FIRST_SEM FRESHMAN YEAR

C Programming

Report I

Bishal Khatri
ID No.: 201611
SOFTWARE ENGINEERING
MORNING SHIFT

/* Variables

In programming, a variable is a container (storage area) to hold data.
To indicate the storage area, each variable should be given a unique name (identifier).
Variable names are just the symbolic representation of a memory location.

Literals

Literals are data used for representing fixed values. They can be used directly in the code. For example: 1, 2.5, 'c',etc .
Here, 1, 2.5 and 'c' are literals. Why? You cannot assign different values to these terms.

1. Integers

An integer is a numeric literal(associated with numbers) without any fractional or exponential part.
There are three types of integer literals in C programming:

- decimal (base 10)
- octal (base 8)
- hexadecimal (base 16)

In C programming, octal starts with a 0, and hexadecimal starts with a 0x.

2. Floating-point Literals

A floating-point literal is a numeric literal that has either a fractional form or an exponent form.
Note: E-5 = 10-5

3. Characters

A character literal is created by enclosing a single character inside single quotation marks.
For example: 'a', 'm', 'F', '2', '}' etc.

4. Escape Sequences

Sometimes, it is necessary to use characters that cannot be typed or has special meaning in C programming.
For example: newline(enter), tab, question mark etc.

Escape Sequences	Character
\n	Newline
\t	Horizontal tab
\?	Question mark

These are the examples.

5. String Literals

A string literal is a sequence of characters enclosed in double-quote marks.
For example:"Bishal"

Constants

If you want to define a variable whose value cannot be changed, you can use the const keyword.
For example: Const float = 3.14;

C Data Types

```
In C programming, data types are declarations for variables.This determines the type and size of data associated with
 variables.
For example,
int num; Here, num is a variable of int (integer) type. The size of int is 4 bytes.


int
Integers are whole numbers that can have both zero, positive and negative values but no decimal values.
For example, 1, -3, 17


float and double
float and double are used to hold real numbers.


char
Keyword char is used for declaring character type variables.

I/O
Use scanf() function to take input from the user, and printf() function to display output to the user.
*/




//-------------------------------------------------------------------------------
/*
Q.1 Algorithm to read the graphical characters and print their equivalent ASCII code.
   Step1: Start
   Step2: Declare variable chr.
   Step3: Read chr variable.
   Step4: Display chr variable with %c format specifier.
   Step5: Display chr variable with %d format specifier that gives ASCII value.
   Step6: Stop
*/
/*
//Q.1-Write a program to read the graphical characters and print their equivalent ASCII code?
   #include <stdio.h>
int main()
{
   char chr;
   printf("Enter a character: ");
   scanf("%c", &chr);

   // When %c is used, a character is displayed
   printf("You entered %c.\n",chr);

   // When %d is used, ASCII value is displayed
   printf("ASCII value is %d.", chr);
   return 0;
}
*/
```

```
//---------------------------------------------------------------------------------------------
/*
Q.2 Algorithm to read ASCII value and print the equivalent character.
    Step1: Start
    Step2: Declare a variable name as code.
    Step3: Read a value from user for code var, it works perfect in float or double or int data type.
    Step4: Print code var with both %f and %c that shows input ASCII code and character.
    Step5: Stop
*/
/*
//Q.2-Write a program to read ASCII value and print the equivalent character?

#include <stdio.h>
int main()
{
    int code;
    printf("Enter ASCII value: ");
    scanf("%d", &code);

    // When %c is used, a character is displayed
    printf("You entered %d.\n",code);

    // When %d is used, ASCII value is displayed
    printf(" chr is %c.", code);
    return 0;
}
*/

//---------------------------------------------------------------------------------------------
/*
Q.3 Algorithm to program to read the value of two variables, compute sum, difference and product.
    Step1: Start
    Step2: Declare Two variables name as num1 and num2 to compute sum, difference and product.
    Step3: Read values num1 and num2.
    Step4: calculate Sum, difference and product of given variables and display the output.
           //(num1+num2), (num1-num2), (num1*num2)
    Step5: Stop
*/
/*
// Q.3-Write a program to read the value of two variables, compute sum, difference and product?
#include <stdio.h>

int main(int argc, char const *argv[])
{
    // Declaring Two varibles name as num1 and num2 to compute sum, difference and product.
    int num1, num2;
    printf("Enter a the value of num1: ");
    scanf("%d", &num1);
    printf("Enter a the value of num2: ");
    scanf("%d", &num2);

    printf("The sum of given two numbers is %d\n", num1 + num2);
    printf("The difference of two given numbers is %d\n", num1 - num2);
    printf("The product of given two numbers is %d\n", num1 * num2);
    return 0;
}
*/
    //When num1 and num2 are 4 & 2 then, Results are;
    //The sum of given two numbers is 8
    //The difference of two given numbers is 0
    //The product of given two numbers is 16


//--------------------------------------------------------------------------
/*
Q.4 Algorithm to to calculate the result of cb^3/d^2.
    Step1: Start
    Step2: Declare a variables name as c,b,d and a.
    Step3: Read c,b and d.
    Step4: Calculate (c*b*b*b)/(d*d) and assign the result to a.
    Step5: Display a
    Step6: Stop
*/
/*
// Q.4-Write a program to calculate the result of cb^3/d^2?

#include <stdio.h>
int main(int argc, char const *argv[])

{

    int c,b,d;
    printf("c: ");
    scanf("%d", &c);
    printf("b: ");
    scanf("%d", &b);
    printf("d: ");
    scanf("%d", &d);

    int a = (c*b*b*b)/(d*d);
    //Here, a is the new var that shows final calculation at the end of the program.
    printf("a is %d", a);
    // printf("Enter the value of c, b, d: ");
    // scanf("\n%d%d%d",&c, &b, &d);
    // printf("The value of cb^3/d^2 is %d", a);

    return 0;
}
*/
    //When
    //c: 4
    //b: 2
    //d: 1
    //Then,
    //a is 32

//----------------------------------------------------------------------------------------------------
```

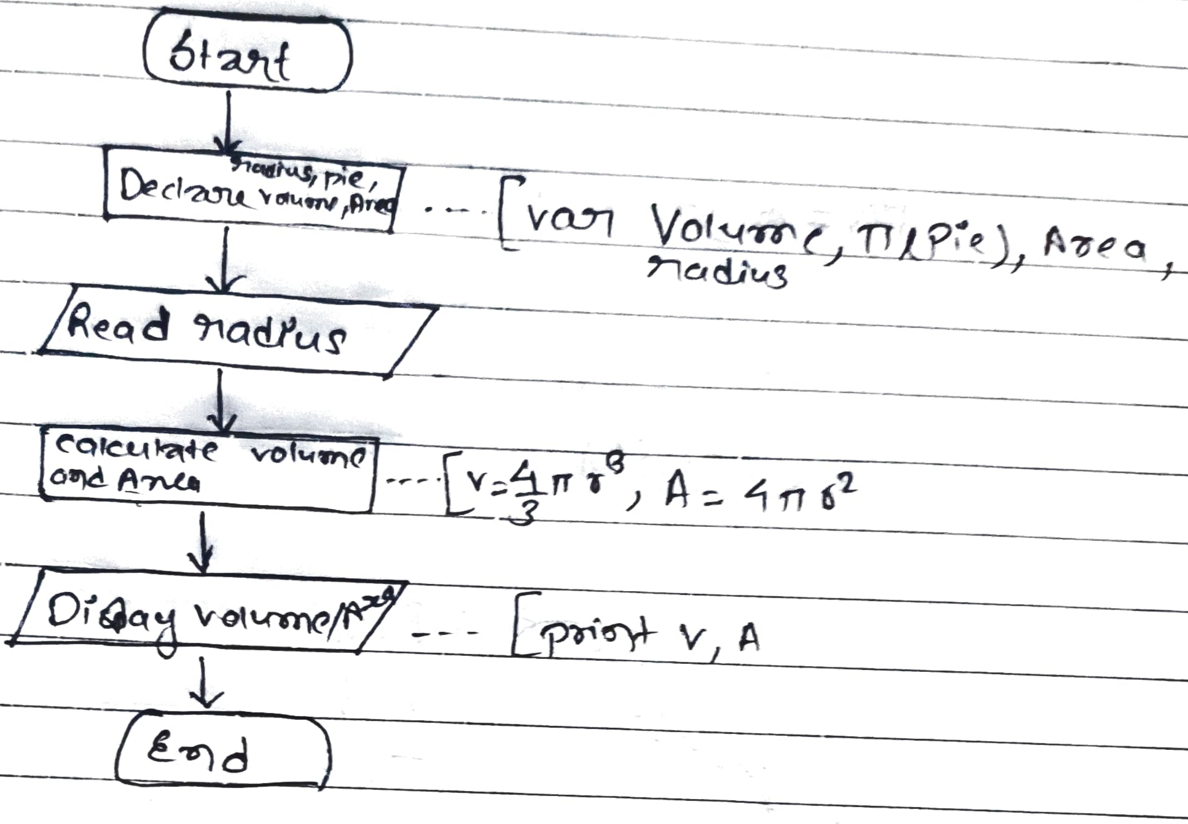
```
/*
Q.5 Algorithm to read the radius of a sphere and compute surface area and volume.
   Step1: Start
   Step2: Declare variables name as radius, pie, volume and Area.
   Step3: Read radius and define the pie and assign (22/7).
   Step4: Calculate the volume and Area of the sphere as (4/3)*pie*r3 and 4*pie*(radius*radius).
   Step5: Assign the volume and area of the sphere to volume and Area variables.
   Step6: Print the volume and Area of the sphere.
   Step7: Stop
*/
/*
// Q.5-Write a program to read the radius of a sphere and compute surface area and volume?

#include <stdio.h>
int main()
{
   int radius;
   printf("User Value for radius: ");
   scanf("%d", &radius);
   float pie=3.14285714286;
   double volume=(4.0/3.0)*pie*(radius*radius*radius);
   double Area=4*pie*(radius*radius);
   printf("Volume of the sphere = %.4f meter cube\n",volume);
   printf("Area of the sphere = %.4f meter square", Area);

   return 0;
}
*/
   //Input,User Value for radius: 6
   //Then, outputs are;
   //Volume of the sphere = 905.1428 meter cube
   //Area of the sphere = 452.5714 meter square


//----------------------------------------------------------------------------------------------------
/*
Q.6 Algorithm to read the radius of a circle and compute its area and circumference.
   Step1: Start
   Step2: Declare variable name as radius, pie, Area and circumference.
   Step3: Read radius and define the pie and assign (22/7).
   Step4: Calculate the Area and Circumference of the circle as pie*(radius*radius) and 2*pie* radius.
   Step5: Assign the area  and circumference of the circle to Area and Circumference variables.
   Step6: Print the Area and Circumference as the result.
   Step7: Stop
*/
/*
// Q.6- Write a program to read the radius of a circle and compute its area and circumference?
#include <stdio.h>
int main()
{
   int radius;
   printf("User Value for radius: ");
   scanf("%d", &radius);
   float pie=3.14285714286;
```

```
    double Area=pie*(radius*radius);
    double Circumference=2*pie* radius;
    printf("Area of the circle = %.4f meter square\n",Area);
    printf("Circumference of the circle = %.4f meter\n", Circumference);

    return 0;
}
*/
    //When, User Value for radius: 11
    //Then, Area of the circle = 380.2857 meter square
    //Circumference of the circle = 69.1429 meter


//--------------------------------------------------------------------------------------------------------
/*
Q.7 Algorithm to calculate the sum of (1 - x^2) / 2! + (x^4) / 4! + (x^6) / 6! +(x^8) / 8! + (x^10) / 10!.
    Step1: Start
    Step2: Declare variables name as x and sum.
    Step3: Read the value of x and assign to the variable x.
    Step4: Compute the sum of (1 - (x^2) / 2 + (x^4) / 24 + (x^6) / 720 +(x^8) / 40320 + (x^10) / 3628800).
    Step5: Print the value of resultant sum variable.
    Step6: Stop
*/

/*
//  Q.7-Write a program to calculate the sum of (1 - x^2) / 2! + (x^4) / 4! + (x^6) / 6! +(x^8) / 8! + (x^10) / 10! ?

// #include <stdio.h>

int main()
{
float x;
    printf("user value of x is ");
    scanf("%f", &x);
    float  sum= (1 - (x*x)/ 2 +pow(x,4)/ (24) + pow(x,6 )/(720) + pow(x,8)/(40320 )- pow(x,10)/ (3628800) );
    printf("The value of x is %f", sum);

    return 0;
}
    //Input is, user value of x is 5
    //Outputis, sum is 43.240032
*/


//--------------------------------------------------------------------------------------
/*
Q.8 Algorithm to read the temperature in centigrade and convert it to fahrenheit.
    Step1: Start
    Step2: Declare variables name as centigrade and fahrenheit.
    Step3: Read centigrade.
    Step4: Convert centigrade to fahrenheit using formula (centigrade * 9/5) + 32.
    Step5: Display both centigrade and fahrenheit with precision value 0.2.
    Step6: Stop
*/
```

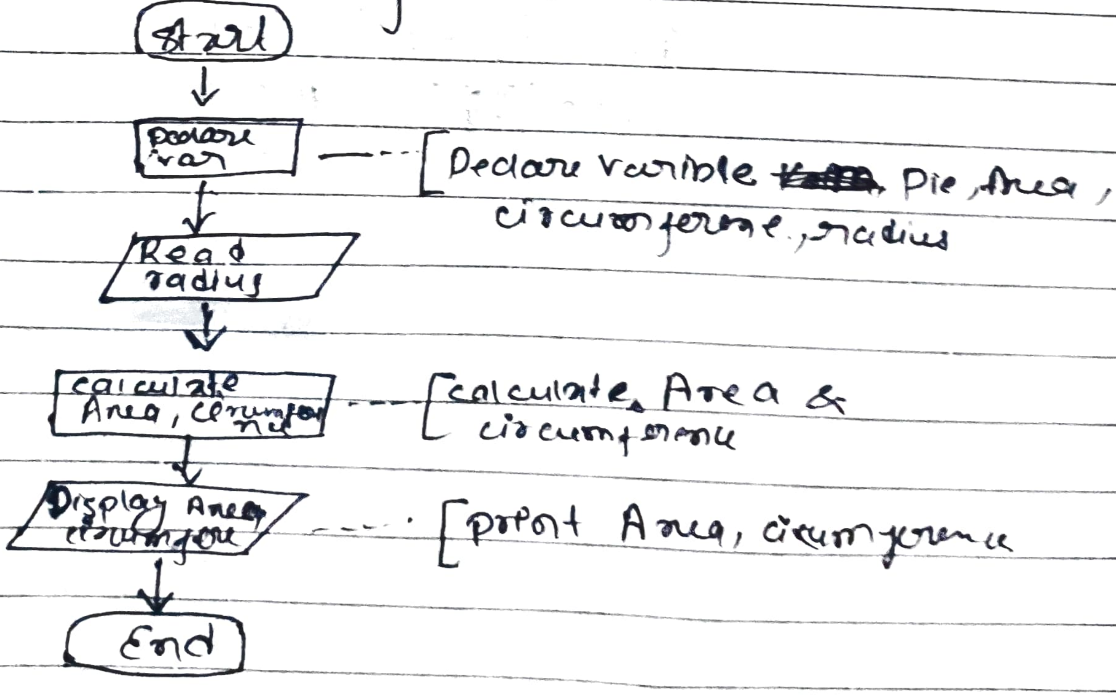
```
/*
// Q.8-Write a program to read the temperature in centigrade and convert it to fahrenheit?

#include <stdio.h>

int main(int argc, char const *argv[])
{
    float centigrade, fahrenheit;
    printf("Enter tempr in centigrade: ");
    scanf("%f", centigrade);
    // degree C to F Conversion
    fahrenheit = (centigrade * 9/5) + 32;
    printf("%.2f centigrade = %.2f fahrenheit",centigrade, fahrenheit);

    return 0;
}
*/
    //When input is 34 degree centigrade.
    //Then, output is 93.2 fahrenheit.


//------------------------------------------------------------------------------------------
/*
Q.9 Algorithm to to calculate Simple Interest.
    Step1: Start
    Step2: Declare variables name as principle, time, rate and SI.
    Step3: Read principle, time and rate.
    Step4: Compute the value of SI using formula (principle * time * rate) / 100.
    Step5: Display the value of SI variable as a result.
    Step6: Stop
*/
/*
// Q.9- Write a program to calculate Simple Interest?
// Simple interest formula is given by.
// SI = (principle * time * rate) / 100

#include <stdio.h>

int main()
{
    float principle, time, rate, SI;

    // Input principle, rate and time
    printf("Enter principle (amount):$ ");
    scanf("%f", &principle);

    printf("Enter time: ");
    scanf("%f", &time);

    printf("Enter rate: ");
    scanf("%f", &rate);

    //  Calculate simple interest
    SI = (principle * time * rate) / 100;
    //  Print the resultant value of SI
    printf("\nSimple Interest =$ %.4f", SI);

    return 0;
}
*/
    //Input values,
    //Enter principle (amount):$ 24000
    //Enter time: 1
    //Enter rate: 2.5

    // Output is, Simple Interest =$ 600.0000


//-------------------------------------------------------------------------------------------------------------
/*
Q.10 Algorithm to Calculate the mass of air  in an automobile tire, using the formula PV = 0.37 m (T+ 460).
    Step1: Start
    Step2: Declare variables name as Pressure, Volume, Mass and Temperature.
    Step3: Read the values of Pressure, Volume and Temperature.
    Step4: Calculate the mass using (Pressure * Volume) / (0.37 * (Temperature + 460).
    Step5: Print the resultant value of Mass variable that must be declared in float or double data type.
    Step6: Stop
*/
/*
// Q.10-Calculate the mass of air  in an automobile tire, using the formula?
// PV = .37 m (T+ 460) Where P is pressure and V is volume and m is mass.
#include <stdio.h>

int main()
{
    float Pressure, Volume, Temperature;
    printf("Enter the value of Pressure: ");
    scanf("%f", &Pressure);
    printf("Enter the value of Volume: ");
    scanf("%f", &Volume);
    printf("Enter the value of Temperature: ");
    scanf("%f", &Temperature);
    float Mass = (Pressure * Volume) / (0.37 * (Temperature + 460));
    printf("\nMass is %.4f", Mass);

    return 0;
}
*/
    //Inputs are,
    //Enter the value of Pressure: 78
    //Enter the value of Volume: 2
    //Enter the value of Temperature: 32
    //Output is,
    //Mass is 0.8570


//---------------------------------------------------------------------------------------------------------
/*
```

```
Q.11 Algorithm to calculate real and equal roots of quadratic equations.
    Step1: Start
    Step2: Declare variables name as a,b,c and root
    Step3 : Calculate root = b^2 - 4ac
    Step4 : if root == 0 print root is real and equal
    Step4.1 : else if root > 0 print root is real and distinct
    Step4.1.1 : else print root is not real
    Step5 : Stop
*/

// Q.11-Write a program to calculate real and equal roots of quadratic equations?
/*
    #include<stdio.h>
    #include<math.h>

    int main()
{
    float A, B, C, root, alpha_sign, beta_sign;
    printf("Enter the coefficient A, B and C: ");
    scanf("%f %f %f",&A,&B,&C);
    root=B*B-4*A*C;
    alpha_sign=(-B+sqrtf(root))/(2*A);
    beta_sign=(-B-sqrtf(root))/(2*A);
    if (B*B<4*A*C)
    {printf("roots are imaginary");}
    else if(pow(B,2)!=4*A*C)
    {printf("Roots are real and unequal.\n");
    printf("The root are %f and %f ",alpha_sign, beta_sign);}
    else
    {printf("Roots are real and equal\n");
    printf("The real and equal root is %f ", (-B)/(2*A));}

    return 0;
}
*/
    /*
    input,
    Enter the coefficient A, B and C:
    -9
    8
    1
    Outputs are,
    Roots are real and unequal.
    The root are -0.111111 and 1.000000
    */



//--------------------------------------------------------------------------------
/*
Q.12 Algorithm to read the weight in gram and convert it to kilogram and gram.
    Step1: Start
    Step2: Declare varibles name as input_gram, gram and kilogram.
    Step3: Read input_gram and assign its value to input_gram variable.
    Step4: Convert the input_gram to kilogram using input_gram / 1000.
    Step5: Compute gram equal to input_gram - kilogram * 1000 just to know to value after decimal.
    Step6: Print the given value of input_gram that must be equal to output kilogram and output gram variable.
    Step7: Stop
*/
/*
// Q.12- Write a program to read the weight in gram and convert it to kilogram and gram?
// Just make our program easy we'll convert gm to kg and then kg to gm
// Gram to Kilogram
#include <stdio.h>
int main(int argc, char const *argv[])
{
    int input_gram;
    printf("Weight in Gram: ");
    scanf("%d", &input_gram);
    int kilogram = input_gram / 1000;
    int gram = input_gram - kilogram * 1000;


    printf("%d input_gram = %d kilogram and %d Gram\n", input_gram, kilogram, gram);

    return 0;
}
*/
    //User_Input: Weight in Gram: 2021
    //Output is; 2021 input_gram = 2 kilogram and 21 Gram

/*
// Kilogram to Gram
#include <stdio.h>
int main()
{
    float kilogram;
    printf("Weight in kilogram: ");
    scanf("%f", &kilogram);
    float gram = kilogram * 1000;
    printf("Your entered weight in gram is %.2f Gm\n",gram);
    printf("%.2f Kilogram = %.2f Gram\n",kilogram, gram);

    return 0;
}
*/


//-----------------------------------------------------------------------------------------------------
/*
Q.13 Algorithm to use sizeof operator to determine the size of different data types.
    Step1: Start
    Step2: Declare variables a, b, c, d, e, f, g with data types.
    Step3: Use sizeof operator to determine the size of different data types while printing the output.
    Step4: Stop
*/
/*
// Q.13-Write a program to use sizeof operator to determine the size of different data types?
// We can find the size of data types by using sizeof() operator

#include <stdio.h>
int main() {
  short a;
  long b;
  long long c;
  long double d;
  char e;
  int f;
  unsigned long long int g;

  printf("size of short = %d bytes\n", sizeof(a));
  printf("size of long = %d bytes\n", sizeof(b));
  printf("size of long long = %d bytes\n", sizeof(c));
  printf("size of long double= %d bytes\n", sizeof(d));
  printf("size of chr= %d bytes\n", sizeof(e));
  printf("size of int= %d bytes\n", sizeof(f));
  printf("size of unsigned long long= %d bytes\n", sizeof(g));
  return 0;
}
*/
    //Results are;
    //size of short = 2 bytes
    //size of long = 8 bytes
    //size of long long = 8 bytes
    //size of long double= 16 bytes
    //size of chr= 1 bytes
    //size of int= 4 bytes
    //size of unsigned long long= 8 bytes
```

Q.5 flowchart to read the radius of a sphere and compute surface area and volume.

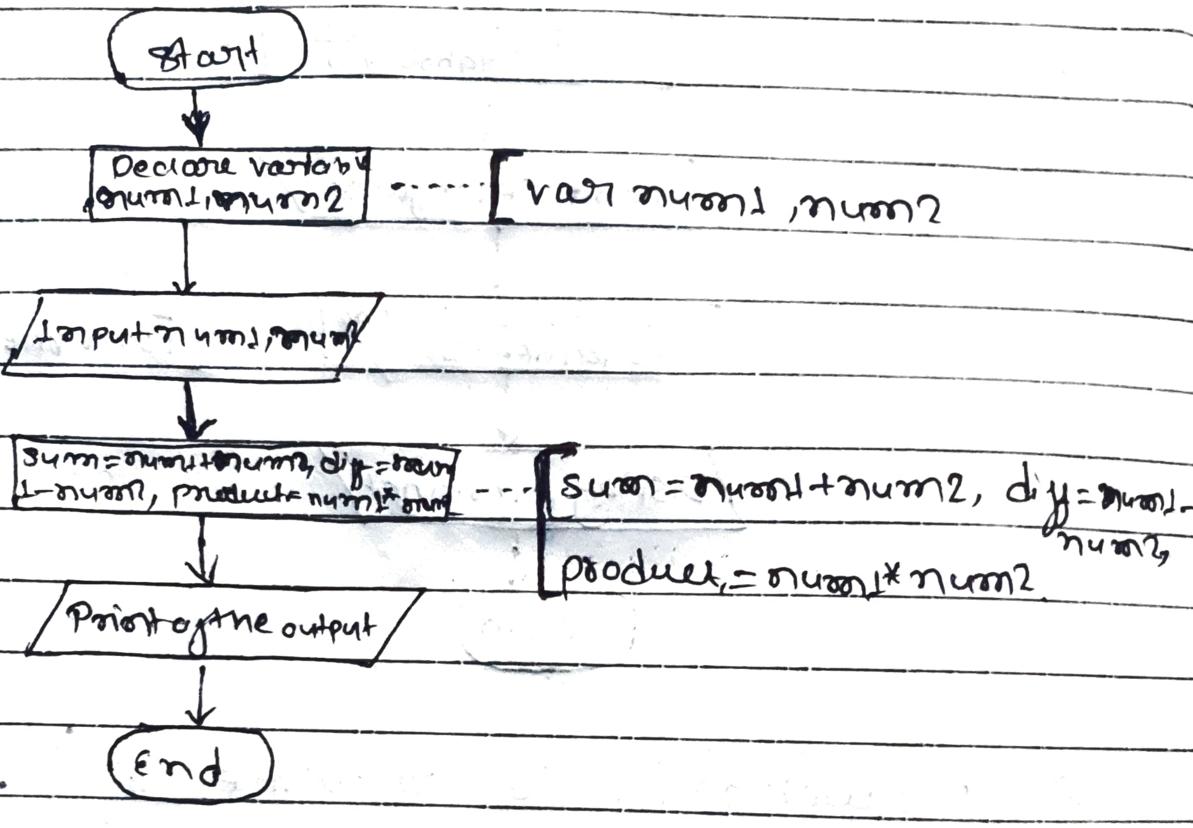

Start
Declare radius, pie, volume, Area
[var Volume, π(Pie), Area, radius
Read radius
calculate volume and Area
[$v = \frac{4}{3}\pi r^3$, $A = 4\pi r^2$
Display volume/Area
[print v, A
End

Q.6. flowchart to read the radius of a circle and compute its area and circumference.

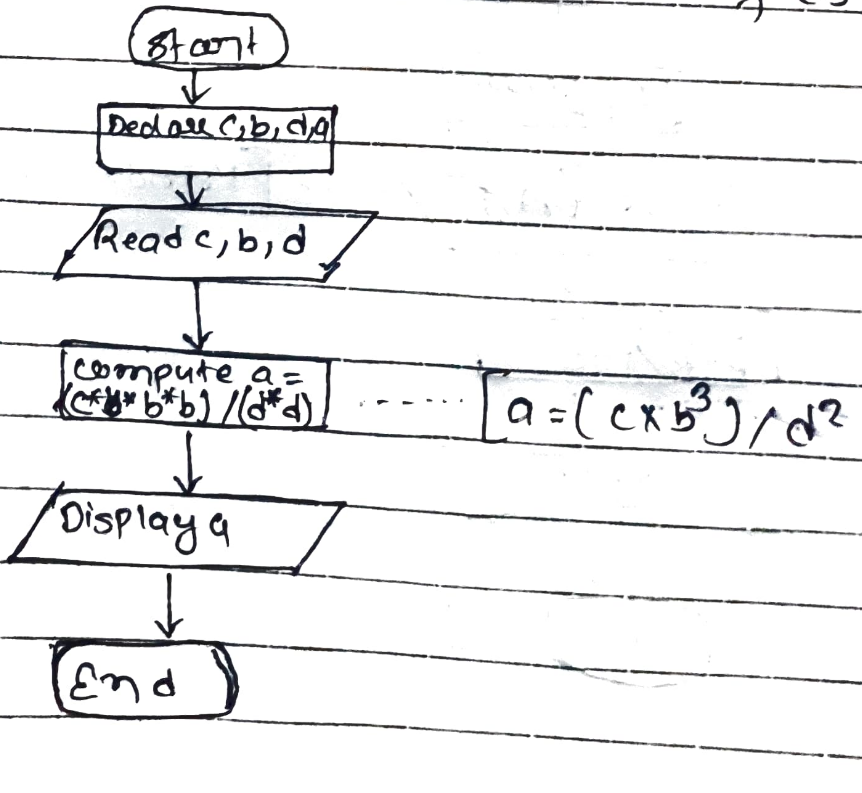

Start
Declare var
[Declare variable Pie, Area, circumference, radius
Read radius
calculate Area, circumference
[calculate Area & circumference
Display Area circumference
[print Area, circumference
End

Q.3.

flowchart to read the value of two variables, compute sum, difference and ~~program~~ product.

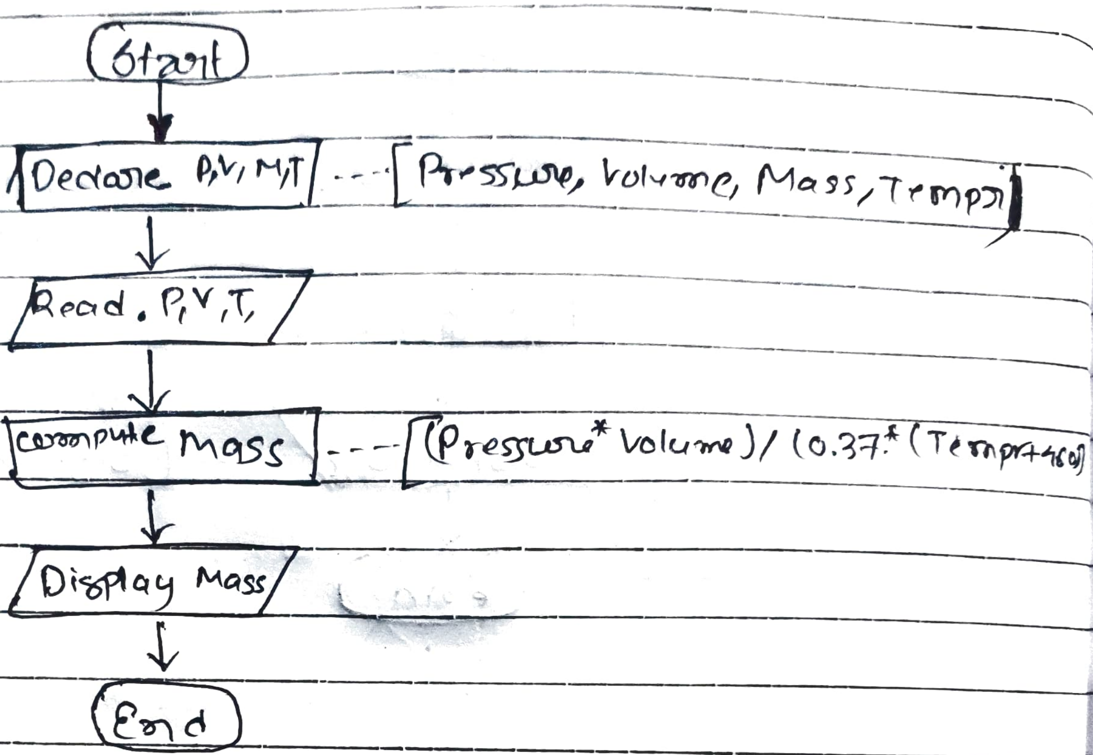

Start
Declare variable num1, num2
var num1, num2
Input num1, num2
sum = num1 + num2, diff = num1 - num2, product = num1 * num2
sum = num1 + num2, diff = num1 - num2,
product = num1 * num2
Print of the output
End

Q.4. flowchart to calculate the result of cb^3/d^2.

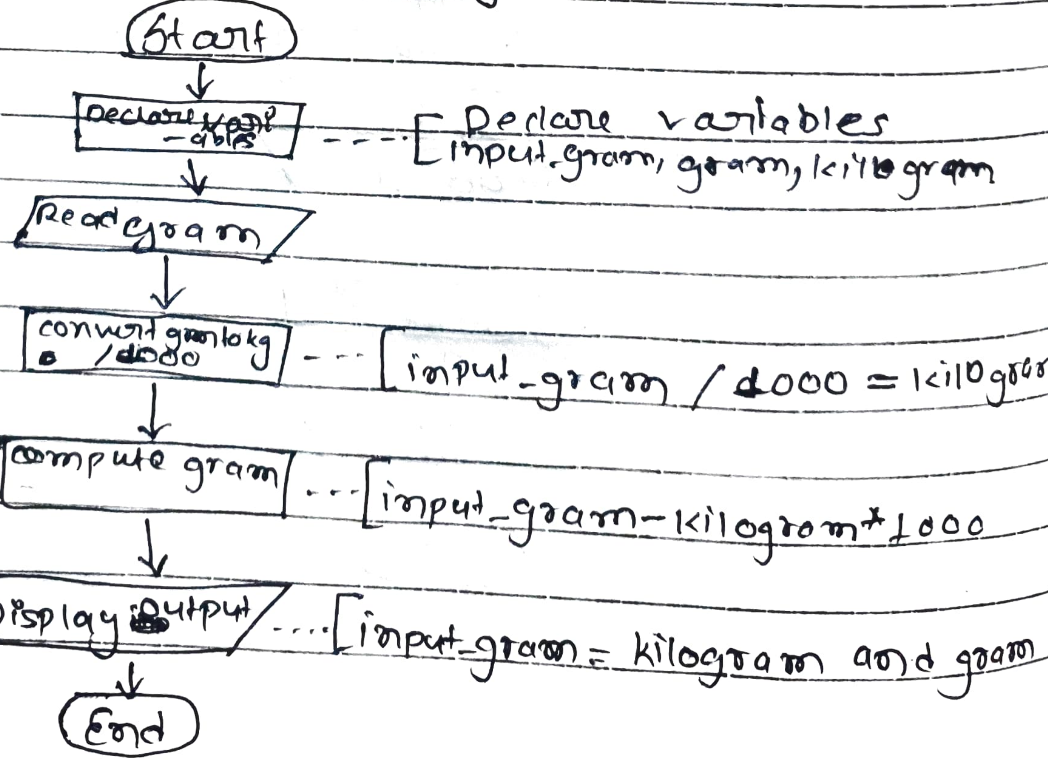


GURUKUL

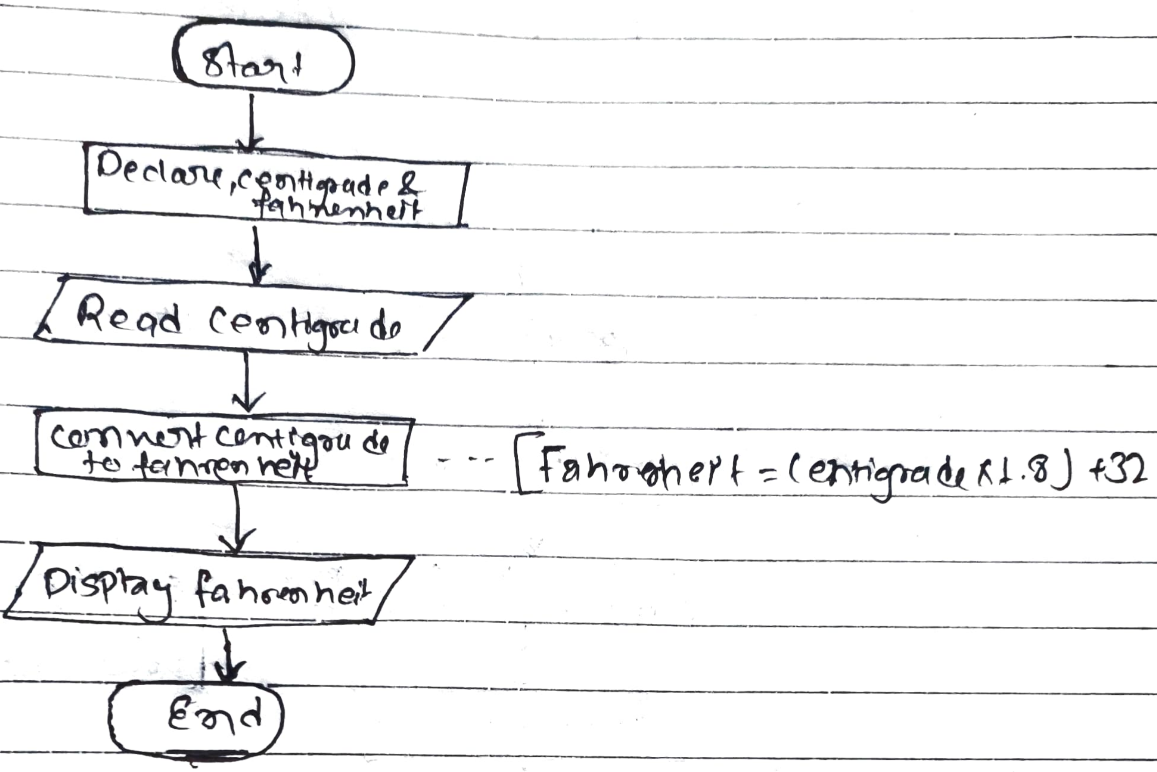
Q.10. flowchart to calculate the mass of air in an automobile tire, using PV = 0.37 m(T+ 460).


Start
Declare P,V,M,T
Pressure, Volume, Mass, Tempr
Read. P,V,T,
compute Mass
(Pressure* Volume)/(0.37*(Tempr+460))
Display Mass
End

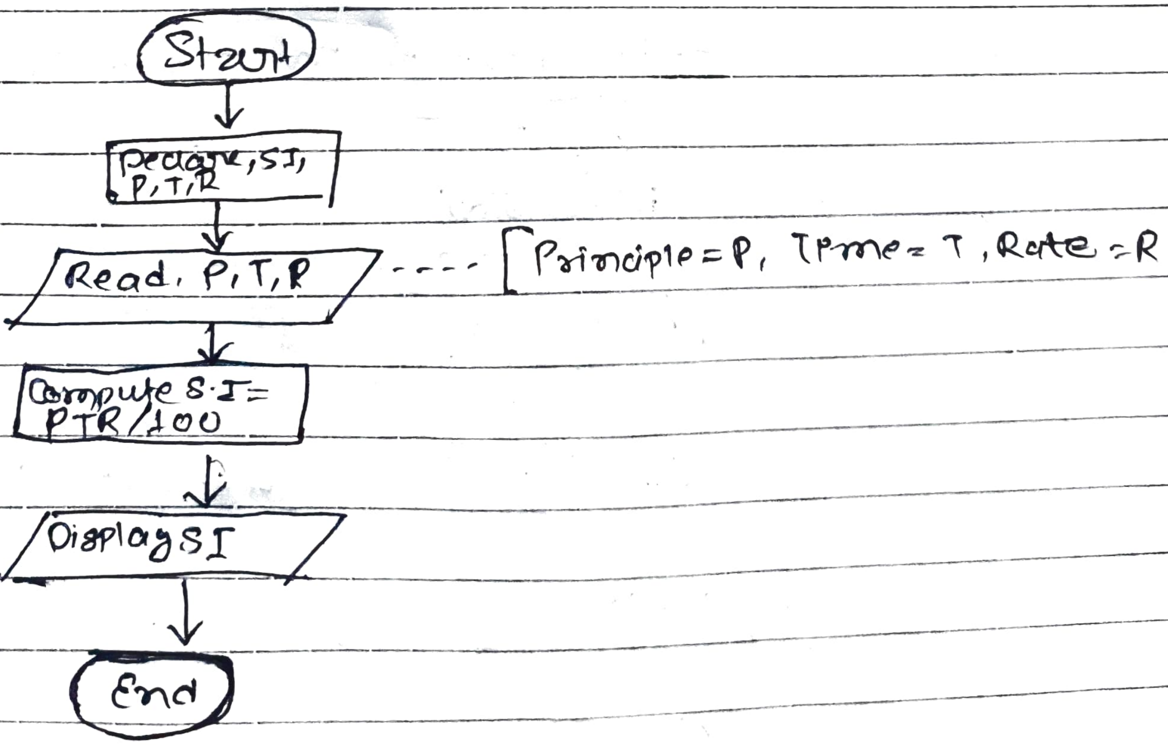
Q.12 flowchart to ~~calculate~~ read the weight in gram and convert it to kilogram and gram.



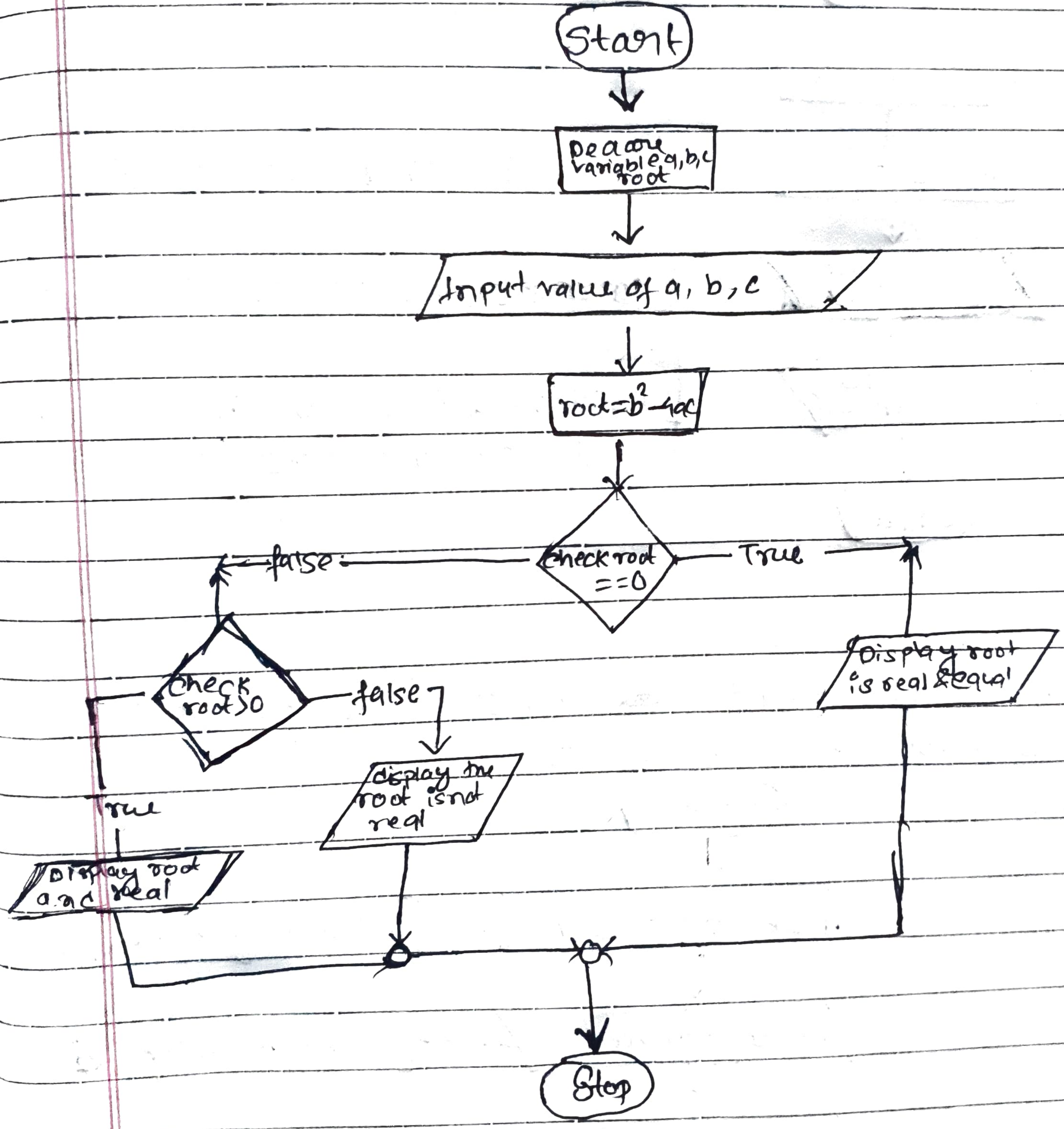
Q.8. ~~Algorithm~~ flowchart to read the temperature in centigrade and convert it to fahrenheit.


Start
Declare, centigrade & fahrenheit
Read centigrade
convert centigrade to fahrenheit
[Fahrenheit = (centigrade x 1.8) + 32
Display fahrenheit
End

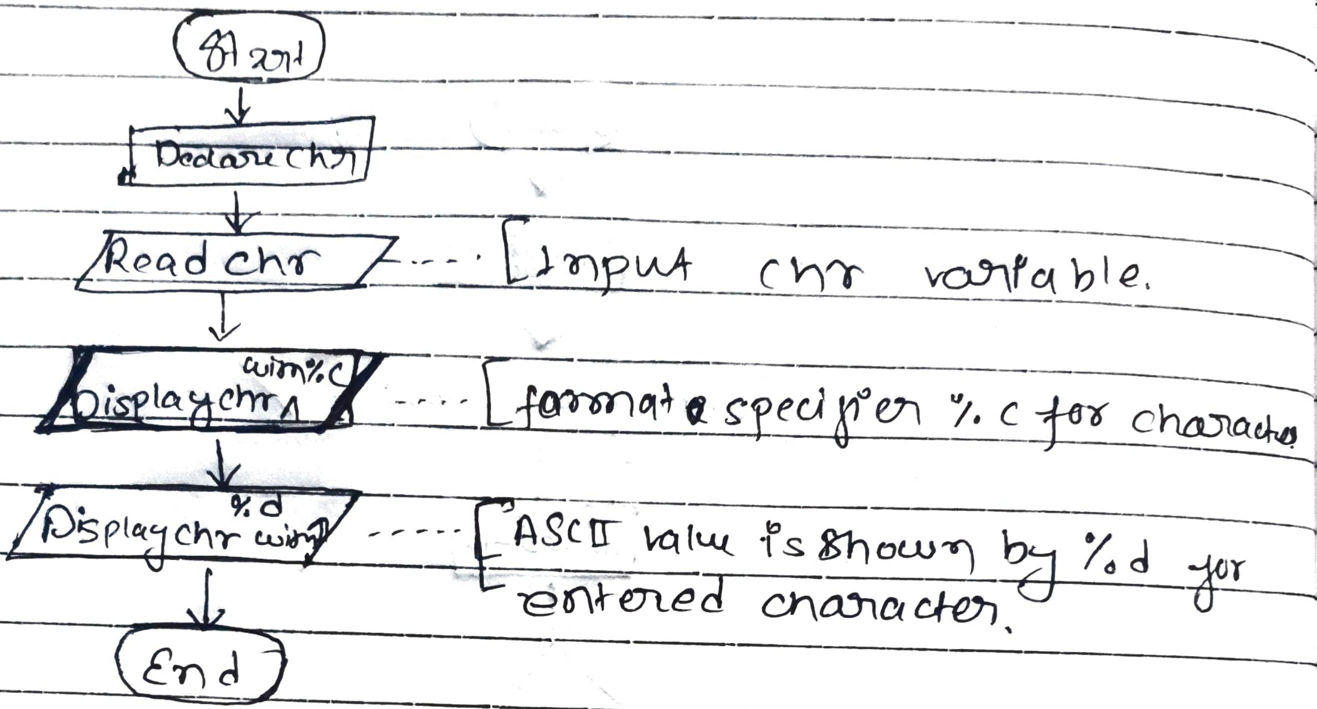
Q.9. Flowchart to calculate Simple Interest.



Q.11-flowchart to calculate real and equal roots of quadric equations.



.1 flowchart to read the graphical characters and print this equivalent ASCII code.



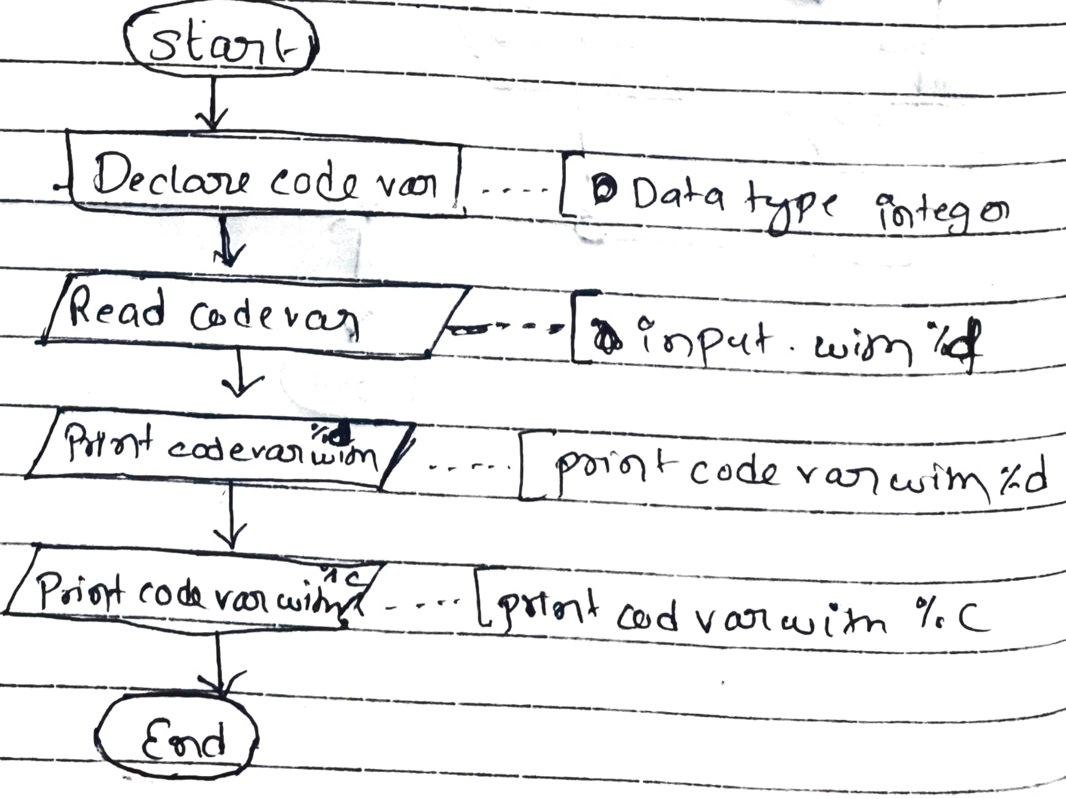
[Input chr variable.

[format specifier %c for character

[ASCII value is shown by %d for entered character.

.2 flowchart ~~to~~ read ~~the~~ ASCII value and print the equivalent character

~~Step~~.



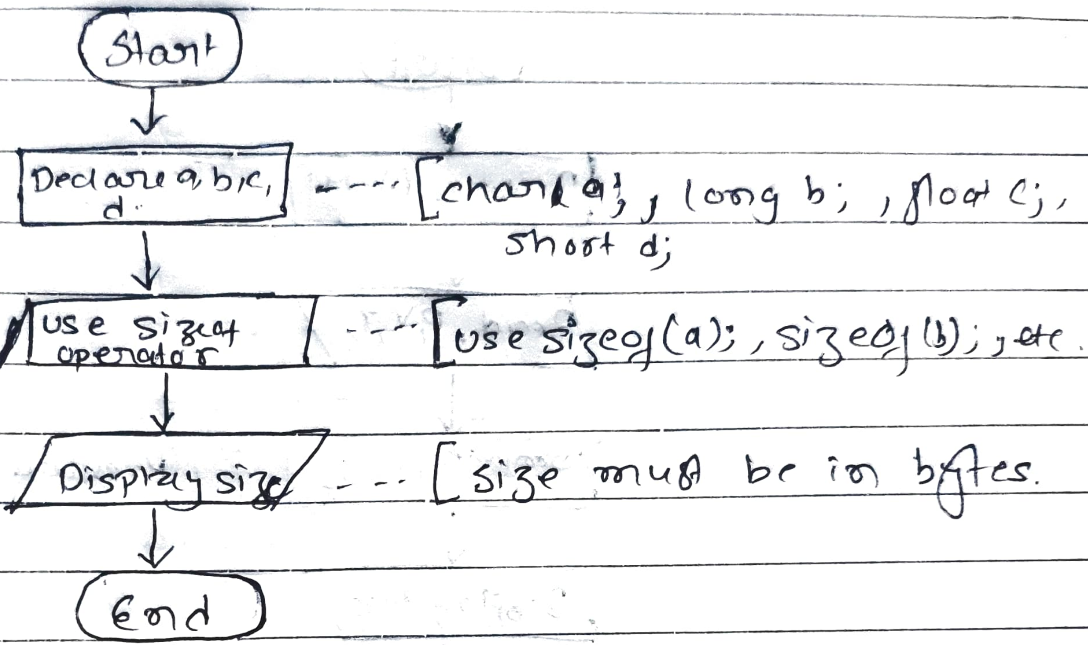
[Data type integer

[input with %d

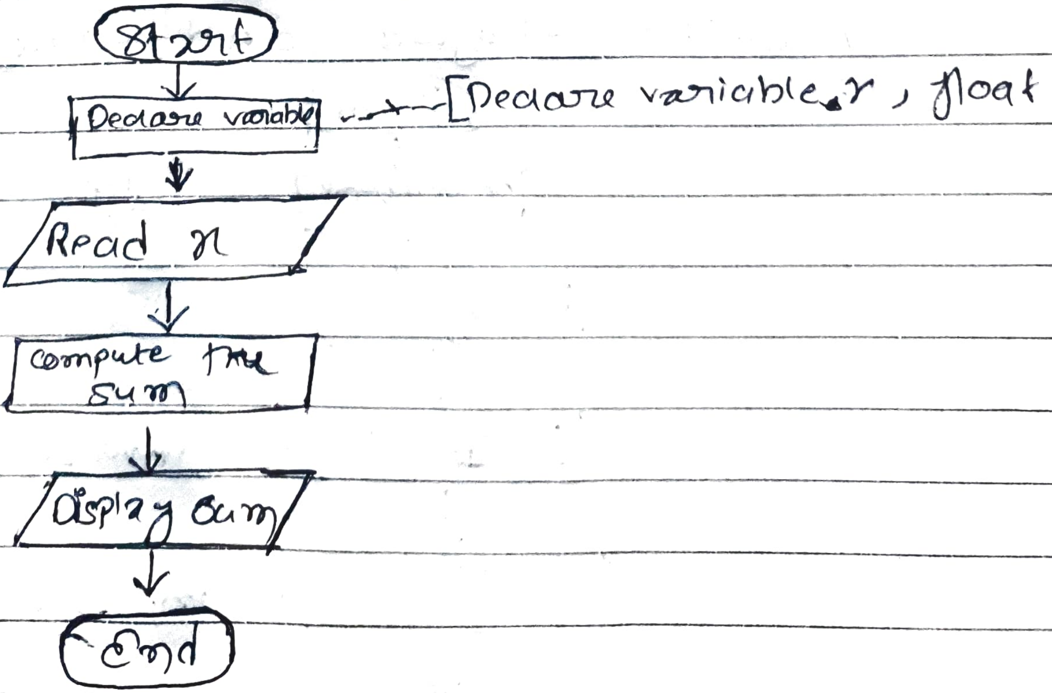
[print code var with %d

[print cod var with %C

8. flowchart to use sizeof operator to determine the size of different datatypes.



Q.7. flowchart to calculate the sum of $(1-x^2)/2! + x^4/4! + x^6/6! + x^8/8! + x^{10}/10!$


Start
Declare variable
[Declare variable x, float
Read x
compute the sum
Display sum
End