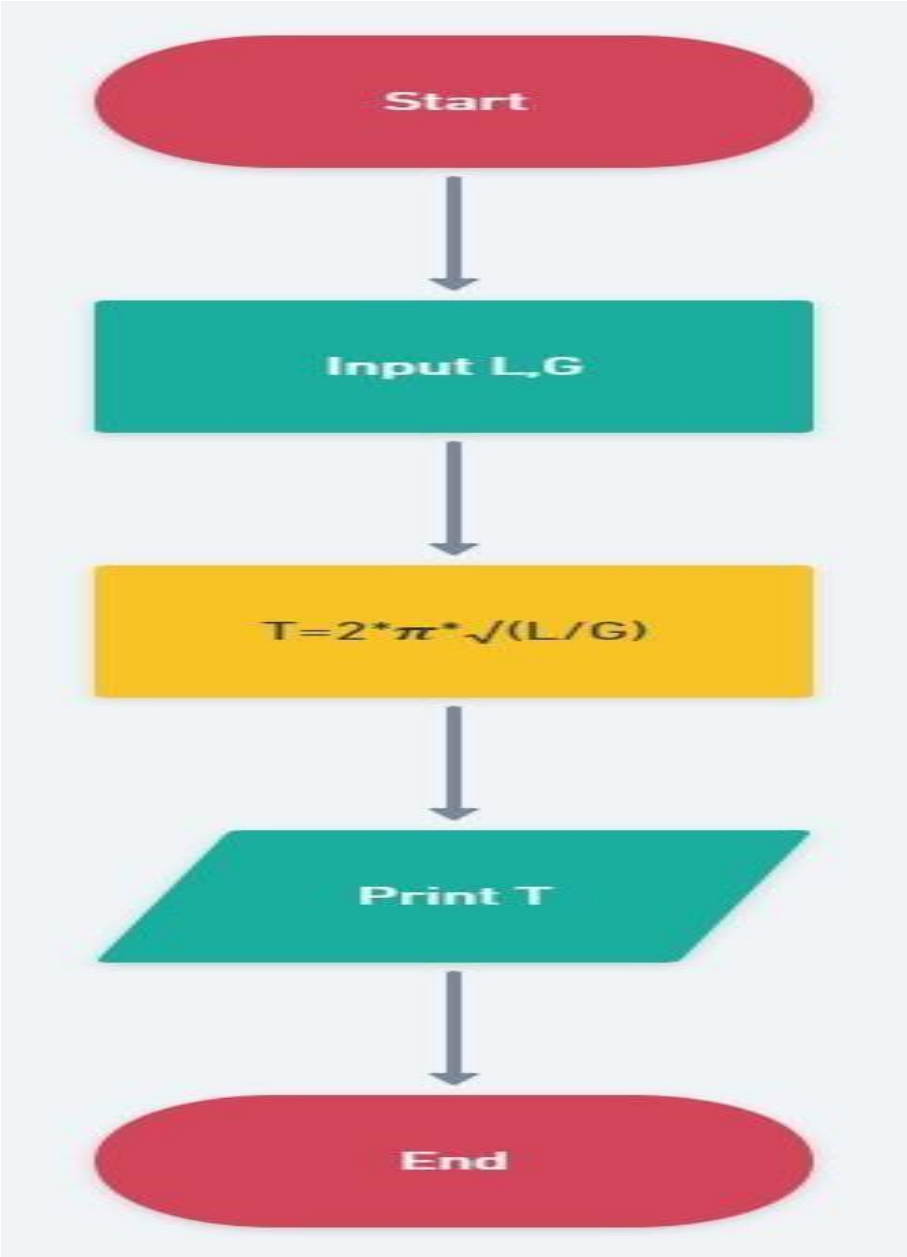
	Chapter 3
Program 3.1	Write a program that takes the length of the pendulum as input and then calculate the time period of the pendulum. Provided that, T=2πvL/G. Define the value of π as 3.14 and take L as the length of the pendulum and G as the acceleration of gravity either in m/s or as input from the keyboard. Display the time period rounded to 2 decimal places.
Flowchart	
Algorithm	Step 1: Start Step 2: Input L,G. Step 3: T=2*3.14*root(L/G). Step 4: print T. Step 5: Stop.

Code

```c
//This is Prepared by 23CS041_DHRUV_LOKADIYA/
#include<stdio.h>
#include<math.h>
#define PI 3.14

int main()
{
float L, T, G;

        printf("Enter value of length=");
        scanf("%f",&L);

        printf("Please enter the value of gravity=");
        scanf("%f",&G);

        T=2*PI*(sqrt(L/G));
        printf("Time period is : %f",T);
        printf("\n 23CS041_CS1");
        return 0;
}
```

Output

```
Enter value of length=100
Please enter the value of gravity=9.8
Time period is : 20.060724
 23CS041_CS1
```

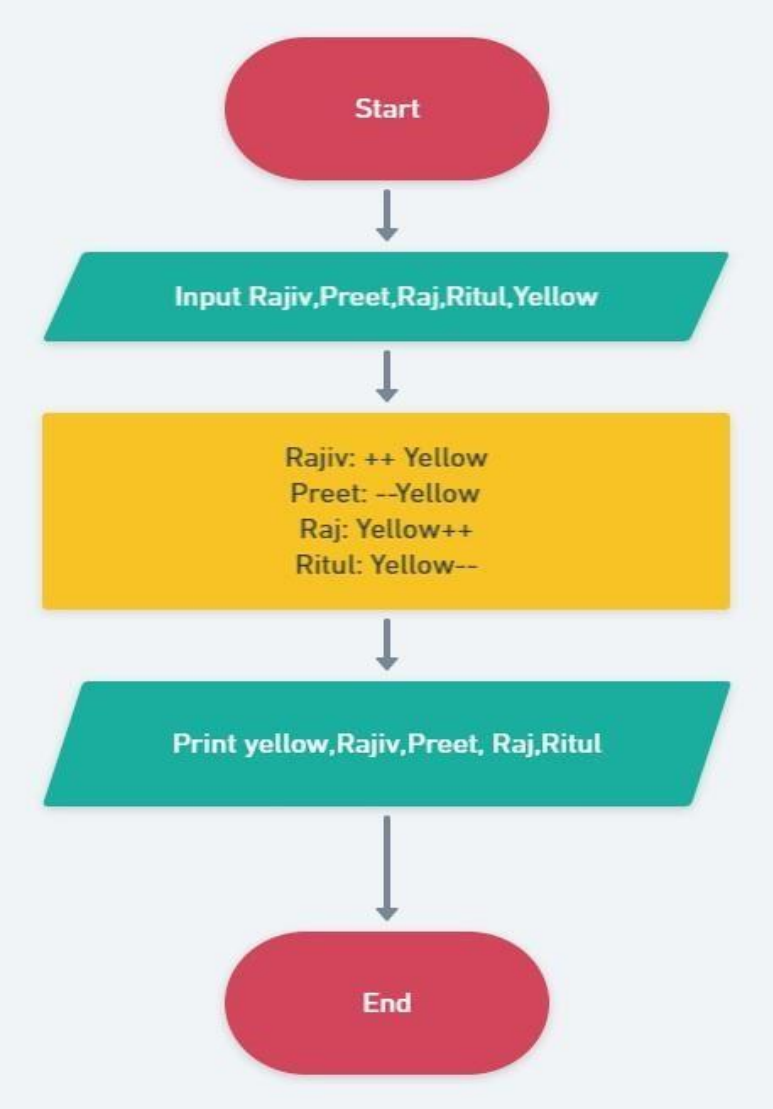
Question

1. Have you learned about, how math function is useful for calculating square root? Which Data type is supported by all math functions? Also mention any 5 math functions with their purpose.

Answer

double data type is supported by all math functions

Sr. No.	Math function	Description
1.	math.sqrt(x)	Computes the square root of a given number x.
2.	math.sin(x)	Calculates the sine of an angle x(in radians).
3.	math.cos(x)	Calculates the cosine of an angle x(in radians).
4.	math.exp(x)	Computes the exponential of `x`, which is the value of *e* raised to the power of `x`.
5.	math.log(x)	Calculates the natural logarithm of `x`.

Program : 3.2.a	Let us understand the working of Pre-increment, Post-increment, Pre-decrement and Post-decrement Consider a scenario where, Boys are playing in the park and collecting and removing the yellow balls in/from the bucket based on teacher's instruction. Let's say there are already 10 Yellow balls present in a bucket. Following is the sequence of the instructions given by the teacher for adding/removing the balls. i.Rajiv: ++ Yellow ii.Preet: --Yellow iii.Raj: Yellow++ iv.Ritul: Yellow--
Flowchart	
Algorithm	Step 1: Start Step 2: Input yellow,Rajiv,Preet,Raj,Ritul Step 3: Rajiv=++Yellow, Preet=--Yellow, Raj= Yellow++, Ritul= Yellow— Step 4: Print yellow,Rajiv,Preet,Raj,Ritul Step 5: End.

Code

```
//This is Prepared by 23CS041_DHRUV_LOKADIYA/
#include<stdio.h>
#include<conio.h>
int main()
{
    int y,r1,r2,r3,r4;
    clrscr();

    printf("enter y =");
    scanf("%d",&y);
    r1=++y;
    r2=--y;
    r3=y++;
    r4=y--;

    printf("\n \tSr.No.\t\tInstructions\t\t Yellow");
    printf("\n \t1.\t\tRajiv has \t\t%d ball",r1);
    printf("\n \t2.\t\tPreet has \t\t%d ball",r2);
    printf("\n \t3.\t\tRaj has \t\t%d ball",r3);
    printf("\n \t4.\t\tRitul has \t\t%d ball",r4);
    printf("\n 23CS041_CS1");
    return 0;
}
```

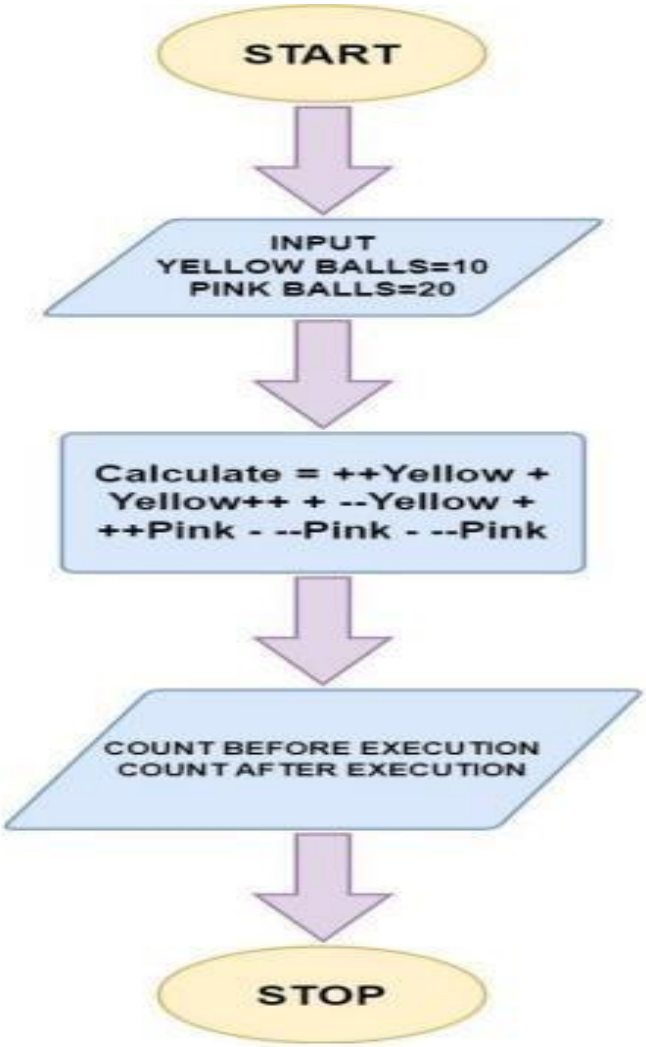
Output

```
enter y = 10

        Sr.No.          Instructions            Yellow
        1.              Rajiv has               11 ball
        2.              Preet has               10 ball
        3.              Raj has                 10 ball
        4.              Ritul has               11 ball
 23CS041_CS1
```

PROGRAM 3.2.b

Consider another scenario where boys and girls both are asked to add/remove Yellow and Pink balls from the bucket respectively. Currently there are 10 Yellow balls in the bucket and 20 Pink balls. Teacher has given the sequence of instructions as below for adding/removing the balls. Calculate = ++Yellow + Yellow++ + --Yellow + ++Pink - --Pink - -- Pink Get the count of yellow and pink balls after evaluating above given scenario.

Flowchart	
Algorithm	Step 1) Start Step 2) Initialize Yellowballs as 10 and pinkBalls as 20. Step 3) Perform pre-increment on yellowBalls(++yellowBalls). Step 4) Perform post-increment on yellowBalls (yellowBalls++). Step 5) Perform pre-decrement on yellowBalls (--yellowBalls). Step 6) Perform pre-increment on pinkBalls (++pinkBalls). Step 7) Perform post-decrement on pinkBalls(--pinkBalls). Step 8) Perform post-decrement on pinkBalls (--pinkBalls). Step 9) Calculate`as ++Yellow + Yellow++ + --Yellow + ++Pink - --Pink - -- Pink`. Step 10) Display the count of yellow and pink balls after evaluating the scenario. Step 11) Stop.

CODE:

```c
//This Program is prepared by 23CS041_DHRUV_LOKADIYA/
#include<stdio.h>
int main()
{
    int yellow=10,pink=20,calculate;
    clrscr();
    printf("yellow ball before execution %d\n", yellow);
    printf("pink ball before execution %d\n", pink);

    printf("**************************************\n\n");

    calculate= ++yellow + yellow++ + --yellow + ++pink - --pink - --pink;

    printf("yellow ball after executaion %d\n", yellow);
    printf("pink ball after executaion %d\n", pink);
    printf("\n 23CS041_CS1");
    return 0;
}
```

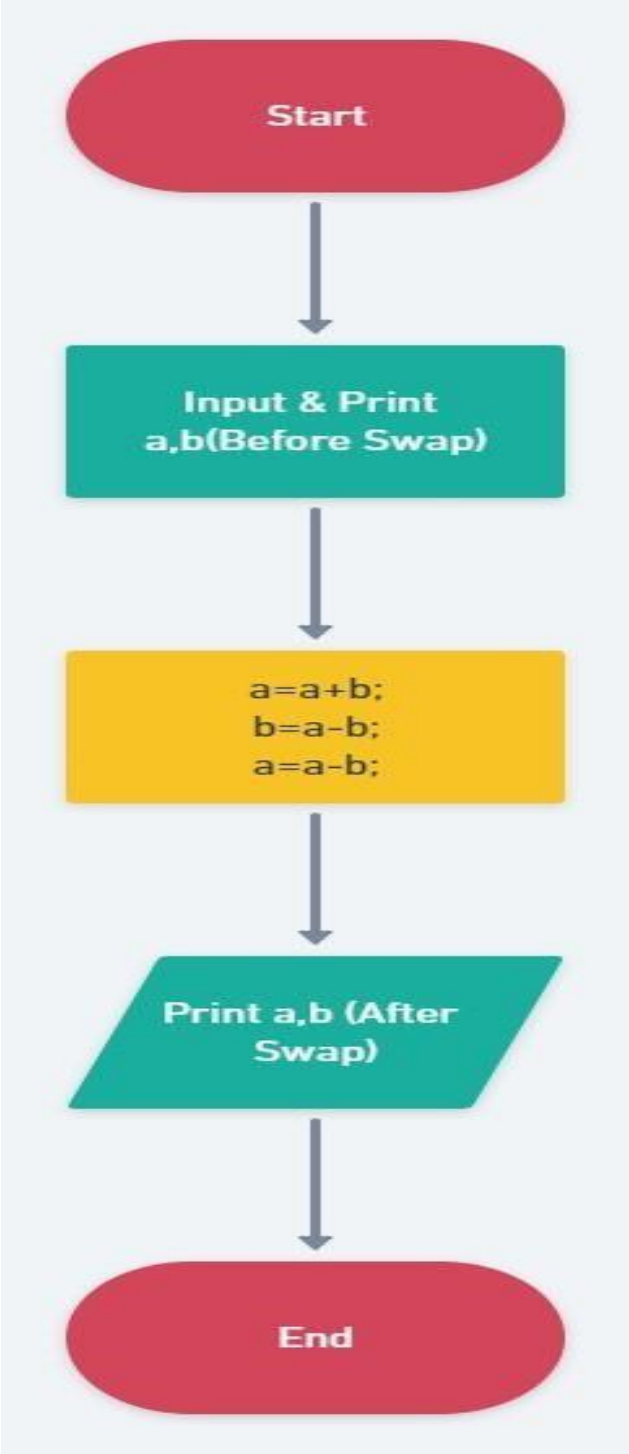
Output:

```
yellow ball before execution 10
pink ball before execution 20
**************************************

yellow ball after executaion 11
pink ball after executaion 19

 23CS041_CS1
```

Question	Have you understood the working of Pre-increment, Post-increment, Pre-decrement and Postdecrement?
Answer	Yes, we learn how to pre/post-increment and decrement is work.
Program : 3.3	Write a C program to swap two numbers with third variable and without using third variable. (use two variables for collecting value from user) (Hint: Use arithmetic operators)

Flowchart	
Algorithm	Step 1: Start Step 2: Input & Print a,b (Before Swap) Step 3: a=a+b: b=a-b; a=a-b; Step 4: Print a,b (After Swap) Step 5: End

Code

```c
//This Program is Prepared by 23CS041_DHRUV_LOKADIYA
#include<stdio.h>
int main()
{
        int a,b,temp;

        printf("*******Before Swapping*******");
        printf("\nEnter first num:");
        scanf("%d",&a);
        printf("\nEnter second num:");
        scanf("%d",&b);

        printf("\n\n *******After Swapping*******");

        temp = a;
        a = b;
        b = temp;

        printf("\n First num become:%d",a);
        printf("\n Second num become:%d",b);
        printf("\n 23CS041_CS1");
        return 0;
}
```

Output

```
*******Before Swapping*******
Enter first num: 10

Enter second num: 11


 *******After Swapping*******
 First num become:11
 Second num become:10
 23CS041_CS1
```

Question	Have you learned about, how we can use arithmetic operators for swapping the numbers?
Answer	yes, for swapping we operate a=a+b , b=a-b and a=a-b And the final answer we will get will be swapped.

Sign: Grade: