

VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)
(Affiliated to Osmania University)
Hyderabad - 500 031.

DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K'SREE INDIRA SIVAN | Roll No. 1602-21-733-052 | Page No. 69

WEEK-5 PRELAB QUESTIONS: 5

1) Differentiate between break and continue:

- Ans:
- * The break statement causes the program to jump out of the loop or conditional statement body; i.e. going to the closing brace and continue with further code.
 - * The continue statement causes the program to bring the control to the beginn end of the loop by skipping few lines and continues with next iteration.

2) What are the advantages of using loops?

- Ans:
- Loops enable the user (or) programmer to repeat a set of instructions in a given program. The user should mention a condition that controls the loop i.e. the loop checks for the condition to satisfy before and after each iteration. If the specified condition turns out to be false and the specified task is accomplished ; the loop terminates and proceeds with further instructions.

3) What is a nested loop?

- Ans:
- Nesting of loops is the feature in C that allows the looping of statements inside another loop. We can define any type of loop inside another loop.

4) Give an example to illustrate continue.

Ans:

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Ans:

```
#include <stdio.h>
void main()
{
    int i=0;
    while(i!=0)
    {
        printf("%d", i);
        continue;
        i++;
    }
}
```

PRELAB PROGRAMS - 5

1) Write a program to print the Pascal Triangle:

```
#include <stdio.h>
int main()
{
    int r, i, j, coeff;
    printf("enter the number of rows.\n");
    scanf("%d", &r);
    for(i=0; i<r; i++)
    {
        for(s=1; s<=r-i; s++)
        {
            printf(" ");
        }
    }
}
```

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```
for(j=0; j<=i; j++)  
{ if(i==0 || j==0)  
    coeff = 1;  
    else  
    coeff = (coeff * (i-j+1))/j;  
    printf("%d ", coeff);  
} printf("\n");  
}  
{ return 0;  
}
```

→ OUTPUT:

Enter the number of rows

6

1 1 1 1
1 1 2 1
1 1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

2) Write a program to check whether the given number is a perfect number.

```
#include <stdio.h>  
int main()  
{ int n, rem, sum=0, i;  
printf("Enter a number\n");  
scanf("%d", &n);  
for(i=1; i<n; i++)  
{ rem = n % i;  
if(rem == 0)  
{  
    sum += i;  
}  
}  
if(sum == n)
```

→ OUTPUT:

1) Enter a number

8

Not a perfect number.

2) Enter a number

6

Perfect number.

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```
{ printf (" Perfect number " );  
}  
else  
{  
printf (" Not a perfect number " );  
}  
return 0;  
}
```

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PRE LAB QUESTIONS: 6

- 1) List different parameter passing techniques.
A: call by value and call by reference.
- 2) What do you understand from function prototype?
A: Function prototype tells us the type of datatypes to be used and the type of return value a function will give after execution.
- 3) Explain the syntax of function definition.
A: return type function name (type¹ argument₁, type² argument₂)

{
 Statements ; } Body of the
 function definition
 }- 4) Differentiate between standard functions & user-defined functions. List few standard functions.
A: Standard functions are the functions which are already defined and stored in 'C' library which are directly used by the user.
Ex: printf, scanf.
User defined functions are those which are defined by the programmer whenever required in 'C' program and are not predefined in the library.

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Q) Define Recursion.

A: Recursion is a repetitive process in which a function calls itself. Every recursive call will solve part of the problem or reduce the size of the problem & it must have base case.

Q) What are the advantages of using functions?

A: Functions help the problems to be understood by breaking them into small pieces. They provide a way to reuse the code that is required in more than one place in a program. We can also create personal & project libraries that make developing systems easier. They also help in protecting data.

PRELAB PROGRAMS - 6:

1) Program to print Fibonacci series using recursive function:

```
#include<stdio.h>
long long int series(int n);
int main()
{
    int n,i;
    printf("Enter the number of terms to be printed\n");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        printf("%lld,",series(i));
    }
    return 0;
}
```

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```
long long int series(int n)
{
    if (n==1)
        return 0;
    else if (n==2 || n==3)
        return 1;
    else
        return ( series(n-1)+series(n-2));
}
```

→ OUTPUT:

Enter the number of terms
to be printed

9
0,1,1,2,3,5,8,13,21,

2) Write a program to solve the towers of Hanoi problem.

```
# include <stdio.h>
```

```
void hanoi( int n, char source, char auxiliary, char destination);
int main()
{
    int n;
    printf("Enter the number of discs\n");
    scanf("%d", &n);
    printf("Sequence of moves involved are:");
    hanoi(n,'S','A','D');
    return 0;
}
```

```
void hanoi( int n, char source, char auxiliary, char destination)
{
    if (n==1)
    {
        printf("In Move %d disc 1 from %c rod to %c rod",
               source, destination);
```

}

{

printf("In Move %d disc 1 from %c rod to %c rod",

source, destination);

}

5

notes 1 . 6

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```
else
{ hanoi(n-1, source, destination, auxiliary);
printf("In Move disc %d from %c rod to %c rod", n, source,
destination);
hanoi(n-1, auxiliary, source, destination);
}
return ; }
```

→ OUTPUT:

Enter the number of discs

4

Sequence of moves involved are:

Move disc 1 from S rod to A rod
Move disc 2 from S rod to D rod
Move disc 1 from A rod to D rod.
Move disc 3 from S rod to A rod
Move disc 1 from D rod to S rod.
Move disc 2 from D rod to A rod.
Move disc 1 from S rod to A rod.
Move disc 4 from S rod to D rod.
Move disc 1 from A rod to D rod.
Move disc 2 from A rod to S rod.
Move disc 1 from D rod to S rod.
Move disc 3 from A rod to D rod
Move disc 1 from S rod to A rod
Move disc 2 from S rod to D rod
Move disc 1 from A rod to D rod.

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- 3) Program to print the prime numbers within the given range using a user-defined function:

Ans:

```
#include <stdio.h>
int prime(int a);
void range(int min, int max);
int main()
{
    int max, min;
    printf("Enter the minimum and maximum
           values of the range\n");
    scanf("%d\n%d", &min, &max);
    range(min, max);
    return 0;
}
void range(int min, int max)
{
    printf("Prime in the given range\n");
    while (min <= max)
    {
        if(prime(min))
            printf("%d", min);
        min++;
    }
}
int prime(int a)
{
    int i;
    for(i=2; i<=a/2; i++)
    {
        if(a % i == 0)
            return 0;
    }
    return 1;
}
```

→ OUTPUT:

Enter the minimum
and maximum
values of the
range.

5

29

Prime numbers in
the given range:

5, 7, 11, 13, 17, 19, 23, 29;

{ return 1; }

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→ AIM: Program to illustrate the use of functions:
CHECK IF NO. IS PRIME OR NOT:

→ PROBLEM STATEMENT:

Write a program to check whether the given number is prime using user defined function.

→ PROGRAM:

```
# include <stdio.h>
int prime(int x)
int main()
{
    int num, a;
    printf(" Enter the number\n");
    scanf("%d", &num);
    a = prime(num);
    if(a == 1)
        printf(" prime number");
    else
        printf(" not a prime number");
    return 0;
}
```

```
int prime(int x)
```

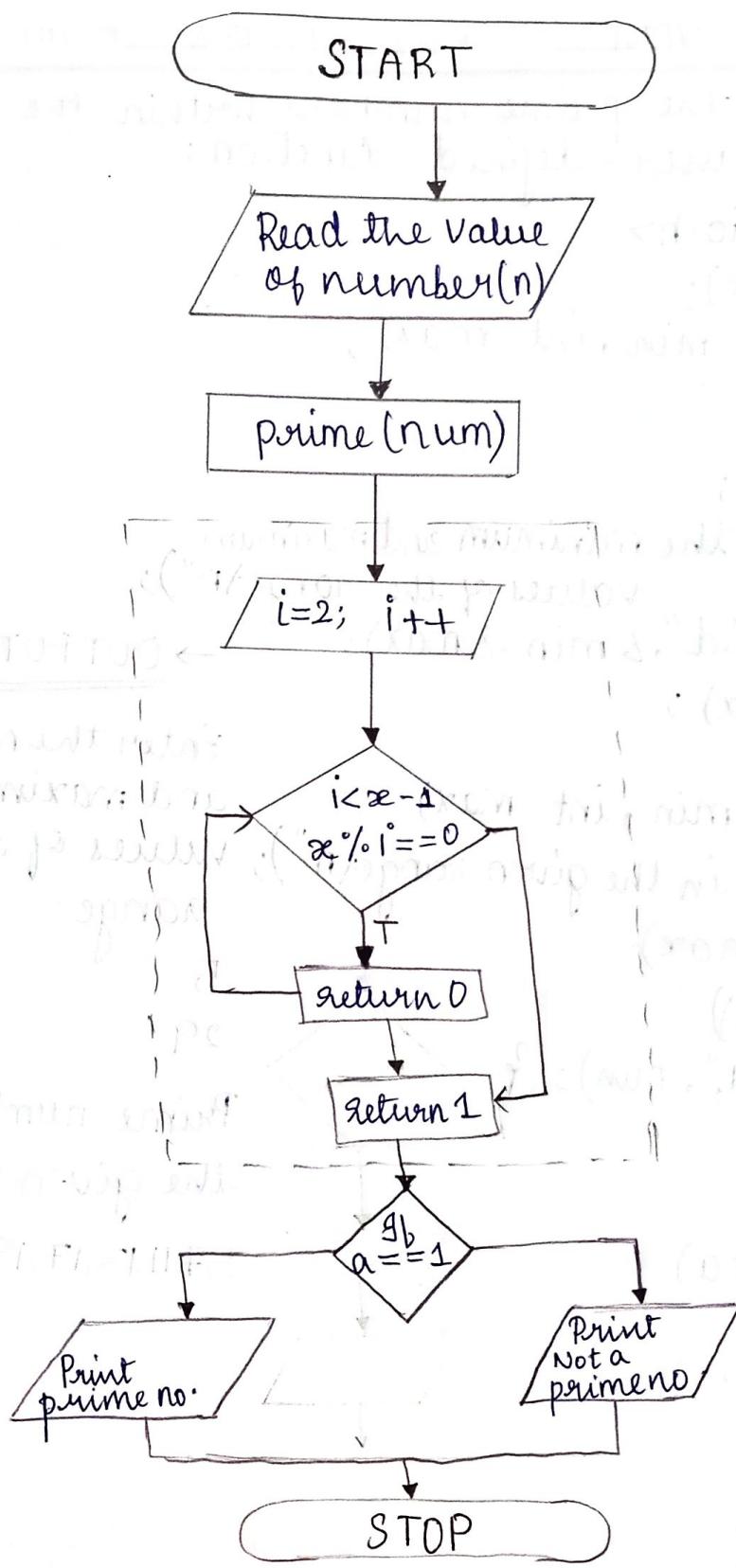
```
{
    int i;
    for(i=2; i<x-1; i++)
    {
        if(x % i == 0)
            return 0;
    }
    return 1;
}
```

*OUTPUT:

→ Enter the number
33
not a prime number.
→ Enter the number
97
prime number.

FLOW CHART: CHECK IF GIVEN NUMBER IS PRIME

OR NOT:



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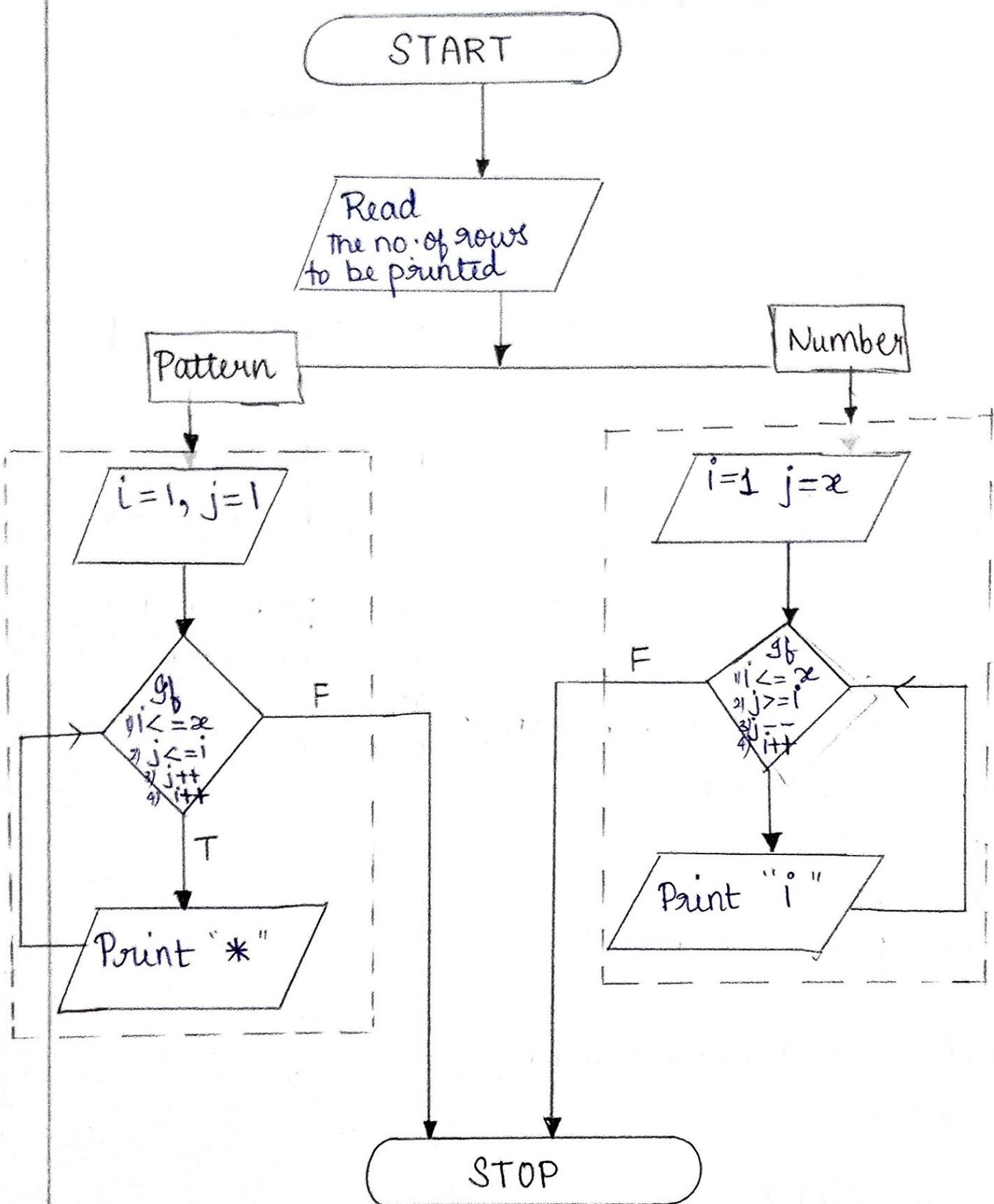
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- AIM: Program to illustrate the use of functions:
PRINT STAR PATTERN & NUMBER PATTERN
- Problem Statement: Write a program to print star and number patterns by using 2 different user defined functions.
- PROGRAM:
- ```
#include <stdio.h>
void pattern(int x);
void number(int x);
int main()
{
 int n;
 printf("Enter the number\n");
 scanf("%d", &n); // of rows to be printed
 pattern(n);
 number(n);
 return 0;
}

void pattern(int x)
{
 int i, j;
 for(i=1; i<=x; i++)
 {
 for(j=1; j<=i; j++)
 {
 printf("*");
 }
 printf("\n");
 }
 return;
}

void number(int x)
{
 int i, j;
 for(i=1; i<=x; i++)
 {
 for(j=x; j>=i; j--)
 {
 printf("%d", i);
 }
 printf("\n");
 }
 return;
}
```
- OUTPUT:
- Enter the number of rows to be printed  
6
- \*  
\*\*  
\*\*\*  
\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
1 1 1 1 1  
2 2 2 2 2  
3 3 3 3  
4 4 4  
5 5  
6

# FLOW CHART: STAR PATTERN AND NUMBER PATTERN



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→ AIM: Program to illustrate call by value:

PRINT MARKS OF 5 SUBJECTS USING CALL BY VALUE:

→ PROBLEM STATEMENT: Write a program to read the internal marks of 5 subjects using a user defined function which increments all the subject marks by 2 and display the marks after calling the increment function.

→ PROGRAM:

```
#include <stdio.h>
void increment(float s1, float s2, float s3, float s4, float s5);
int main()
{ float s1, s2, s3, s4, s5;
printf("Enter the five subject marks\n");
scanf("%f\n%f\n%f\n%f\n%f", &s1, &s2, &s3, &s4, &s5);
increment(s1, s2, s3, s4, s5);
return 0;
}
```

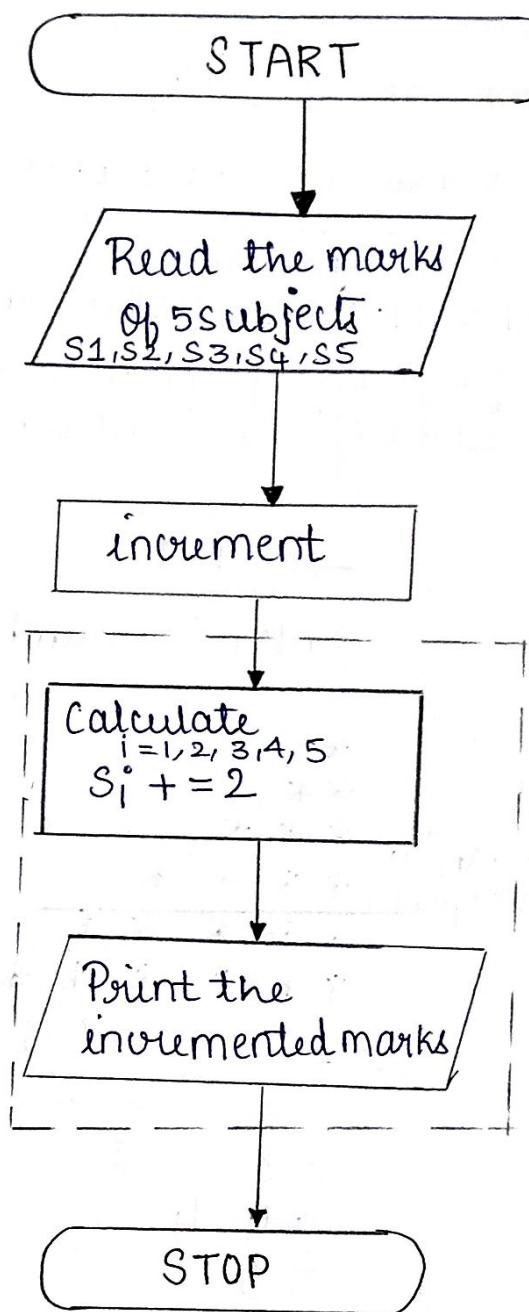
```
3 void increment(float s1, float s2, float s3, float s4, float s5)
```

```
{ s1 += 2;
s2 += 2;
s3 += 2;
s4 += 2;
s5 += 2;
```

```
printf("%f\n%f\n%f\n%f\n%f", s1, s2, s3, s4, s5);
```

3

## FLOW CHART: PRINT MARKS OF 5 SUBJECTS USING CALL BY VALUE



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## → OUTPUT:

Enter the five subject marks:

25

26

23

18

30

27.000000

28.000000

25.000000

20.000000

32.000000

44

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→ AIM: Program to illustrate the use of call by reference.  
PRINT 5 SUBJECT MARKS USING CALL BY REFERENCE:

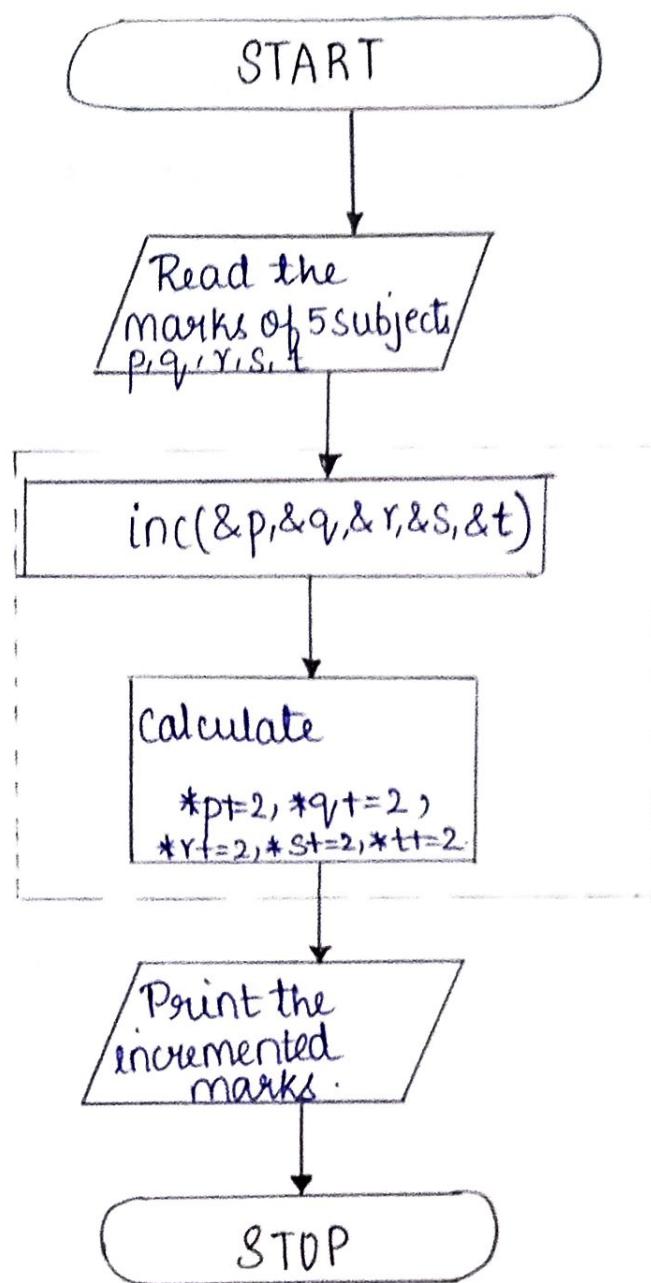
→ PROBLEM STATEMENT: Execute the above program by call by reference.

→ PROGRAM:

```
#include <stdio.h>
void inc (float *p, float *q, float *r, float *s, float *t);
int main()
{ float p,q,r,s,t;
 printf("Enter the 5 subject marks\n");
 scanf ("%f\n%f\n%f\n%f\n%f", &p,&q,&r,&s,&t);
 inc (&p,&q,&r,&s,&t);
 printf ("%f\n%f\n%f\n%f\n%f", p,q,r,s,t);
 return 0;
}

void inc (float *p, float *q, float *r, float *s, float *t)
{
 *p+=2;
 *q+=2;
 *r+=2;
 *s+=2;
 *t+=2;
}
```

FLOW CHART: PRINT 5 SUBJECT MARKS USING  
CALL BY REFERENCE:



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→ OUTPUT:

Enter the five subject marks :

26

25

29

30

21

28.000000

27.000000

31.000000

32.000000

22.000000

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→ AIM: Program to illustrate the use of recursive function  
PRINT FACTORIAL USING RECURSIVE FUNCTION:

→ PROBLEM STATEMENT: Write a recursive function to calculate the factorial of a given number.

→ PROGRAM:

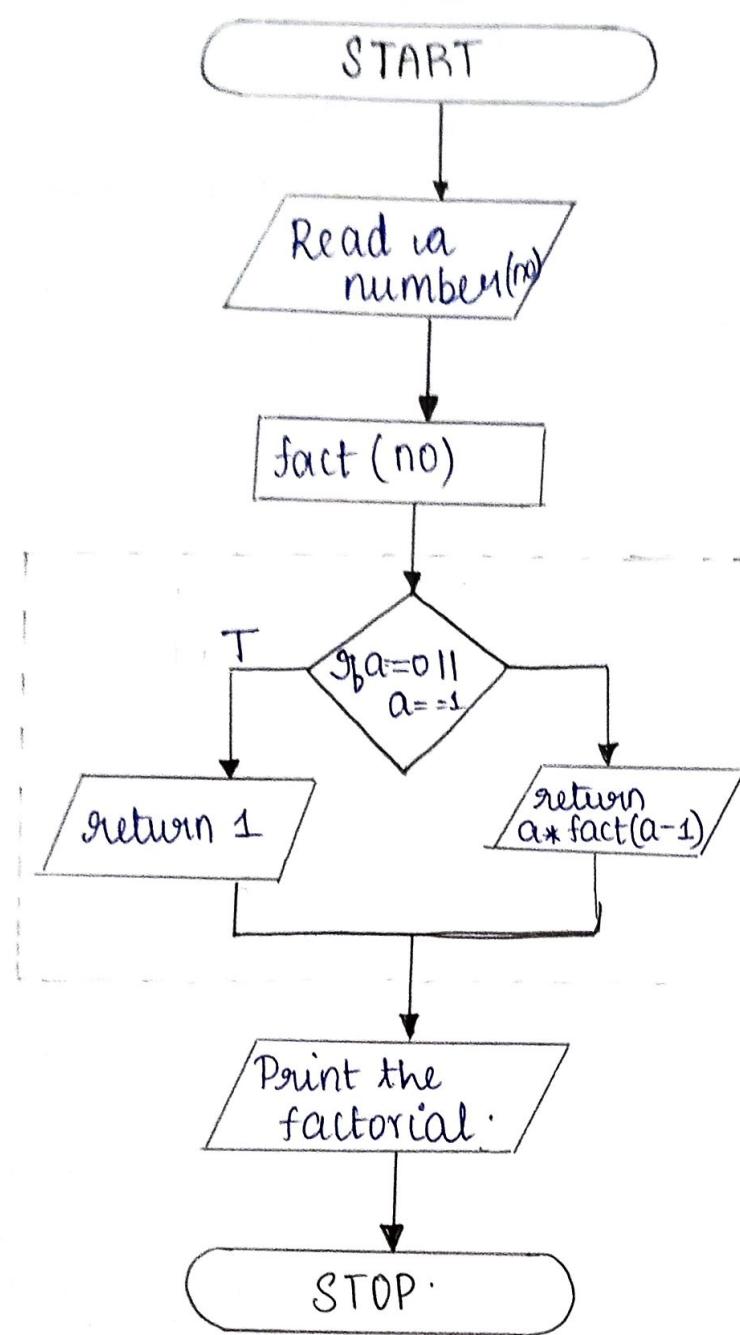
```
#include <stdio.h>
int fact(int a);
int main()
{
 int no, b;
 printf("Enter a number\n");
 scanf("%d", &no);
 b=fact(no);
 printf("factorial = %d", b);
 return 0;
}

int fact(int a)
{
 if(a==0 || a==1)
 {
 return 1;
 }
 else
 return (a*fact(a-1));
}
```

→ OUTPUT:

Enter a number  
7  
factorial = 5040

## FLOW CHART: FACTORIAL USING RECURSIVE FUNCTION.



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→ AIM: Program to illustrate the use of recursive function :  
PRINT GCD OF 2 NUMBERS USING RECURSIVE FUNCTION:

→ PROBLEM STATEMENT: Write a program to find gcd of given 2 numbers using recursive function :

→ PROGRAM:

```
include <stdio.h>
int gcd(int n1, int n2);
int main()
{
 int n1, n2, y;
 printf("Enter the 2 numbers\n");
 scanf("%d %d", &n1, &n2);
 printf("Gcd of %d and %d is %d", n1, n2, gcd(n1, n2));
 return 0;
}

int gcd(int n1, int n2)
{
 if (n2 == 0)
 return gcd(n1, n1 % n2);
 else
 return n1;
}
```

→ OUTPUT:

Enter the 2 numbers  
4 8  
Gcd of 4 and 8 is 4.

# FLOWCHART: GCD OF 2 NUMBERS USING RECURSIVE FUNCTION:

