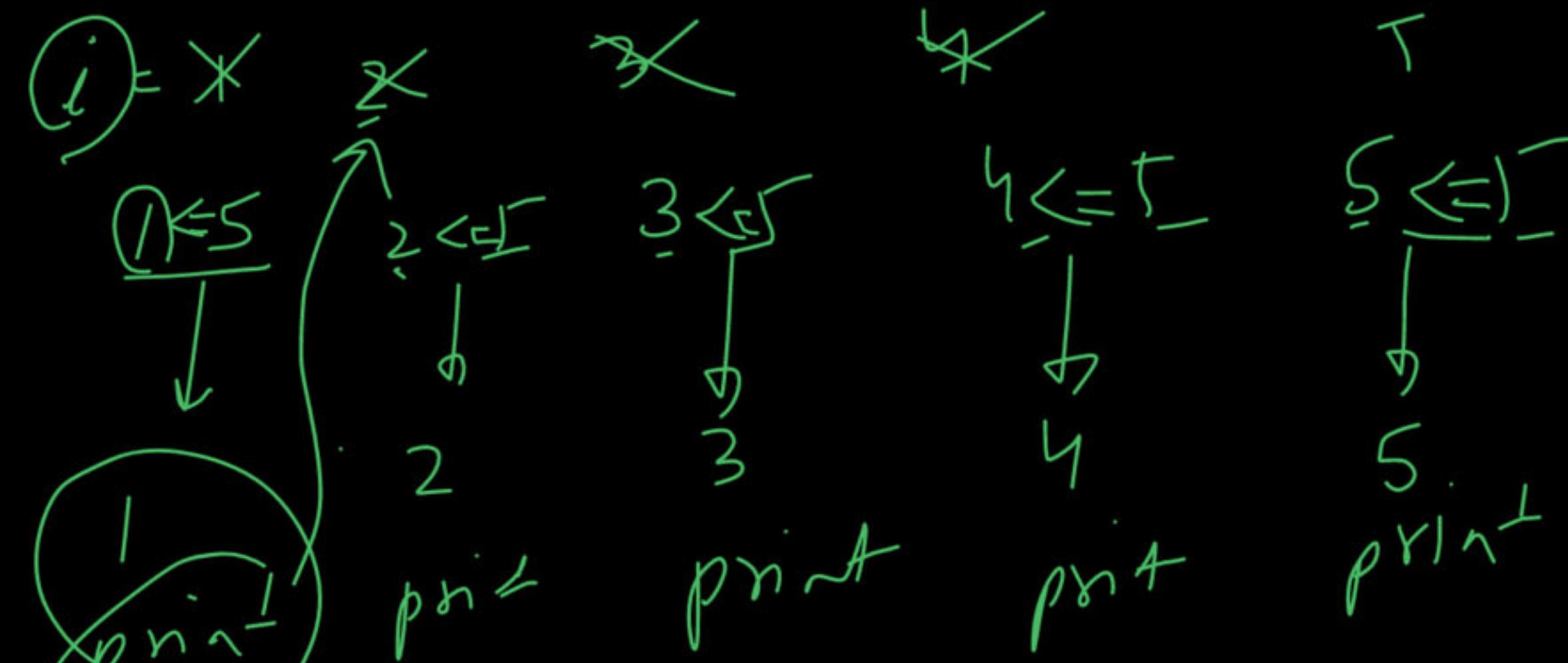
- name = Vansh
- n = 4
- limit = ~~4~~ ~~3~~ ~~2~~ ~~1~~ ~~0~~



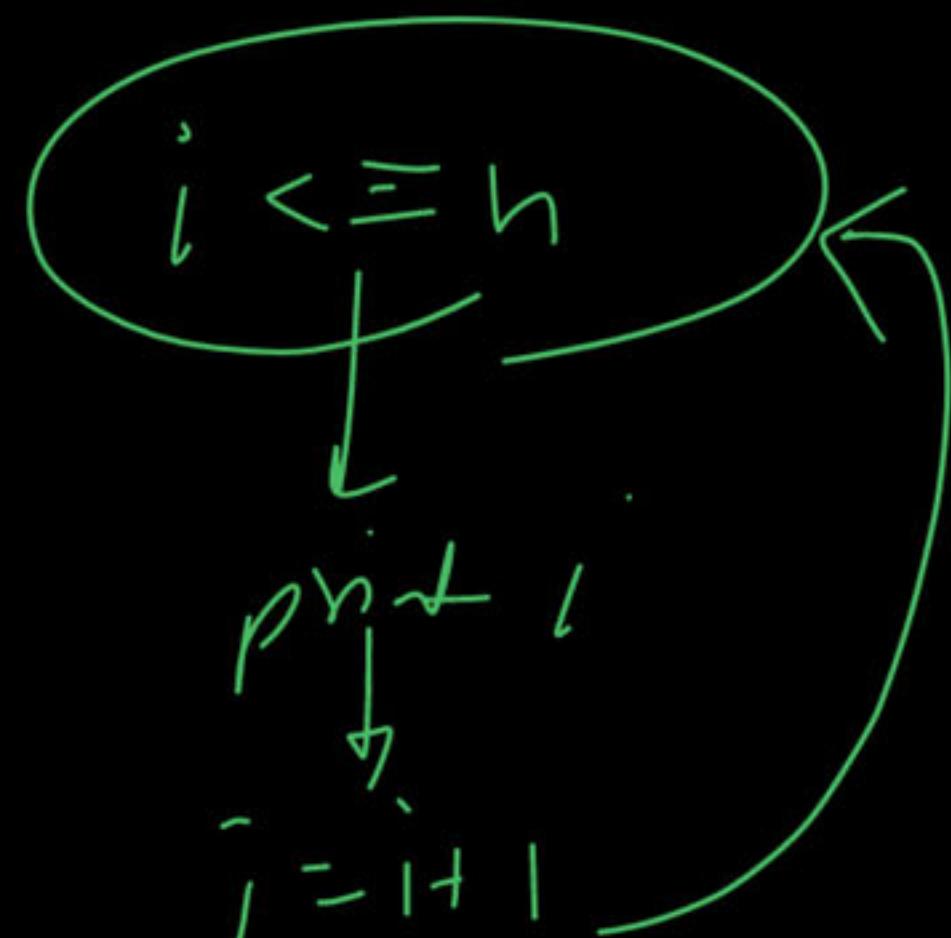
Design Flowchart - Print counting from 1 to N

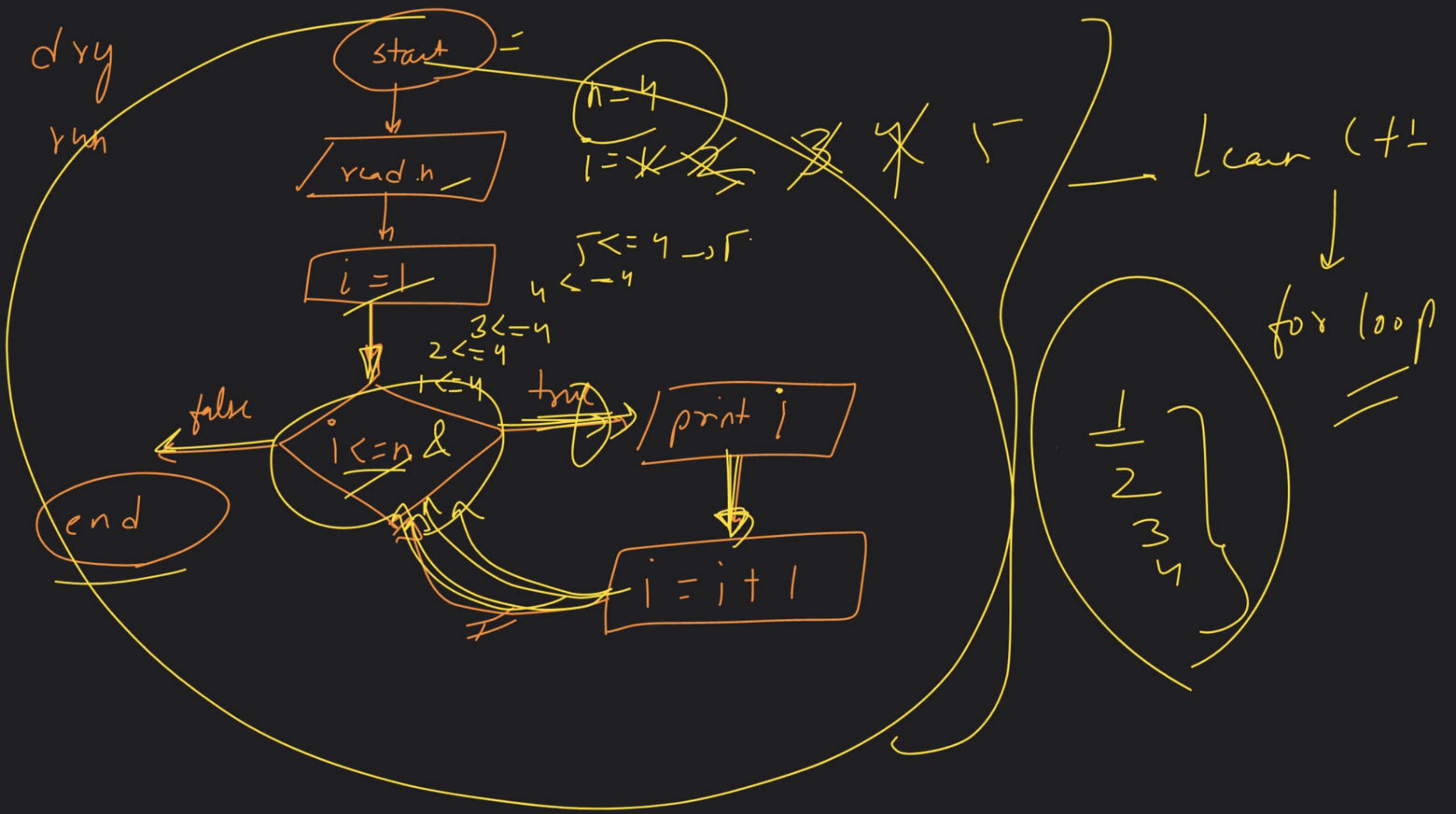
Q1

$h = 5$



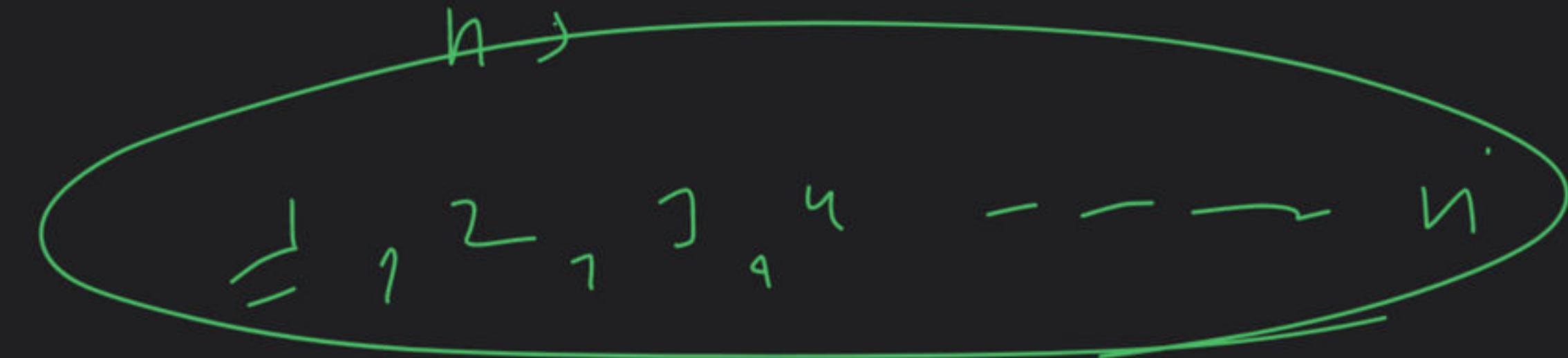
Loops





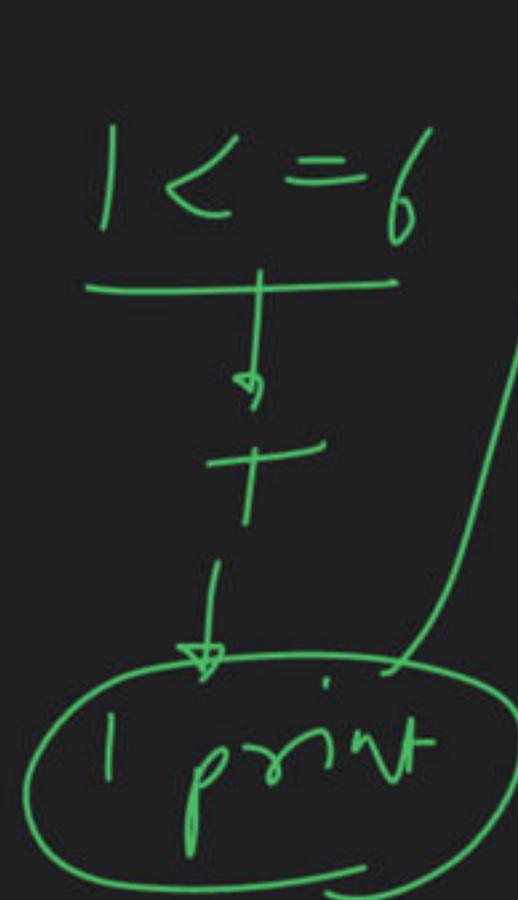


Count



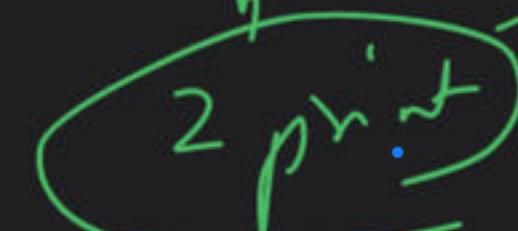
$$n = 6$$

$$\underline{\text{Count}} = \cancel{\cancel{\cancel{\cancel{\cancel{\cancel{}}}}}}$$



$$2 <= 6$$

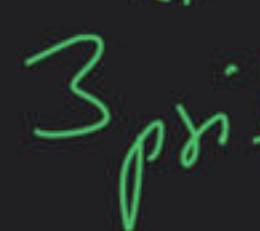
T



$$3 \cancel{\cancel{\cancel{\cancel{\cancel{\cancel{}}}}}}$$

$$3 <= 6$$

T



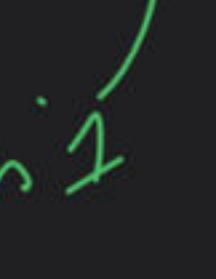
$$4 <= 6$$

T



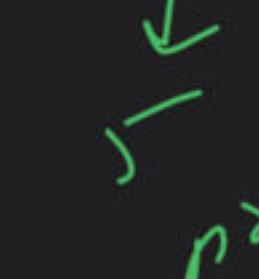
$$5 <= 6$$

T



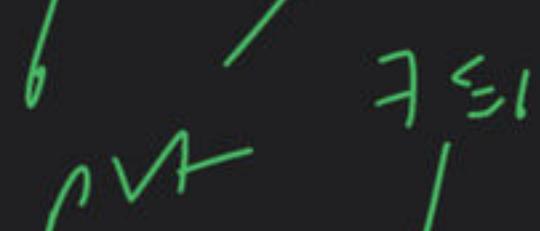
$$6 <= 6$$

T

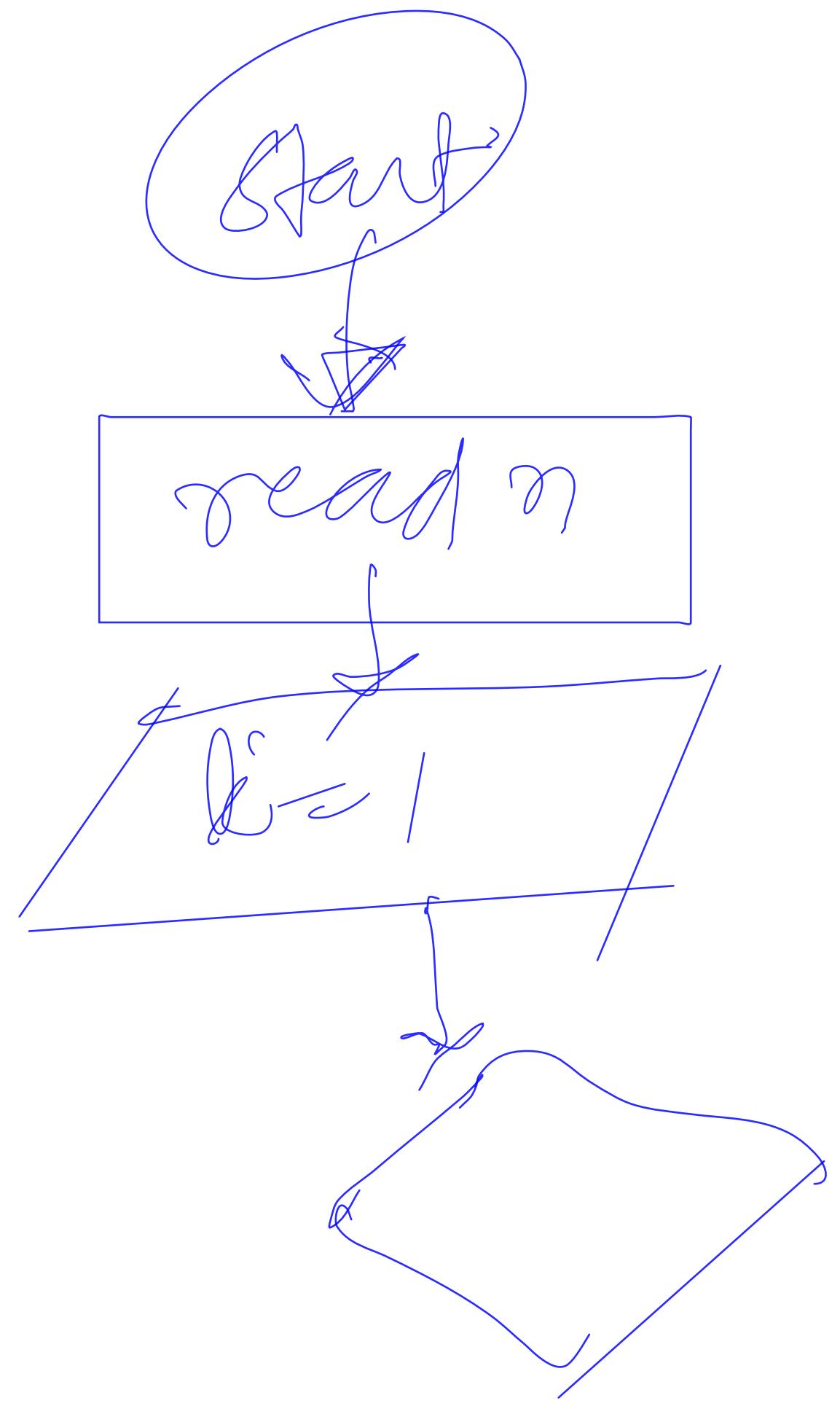


$$7 <= 6$$

F



end



① start

② read n

③ $i = 1$

④ if $i \leq n$

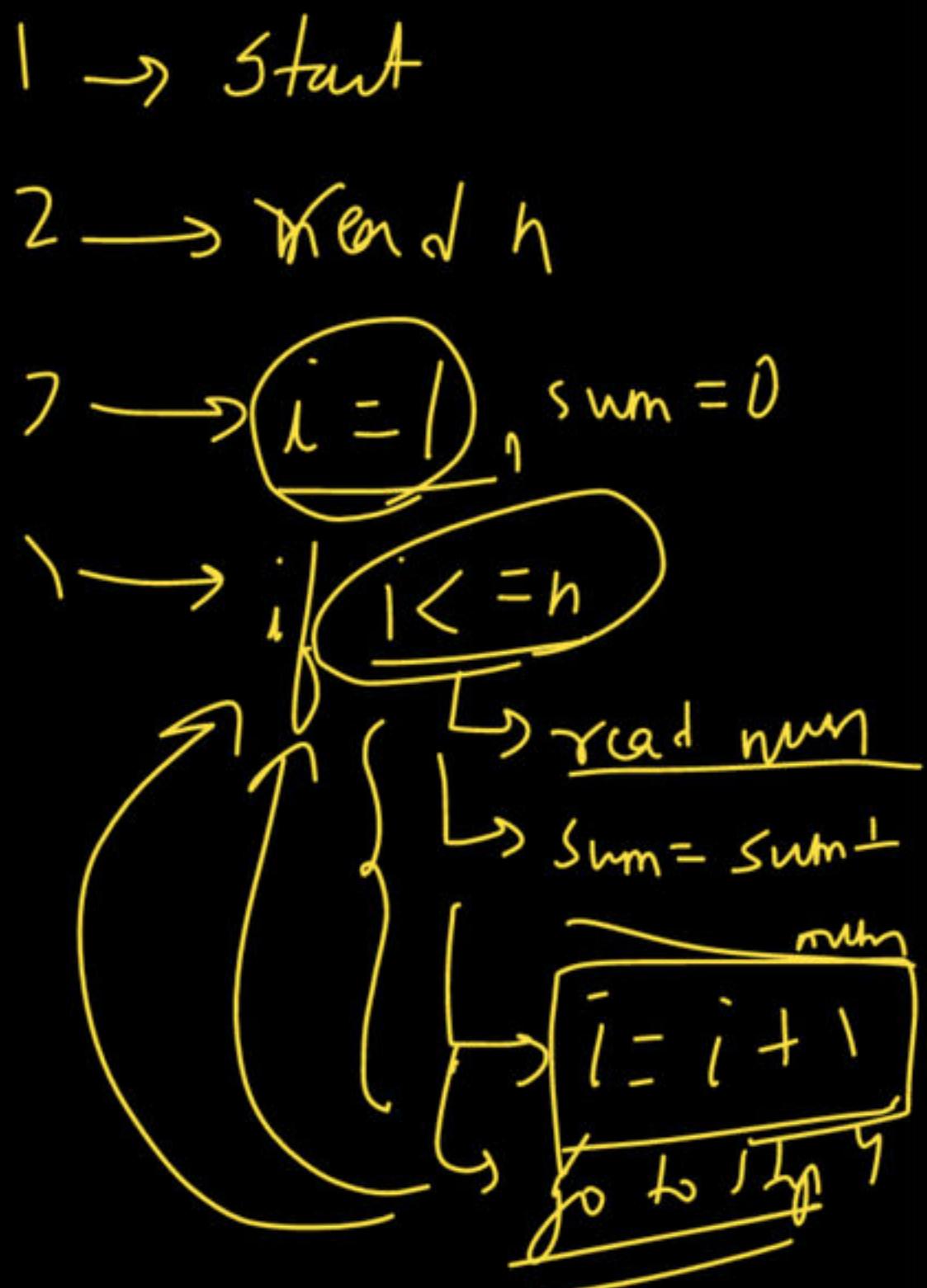
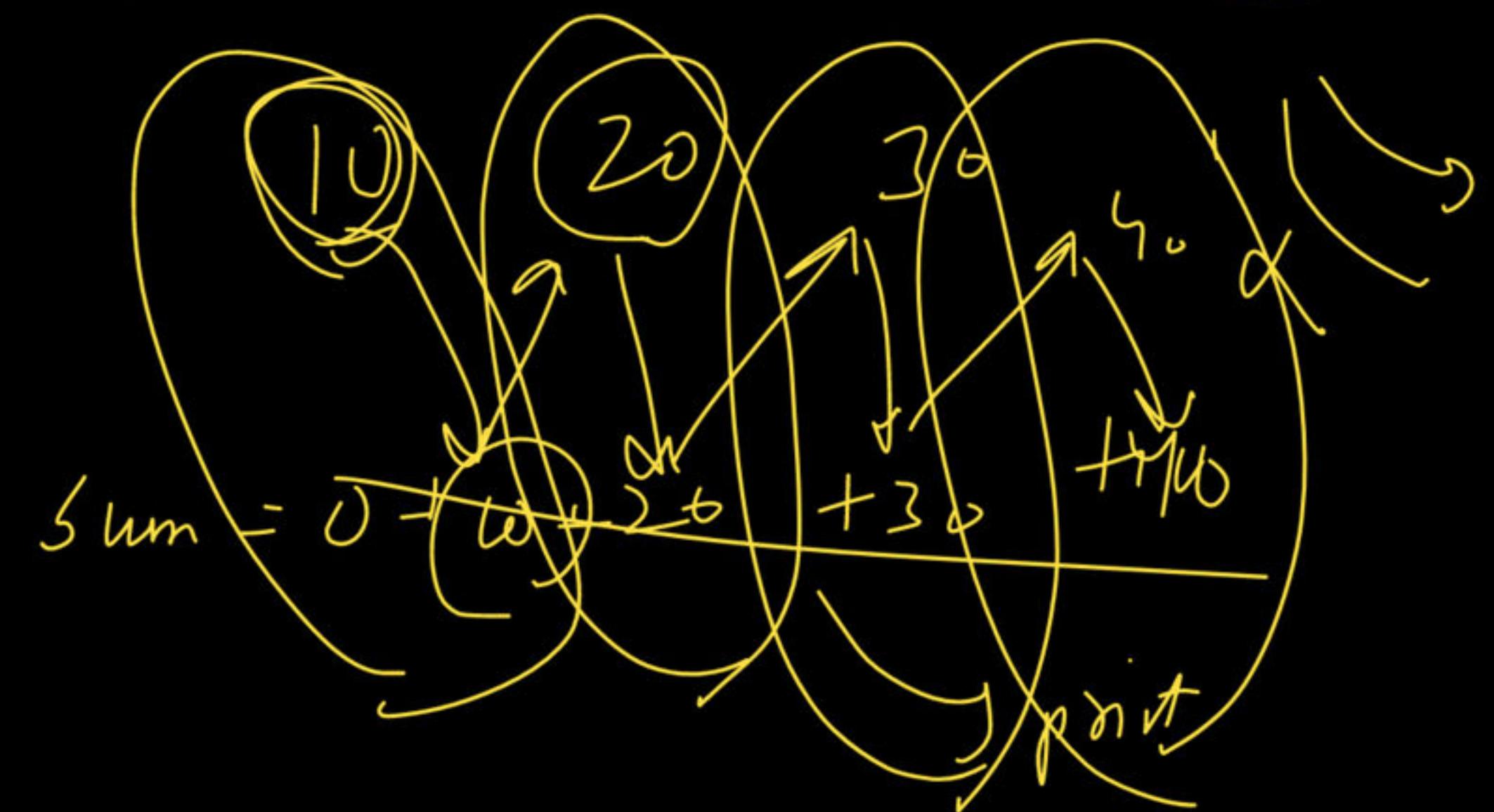
↳ point of
 $i = "t"$

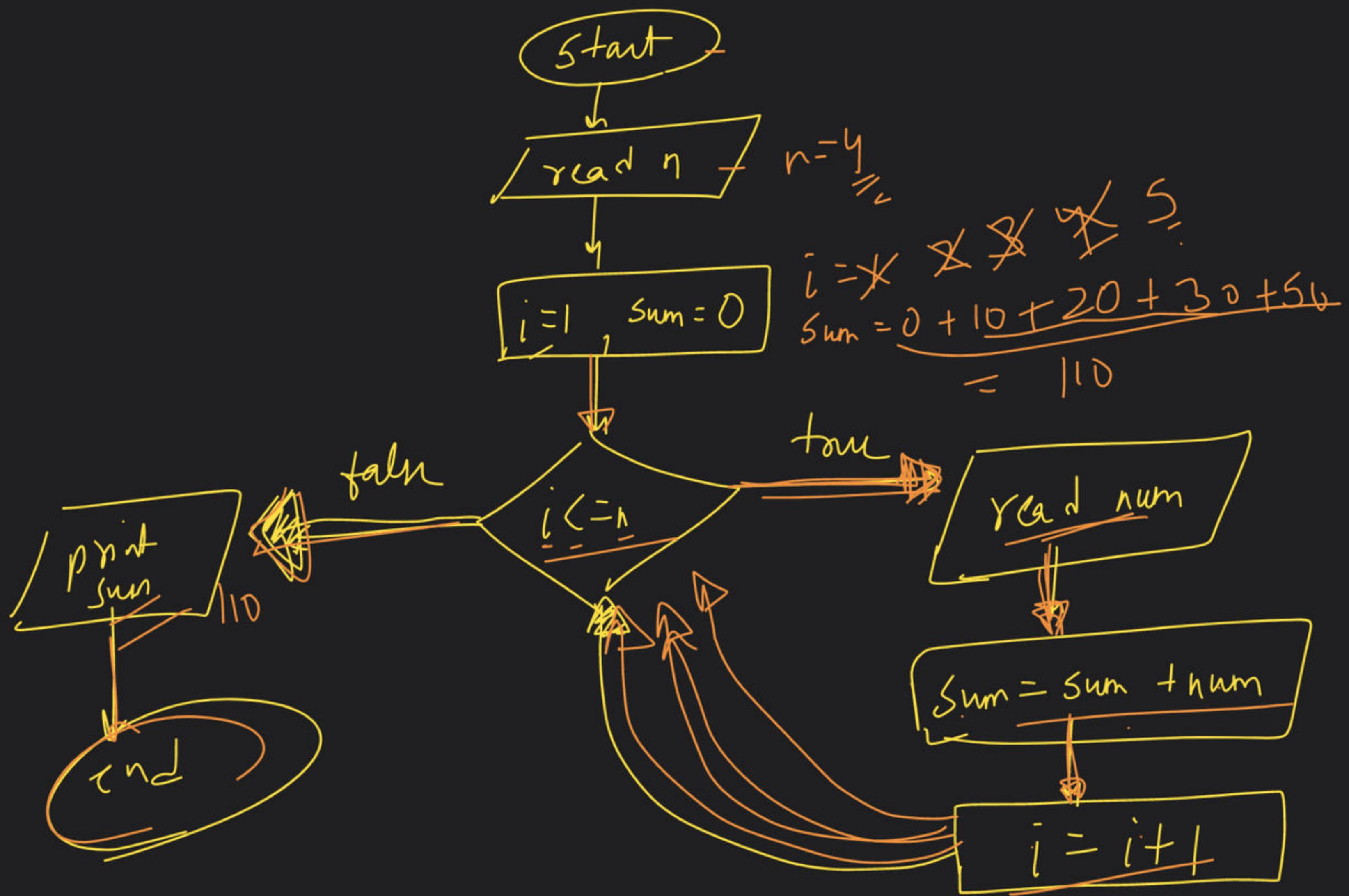
go to step
4

else

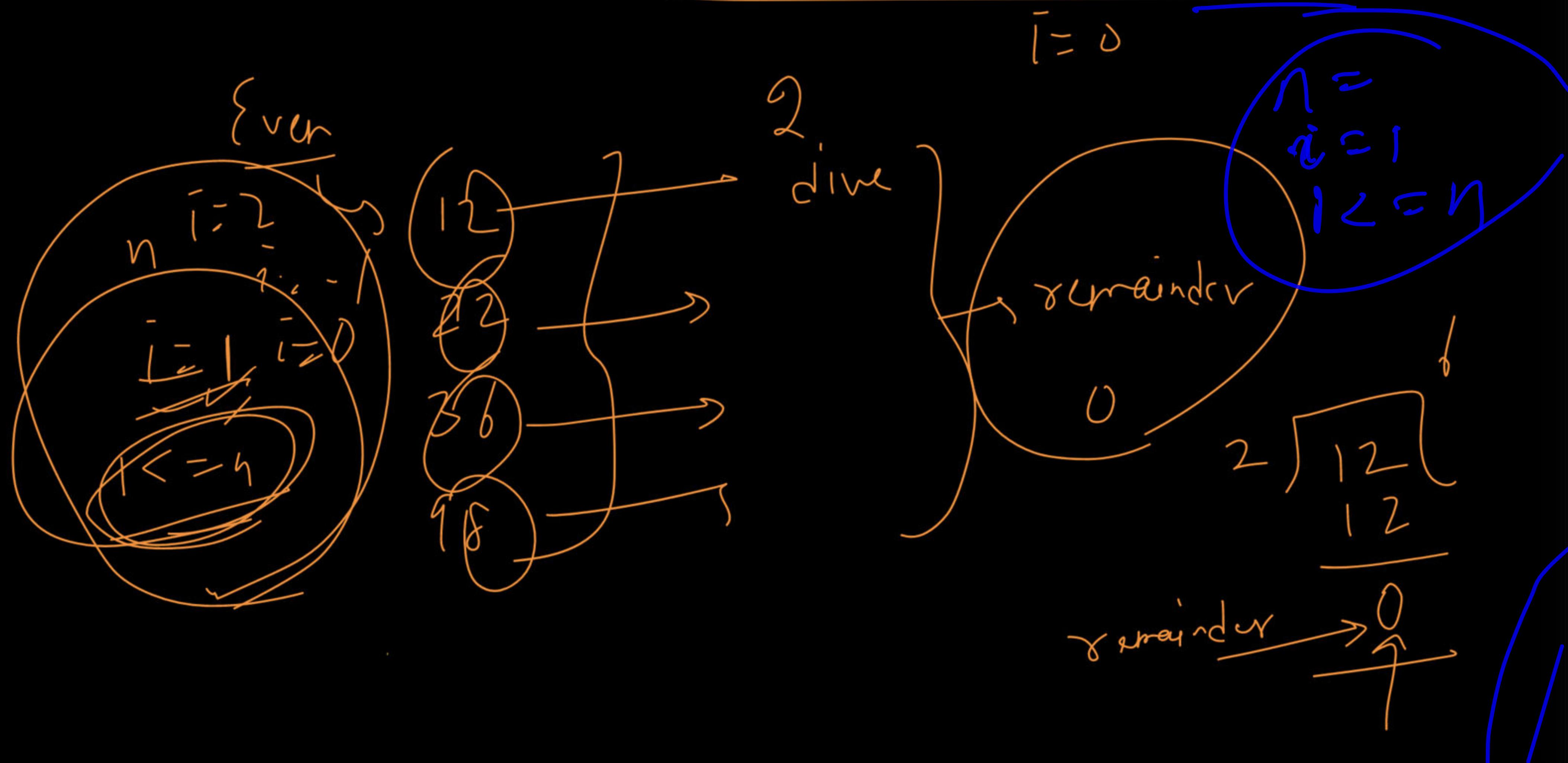
⑤ end

Design Flowchart - Add N numbers from user





Design Flowchart - Print Even numbers from 1 to N



$n = 10$

$i = 1$



$0/0.2$

odd

$\begin{matrix} 2 \\ \downarrow \\ 0/0.2 \end{matrix}$

Even

P

$\begin{matrix} 4 \\ \downarrow \\ 0/0.2 \end{matrix}$

2

$\begin{matrix} 1 \\ \downarrow \\ 0/0.2 \end{matrix}$

Even

P

$\begin{matrix} 5 \\ \downarrow \\ 0/0.2 \end{matrix}$

Odd

P

$\begin{matrix} 6 \\ \downarrow \\ 0/0.2 \end{matrix}$

Even

P

$\begin{matrix} 7 \\ \downarrow \\ 0/0.2 \end{matrix}$

odd

L

$\begin{matrix} 8 \\ \downarrow \\ 0/0.2 \end{matrix}$

Even

V

$\begin{matrix} 9 \\ \downarrow \\ 0/0.2 \end{matrix}$

2

L

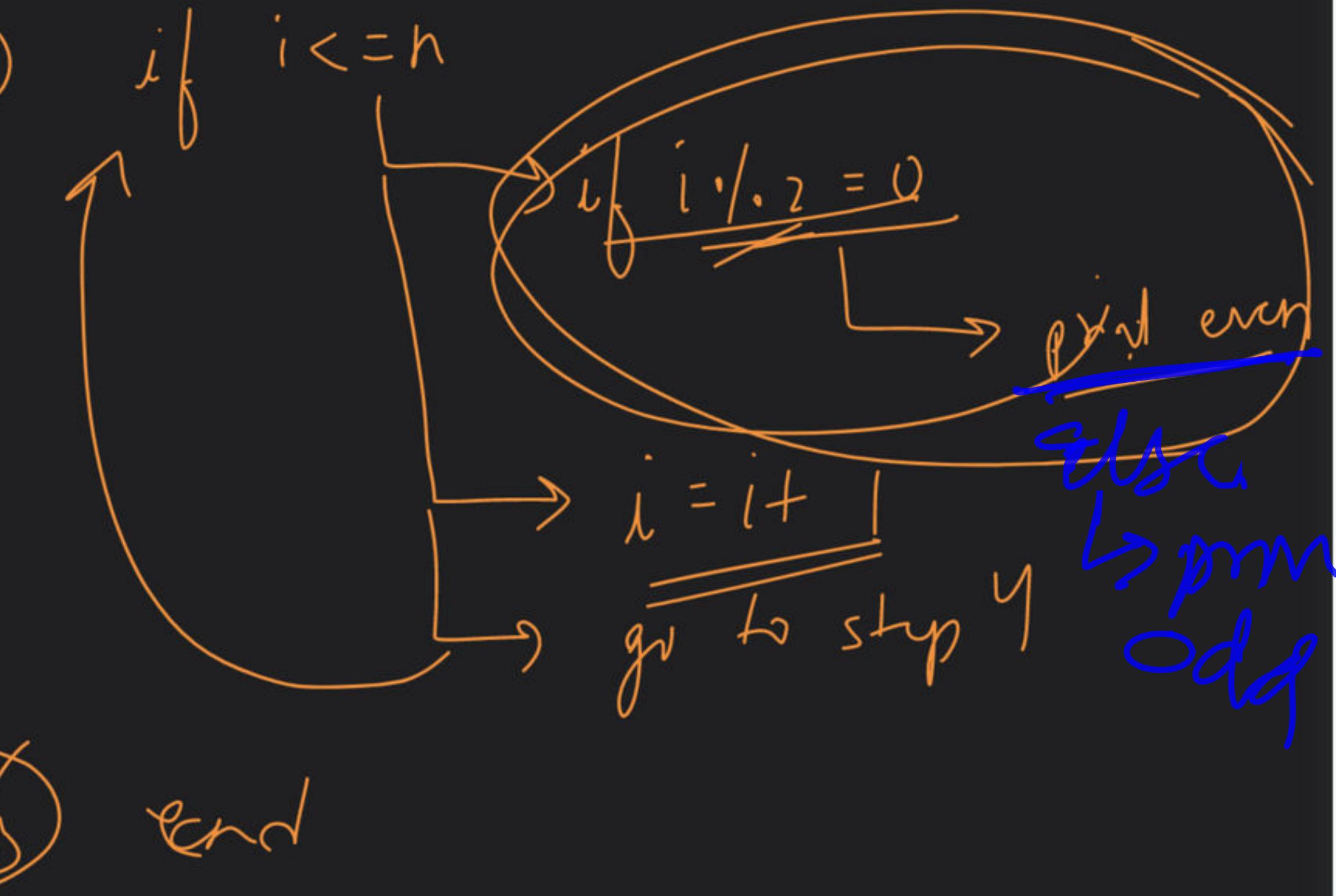
$\begin{matrix} 10 \\ \downarrow \\ 0/0.2 \end{matrix}$

even

V

even | odd

- ① Start
- ② $i = n$
- ③ $i = 1$
- ④ if $i \leq n$

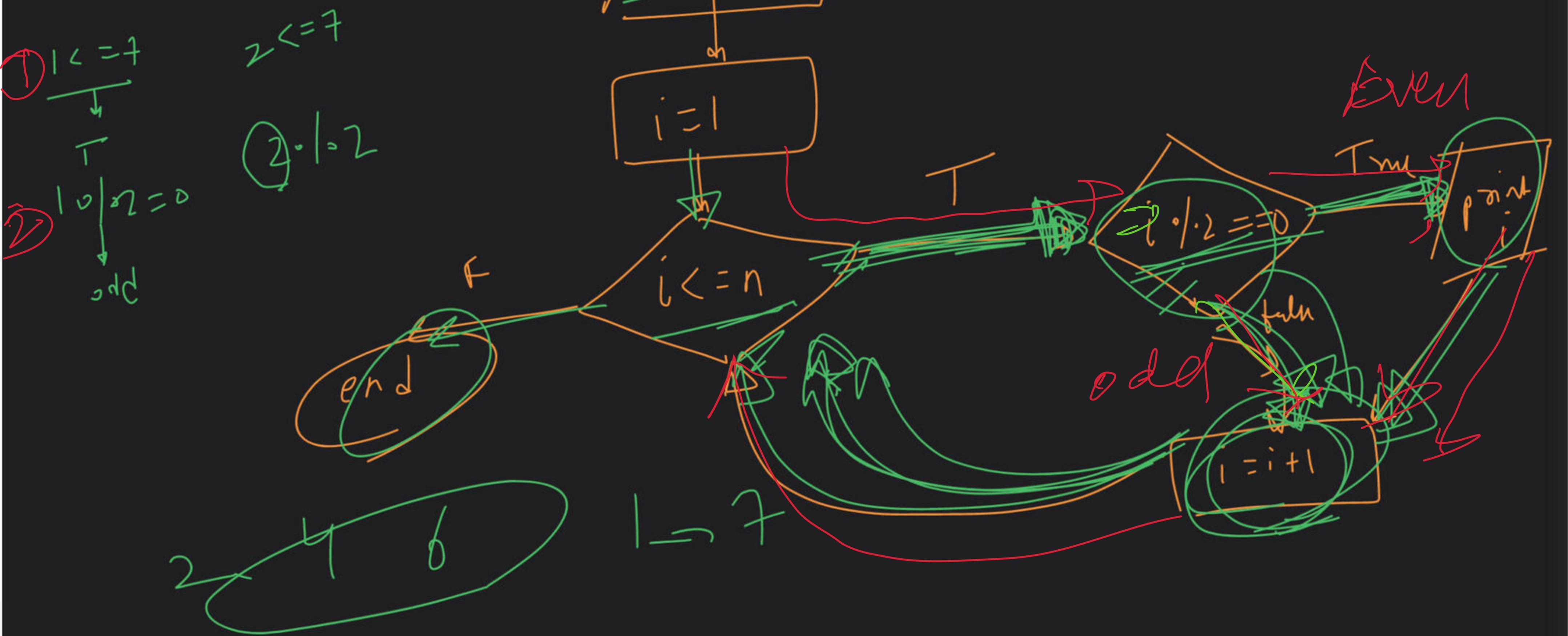
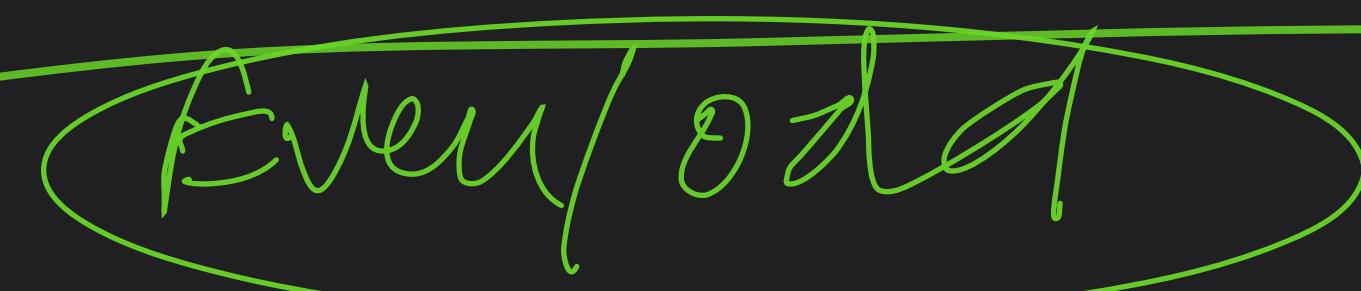


$n = 7$

$i = 1$



Flowchart - Even-Odd



$$12 \div 2$$

Modulo

Modulus

remainder

$$12 \div 2 = 0$$

↑
r cm

$$12 \div 2$$

$$\begin{array}{ccc} \textcircled{D} & \rightarrow & \text{Even} \\ \textcircled{I} & \rightarrow & \text{Odd} \end{array}$$

```
#include <iostream>
```

~~#include <cmath>~~

using namespace std;

Design Flowchart for below:

- Multiply 2 numbers after taking input
 - Perimeter of triangle
 - Find Simple Interest
 - Find Compound Interest
 - Print Counting from N to 1
 - Find Factorial of a Number
 - Check if a number is Prime or not
 - Check Valid Triangle or not
 - Print Max of 2 number
- ```
void multiplyTwoNumbers() {
 double num1, num2;
 cout << "Enter first number : ";
 cin >> num1;
 cout << "Enter second number : ";
 cin >> num2;
 cout << "Result : " << num1 * num2 << endl;
}
}
```

## 112. Perimeters of a Triangle

```
void perimeterOfTriangle() {
 double side1, side2, side3;
 cout << "\n==== Perimeter of Triangle ====" << endl;
 cout << "Enter side 1: ";
 cin >> side1;
 cout << "Enter side 2: ";
 cin >> side2;
 cout << "Enter side 3: ";
 cin >> side3;
 cout << "Perimeter: " << (side1 + side2 + side3) <<
 endl;
}
```

### 11.3. Find Simple Interest

```
void simpleInterest() {
 double principle, rate, time;
 cout << "\n ==> simple interest = " << endl;
 cout << "Enter Principle amount: ";
 cin >> principle;
 cout << "Enter Rate of Interest: ";
 cin >> rate;
 cout << "Enter Time period (years): ";
 cin >> time;
 double si = (principle * rate * time) / 100;
 cout << "Simple Interest: " << si << endl;
```

3

C6

```
cout << "Enter principle amount: ";
cin >> principle;
cout << "Enter Rate of Interest: ";
cin >> rate;
cout << "Enter Time period (years): ";
cin >> time;
cout << "Enter Number of times interest compound
per year:";
```

```
cin >> n,
double amount = principle * pow((1+rate)/(a*.200)),n*tmo);
double ci = amount - principle;
cout << "Compound Interest :" << ci << endl;
cout << "Total Amount :" << amount << endl;
```

3

#11 6. Find factorial of a number

```
void factorial() {
 int n;
 cout << "\n = = Factorial of a Number = = " << endl;
 cout << "Enter a number : ";
 cin >> n;
 long long fact = 1;
 for (int i = 1; i <= n; i++) {
 fact *= i;
 }
 cout << "Factorial of " << n << " = " << fact << endl;
}
```

117. check if the number is prime or not

```
void checkPrime() {
 int n;
 cout << "nEnter Prime Numbers ==><" << endl;
 cout << "Enter a number: ";
 cin >> n;

 if (n <= 1) {
 cout << n << " is not a prime number," << endl;
 return;
 }
```

```
bool isPrime = true;
for (int i = 2; i <= sqrt(n); i++) {
 if (n % i == 0) {
 isPrime = false;
 break;
 }
}
```

```
if (isPrime)
 cout << n << " is a prime number" <<
 endl;
```

```
else
 cout << n << " is not a prime number" <<
 endl;
```

# 11.8 - check valid Triangle or not

```
void checkValidTriangle or not
double side1, side2, side3;
cout << "Enter valid Triangle ==><
cout << endl;
cout << "Enter side 1: ";
cin >> side1;
cout << "Enter side 2: ";
cin >> side2;
cout << "Enter side 3: ";
cin >> side3;
```

if ( $\text{side}_1 + \text{side}_2 > \text{side}_3$  &  $\text{side}_1 + \text{side}_3 > \text{side}_2$   
 $\text{side}_2 + \text{side}_3 > \text{side}_1$ )

$\text{side}_1 + \text{side}_2 > \text{side}_3$  &  $\text{side}_1 + \text{side}_3 > \text{side}_2$   
 $\text{side}_2 + \text{side}_3 > \text{side}_1$

$\text{side}_1 + \text{side}_2 > \text{side}_3$  )

cost << " valid Triangle " < endl;

else

cost << " not a valid Triangle " < endl;

}

// 9. Print max of 2 numbers

```
void maxOfTwoNumbers() {
 double num1, num2;
 cout << "Enter first number : ";
 cin >> Num1;
 cout << "Enter second number : ";
 cin >> Num2;
 if (Num1 > Num2)
 cout << "Max number is " << Num1
 else
 cout << "Max number is " << Num2;
}
```

```
cout << "Enter second Number: ";
cin >> num2;
if (num1 >= num2)
 cout << "Maximum: " << num1 << endl;
else if (num2 >= num1)
 cout << "Maximum: " << num2 << endl;
else
 cout << "Both numbers are equal"
 << num1 << endl;
```

```
int main()
{
 int cho;
 do {
 cout << "MAIN MENU" << endl;
 cout << "1. Multiply 2 numbers" << endl;
 cout << "2. Perimeter of triangle" << endl;
 cout << "3. Find simple interest" << endl;
 cout << "4. Find compound Interest" << endl;
 cout << "5. Pointing Country from N to J" << endl;
 cout << "Enter your choice" << endl;
 cin >> cho;
 if (cho == 1) {
 cout << "Enter 2 numbers" << endl;
 int a, b;
 cin >> a >> b;
 cout << "Product = " << a * b << endl;
 }
 else if (cho == 2) {
 cout << "Enter 3 sides" << endl;
 float a, b, c;
 cin >> a >> b >> c;
 cout << "Perimeter = " << a + b + c << endl;
 }
 else if (cho == 3) {
 cout << "Enter P, R, T" << endl;
 float P, R, T;
 cin >> P >> R >> T;
 cout << "SI = " << P * R * T / 100 << endl;
 }
 else if (cho == 4) {
 cout << "Enter P, R, T" << endl;
 float P, R, T;
 cin >> P >> R >> T;
 cout << "CI = " << P * (1 + R / 100) ^ T << endl;
 }
 else if (cho == 5) {
 cout << "Enter N" << endl;
 int N;
 cin >> N;
 cout << "J = " << N / 2 + 1 << endl;
 }
 } while (cho != 0);
}
```

- 1' 6. Find factorial of a Number "
- 2' 7. check if a number is Prime
- 3' 8. check valid Triangle "
- 4' 9. Print Max of 2 numbers "

cout << "0. EXIT << endl;"

cout << "~~~~~" "Clear";

cout << "Enter your choice: ";

cin >> choice;

```
switch (choice) {
 case 1; myEmptyTwoNumbers();
 break;
 case 2; perimeterOfTriangle(); break;
 case 3; simpleInterest(); break;
 case 4; compoundInterest(); break;
 case 5; countingN + 1(); break;
 case 6; factorial(); break;
 case 7; cheerLeader(); break;
 case 8; maxOfTwoNumber();
}
```

```
(
 default: cout << "Invalid choice! Try again."
 break;
}
endl;
while (choice != 0);
return 0;
```