CS F111: Computer Programming

(Second Semester 2021-22)

Lect 6: Flowchart & Algorithm Contd..

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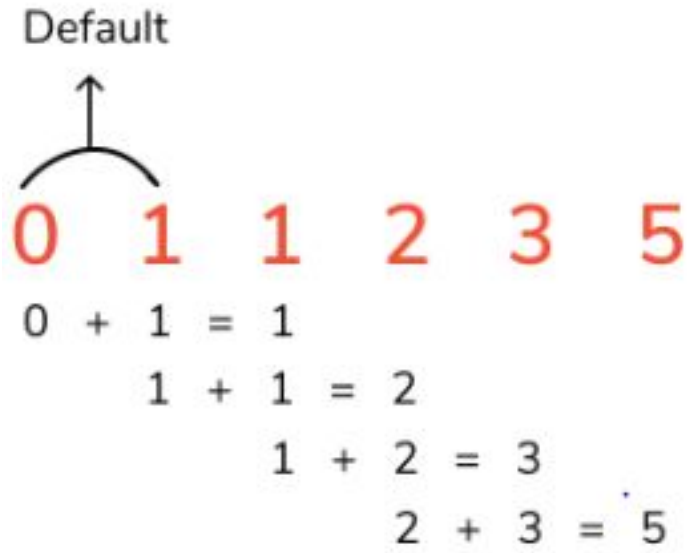
Ex: Check if the no. is Armstrong no?

371, 153, 407, ...

Step 1: Start
Step 2: Declare variables sum, temp, num
Step 3: Read num from User
Step 4: Initialize Variable sum=0 and temp=num
Step 5: While (num>0)
    5.1 sum=sum + [(num%10)*(num%10)*(num%10)]
    5.2 num=num/10
Step 6: If (sum==temp)
     print "Armstrong Number"
    else
    print "Not Armstrong Number"
Step 7: Stop

Applications: Number theory

Ex: Fibonacci series



$$F_n = F_{n-1} + F_{n-2}$$

$$F_0 = 0$$

$$F_1 = 1$$

Appls: Fibonacci search, Fibonacci heap, Fibonnaci qube graphs etc…

Fibonacci : 1 1 2 3 5 8

1. START
2. Read N
3. a = 1, b = 1
4. for i = 1 to N

4.1 print a

4.2 c = a + b

4.3 a = b

4.4 b = c

5. STOP

Factors of number N

1. START
2. Read N
3. for i = 1 to N

3.1 if(N%i == 0)

3.1.1 print i is the factor

4. STOP

Checking if a Number is Prime

1. START
2. Read N
3. if(N <= 1)

3.1 print N is not a prime number

3.2 STOP

4. for i = 2 to $\sqrt{N}$

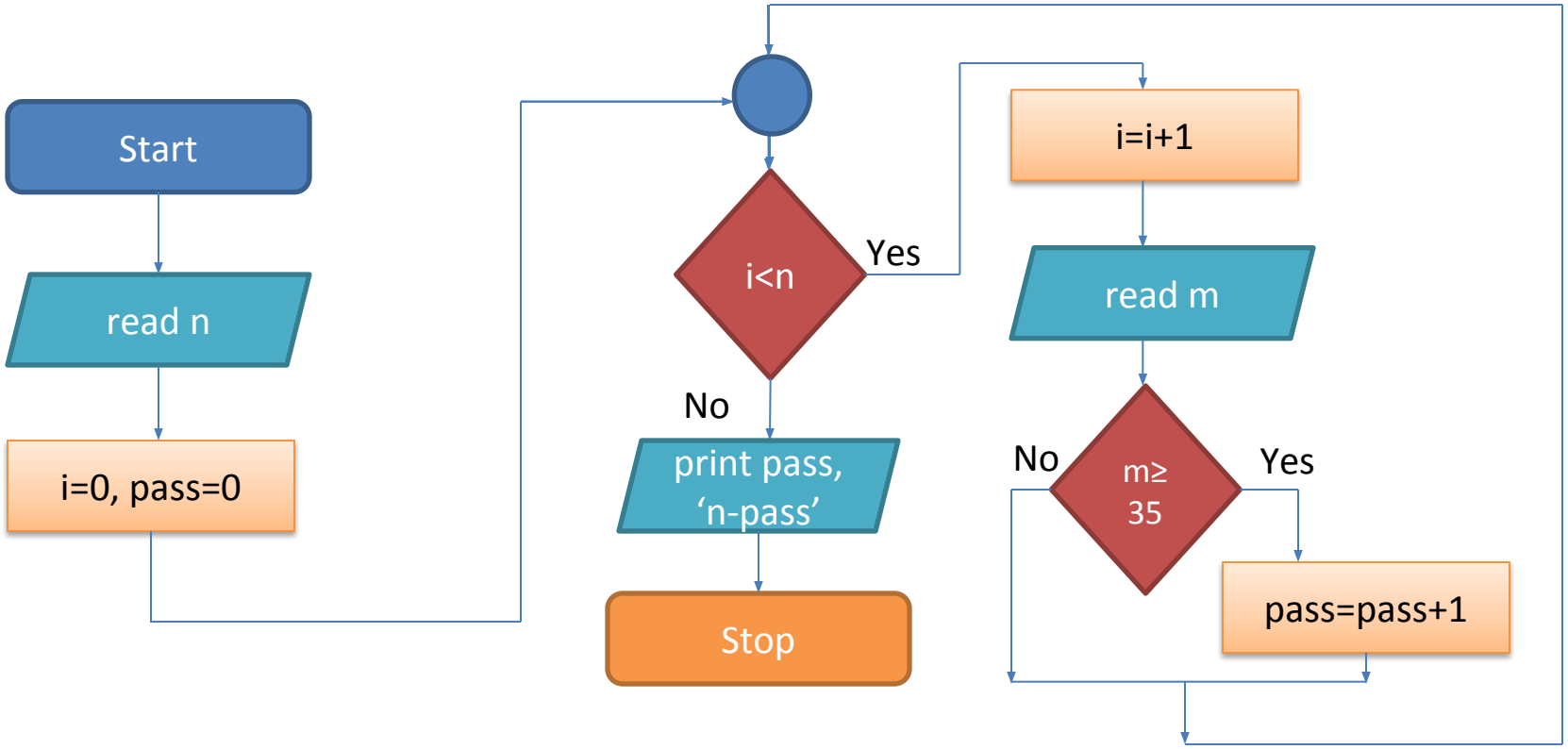
4.1 if(N%i == 0)

4.1.1 print N is not a prime number

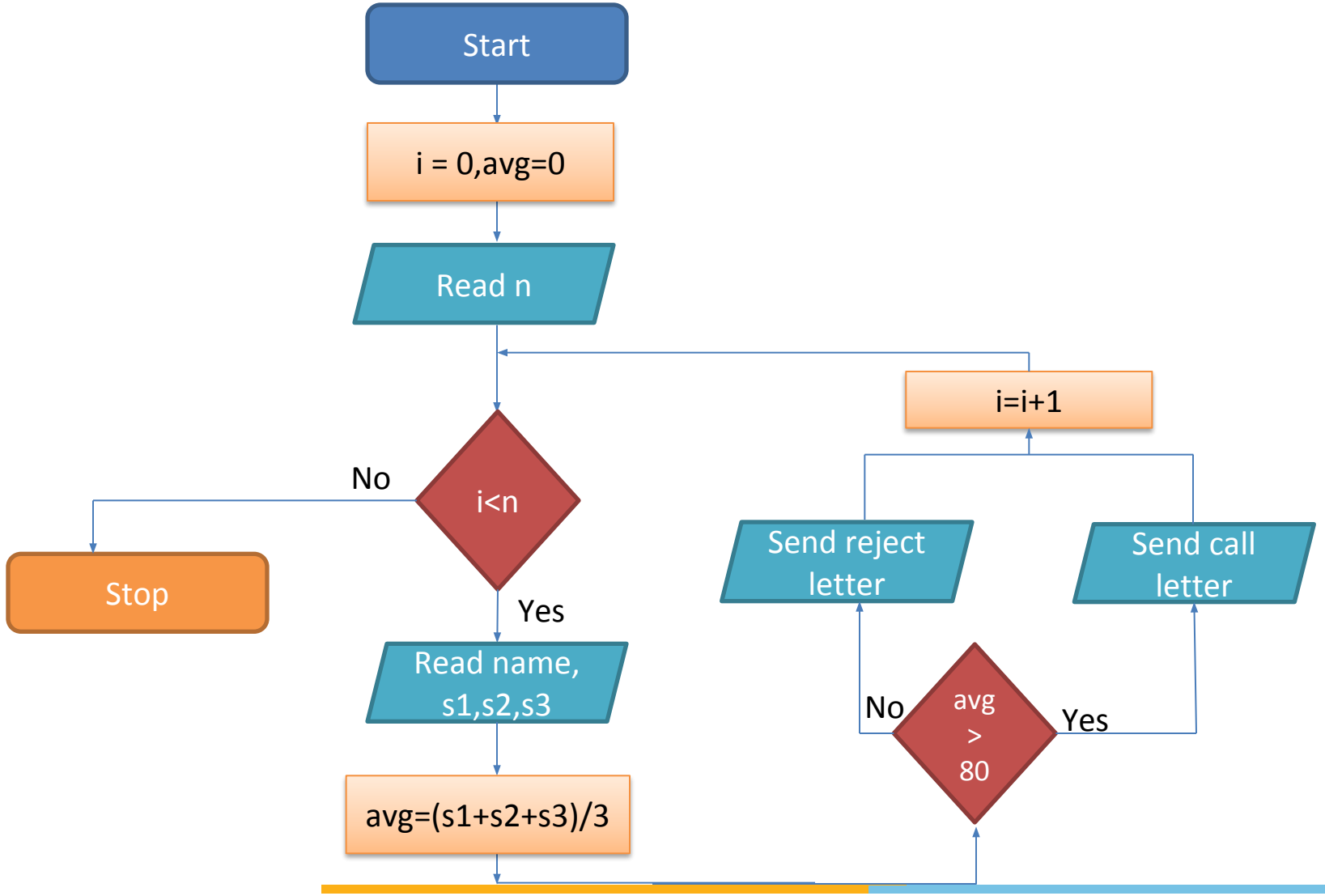
4.1.2 STOP

5. print N is a prime number
6. STOP

Ex: Given scores of ‘n’ students, and value of ‘n’, find out how many students have passed the course and how many have failed. Passing score of a subject is 35.



Ex6: The average score for three tests has to be greater than 80 for a candidate to qualify for an interview



1. **Write a program to enter the numbers till the user wants and at the end the program should display the largest and smallest numbers entered.**

Problems

1. Draw a flowchart to read a number and check if it is even or odd.
2. Draw a flowchart to read a number and check if it is divisible by 11 or not.
3. Draw a flowchart to print the following sequence of numbers.
   i.) 20, 19, 18, 17,...., 1
   ii.) 2, 4, 6, 8,....., 32
4. Draw a flowchart to read n numbers and find the average.
5. Draw a flowchart to read a number and print all positive even numbers till the number.
6. Draw a flowchart to read a number and print all positive odd numbers till the number.
7. Draw a flowchart to read a number and print all factors of it.
8. Draw a flowchart to read a number and check if it is a prime number or not.