Chandpur Science and Technology University

Department of Computer Science and Engineering

LAB ASSIGNMENT #1

C Lab Assignment Submitted By:

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Submitted To:

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Marks & Signature

Lab Date:

Submission Date: 11/26/2023

Problem No - 1

Objective(s):

1. Using C program to solve mathematical problems

Title:

Find the Area and Circumference of a Circle

Problem Analysis:

Calculating the area and circumference of a circle requires certain steps. Firstly, we need to declare a variable 'r' and assign a value to it as the circle's radius. Additionally, we need to declare two more variables to calculate the area and circumference of the circle.

Next, we use the equation area=pi*r*r to calculate the area of the circle. Similarly, the circumference of the circle is calculated using the equation circf=2*pi*r.

Finally, we print the values of area and circumference using the 'printf' function.

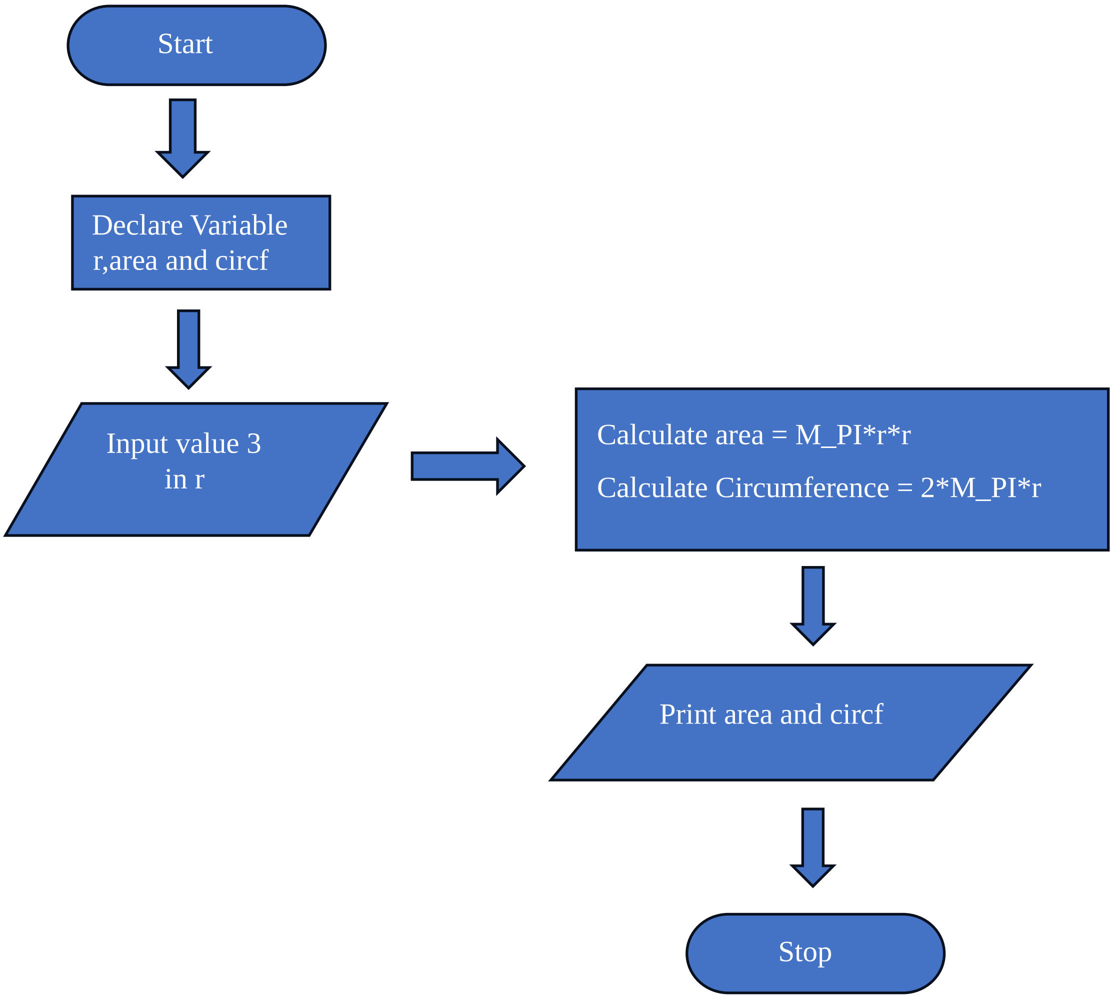
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros

r(float)	area = pi*r*r
	circf = 2*pi*r
		area(float)
		circf(float)
			`stdio.h`
			`math.h`

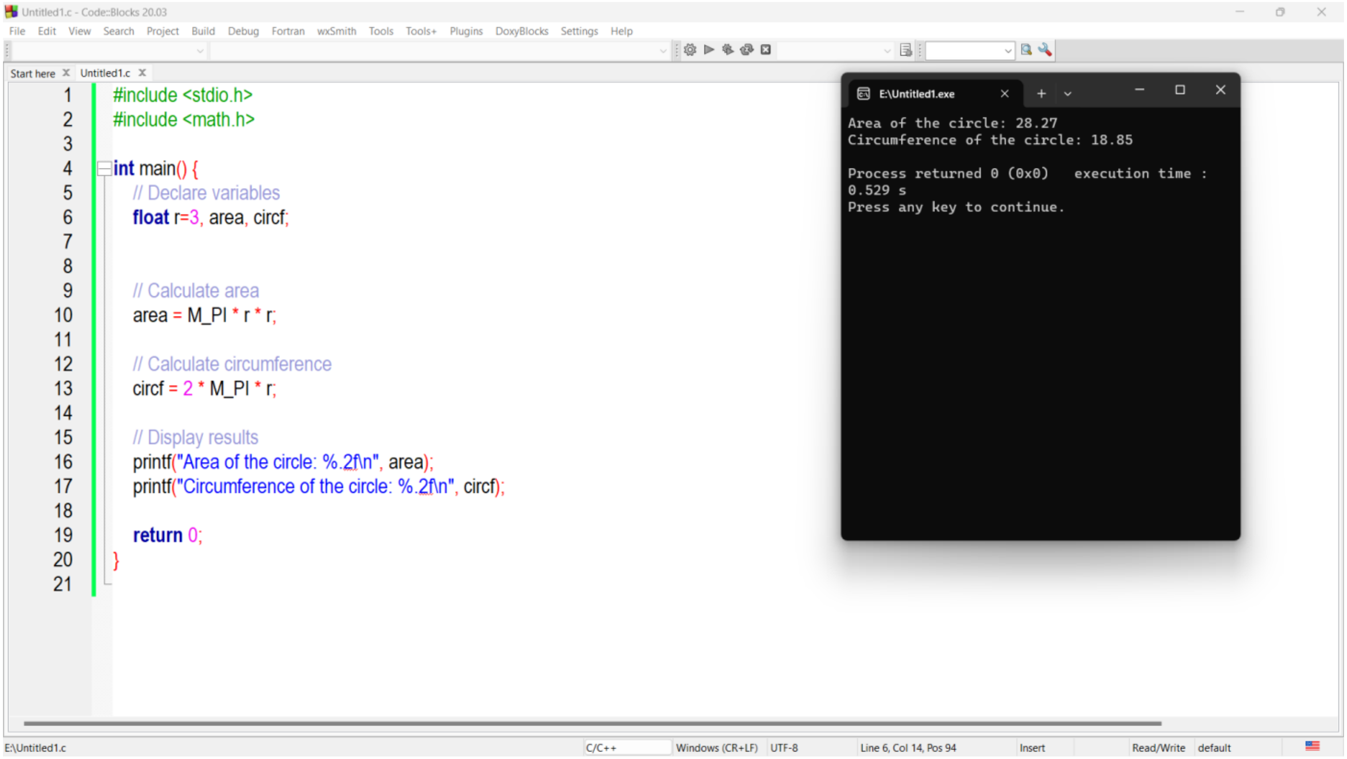
Algorithm:

1. Start
2. Declare variable r and cricf
3. Input radius in variable r
4. Calculate the area = π * r * r
5. Calculate circumference = 2 * π * r
6. Print Output area, circumference
7. Stop

Flowchart:


Start
Declare Variable r,area and circf
Input value 3 in r
Calculate area = M_PI*r*r
Calculate Circumference = 2*M_PI*r
Print area and circf
Stop

Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
Untitled1.c
E:\Untitled1.exe
E:\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 6, Col 14, Pos 94
Insert
Read/Write
default

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

int main() {
    // Declare variables
    float r=3, area, circf;


    // Calculate area
    area = M_PI * r * r;

    // Calculate circumference
    circf = 2 * M_PI * r;

    // Display results
    printf("Area of the circle: %.2f\n", area);
    printf("Circumference of the circle: %.2f\n", circf);

    return 0;
}
```

```
Area of the circle: 28.27
Circumference of the circle: 18.85

Process returned 0 (0x0)   execution time :
0.529 s
Press any key to continue.
```

Problem No - 2

Objective(s):

To be familiar with character and ASCII value

Title:

Print ASCII Value of the Character

Problem Analysis:

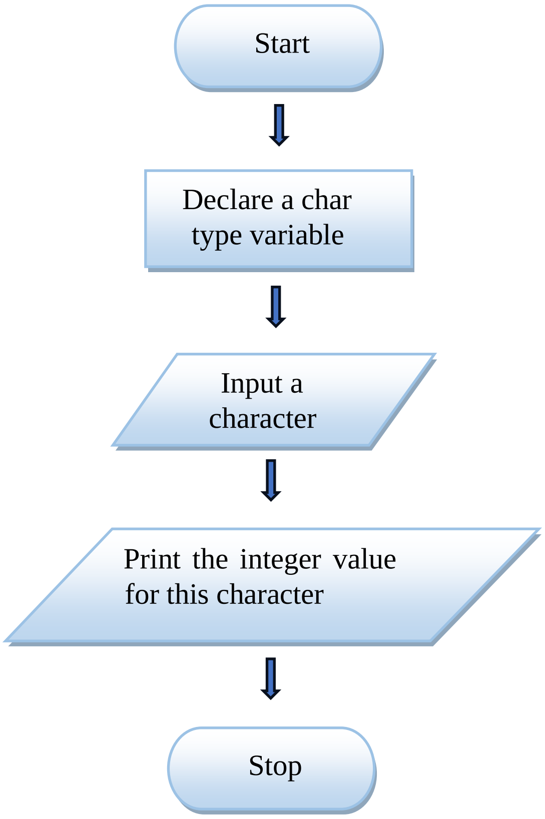
This problem is to know the ASCII value of a character. For this we diclare a char type variable then take a character input in it. After all print the integer value for this char type data that is actually the ASCII value for that character.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
letter(char)		Integer value of char data type	`stdio.h`

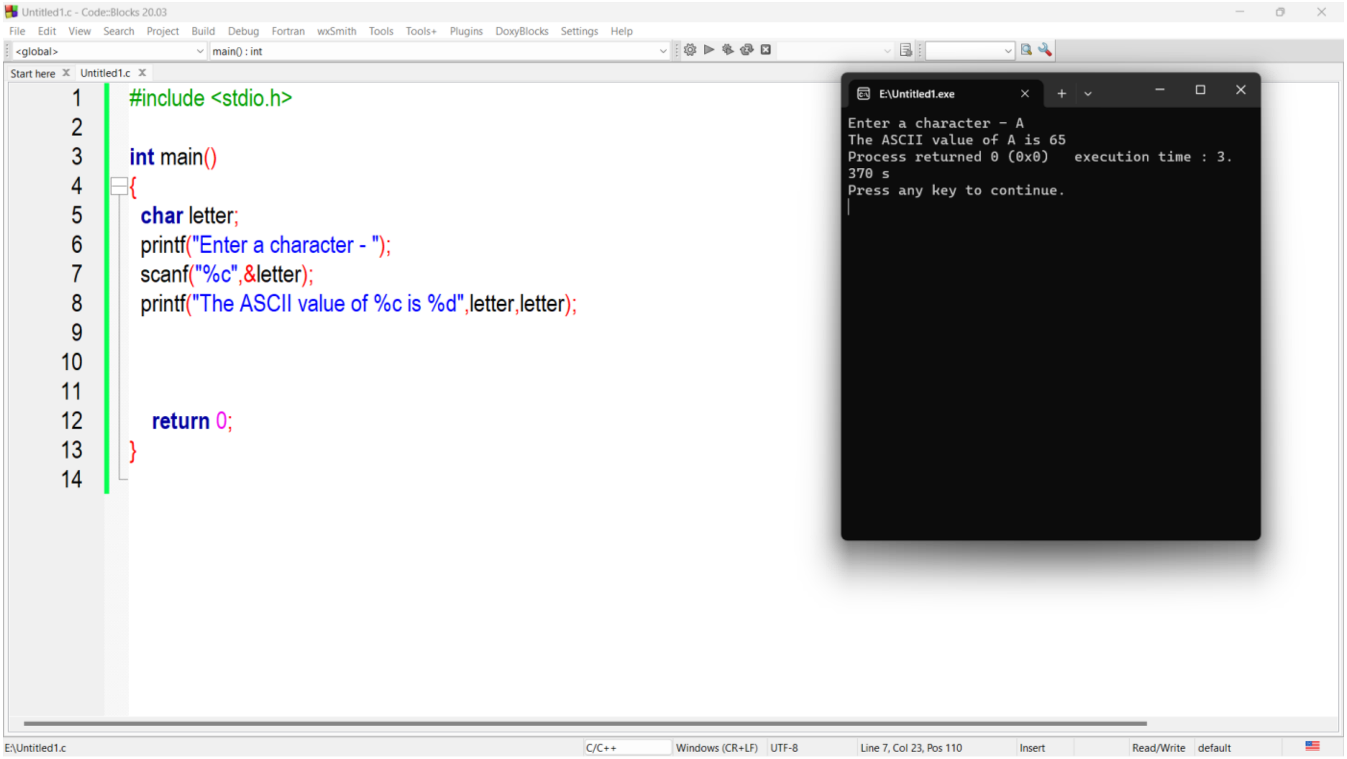
Algorithm:

1. Start
2. Declare variable “letter”
3. Input a character in this variable
4. Print the integer value of this character
5. Stop

Flowchart:


Start
Declare a char type variable
Input a character
Print the integer value for this character
Stop

Code & Output (Compilation, Debugging & Testing):



```
#include <stdio.h>

int main()
{
 char letter;
 printf("Enter a character - ");
 scanf("%c",&letter);
 printf("The ASCII value of %c is %d",letter,letter);



   return 0;
}

```

```
Enter a character - A
The ASCII value of A is 65
Process returned 0 (0x0)   execution time : 3.
370 s
Press any key to continue.
```

Problem No - 3

Objective(s):

1. To be familiar with the variable declaration and doing mathematical operation using C

Title:

Find the Area of a Triangle

Problem Analysis:

To find the area of a triangle, we need to begin by declaring three variables - base, height, and area. We can use the scanf function to take input for these variables. Once we have taken the input, we can calculate the area of the triangle using the formula: area = 0.5 * base * height. Finally, we can print the value of the area in the program.

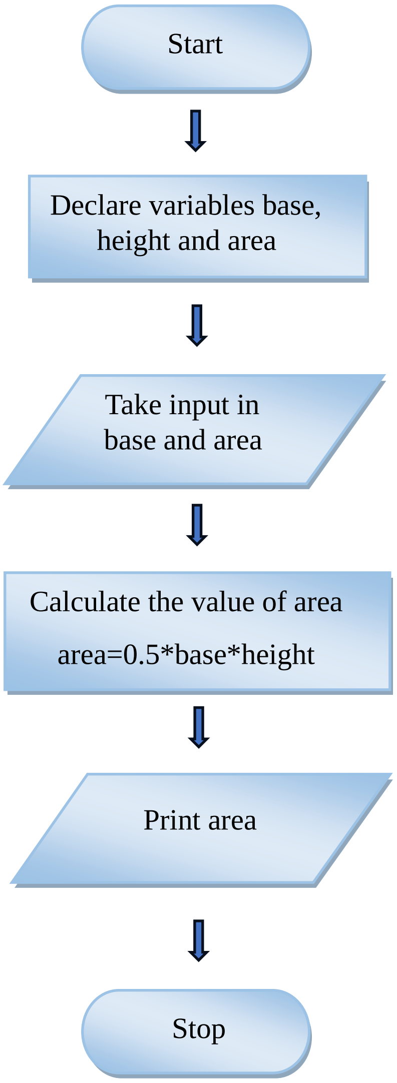
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros

base(float)
height(float)
	area=0.5*base*height	area	`stdio.h`

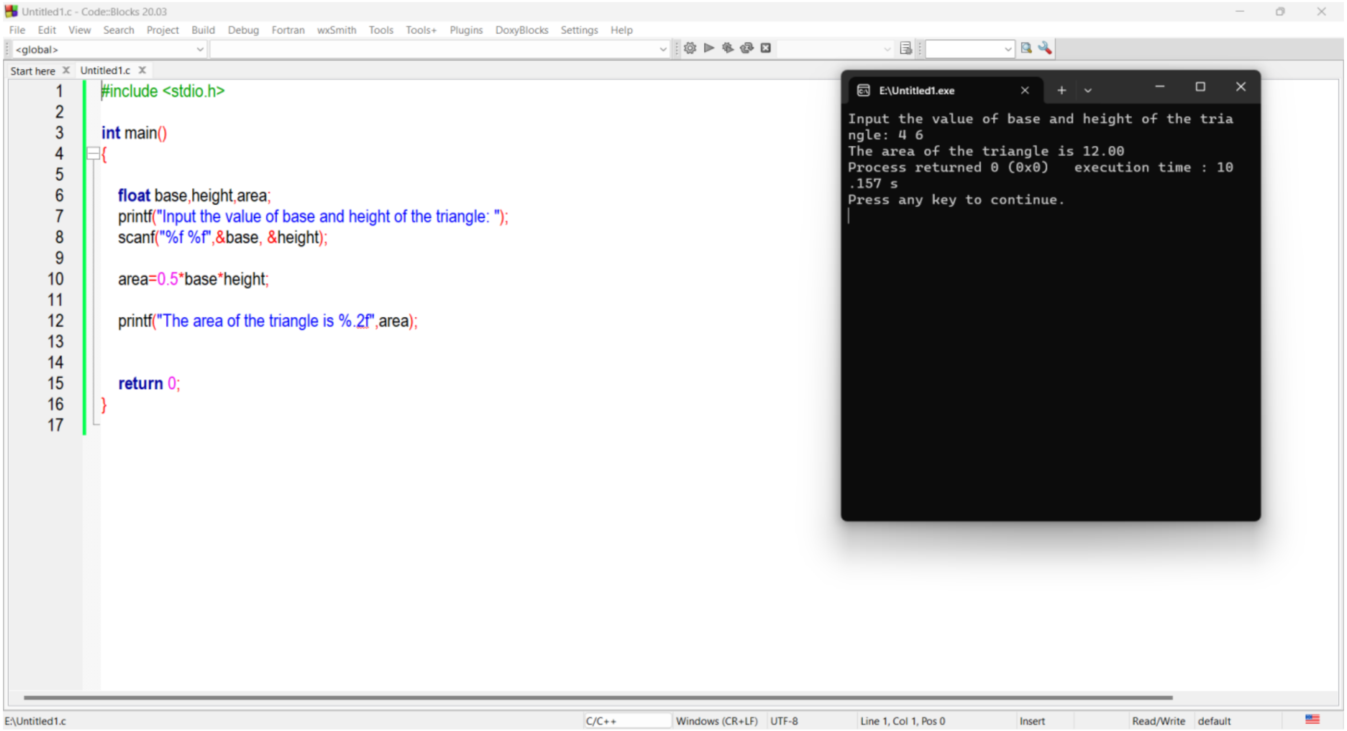
Algorithm:

1. Start
2. Declare variable base, height and area
3. Take input of base and height
4. Calculate the value of area using area=0.5*base*height
5. Print the area
6. stop

Flowchart:


Start
Declare variables base, height and area
Take input in base and area
Calculate the value of area
area=0.5*base*height
Print area
Stop

Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Start here
Untitled1.c
E:\Untitled1.exe
E:\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 1, Col 1, Pos 0
Insert
Read/Write
default

```c
#include <stdio.h>

int main()
{

    float base,height,area;
    printf("Input the value of base and height of the triangle: ");
    scanf("%f %f",&base, &height);

    area=0.5*base*height;

    printf("The area of the triangle is %.2f",area);


    return 0;
}

```

```
Input the value of base and height of the tria
ngle: 4 6
The area of the triangle is 12.00
Process returned 0 (0x0)   execution time : 10
.157 s
Press any key to continue.
```

Problem No - 4

Objective(s):

To learn about string and array

To know how to take a string as input

Title:

Convert a Person's Name in Abbreviated

Problem Analysis:

To begin, we must define two array variables named "fname" and "lname" to store the first and last names of a person. We can then use the "scanf" function to retrieve the names from the user. In C, there is no specific data type for storing strings, so we must declare an array to store the input. Once we have obtained the first and last names, we can print out the first initial of the first name, followed by a period and the full last name.

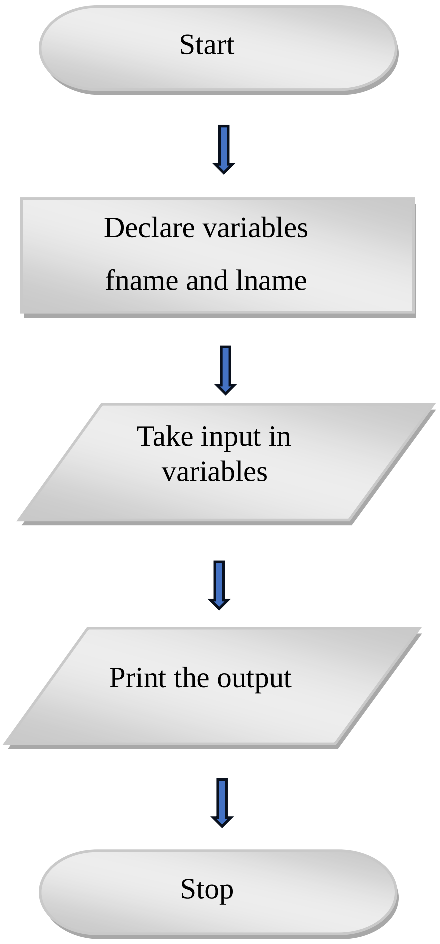
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros

fname(char array)
lname(char aary)
		fname[0]
		lname
			`stdio.h`

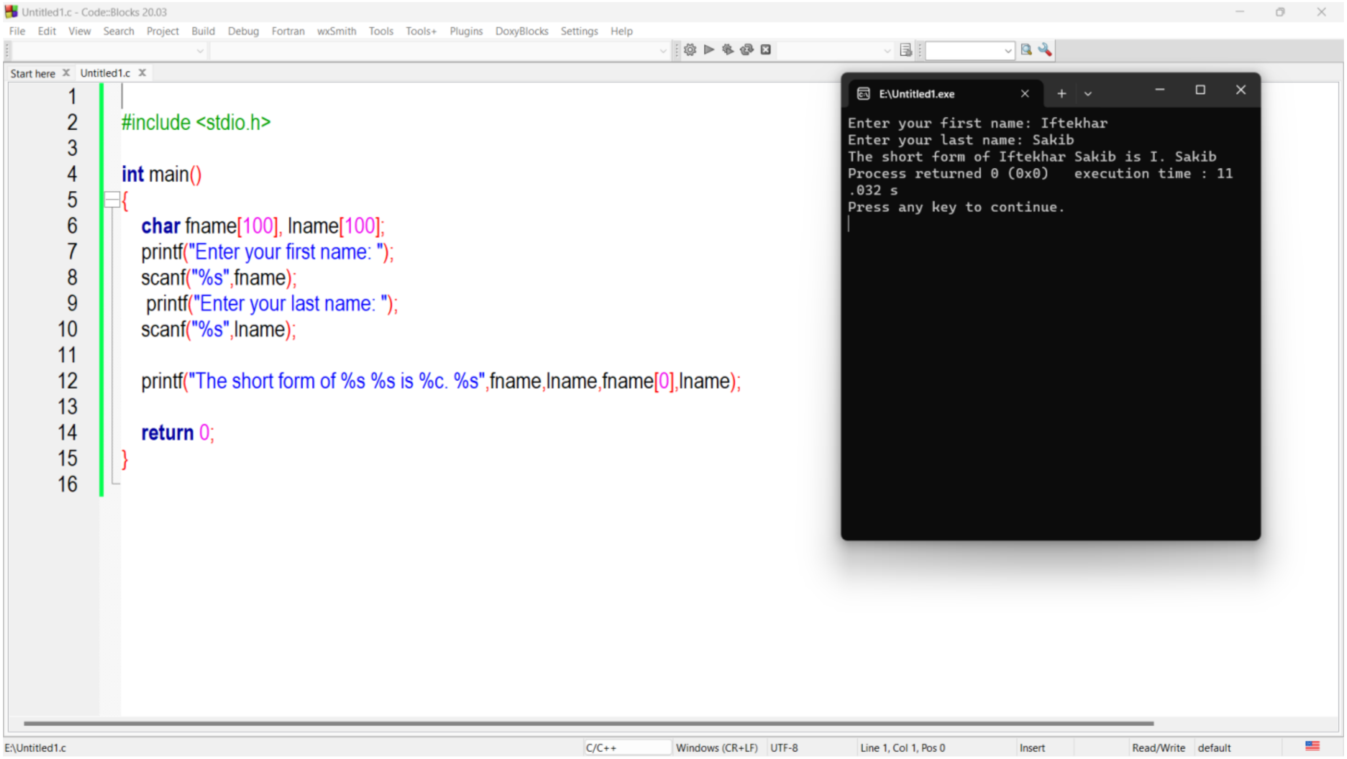
Algorithm:

1. start
2. declare two arrays for first name and last name.
3. take a person full name as user input
4. print the first character of first name by array index and full second name
5. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
Untitled1.c
E:\Untitled1.exe
E:\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 1, Col 1, Pos 0
Insert
Read/Write
default

```c

#include <stdio.h>

int main()
{
    char fname[100], lname[100];
    printf("Enter your first name: ");
    scanf("%s",fname);
     printf("Enter your last name: ");
    scanf("%s",lname);

    printf("The short form of %s %s is %c. %s",fname,lname,fname[0],lname);

    return 0;
}

```

```
Enter your first name: Iftekhar
Enter your last name: Sakib
The short form of Iftekhar Sakib is I. Sakib
Process returned 0 (0x0)   execution time : 11
.032 s
Press any key to continue.
```

Problem No - 5

Objective(s):

To be familiar with mathematical operation using c programme

Title:

Calculate a Simple Interest

Problem Analysis:

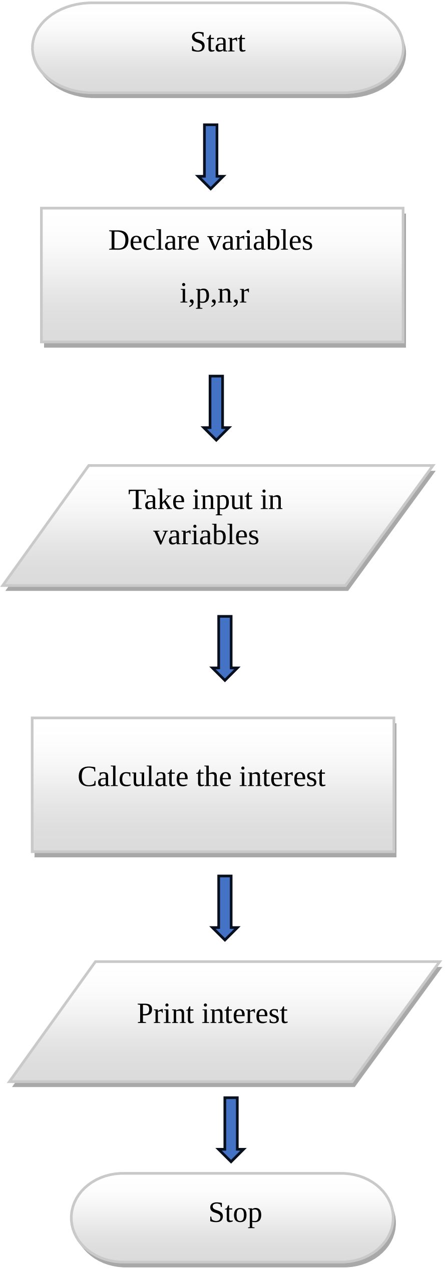
This problem involves calculating simple interest, using the variables I (interest), P (principal), N (number of periods), and R (rate of interest). The interest can be calculated using the formula I = PNR.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
i,p,n,r	i=p*n*r	i	`stdio.h`

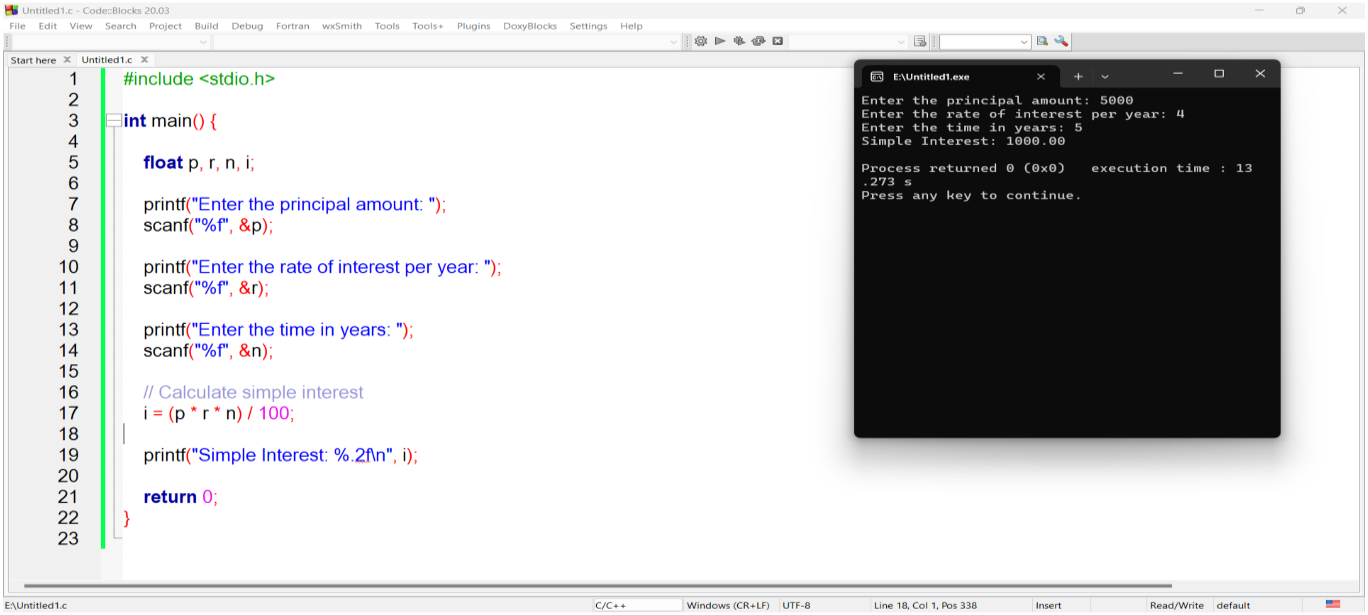
Algorithm:

1. start
2. declare variables i,p,n,r
3. take input
4. calculate interest
5. print interest
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
Untitled1.c
E:\Untitled1.exe
E:\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 18, Col 1, Pos 338
Insert
Read/Write
default

```c
#include <stdio.h>

int main() {

    float p, r, n, i;

    printf("Enter the principal amount: ");
    scanf("%f", &p);

    printf("Enter the rate of interest per year: ");
    scanf("%f", &r);

    printf("Enter the time in years: ");
    scanf("%f", &n);

    // Calculate simple interest
    i = (p * r * n) / 100;

    printf("Simple Interest: %.2f\n", i);

    return 0;
}
```

```
Enter the principal amount: 5000
Enter the rate of interest per year: 4
Enter the time in years: 5
Simple Interest: 1000.00

Process returned 0 (0x0)   execution time : 13
.273 s
Press any key to continue.
```

Problem No - 6

Objective(s):

To be familiar with business related mathematical operation with c program

Title:

Find the Gross Salary of an Employee

Problem Analysis:

Gross salary refers to the total amount of money earned by an employee before any deductions are made. It includes not only the employee's basic salary but also additional components such as allowances, bonuses, overtime pay, and other benefits. Gross salary is the total compensation that an employee receives from their employer.

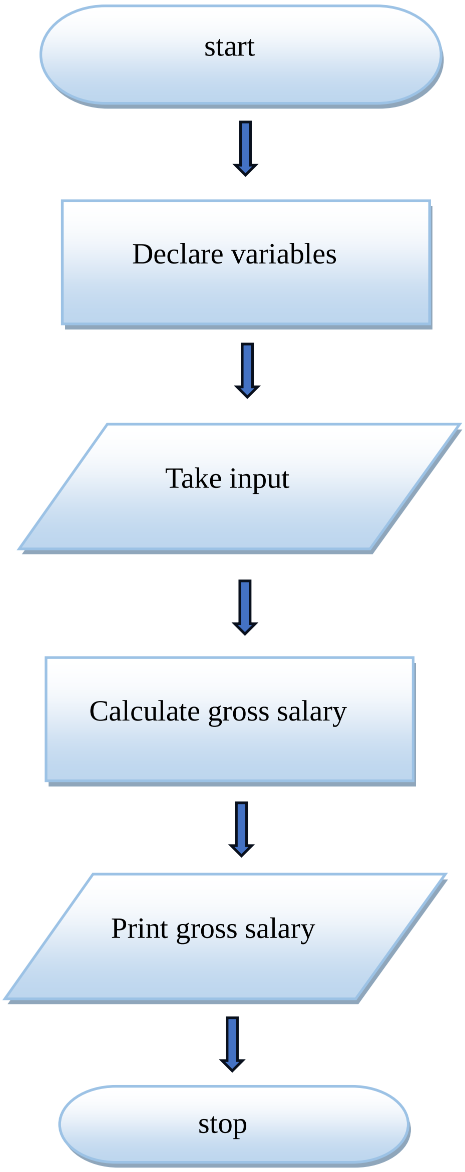
To calculate gross salary we declare four variables basicSalary, allowances, bonus, grossSalary. Then take input in these variables. After all print the grossSalary.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
basicSalary, allowances, bonus, grossSalary	grossSalary=basicSalary+allowances+bonus	grossSalary	`stdio.h`

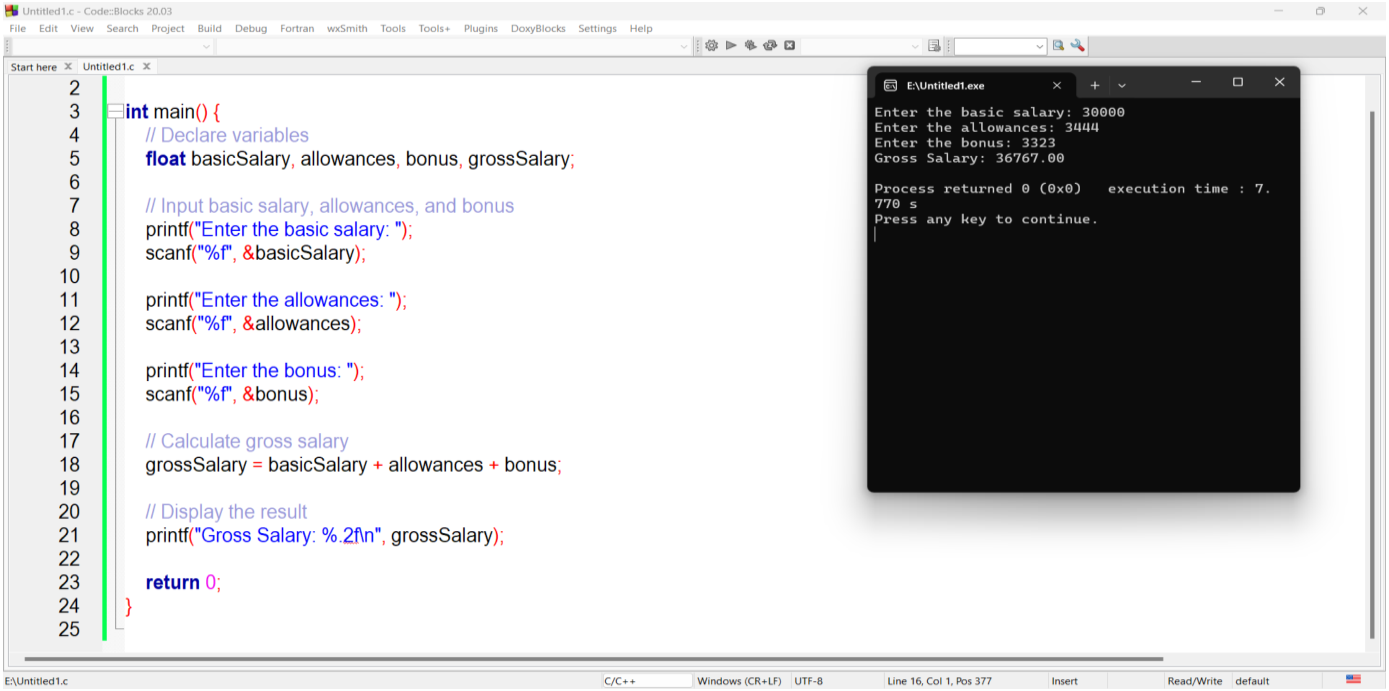
Algorithm:

1. start
2. declare variables
3. take input
4. calculate gross salary
5. print gross salary
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
Untitled1.c
E:\Untitled1.exe
E:\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 16, Col 1, Pos 377
Insert
Read/Write
default

```c

int main() {
    // Declare variables
    float basicSalary, allowances, bonus, grossSalary;

    // Input basic salary, allowances, and bonus
    printf("Enter the basic salary: ");
    scanf("%f", &basicSalary);

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

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

    // Calculate gross salary
    grossSalary = basicSalary + allowances + bonus;

    // Display the result
    printf("Gross Salary: %.2f\n", grossSalary);

    return 0;
}

```

```
Enter the basic salary: 30000
Enter the allowances: 3444
Enter the bonus: 3323
Gross Salary: 36767.00

Process returned 0 (0x0)   execution time : 7.
770 s
Press any key to continue.
```

Problem No - 7

Objective(s):

To be familiar with calculating percentage by C programme

Title:

Calculate the Percentage of 5 Subjects

Problem Analysis:

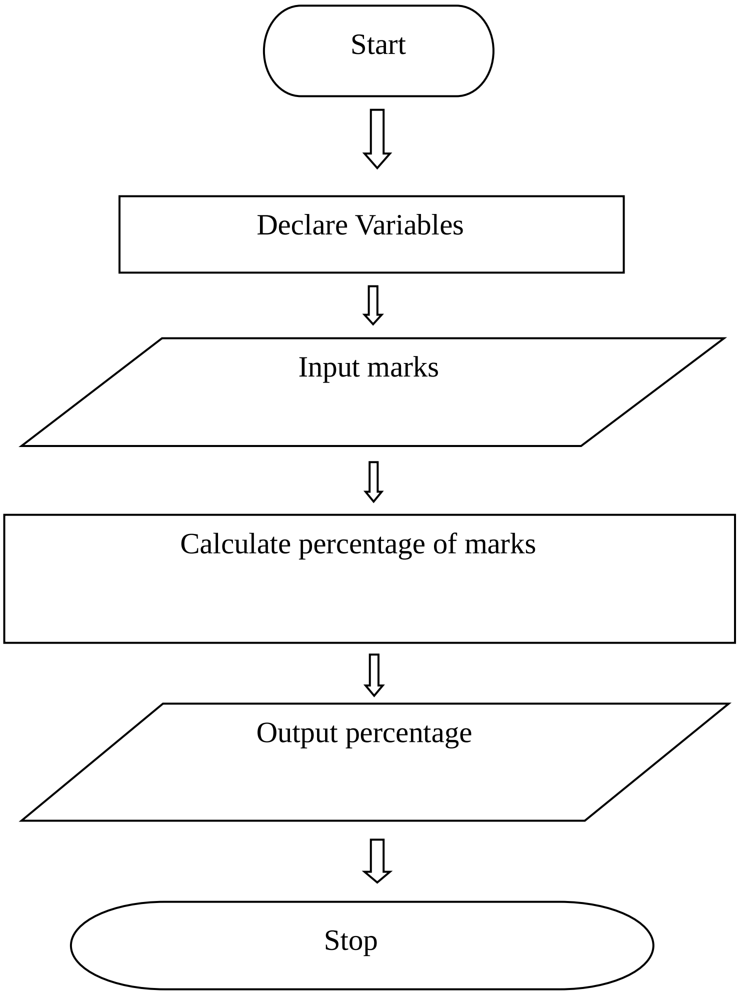
In order to calculate the percentage of five subjects, we need to assign variables for each subject's mark, as well as a variable for calculating the total percentage. There should be five variables in total for each subject's mark, and one additional variable for calculating the overall percentage.
Here are the variables that need to be assigned:

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
bio,math,che,eng,phy pmark	pmark=((bio+math+che+eng+phy)/500)*100	pmark	`stdio.h`

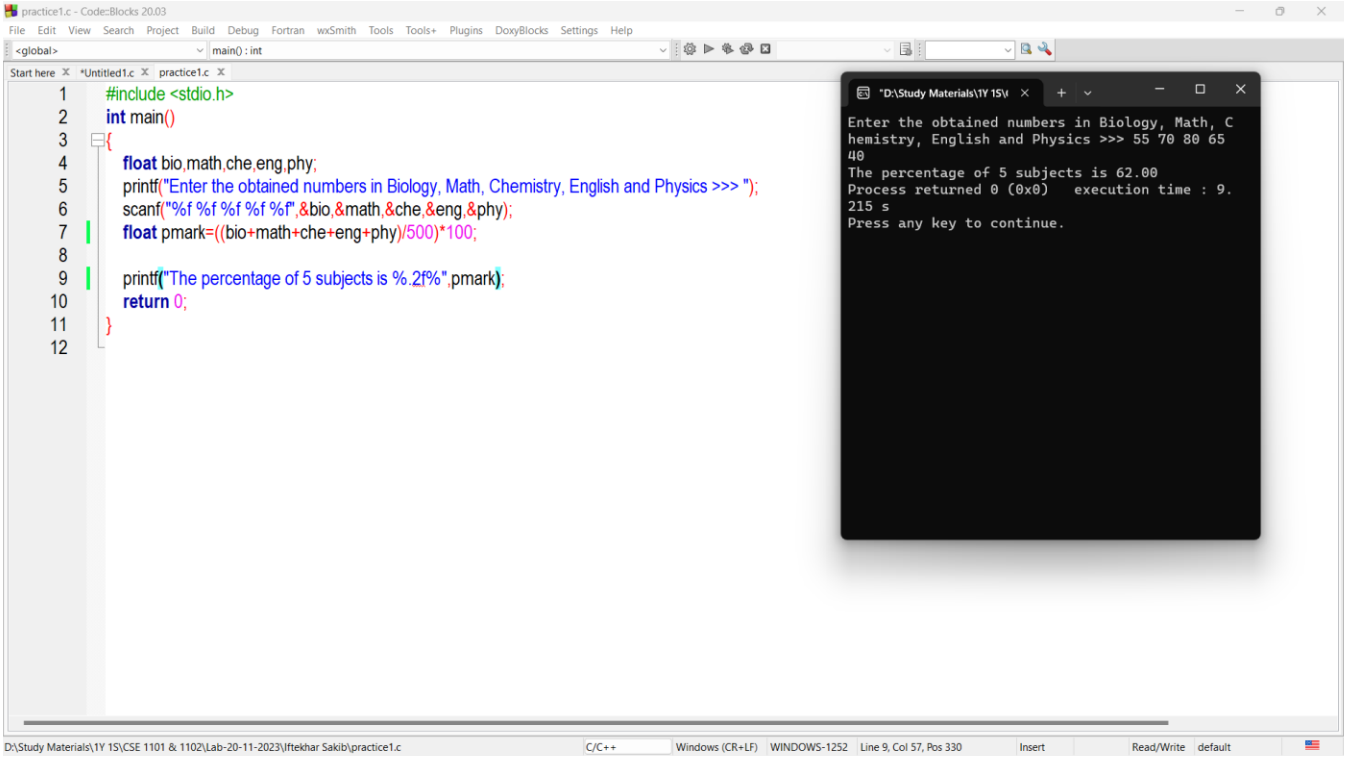
Algorithm:

1. start
2. declare variables
3. input marks in variables
4. calculate percentage of total marks
5. print percentage
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


practice1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Start here
*Untitled1.c
practice1.c
"D:\Study Materials\1Y 1S\
D:\Study Materials\1Y 1S\CSE 1101 & 1102\Lab-20-11-2023\Iftekhar Sakib\practice1.c
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 9, Col 57, Pos 330
Insert
Read/Write
default

```c
#include <stdio.h>
int main()
{
    float bio,math,che,eng,phy;
    printf("Enter the obtained numbers in Biology, Math, Chemistry, English and Physics >>> ");
    scanf("%f %f %f %f %f",&bio,&math,&che,&eng,&phy);
    float pmark=((bio+math+che+eng+phy)/500)*100;

    printf("The percentage of 5 subjects is %.2f%",pmark);
    return 0;
}
```

```
Enter the obtained numbers in Biology, Math, C
hemistry, English and Physics >>> 55 70 80 65
40
The percentage of 5 subjects is 62.00
Process returned 0 (0x0)   execution time : 9.
215 s
Press any key to continue.
```

Problem No - 8

Objective(s):

To be familiar with solving physics problems by C programme

To be familiar with mathematical operations by programming

Title:

Convert Temperature Celsius into Fahrenheit

Problem Analysis:

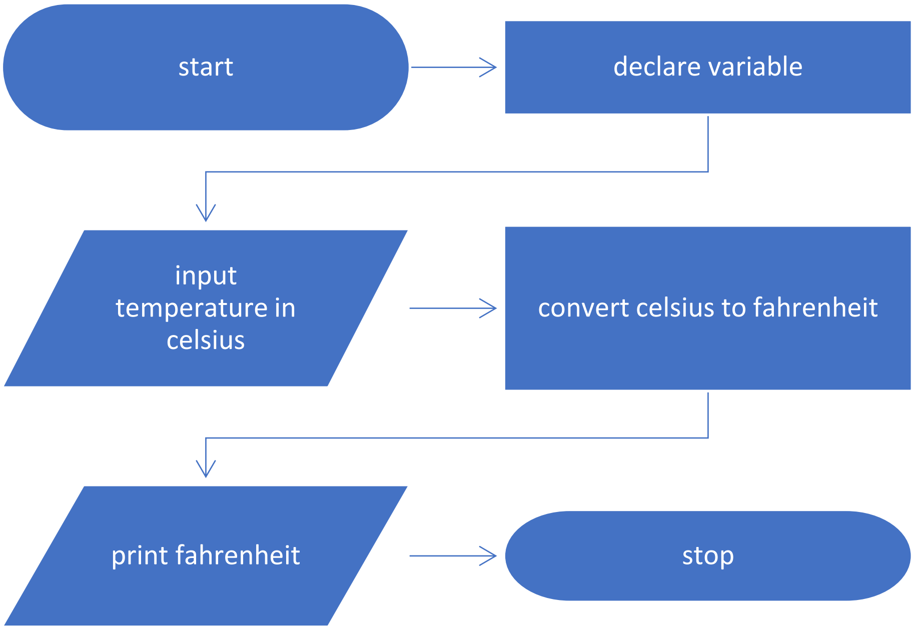
This problem is the conversion of Celsius temperature into Fahrenheit. For this first of all we take the Celsius temperature and then do a mathematical operation to convert it to Fahrenheit. The input and output variables are below.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
celsius(float)	fahrenheit=(celsius*9/5)+32	fahrenheit	`stdio.h`

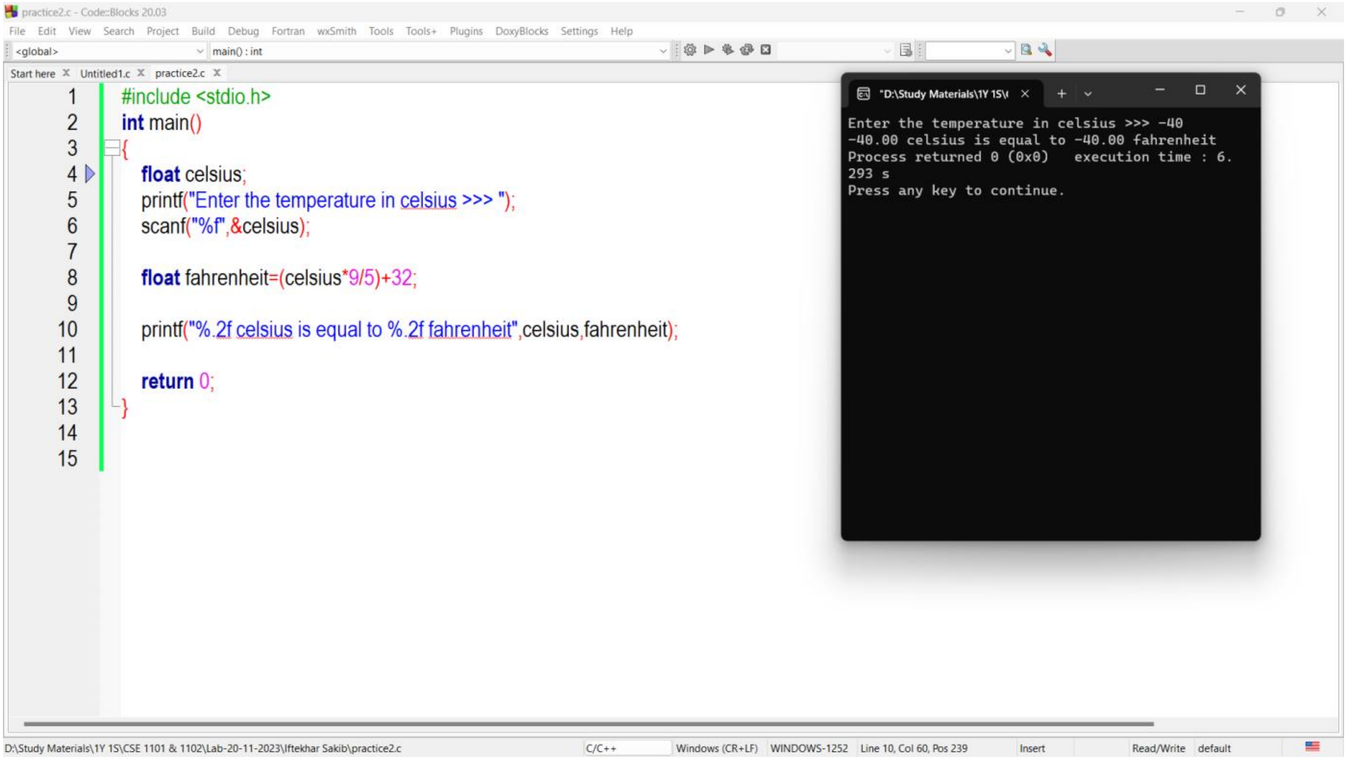
Algorithm:

1. start
2. declare variable Celsius
3. input temperature
4. covert it to Fahrenheit
5. print Fahrenheit temperature
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


practice2.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Start here
Untitled1.c
practice2.c
"D:\Study Materials\1Y 1S\(

```c
#include <stdio.h>
int main()
{
    float celsius;
    printf("Enter the temperature in celsius >>> ");
    scanf("%f",&celsius);

    float fahrenheit=(celsius*9/5)+32;

    printf("%.2f celsius is equal to %.2f fahrenheit",celsius,fahrenheit);

    return 0;
}
```

```
Enter the temperature in celsius >>> -40
-40.00 celsius is equal to -40.00 fahrenheit
Process returned 0 (0x0)   execution time : 6.
293 s
Press any key to continue.
```

D:\Study Materials\1Y 1S\CSE 1101 & 1102\Lab-20-11-2023\Iftekhar Sakib\practice2.c | C/C++ | Windows (CR+LF) | WINDOWS-1252 | Line 10, Col 60, Pos 239 | Insert | Read/Write | default

Problem No - 9

Objective(s):

To be familiar with the memory size of each data type.

Title:

Program to Display the Size of the Different Datatype

Problem Analysis:

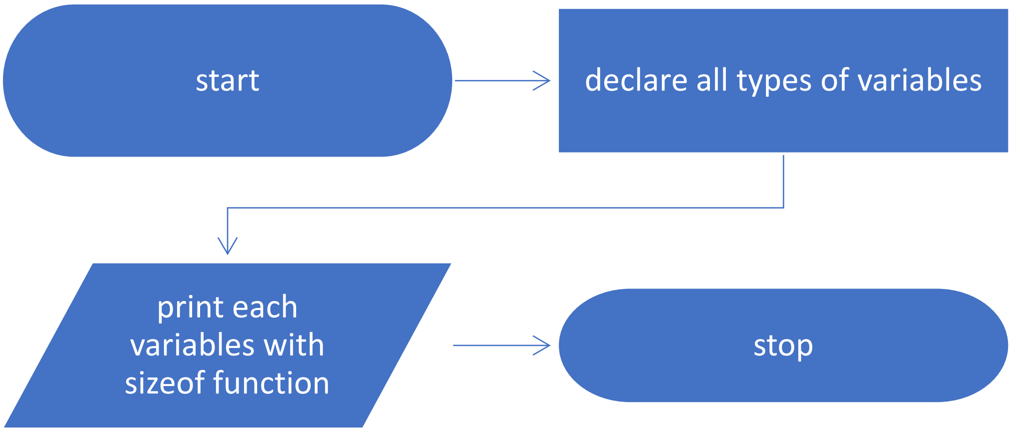
This problem is to determine the memory size of the variable of different data types. For this, we need to declare the different types of variables of c programming. The

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
Int,float, Char,double		Size of each datatypes	`stdio.h`

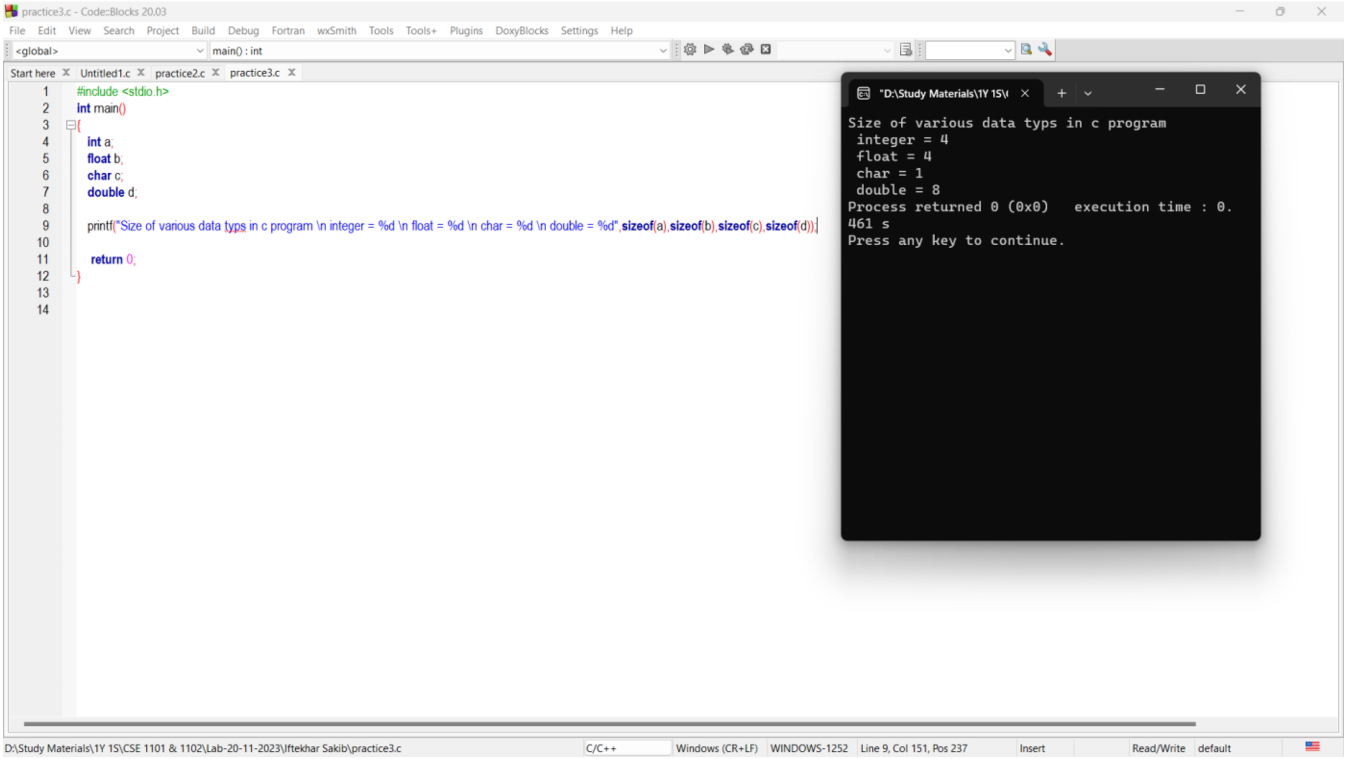
Algorithm:

1. start
2. declare variables of all data types
3. print them with sizeof function
4. stop

Flowchart:


start
declare all types of variables
print each variables with sizeof function
stop

<u>Code & Output (Compilation, Debugging & Testing):</u>



practice3.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Start here
Untitled1.c
practice2.c
practice3.c
"D:\Study Materials\1Y 1S\
D:\Study Materials\1Y 1S\CSE 1101 & 1102\Lab-20-11-2023\Iftekhar Sakib\practice3.c
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 9, Col 151, Pos 237
Insert
Read/Write
default

```c
#include <stdio.h>
int main()
{
  int a;
  float b;
  char c;
  double d;

  printf("Size of various data typs in c program \n integer = %d \n float = %d \n char = %d \n double = %d",sizeof(a),sizeof(b),sizeof(c),sizeof(d));

   return 0;
}
```

```
Size of various data typs in c program
 integer = 4
 float = 4
 char = 1
 double = 8
Process returned 0 (0x0)   execution time : 0.
461 s
Press any key to continue.
```

Problem No - 10

Objective(s):

To be familiar with the conditional statement of the c programme

Title:

Check Number is a Positive or Negative

Problem Analysis:

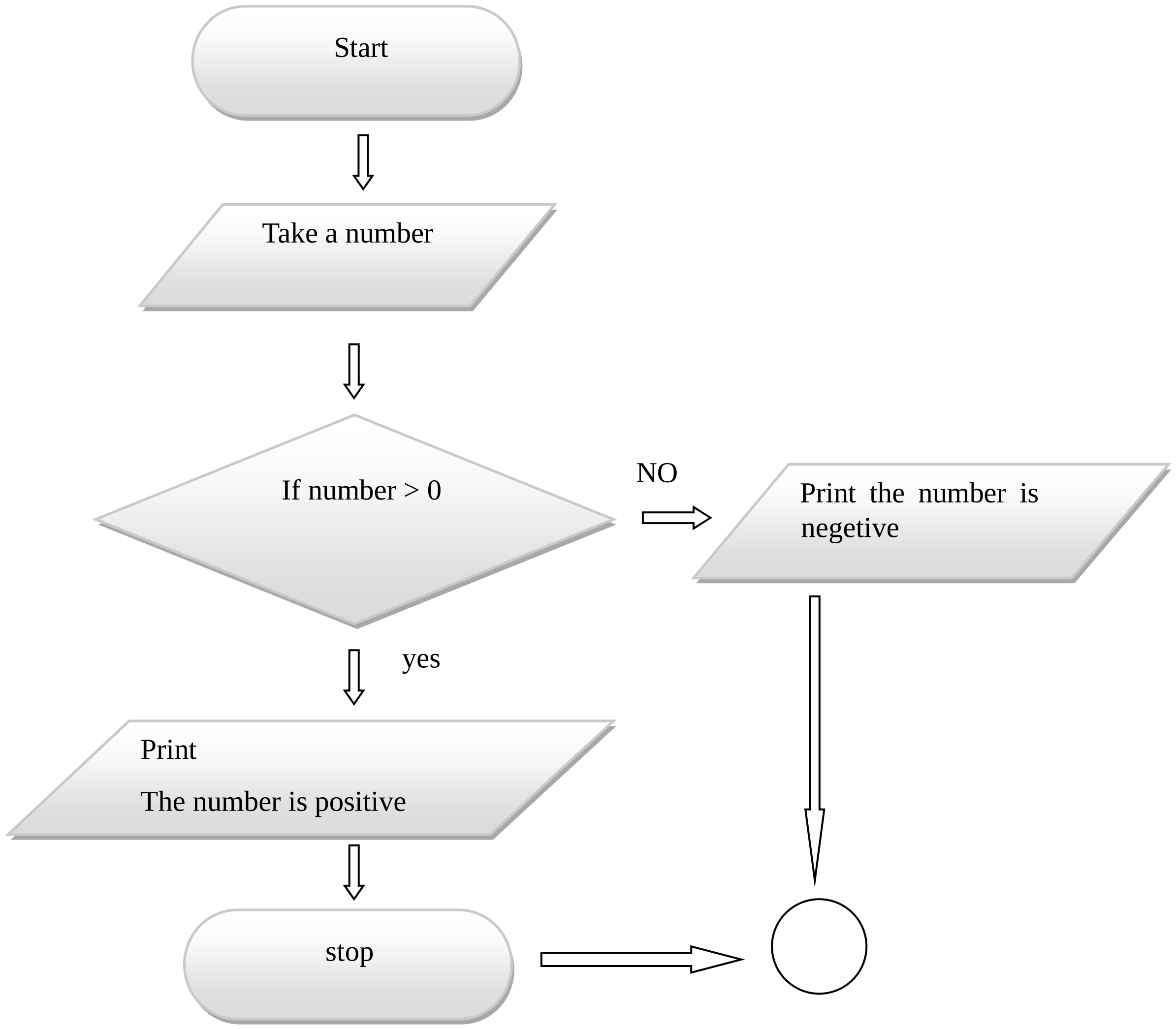
This problem is to be determine that a number is positive or negative. For this we can use if else statement . if the number is bigger than 0 we print the number is positive otherwise we print the number is negative.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
number(int)			`stdio.h`

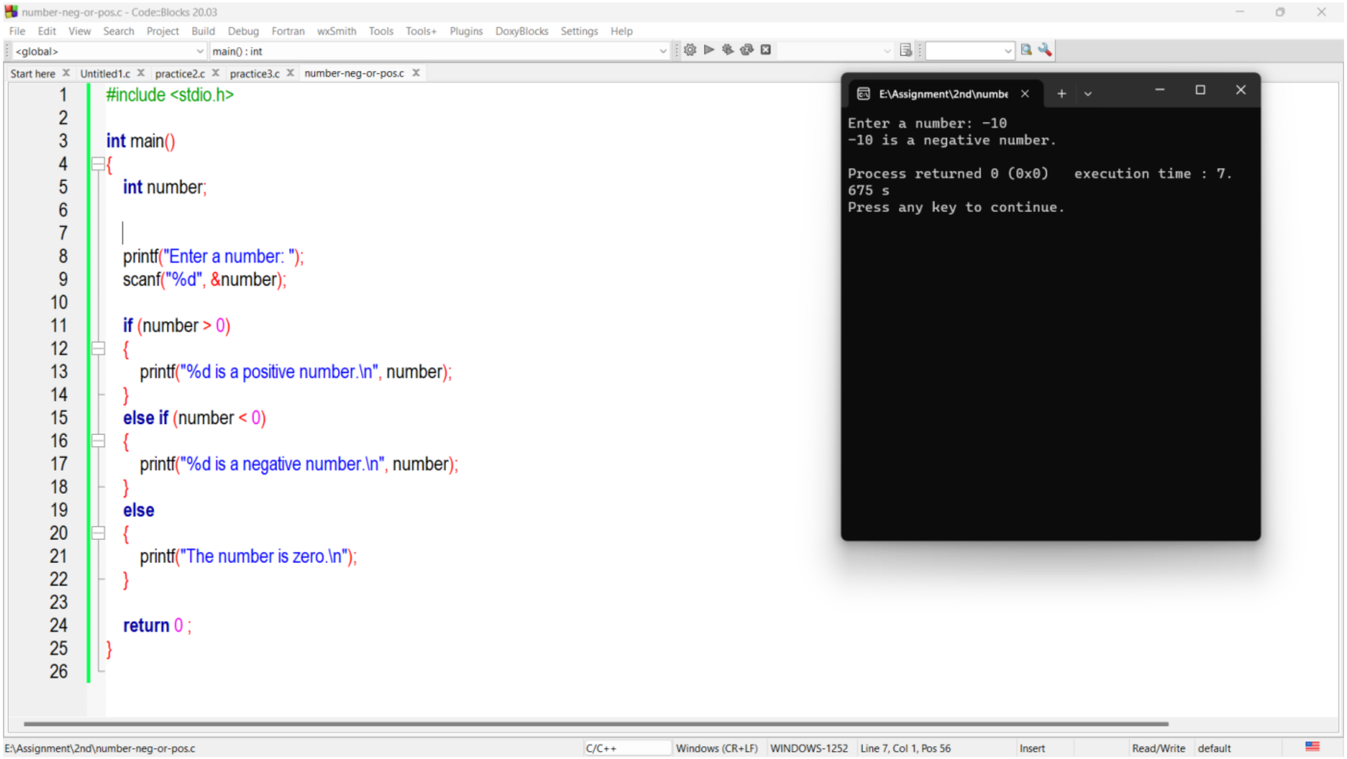
Algorithm:

1. start
2. input a integer number
3. if number is bigger than 0 go to step 4. Otherwise go to step 5.
4. Print “the number is positive”
5. Print “the number is negative”
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):



```c
#include <stdio.h>

int main()
{
    int number;

    
    printf("Enter a number: ");
    scanf("%d", &number);

    if (number > 0)
    {
        printf("%d is a positive number.\n", number);
    }
    else if (number < 0)
    {
        printf("%d is a negative number.\n", number);
    }
    else
    {
        printf("The number is zero.\n");
    }

    return 0 ;
}

```

```
Enter a number: -10
-10 is a negative number.

Process returned 0 (0x0)   execution time : 7.
675 s
Press any key to continue.
```

Problem No - 11

Objective(s):

To be familiar with ASCII value of characters

To be familiar with logical operators

Title:

Find the Character is Vowel or Not.

Problem Analysis:

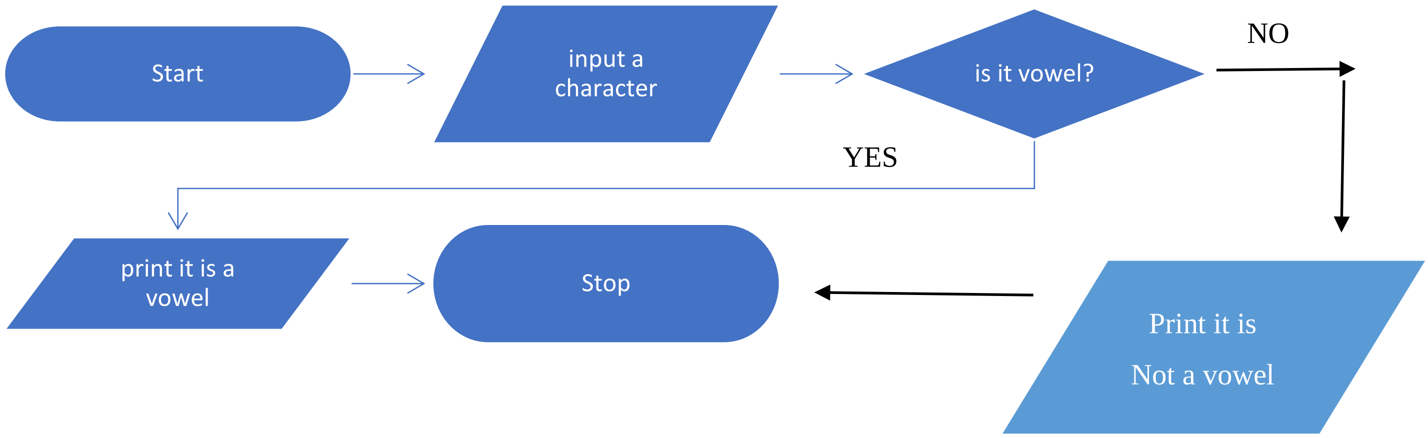
This problem is to check a character is vowel or not. For this I need to input any character then check it by it`s ascii value.if the value is same as value of any vowels then we will print the character is a vowel otherwise it is not a vowel.

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
alpha(char)			stdio.h

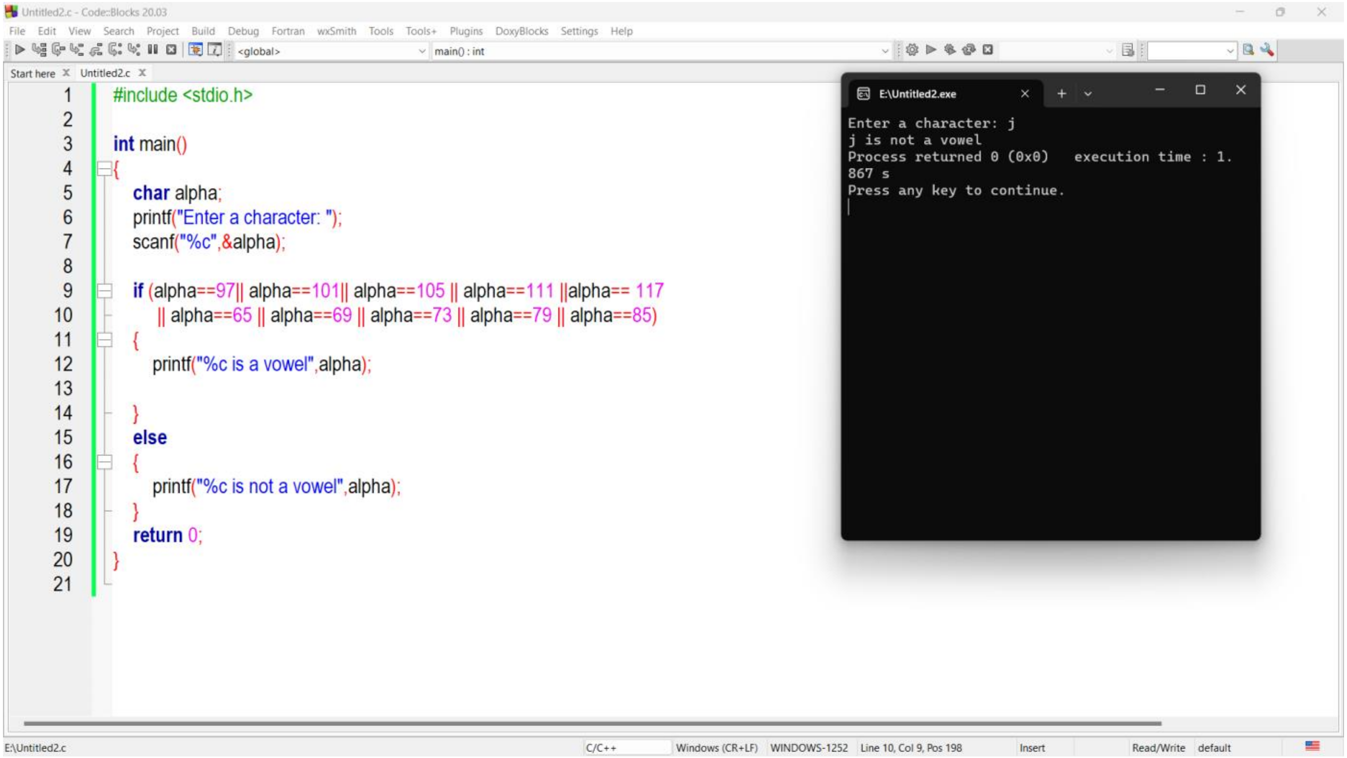
Algorithm:

1. start
2. input a character
3. check the character is vowel or not by their ascii value
4. if the value is same as value of any vowel then print it is a vowel. Otherwise go to the step 5
5. print it is not a vowel
6. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):



```c
#include <stdio.h>

int main()
{
    char alpha;
    printf("Enter a character: ");
    scanf("%c",&alpha);

    if (alpha==97|| alpha==101|| alpha==105 || alpha==111 ||alpha== 117
        || alpha==65 || alpha==69 || alpha==73 || alpha==79 || alpha==85)
    {
        printf("%c is a vowel",alpha);

    }
    else
    {
        printf("%c is not a vowel",alpha);
    }
    return 0;
}
```

```
Enter a character: j
j is not a vowel
Process returned 0 (0x0)   execution time : 1.
867 s
Press any key to continue.
```

Problem No - 12

Objective(s):

To be familiar with mathematical expontial operation with c programming

To be familiar with math.h header

Title:

Read Integer N and Print the First Three Powers (N^1, N^2, N^3)

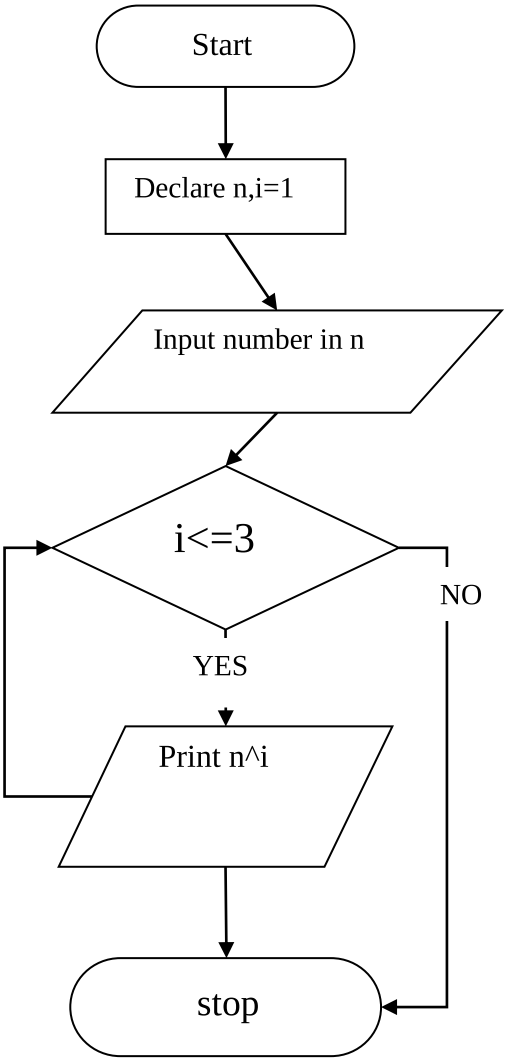
Problem Analysis:

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros
n(int)	For loop	n^1,n^2,n^3	stdio.h math.h

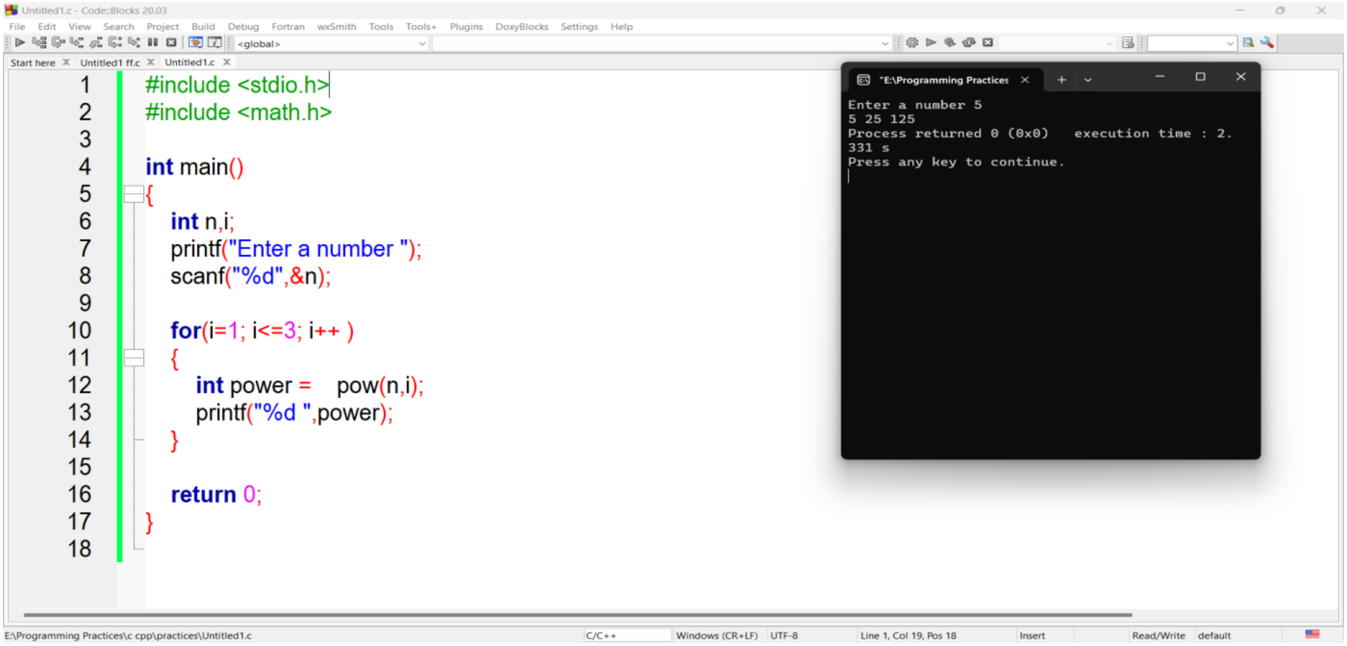
Algorithm:

1. Start
2. Declare variables n and i=1;
3. Input a number
4. Print n^i until n<=3
5. stop

Flowchart:



Code & Output (Compilation, Debugging & Testing):


Untitled1.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Start here
Untitled1 ff.c
Untitled1.c
"E:\Programming Practices
E:\Programming Practices\c cpp\practices\Untitled1.c
C/C++
Windows (CR+LF)
UTF-8
Line 1, Col 19, Pos 18
Insert
Read/Write
default

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

int main()
{
    int n,i;
    printf("Enter a number ");
    scanf("%d",&n);

    for(i=1; i<=3; i++ )
    {
        int power =    pow(n,i);
        printf("%d ",power);
    }

    return 0;
}
```

```
Enter a number 5
5 25 125
Process returned 0 (0x0)   execution time : 2.
331 s
Press any key to continue.
```

Problem No - 13

Objective(s):

To be familiar with multiple types of mathematical operation using c

Title:

Write a program to enter a 4-digit number from the keyboard. Add 8 to the number and then divide it by 3. Now, the modulus of that number is taken with 5 and then multiply the resultant value by 5. Display the final result.

Problem Analysis:

This program is about doing multiple type of mathematical operation with a 4 digit number.

The steps are given below:

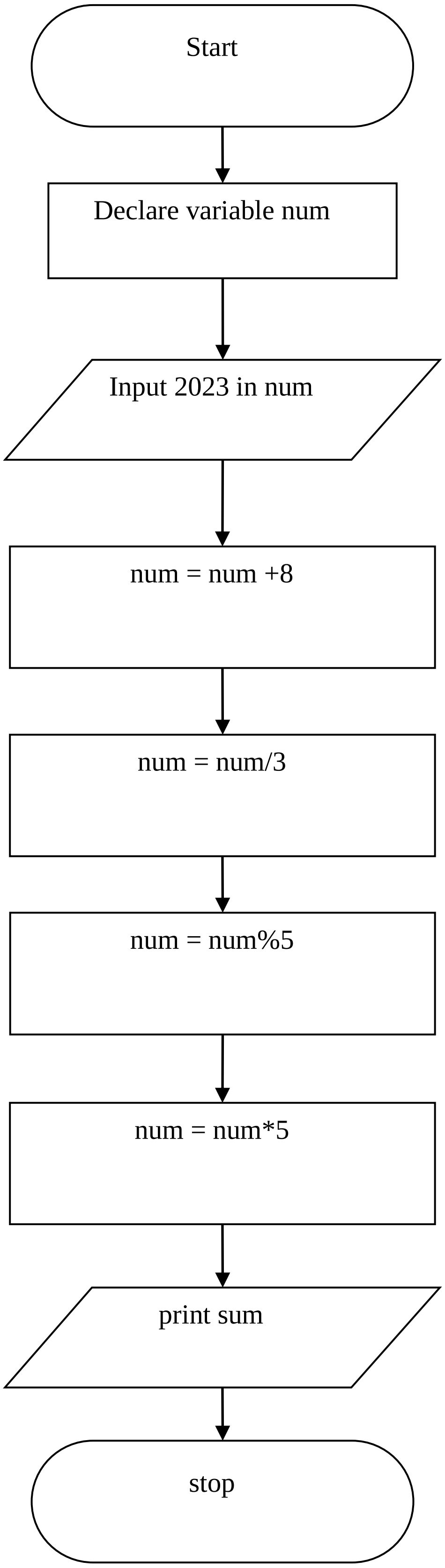
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros

num	Num = num+8
	Num = num / 3
	Num = num% 5
	Num = num*5
		num	stdio.h

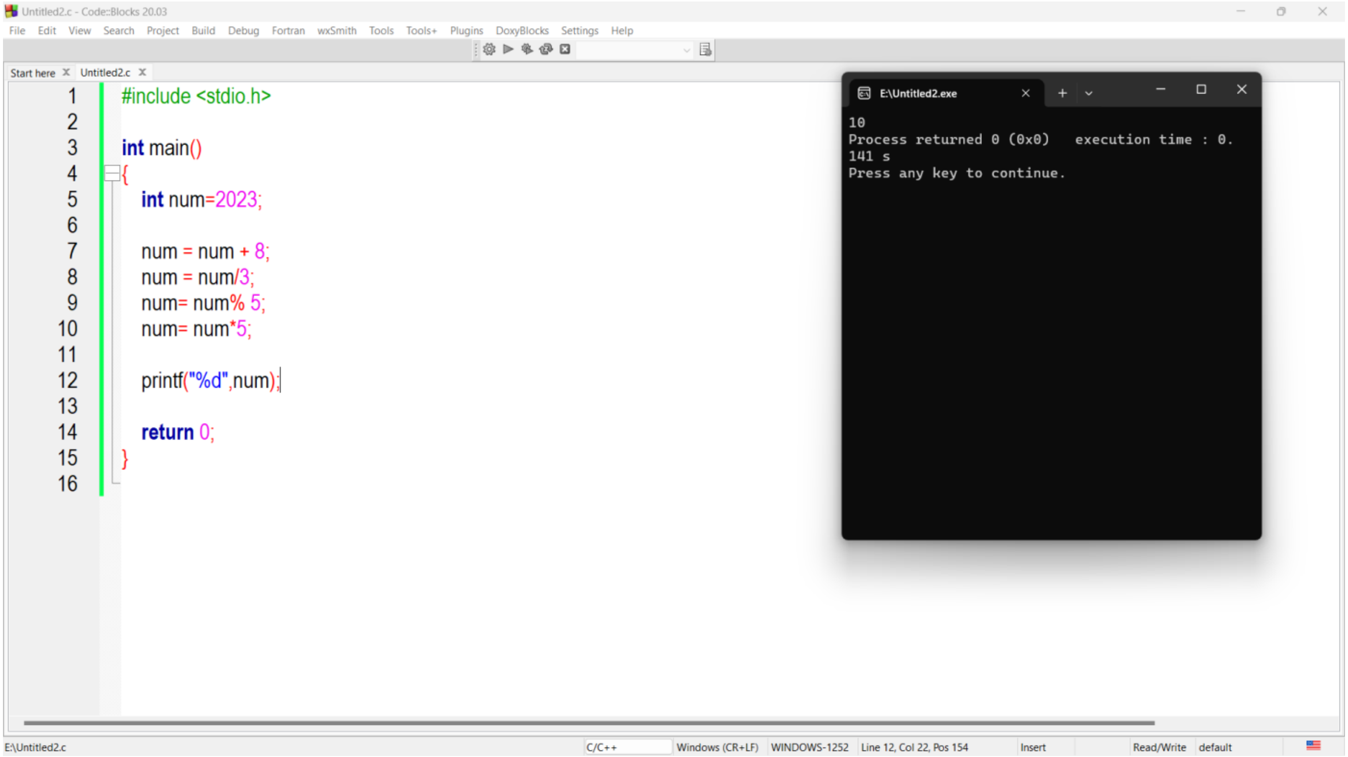
Algorithm:

1. start
2. declare a variable num
3. input a 4 digit number in variable num
4. add 8 with num
5. then divid it by 3
6. then take modulus with 5
7. multiply the result by 5
8. print num
9. stop

Flowchart:


Start
Declare variable num
Input 2023 in num
num = num +8
num = num/3
num = num%5
num = num*5
print sum
stop

Code & Output (Compilation, Debugging & Testing):



Untitled2.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
Untitled2.c
E:\Untitled2.exe
E:\Untitled2.c
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 12, Col 22, Pos 154
Insert
Read/Write
default

```c
#include <stdio.h>

int main()
{
    int num=2023;

    num = num + 8;
    num = num/3;
    num= num% 5;
    num= num*5;

    printf("%d",num);

    return 0;
}
```

```
10
Process returned 0 (0x0)   execution time : 0.
141 s
Press any key to continue.
```

Problem No - 14

Objective(s):

To be familiar with while loop

To familiar with modulus of c program

Title:

Write a program to calculate the sum of the digits of a 3-digit number which is entered from keyboard.

Problem Analysis:

This problem is to calculate the the sum of all digits of a number. For this we need to use while loop and store the reminder value of number by 10.Then subtract the reminder value from the number and divid by 10 until the number become 0.

In every irritation we strore the all modulus value by following equation sum=sum+reminder

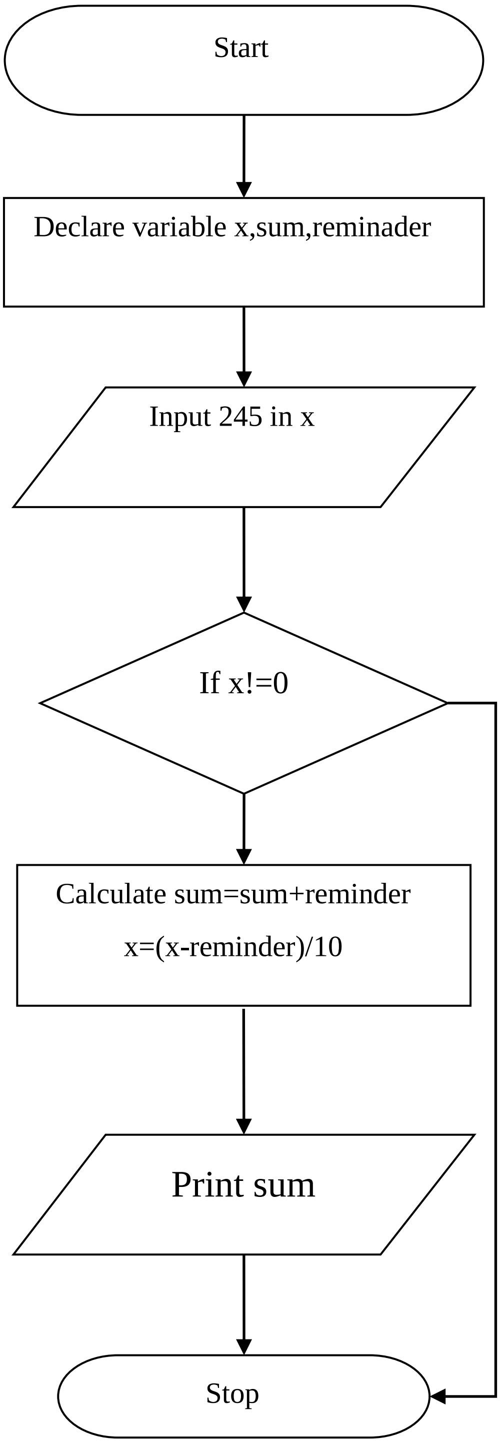
Input variables	Processing variables/calculations	Output variables	Necessary header files/functions/macros

x,sum,reminder	sum=sum+reminder
	x=(x-reminder)/10
		sum	`stdio.h`

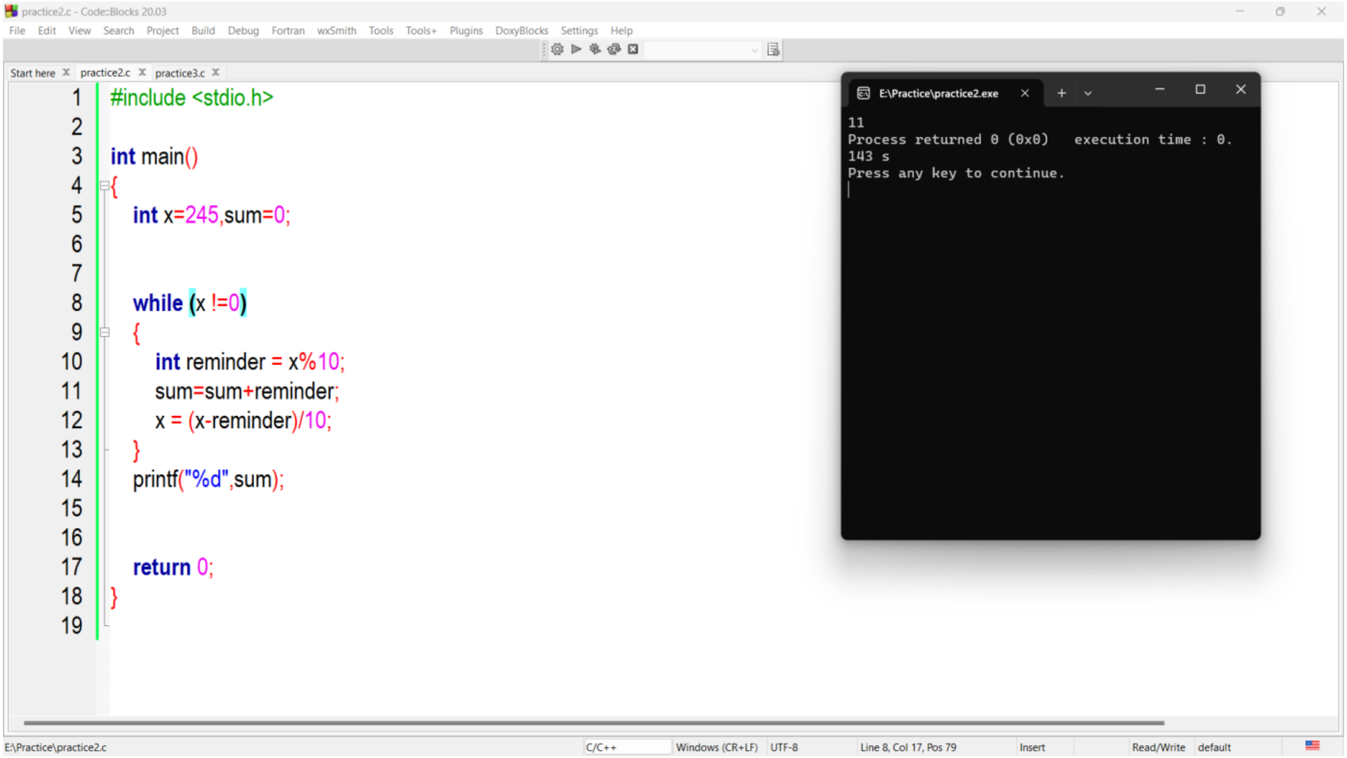
Algorithm:

1. Start
2. Declare variables x,sum,reminder
3. If x!=0 then perform the step 4 and 5. Otherwise go to step 6
4. calculate sum=sum+reminder and x=(x-reminder)/10
5. print sum
6. stop

Flowchart:


Start
Declare variable x,sum,reminader
Input 245 in x
If x!=0
Calculate sum=sum+reminder
x=(x-reminder)/10
Print sum
Stop

Code & Output (Compilation, Debugging & Testing):


practice2.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Start here
practice2.c
practice3.c
E:\Practice\practice2.exe
E:\Practice\practice2.c
C/C++
Windows (CR+LF)
UTF-8
Line 8, Col 17, Pos 79
Insert
Read/Write
default

```c
#include <stdio.h>

int main()
{
    int x=245,sum=0;


    while (x !=0)
    {
        int reminder = x%10;
        sum=sum+reminder;
        x = (x-reminder)/10;
    }
    printf("%d",sum);


    return 0;
}

```

```
11
Process returned 0 (0x0)   execution time : 0.
143 s
Press any key to continue.
```