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3		**Simple computational problems using arithmetic expressions.**			
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		3.3	Area of a triangle using heron's formulae		
		3.4	Distance travelled by an object		
		3.5	calculate the sum of digits of a four digits positive integer num		
		3.6	$$cfrac = x + \cfrac{1}{x + \cfrac{1}{x + \cfrac{1}{x + \cfrac{1}{x + \frac{1}{x}}}}}$$ You are given double x as input, compute the value of this continued fraction and the result in a double variable named `cfrac`.		
		3.7	Given the diameter of the pizza in inches, the cost per square inch of pizza, the number of toppings and the cost of one topping and print the total cost of the pizza order.		
		3.8	Calculates the shipping cost based on the weight of a package and the shipping rate per kilogram.		
		3.9	Print the result of the following expression: $R = a^3 + b^3 + c^3 + 3abc - 2(a + b + c)$		
		3.10	Calc EMI using the formula $$Monthly\ Payment = \frac{P * r(1+r)^n}{(1+r)^n - 1}$$ Where: P is the principal loan amount. R is the annual interest rate in percentage. $r = R/(12 * 100)$ n is the number of monthly payments.		

MODULE 3 - Program 3.1

AIM : write a C program, to Find the square root of a given number

FORMULA :

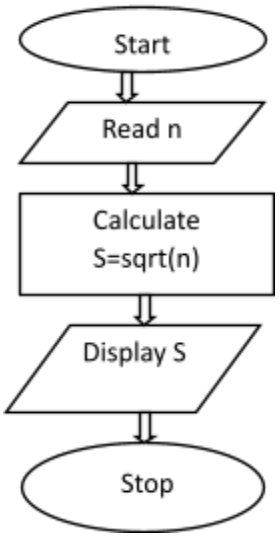
Let the number be 'n' we can find square root using sqrt() function in math.h header file

S=sqrt(n)

ALGORITHM :

STEP-1 : start
STEP-2 : read n
STEP-3 : calculate
S=sqrt(n)
STEP-4 : display S
STEP-5 : stop

FLOWCHART :



PROGRAM 3.1 :

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

int main()
{
  int n;
  float sqt;
  printf("\n Enter any number : ");
  scanf("%d",&n);
  sqt=sqrt(n);
  printf(" Square root of (%d) = %f",sqt);

    return 0;
}
```

OUTPUT :

```
Enter any number : 19
Square root of (19) = 4.358899
```

MODULE 3 - Program 3.2

AIM : write a C program, to find the compound interest

FORMULA :

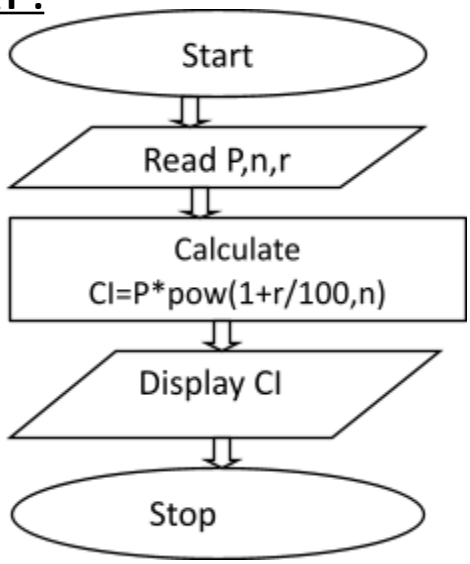
$CI=P*(1+r/100)^n$

Where CI—Compound Interest, P—Principle Amount ,
n—Time Period, r—Rate of Interest

ALGORITHM :

STEP-1 : start
STEP-2 : read P,n,r
STEP-3 : calculate
CI=P*pow(1+r/100,n)
STEP-4 : display CI
STEP-5 : stop

FLOWCHART :



PROGRAM :

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

int main()
{
  long int P;
  float n,r,CI,A;
  printf("\n Enter the Principle Amount : ");
  scanf("%ld",&P);
  printf("\n Enter the Rate of Interest : ");
  scanf("%f",&r);
  printf("\n Enter the Time Period : ");
  scanf("%f",&n);
  A=P*pow(1+r/100,n);
  CI=A-P;
  printf(" Compound Interest = %.2f",CI);
  return 0;
}
```

OUTPUT :

```
Enter the Principle Amount : 1000

Enter the Rate of Interest : 12

Enter the Time Period : 2
Compound Interest = 254.40
```

MODULE 3 - Program 3.3

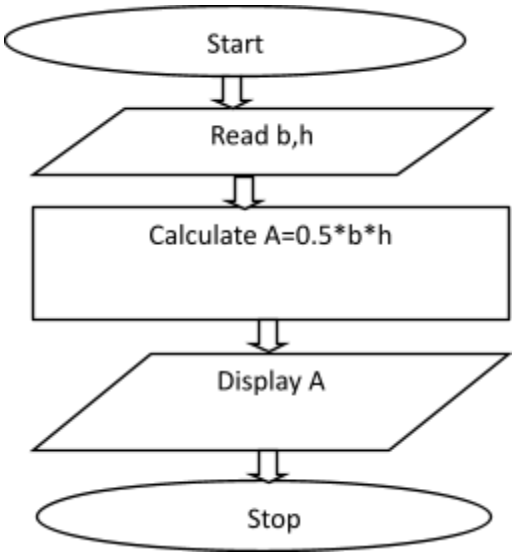
AIM : write a C program, to find the area of triangle using base and height

FORMULA : Area=0.5*base*height

ALGORITHM :

STEP-1 : start
STEP-2 : read b,h
STEP-3 : calculate
A=0.5*b*h
STEP-4 : display A
STEP-5 : stop

FLOWCHART :



PROGRAM :

```c
#include <stdio.h>

int main()
{
  float base,height,area;
   printf("\n Enter the base of triangle : ");
   scanf("%f",&base);
   printf("\n Enter the height of triangle : ");
   scanf("%f",&height);
   area=1.0/2*base*height;
  printf("\n Area of triangle = %.2f",area);
  return 0;
}
```

OUTPUT :

```
Enter the base of triangle : 10

Enter the height of triangle : 5

Area of triangle = 25.00
```

MODULE 3 - Program 3.4

AIM : Write a C program ,to find distance travelled by an object

FORMULA :

d=s*t

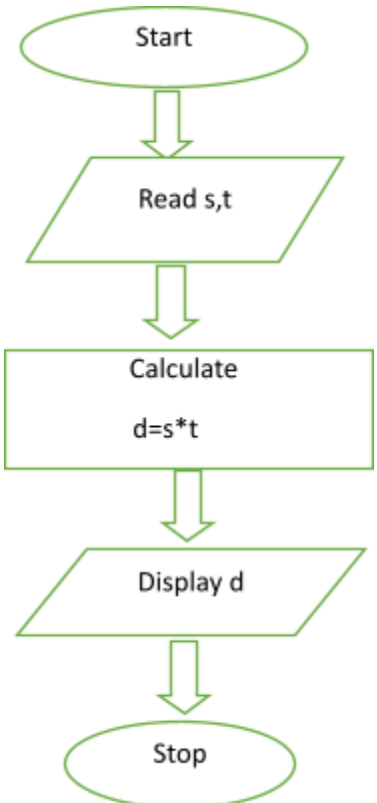
where,

d=Distance
s=Speed
t=Time

ALGORITHM :

STEP 1 : Start
STEP 2 : Read s,t
STEP 3 : Calculate,
d=s*t
STEP 4 : Display d
STEP 5 : Stop

FLOWCHART :



PROGRAM :

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

int main()
{
  int d,s,t;
   printf("\n Enter the speed of object : ");
   scanf("%d",&s);
   printf("\n Enter the time travelled by an object : ");
   scanf("%d",&t);
   d=s*t;
  printf("\n Distance Travelled by an object = %d",d);
  return 0;
}
```

OUTPUT

```
Enter the speed of object : 80

Enter the time travelled by an object : 2

Distance Travelled by an object = 160
```

MODULE 3 - Program 3.5

AIM : Write a C program , to find sum of digits of a four digits positive integer numbers

FORMULA :

Sum=n%10+(n%100)/10+(n%1000)/100+(n%10000)/1000

ALGORITHM :

STEP 1 : Start

STEP 2 : Read n

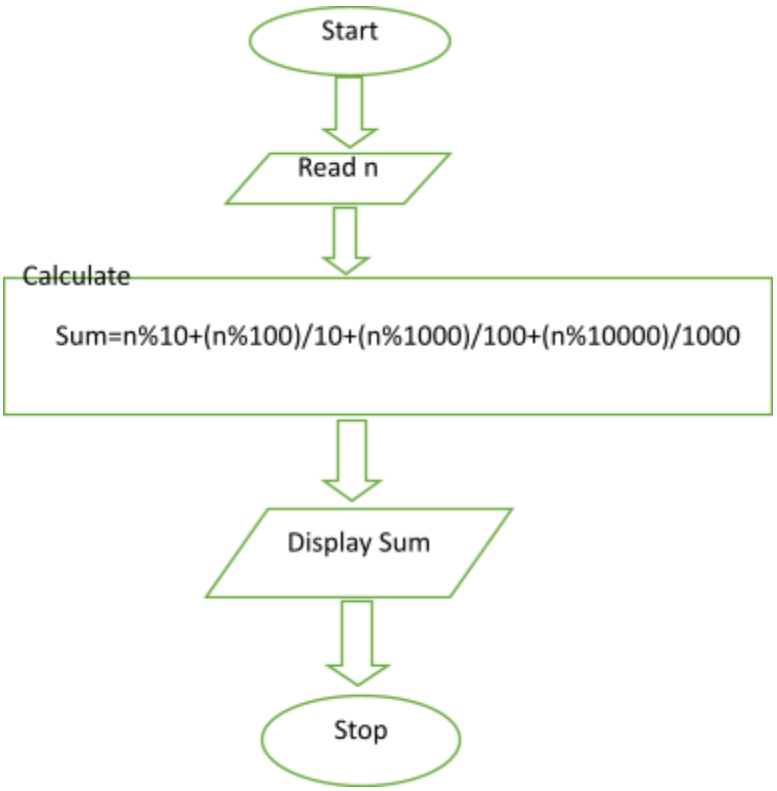
STEP 3 : Calculate

Sum=n%10+(n%100)/10+(n%1000)/100+(n%10000)/1000

STEP 4 : Display Sum

STEP 5 : Stop

FLOWCHART :



PROGRAM :

```c
#include <stdio.h>
int main() {
    int num,sum;
    printf(" Enter Four digit number : ");
    scanf("%d", &num);
    sum=num%10+(num%100)/10+(num%1000)/100+(num%10000)/1000;
    printf("sum of the digits = %d", sum);
    return 0;
}
```

OUTPUT :

```
 Enter Four digit number : 4523
sum of the digits = 14
```

MODULE 3 - Program 3.6

AIM : Write a C program , to find the value of a given continued fraction.

FORMULA :

Given,

cfrac = x+(1/(x+1/(x+1/(x+1/(x+1/x)))))

ALGORITHM :

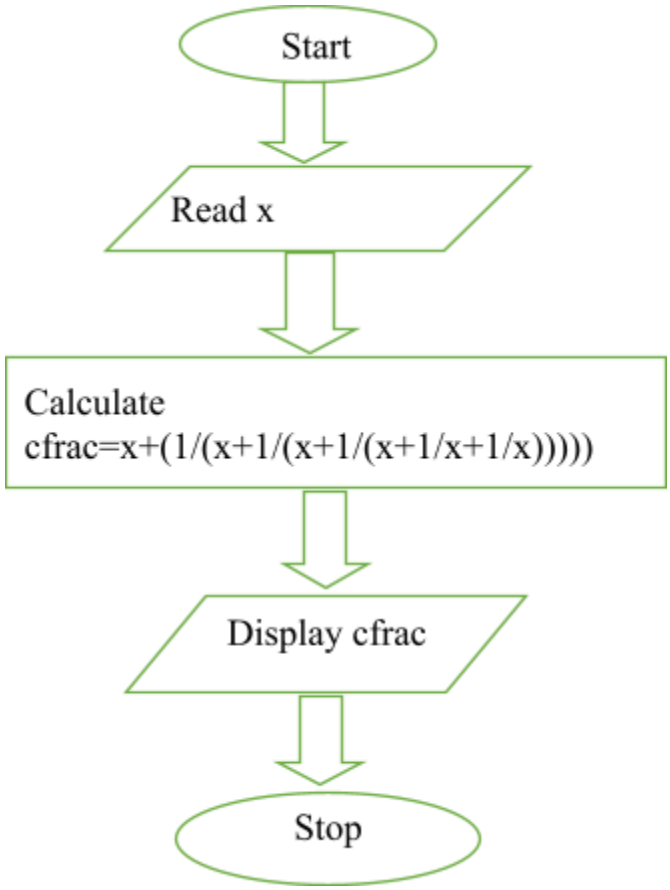
STEP 1 : Start

STEP 2 : Read x

STEP 3 : Calculate

cfrac = x+(1/(x+1/(x+1/(x+1/(x+1/x)))))

FLOWCHART :



PROGRAM :

```c
#include <stdio.h>
int main() {
    double x,cfrac;
    printf("\n Enter the x value : ");
    scanf("%lf", &x);
    cfrac = x+(1.0/(x+1.0/(x+1.0/(x+1.0/(x+1.0/x)))));
    printf("Value of expression = %.2lf",cfrac);
    return 0;
}
```

OUTPUT :

```
 Enter the x value : 2
Value of expression = 2.41
```

MODULE 3 - Program 3.7

AIM : Write C program that calculates the total cost of a pizza order based on the size of the pizza and the number of toppings. The program take the following inputs: the diameter of the pizza in inches, the cost per square inch of pizza, the number of toppings and the cost of one topping and print the total cost of the pizza order.

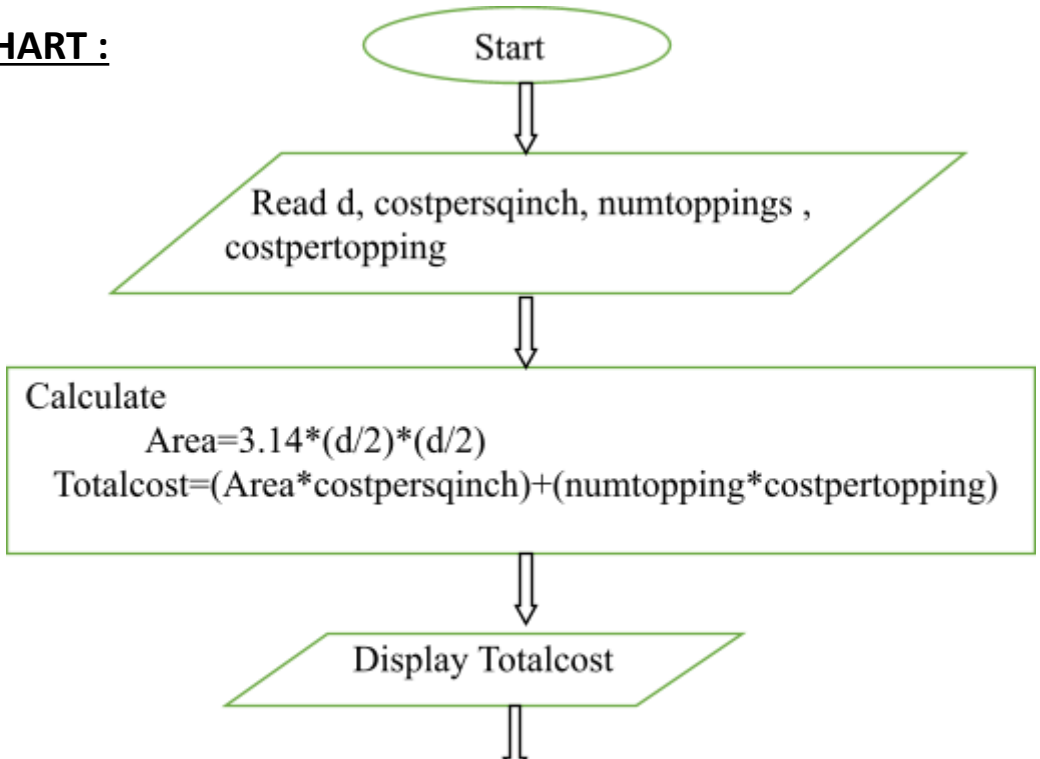
FORMULA :

Area=3.14*(d/2)*(d/2)
Totalcostofpizza=(Area*costpersqinch)+(numtopping*costpertopping)

ALGORITHM :

STEP 1 : Start
STEP 2 : Read d,costpersqinch,costpertopping,numtopping
STEP 3 : Calculate
Area=3.14*(d/2)*(d/2)
Totalcost=(Area*costpersqinch)+(numtopping*costpertopping)
STEP 4 : Display Totalcost
STEP 5 : Stop

FLOWCHART :



PROGRAM :

```c
#include <stdio.h>
#include <math.h>
int main()
{
    double diameter, costPerSqInch, costperTopping, totalCost;
    double pi = 3.14;
    int numToppings;

    printf(" Enter the Diameter of the pizza : ");
    scanf("%lf", &diameter);
    printf(" Enter the cost per square inch : ");
    scanf("%lf", &costPerSqInch);
    printf(" Enter the number of toppings : ");
    scanf("%d", &numToppings);
    printf(" Enter the cost of one topping : ");
    scanf("%lf", &costperTopping);

    double area=3.14*(diameter/2.0)*(diameter/2.0);
    totalCost=(area*costPerSqInch)+(numToppings*costperTopping);

    printf("\n Total cost of pizza = %.2lf", totalCost);
    return 0;
}
```

OUTPUT :

```
Enter the Diameter of the pizza : 4.5
Enter the cost per square inch : 10
Enter the number of toppings : 6
Enter the cost of one topping : 4

Total cost of pizza = 182.96
```

MODULE 3 - Program 3.8

AIM : Write C program that calculates the shipping cost based on the weight of a package and the shipping rate per kilogram. The program should take the weight of the package (in kilograms) and the shipping rate as input. Calculate and print the shipping cost.

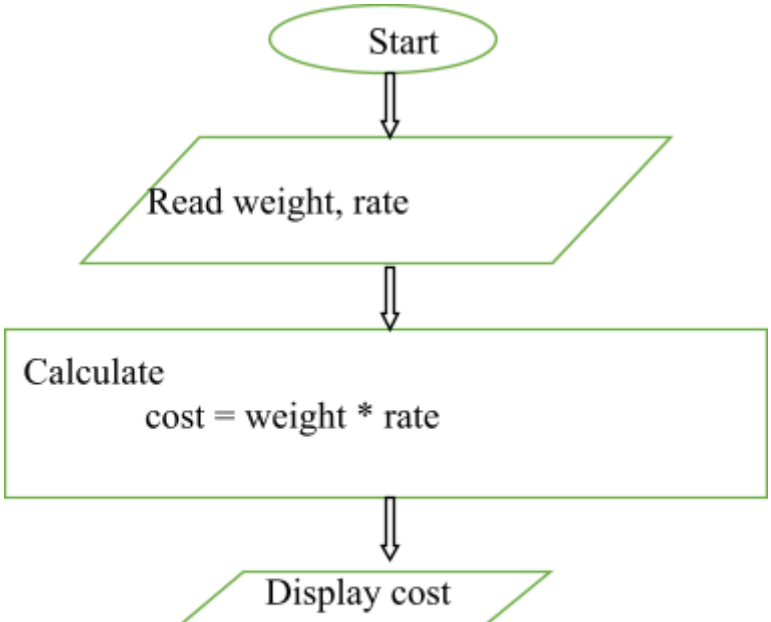
FORMULA :

Shipping cost = weight of package in kgs * shipping rate per kg

ALGORITHM :

STEP 1 : Start
STEP 2 : Read weight , rate
STEP 3 : Calculate
cost = weight * rate
STEP 4 : Display cost
STEP 5 : Stop

FLOWCHART :



PROGRAM :

```c
#include<stdio.h>
int main()
{
    double weight,rate,cost;
    printf(" Enter the weight of the package : ");
    scanf("%lf",&weight);
    printf(" Enter the cost per KG : ");
    scanf("%lf",&rate);
    cost=weight*rate;
    printf("\n Shipping Cost = %.2lf",cost);
    return 0;
}
```

OUTPUT :

```
Enter the weight of the package : 24.5
Enter the cost per KG : 10

Shipping Cost = 245.00
```

MODULE 3 - Program 3.9

AIM : **Write a C program that takes three integers a, b, and c as input and prints the result of the following expression**

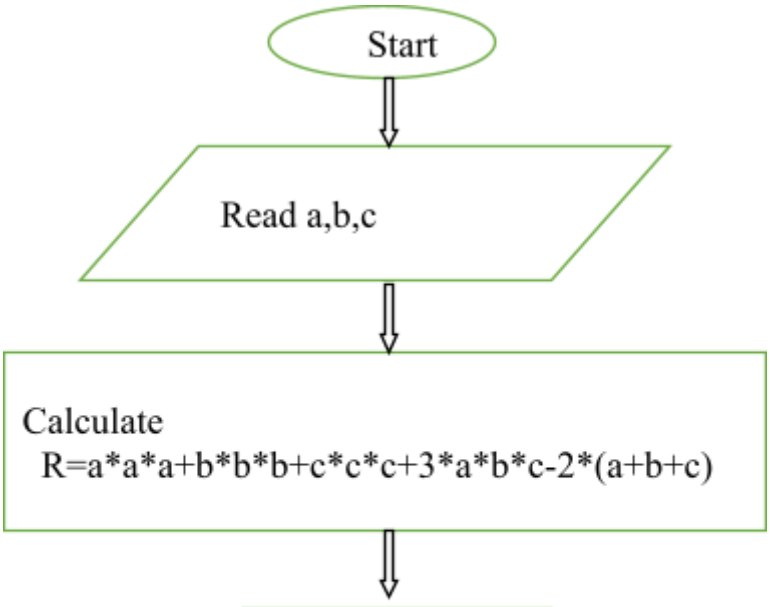
FORMULA :

$$R = a^3 + b^3 + c^3 + 3abc - 2(a + b + c)$$

ALGORITHM :

STEP 1 : Start
STEP 2 : Read a,b,c
STEP 3 : Calculate
R=a*a*a+b*b*b+c*c*c+3*a*b*c-2*(a+b+c)
SREP 5 : Display R
STEP 6 : Stop

FLOWCHART :



PROGRAM:

```c
#include <stdio.h>
#include<math.h>
int main()
{
    int a,b,c,R;

    printf("Enter a,b,c values : ");
    scanf("%d %d %d",&a,&b,&c);
    R=pow(a,3)+pow(b,3)+pow(c,3)+3*a*b*c-2*(a+b+c);
    printf("Result=%d",R);

    return 0;
}
```

OUTPUT :

```
Enter a,b,c values : 1 2 3
Result=42
```

MODULE 3 - Program 3.91

AIM : Write a C program that calculates the user's recommended daily calorie intake based on their age, gender, weight, height, and activity level. The program should take the following inputs: age, gender (1 for male, 2 for female), weight (in kilograms), height in cm and activity factor (1.20 for sedentary, 1.55 for moderately active, 1.725 for very active). Calculate and display the recommended daily calorie intake using the given Harris-Benedict formula:

FORMULA:

For males:

$$Calories = (88.362 + (13.397 \times weight\ in\ kg) + (4.799 \times height\ in\ cm) - (5.677 \times age\ in\ years)) \times activity\ factor$$

For females:

$$Calories = (447.593 + (9.247 \times weight\ in\ kg) + (3.098 \times height\ in\ cm) - (4.330 \times age\ in\ years)) \times activity\ factor$$

ALGORITHM :

STEP 1 : Start
STEP 2 : Read age, gender, weight, height,activity
STEP 3 : if(gender==1) then
Calculate
calories = (88.362+(13.397*weight)+(4.799*height)-(5.677*age))*activity

Goto step 5 otherwise goto step 4

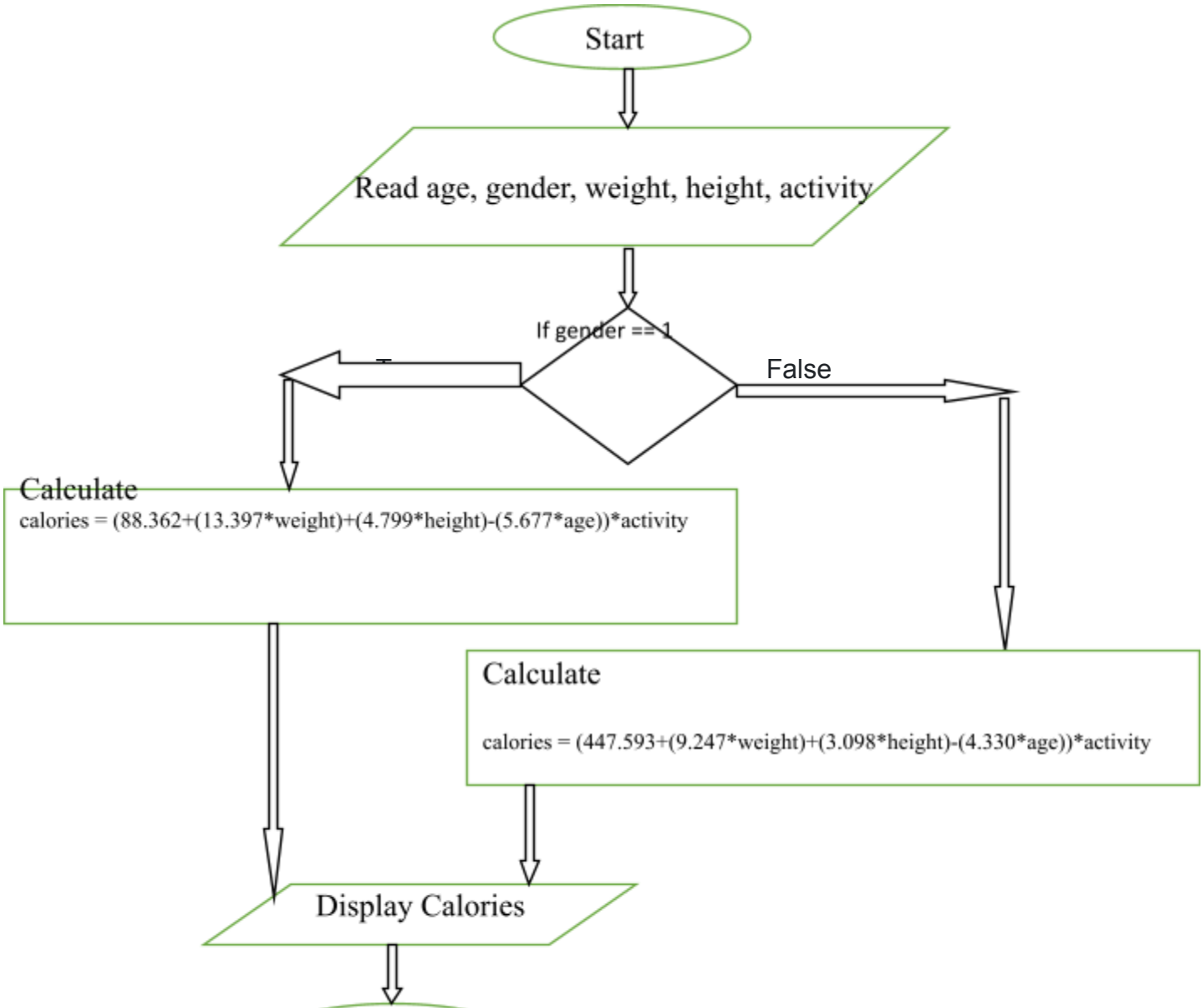
STEP 4 : calculate

calories = (447.593+(9.247*weight)+(3.098*height)-(4.330*age))*activity

SREP 5 : Display Calories

STEP 6 : Stop

FLOWCHART :



PROGRAM:

```c
#include <stdio.h>

int main()
{
    int age,gender;
    double weight,height,activity,calories;
    printf("\n Enter the age, gender, weight, height, activity level of a person : ");
    scanf("%d %d %lf %lf %lf",&age,&gender,&weight,&height,&activity);
    if (gender == 1)
    {
       calories=(88.362+(13.397*weight)+(4.799*height)-(5.677*age))*activity;
    }
    else if (gender == 2)
    {
       calories=(447.593+(9.247*weight)+(3.098*height)-(4.330*age))*activity;

    }
    printf("recommended daily calorie intake = %.2lf",calories);

    return 0;
}
```

OUTPUT :

```
 Enter the age, gender, weight, height, activity level of a person : 27 1 67.5 172.50 1.2
recommended daily calorie intake = 2000.65
```

MODULE 3 - Program 3.10

AIM : Write a C Program to calculate the monthly payment on a loan. take the principal amount, annual interest rate in percentage, and the number of months to repay the loan as inputs and print the monthly payment(EMI) using the following formula:

FORMULA :

$$Monthly\ Payment = \frac{P * r(1+r)^n}{(1+r)^n - 1}$$

Where:

P is the principal loan amount.

R is the annual interest rate in percentage.

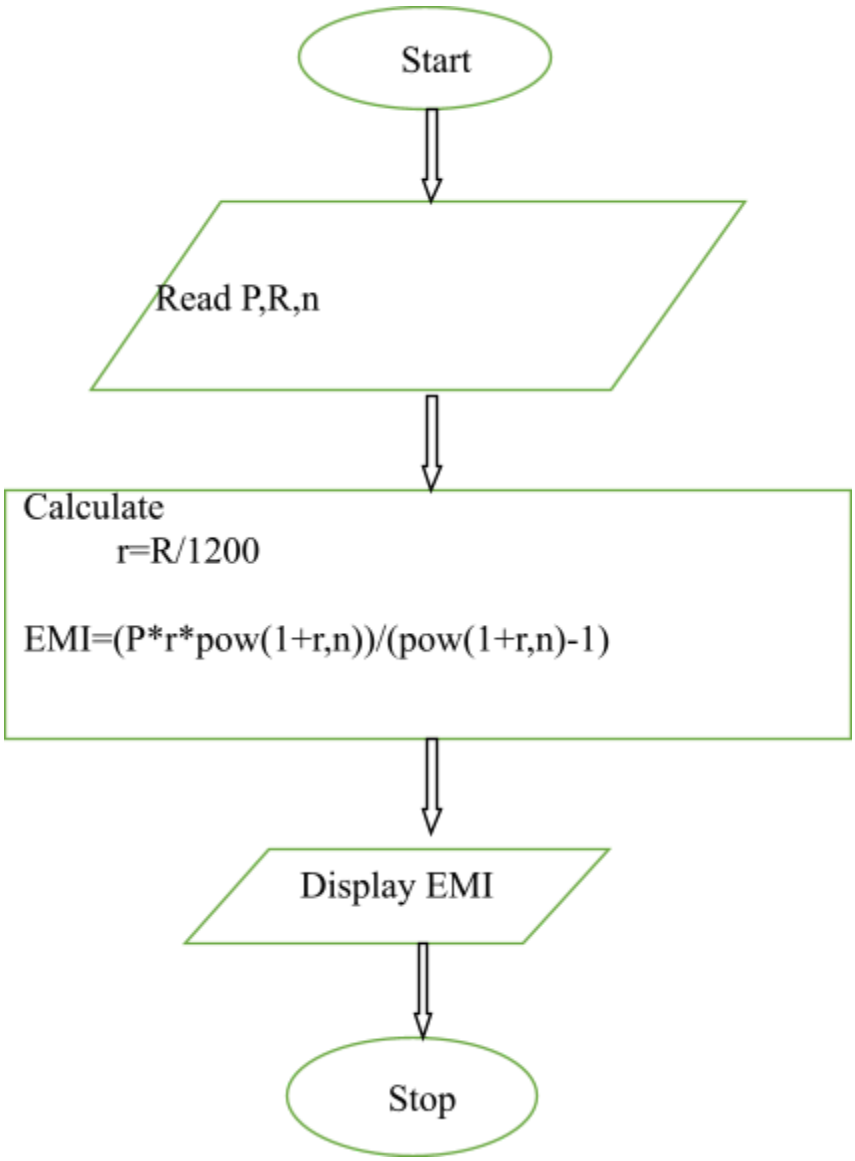
$$r = R/(12 * 100)$$

n is the number of monthly payments.

ALGORITHM :

STEP 1 : Start
STEP 2 : Read P,R,n
STEP 3 : Calculate
r=R/1200
EMI=(P*r*pow(1+r,n))/(pow(1+r,n)-1)
STEP 4 : Display EMI
STEP 5 : Stop

FLOWCHART :


Start
Read P,R,n
Calculate
r=R/1200
EMI=(P*r*pow(1+r,n))/(pow(1+r,n)-1)
Display EMI
Stop

PROGRAM :

```c
#include <stdio.h>
#include <math.h>
int main()
{
    double principal, annualRate, monthlyRate, monthlyPayment;
    int numMonths;

    printf(" Enter the Principal Amount : ");
    scanf("%lf", &principal);
    printf(" \nEnter the Rate of Interest : ");
    scanf("%lf", &annualRate);
    printf(" \nEnter the Number of Months Installment to be paid : ");
    scanf("%d", &numMonths);

   double r=annualRate/(12*100);
   monthlyPayment=(principal*r*pow((1+r),numMonths))/(pow(1+r,numMonths)-1);

    printf("Monthly Installment(EMI) = %.0lf", monthlyPayment);
    return 0;
}
```

OUTPUT:

```
 Enter the Principal Amount : 100000

Enter the Rate of Interest : 12

Enter the Number of Months Installment to be paid : 12
Monthly Installment(EMI) = 8885
```