



CRUX



CODING BLOCKS

Problem Solving

- Logistics
- Flowcharts
- Pseudo Codes

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Logistics

- Piazza
- Whatsapp
- Laptops
- Assignments



Course Content



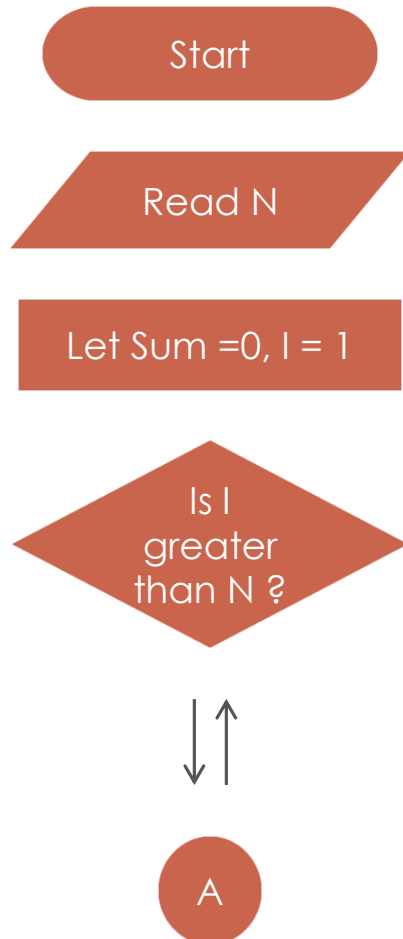
- Basics of Problem Solving
- Programming Fundamentals
- Object Oriented Programming
- Data Structures

What is a flowchart?



- Diagrammatic representation illustrating a solution to a given problem.
- Allows you to break down any process into smaller steps and display them in a visually pleasing way.

Flowchart Components



Terminator

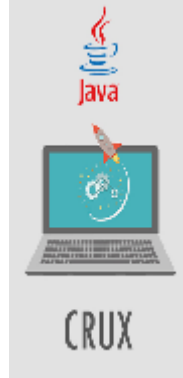
Input / Output

Process

Decision

Arrow

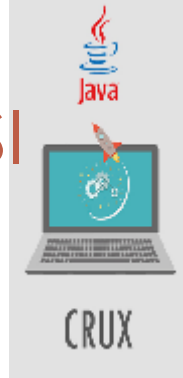
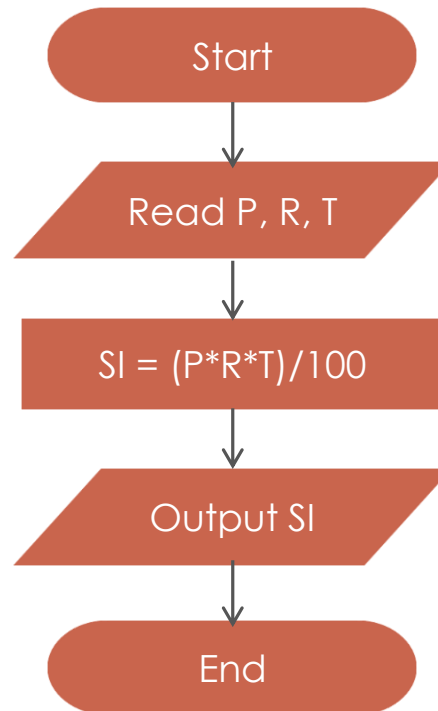
Connector



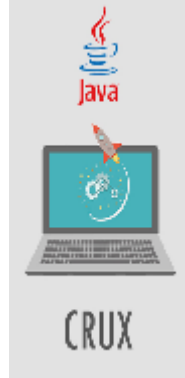
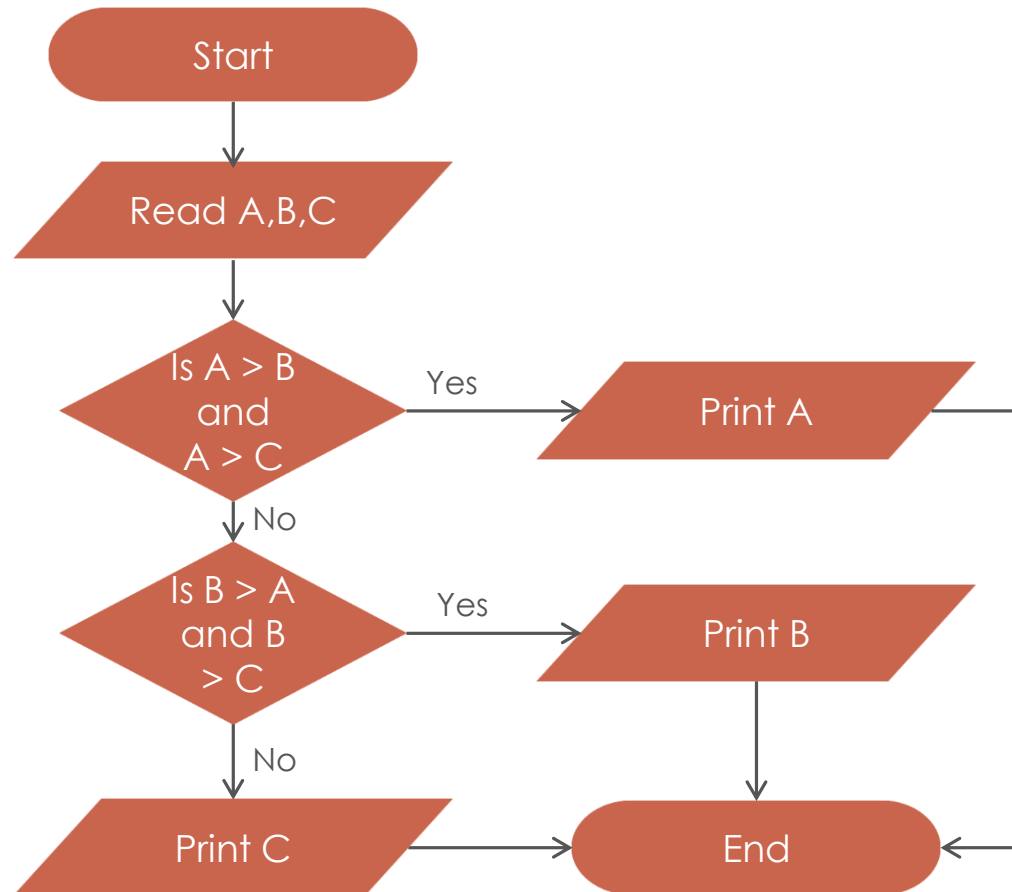


Lets look at few problems
and their flowcharts!

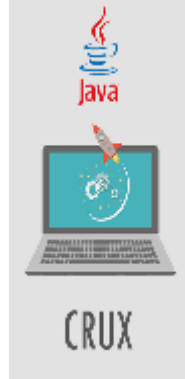
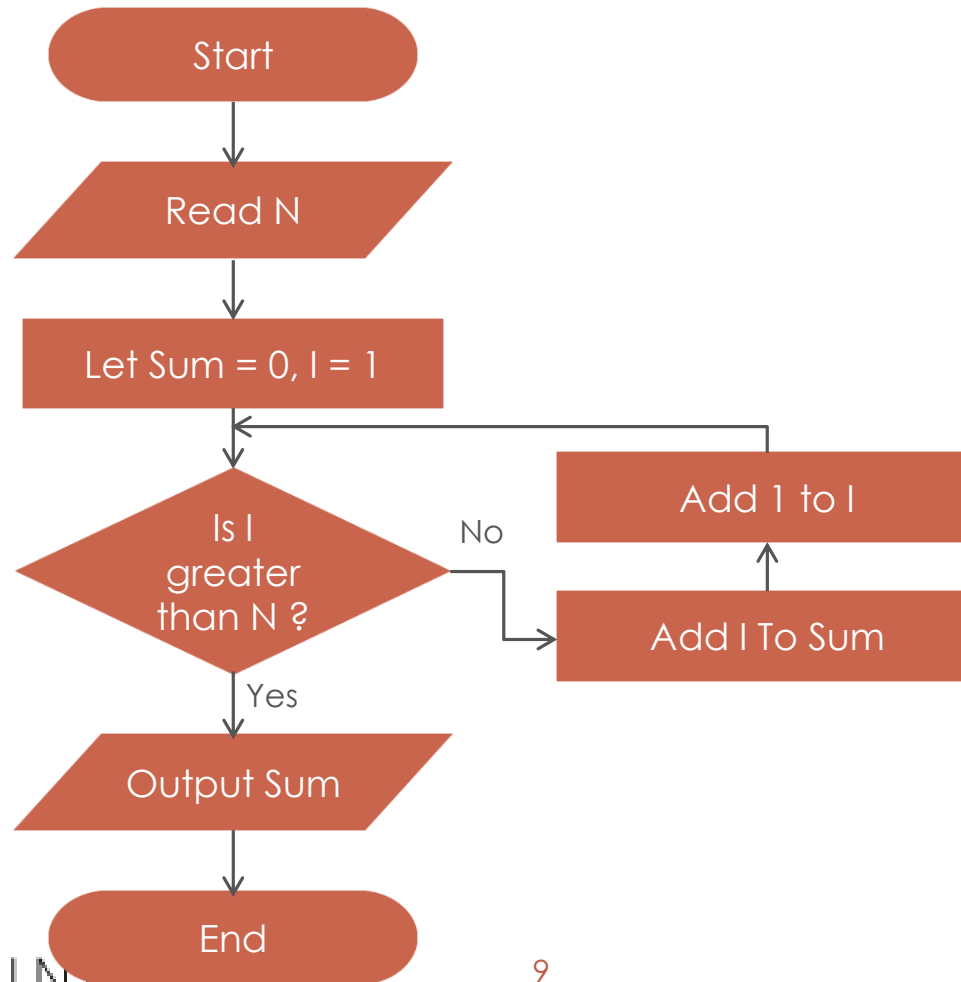
Read Principal, Rate & Time and Print SI



Find largest of three numbers



Find Sum of numbers from 1 to N

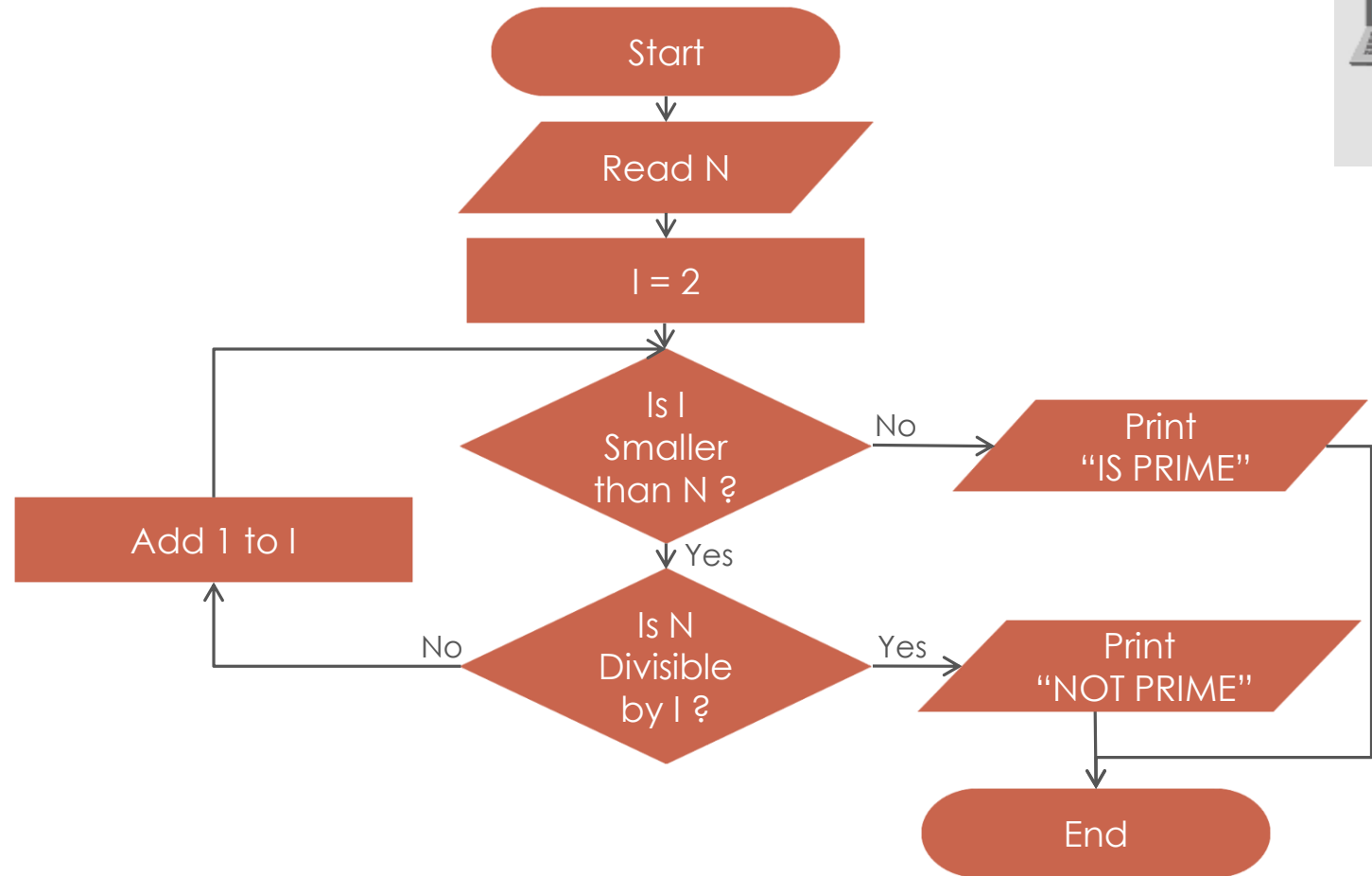


Time to Try?



Given a Number N , check if it's Prime or Not?

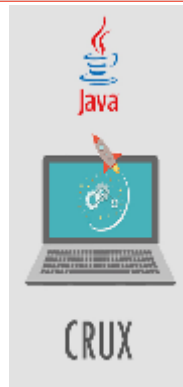
Check if a number Is Prime?



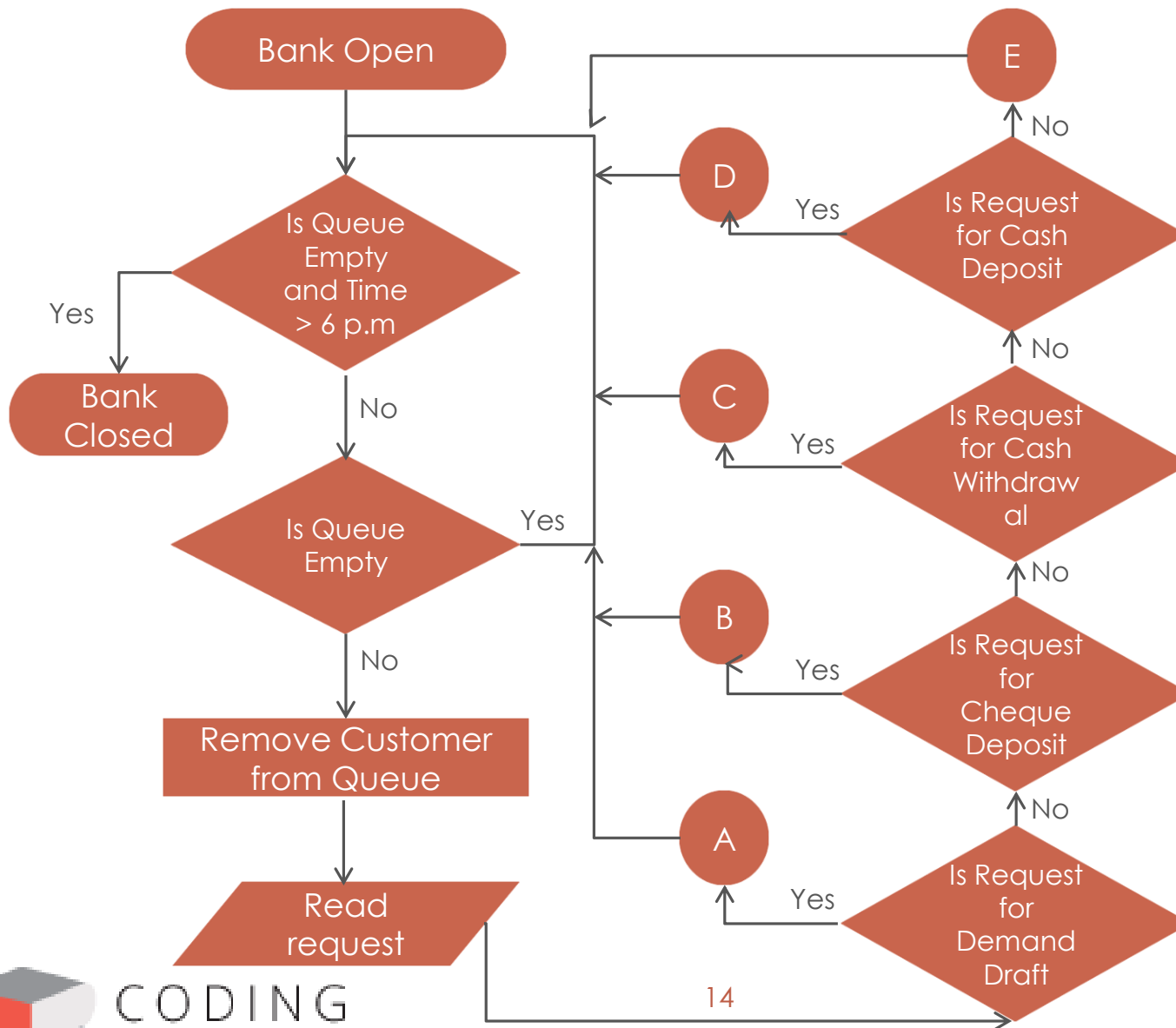
A real world example!

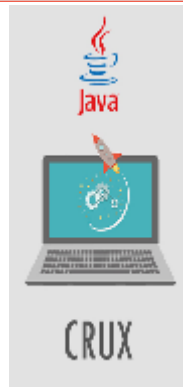
- A Bank is open till 6 p.m. and the banker needs to process requests from customers
- Requests can be one of the four types:
 - i. Cash Deposit
 - ii. Cash Withdrawal
 - iii. Cheque Deposit
 - iv. Making A Demand Draft
- Draw the workflow of the banker





Lets see what the banker
needs to do?





Time for Brain Teasers!

BT - 1: Hour Glasses



You have two hourglasses: a 7 minute one and a 11 minute one. Using just two hourglass, **accurately time 15 minutes.**

BT – 2: Apples and Oranges

There are three closed and opaque cardboard boxes. One is labeled "APPLES", another is labeled "ORANGES", and the last is labeled "APPLES AND ORANGES". You know that the labels are currently misarranged, such that no box is correctly labeled. You would like to correctly rearrange these labels. To accomplish this, you may draw only one fruit from one of the boxes. **Which box do you choose, and how do you then proceed to rearrange the labels?**



BT – 3: Average Salary



Three coworkers would like to know their average salary. However, they are self-conscious and don't want to tell each other their own salaries, for fear of either being ridiculed or getting their houses robbed. **How can they find their average salary, without disclosing their own salaries?**

What is a Pseudocode?



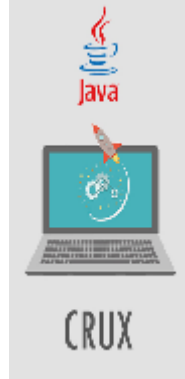
Human readable informal description of a
algorithm/program

Why Learn It?



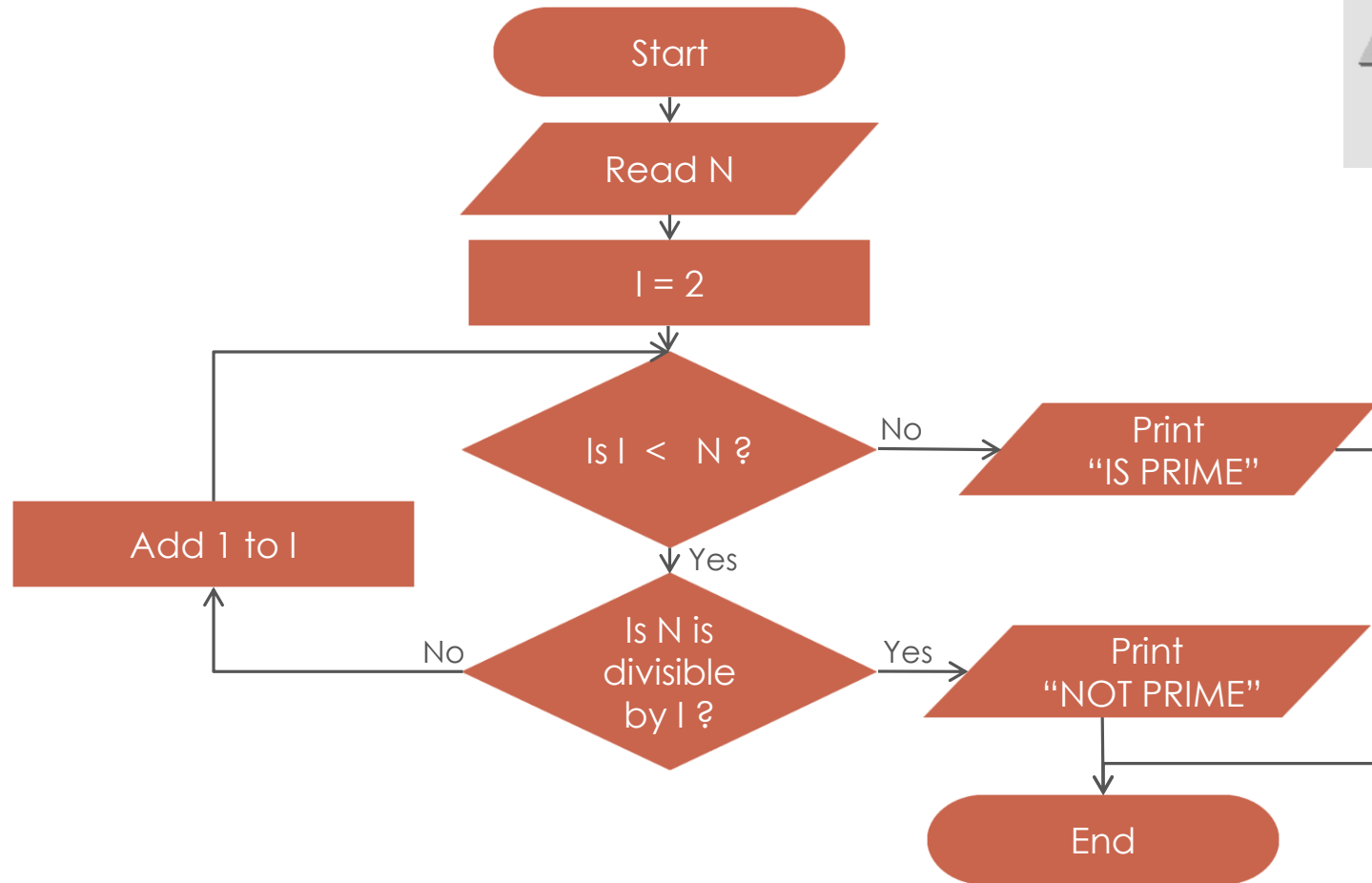
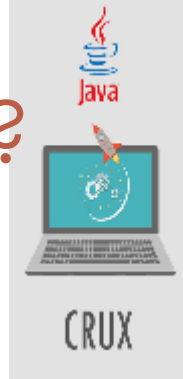
- Language Independent.
- Structure your code before writing it.
- Fastest way to verify.

Lets define our own Pseudocode language



- Input [read N]
- Assignment [Sum \leftarrow 0]
- Output [print Sum]
- If Else [if I < N then ... end else then ... end]
- While Loop [while I < N do ... end]
- Exit [exit]

Check if a number is prime or not?



Check if a number is Prime?

```
read N
divisor ← 2
while divisor < N do
    if N is divisible by divisor then
        print "NOT PRIME"
        exit
    end
    divisor ← divisor + 1
end
print "IS PRIME"
exit
```



Lets try one more problem!



- Write psuedocode to print following pattern!

1

2 3

4 5 6

7 8 9 10

Pseudocode

```
read N
Row  $\leftarrow$  1
Value  $\leftarrow$  1
while Row  $\leq$  N do
    Col  $\leftarrow$  1
    while Col  $\leq$  Row do
        print Value
        Value  $\leftarrow$  Value + 1
        Col  $\leftarrow$  Col + 1
    end
    print "\n"
    Row  $\leftarrow$  Row + 1
end
exit
```



Time to try?

- Write pseudocode to print the following pattern

```
1
2 3 2
3 4 5 4 3
4 5 6 7 6 5 4
```

- Find reverse of a number
- Find Nth Fibonacci, where 0 is 0th and 1 is 1st Fibonacci number





CRUX



CODING BLOCKS

Thank you

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