SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 23ITT101 Problem Solving and C Programming

YEAR /I SEMESTER

Unit 1- INTRODUCTION TO PROBLEM SOLVING TECHNIQUES

Topic 7: Simple strategies for developing algorithms (iteration, recursion)

Brain Storming

1. What is the meaning/application of iteration and recursion?

SIMPLE STRATEGIES FOR DEVELOPING ALGORITHMS

1. Iterations
2. Recursions

Iterations:

A sequence of statements is executed until a specified condition is true is called iterations.

1. for loop
2. While loop

Example

Syntax for For:	**Example: Print n natural numbers**

FOR(*start-value* to *end-value)* DO
  statement
 ...
ENDFOR
	BEGIN
	GET n
	INITIALIZE i=1
	FOR (i<=n) DO
	  PRINT i
	  i=i+1
	ENDFOR
	END

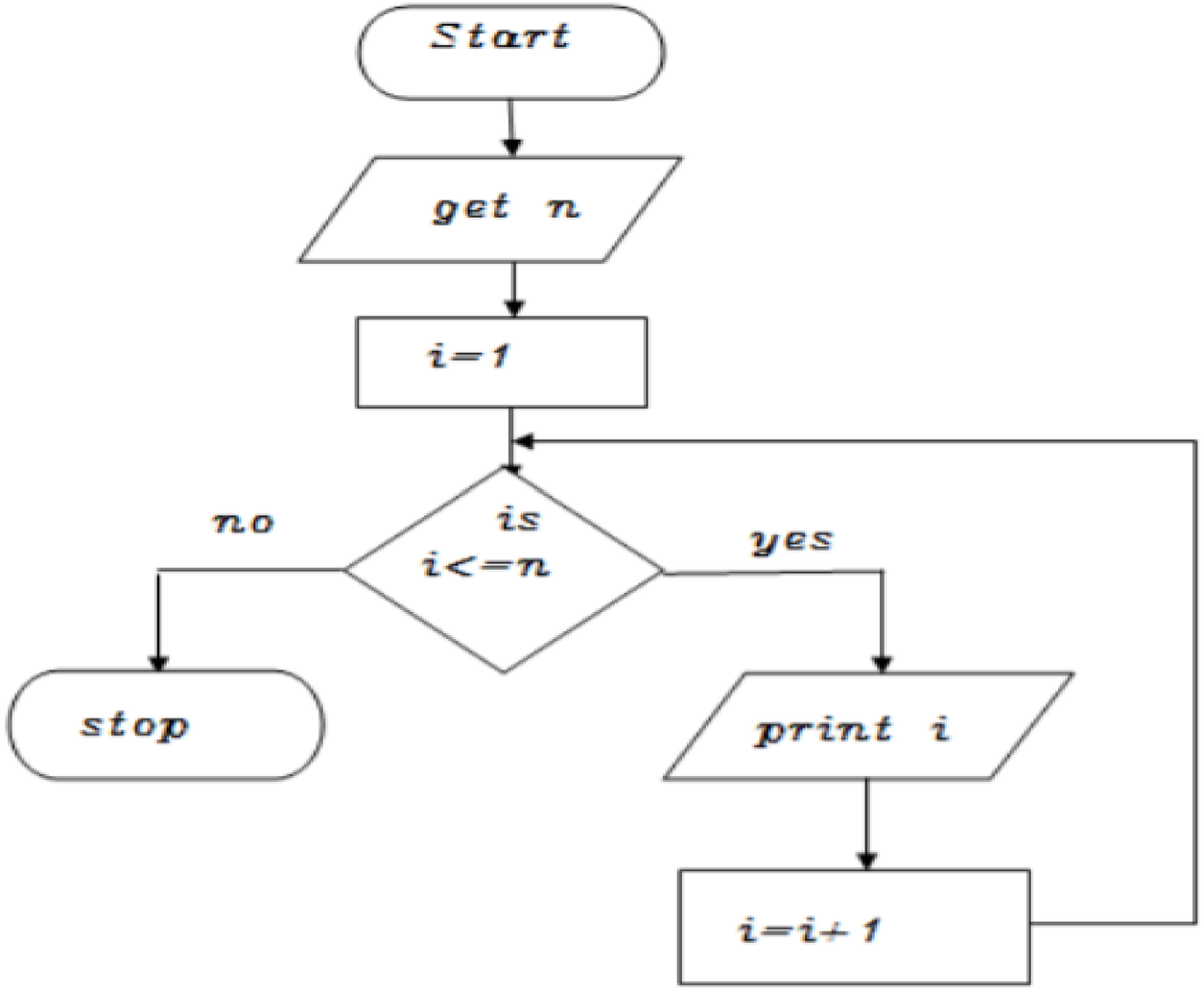
Syntax for While:	**Example: Print n natural numbers**

WHILE (condition) DO
  statement
  ...
ENDWHILE
	BEGIN
	GET n
	INITIALIZE i=1
	WHILE(i<=n) DO
	  PRINT i
	  i=i+1
	ENDWHILE
	END

Flowchart

/* Algorithm For print "n" numbers */

1. Read the value of n.
2. i = 1
3. if (i > n) go to step 7
4. Display value of i
5. i = i + 1
6. go to step 3
7. Stop



Recursions

- A function that calls itself is known as recursion.
- Recursion is a process by which a function calls itself repeatedly until some specified condition has been satisfied.

Algorithm for factorial of n numbers using recursion:

Main function:

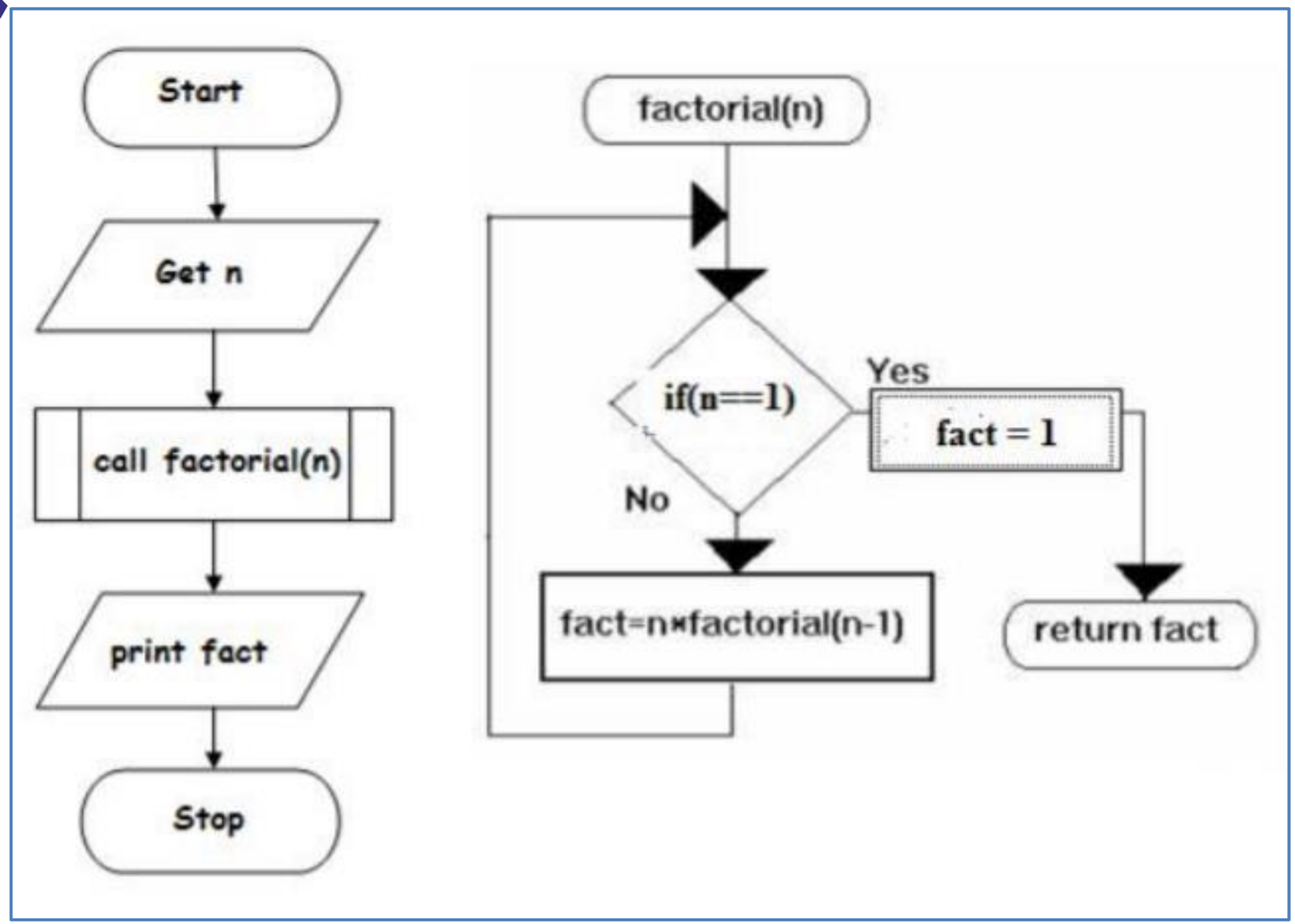
Step1: Start
Step2: Get n
Step3: call factorial(n)
Step4: print fact
Step5: Stop

Factorial of a positive integer (number) is the sum of multiplication of all the integers smaller than that positive integer. For example, factorial of 5 is 5 * 4 * 3 * 2 * 1 which equals to 120

Sub function factorial(n):

Step1: if(n==1) then fact=1 return fact
Step2: else fact=n*factorial(n-1) and return fact

Conti...


Start
Get n
call factorial(n)
print fact
Stop
factorial(n)
if(n==1)
Yes
fact = 1
No
fact=n*factorial(n-1)
return fact

Pseudo code for factorial using recursion

Main function:

```
BEGIN
GET n
CALL factorial(n)
PRINT fact
BIN
```

Sub function factorial(n):

```
IF(n==1) THEN
      fact=1
      RETURN fact
ELSE
     RETURN fact=n*factorial(n-1)
```

Assessment 1

1. What is Recursion and Iteration?

Ans : _____

References

TEXT BOOKS

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5.Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011. (UNIT – I, II, III, IV, V)

Thank You