INCEPTION

C++ Foundation & Data Structures

Lecture 1 : Basics of Problem Solving

Saturday, 12 August 17

Teaching Assistants

- Ashutosh Gupta

Course Content

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

Logistics

- Facebook/Whatsapp Group
- Laptops
- Doubt Classes
- Video Backup

Few Do’s & Don’ts

Assignments & Tests

- Assignments
- Tests
- CodeZen
- Scoring System

Benefits for Top Performers

- Goodies for Top 10 performers
- 20% Discount in next courses for top 5% performers
- TA/Intern offers from CN
- Referral for intern/jobs outside CN as well

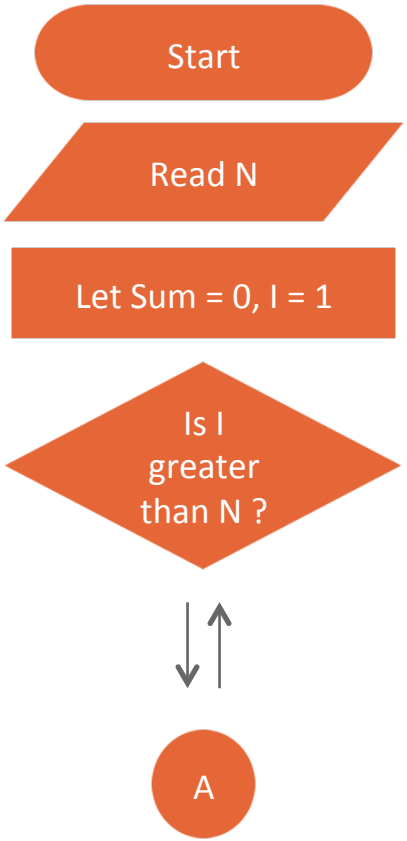
CodeZen Demo

Flow Charts

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

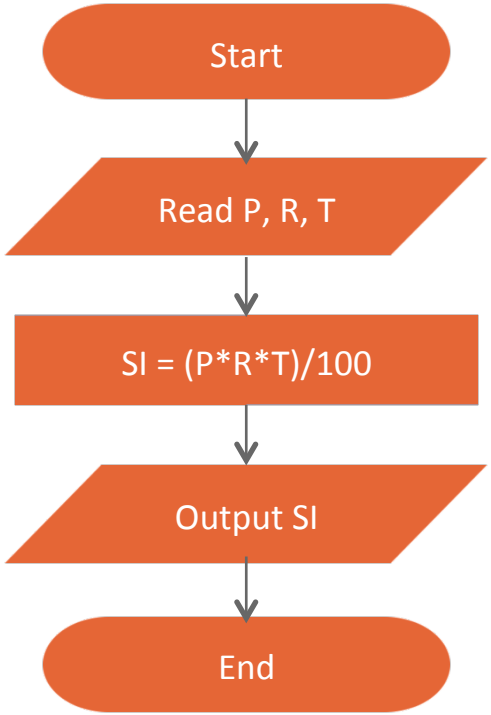
Decision

Arrow

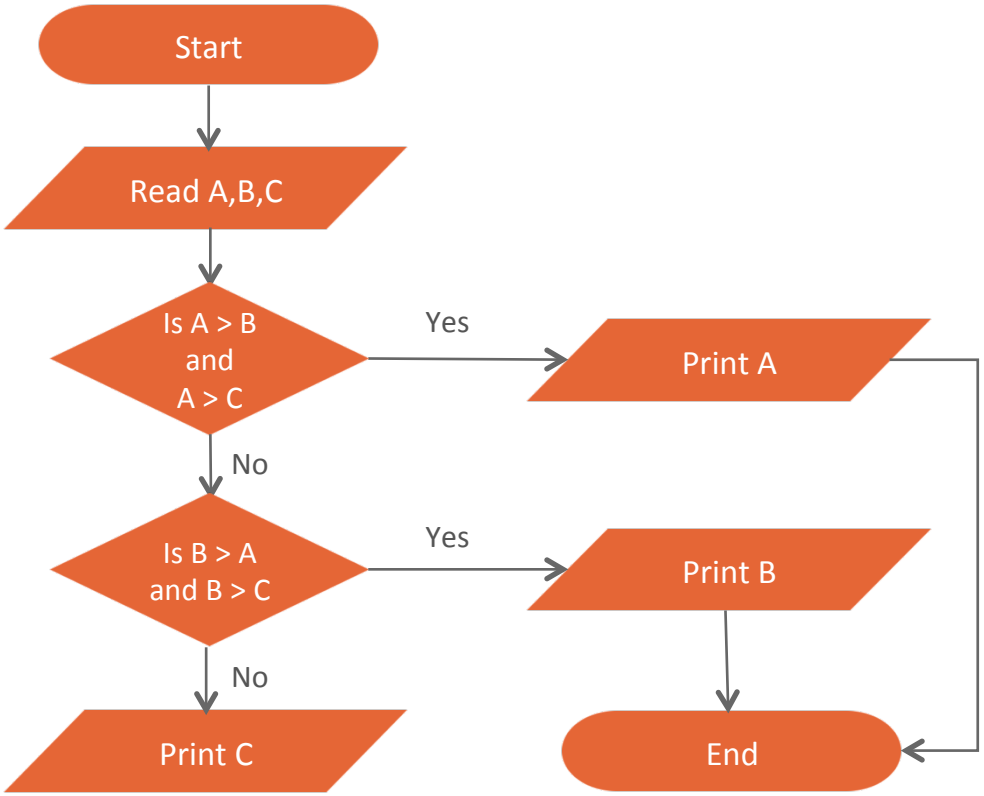
Connector

Lets Look At Few Problems And Their Flowcharts!

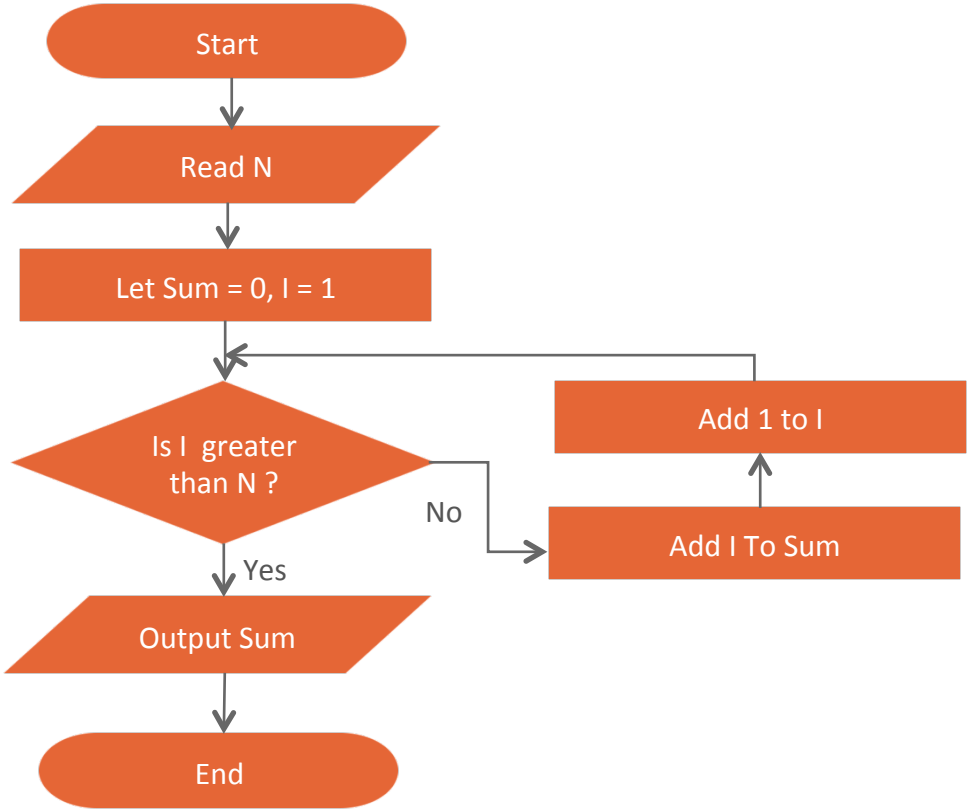
Read Principal, Rate & Time & Print Si



Find Largest Of Three Numbers



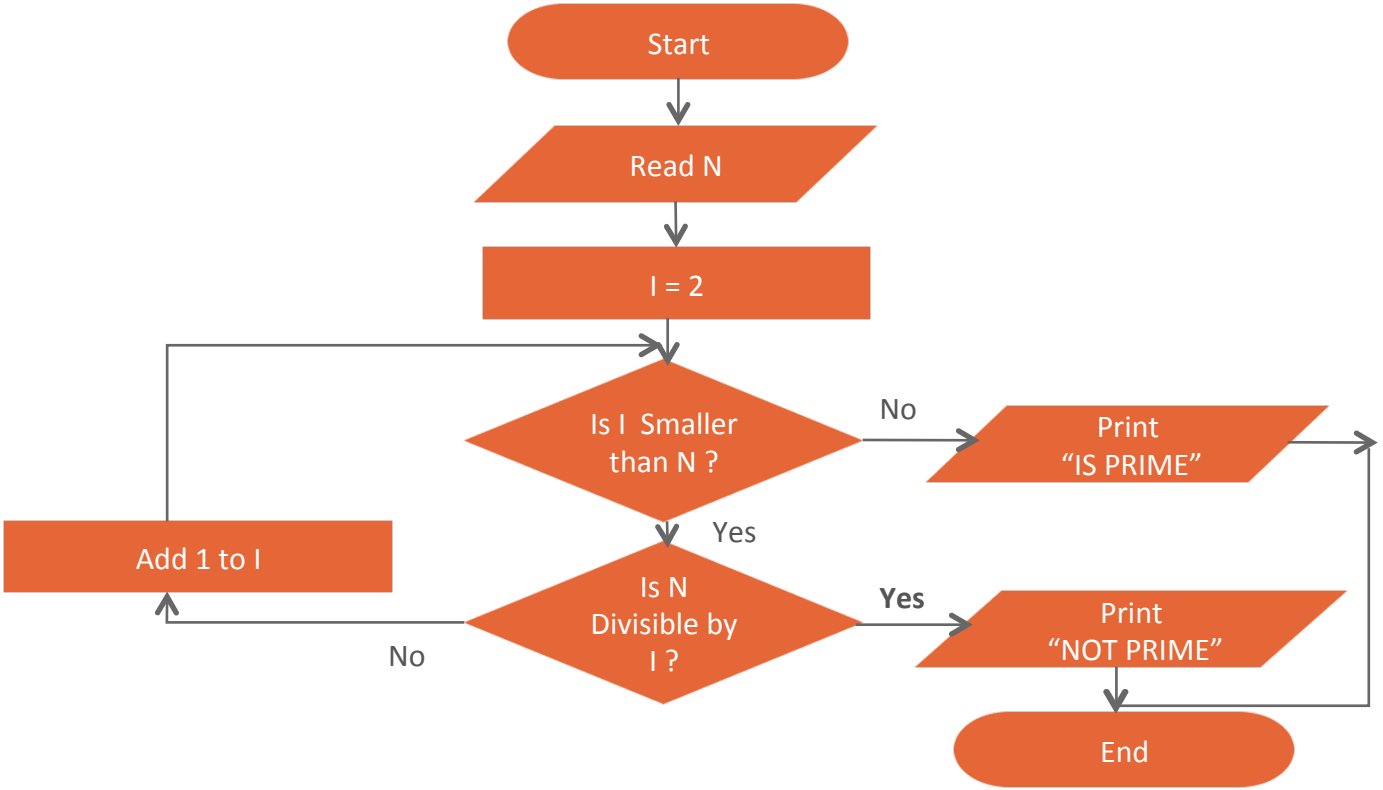
Find Sum Of Numbers From 1 To N



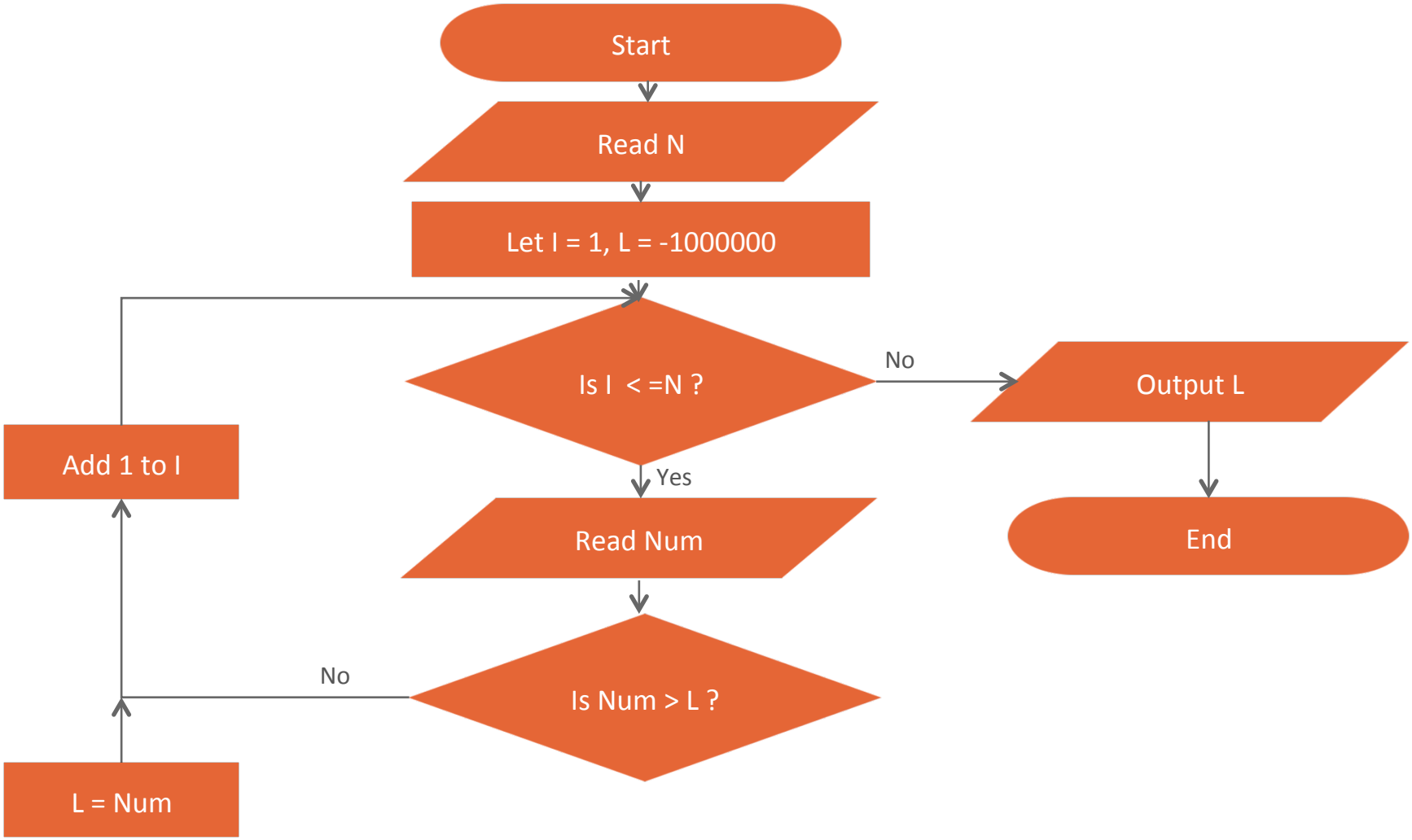
Time to try?

- Read five numbers and print their average
- Given N, find sum of even numbers from 1 to N
- Given N, check if its prime or not

Check If A Number Is Prime?



Find largest of N numbers



Time to try?

- Given a list of N integers, find mean of integers given. You would be given first N, and then N integers of the list.
- Given a number check if it is a member of Fibonacci sequence or not

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 measure 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?

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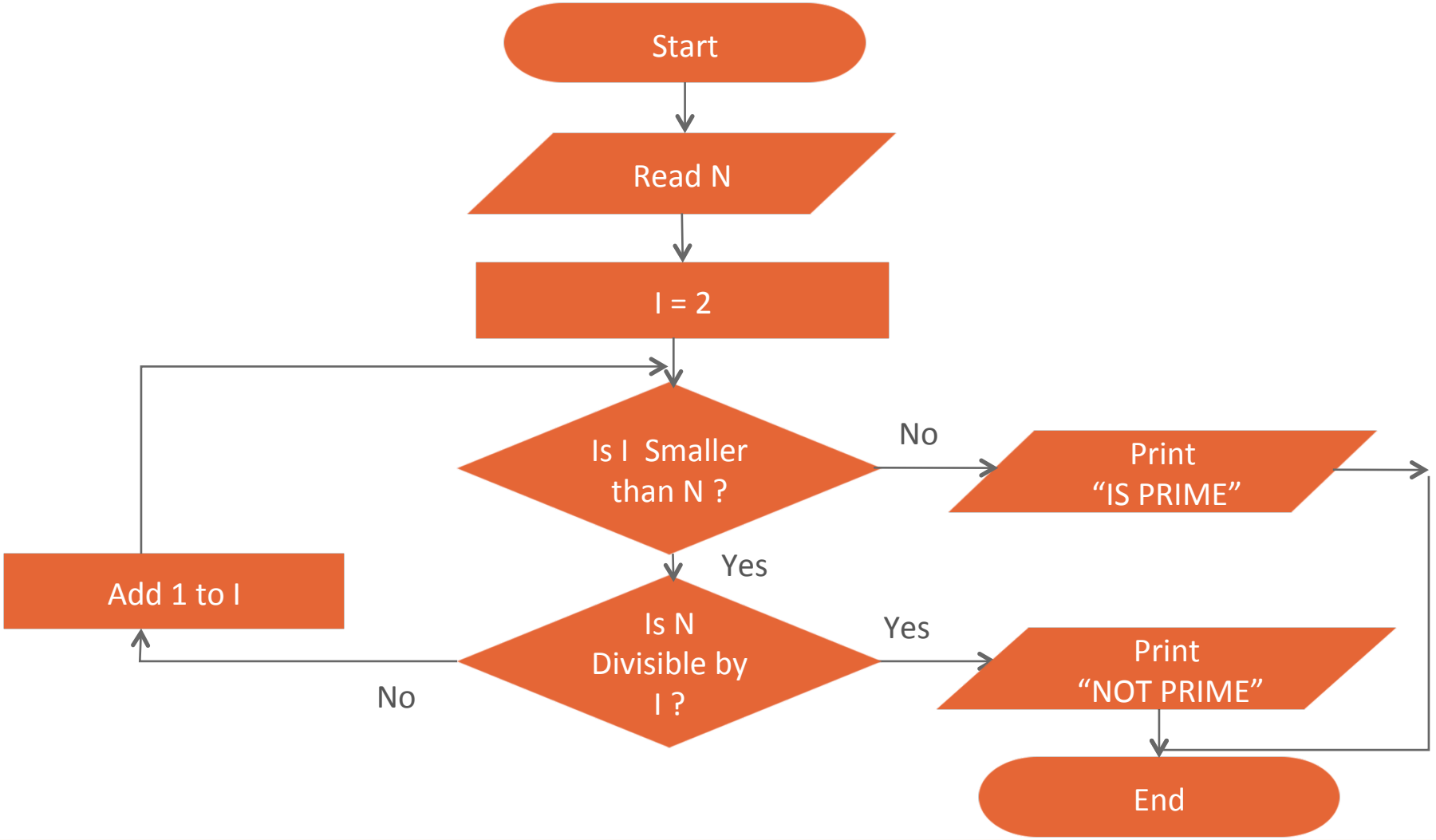
- Language Independent.
- Structure your code before writing it.
- Fastest way to verify.

Lets define our own Pseudocode language

- Input [read N]
- Assignment [Sum ← 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?



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 ← 1
Value ← 1
while Row <= N do
        Col ← 1
        while Col <= Row do
                print Value
                Value ← Value + 1
                Col  Col + 1
        end
        print “\n”
        Row ← Row + 1
end
exit
```

Time to try?

- Write pseudocode to print the following pattern

1

232

34543

4567654

567898765

- Find sum of reverse of two numbers.
- Write a program to swap two numbers without using third variable.

THANK YOU

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