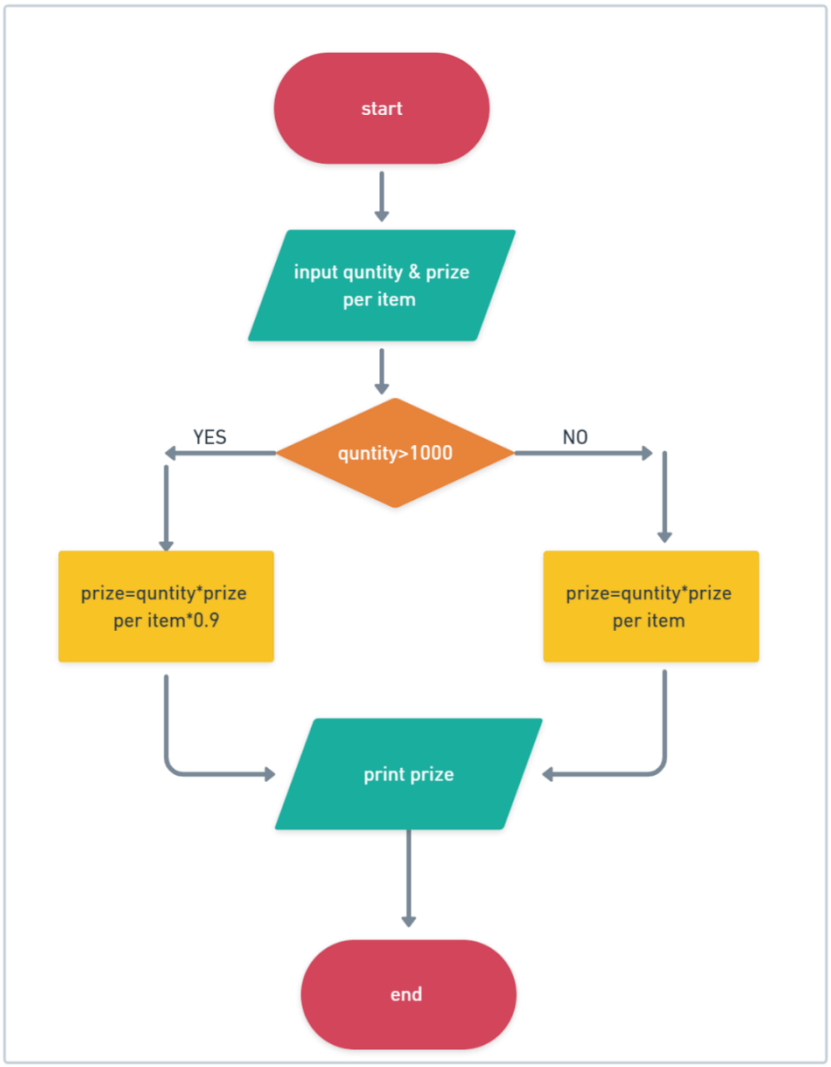
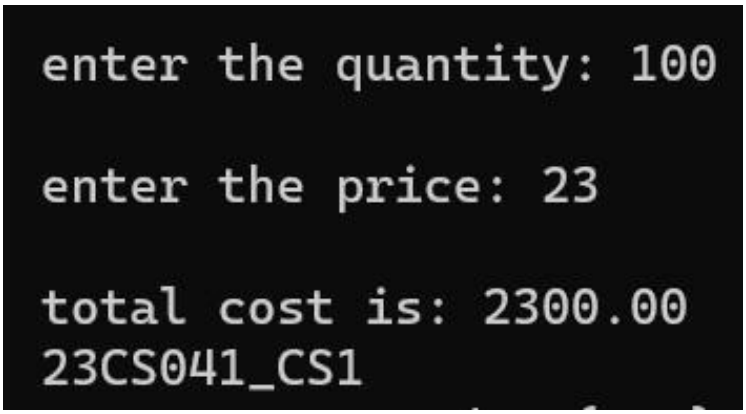
	Chapter 5
Program 5.1	While purchasing certain items, a discount of 10% is offered if the quantity purchased is more than 1000.If quantity and price per item are input through the keyboard, write a program to calculate the total expenses. Use Simple If statement.
Flowchart	
Algorithm	Step 1: start Step 2: enter quantity and prize per item. Step 3: if 1000<quantity then prize=prize per item*quantity*0.9 Step 4: if 1000>quantity then prize=prize per item*quantity. Step 5: print prize Step 6: end.

Code

```c
/* This program is prepared by 23CS041_DHRUV_LOKADIYA*/
 #include<stdio.h>
 int main()
 {
     int quantity;
     float price,total_cost;
     printf("\n enter the quantity: ");
     scanf("%d",&quantity);
     printf("\n enter the price: ");
     scanf("%f",&price);
     total_cost=quantity*price;
     printf("\n total cost is: %.2f", total_cost);
     if(quantity>1000)
     {
       printf("\n total cost after discount: %.2f\n",total_cost-total_cost*0.1);
     }
     printf("\n 23CS041_CS1");
     return 0;
 }
```

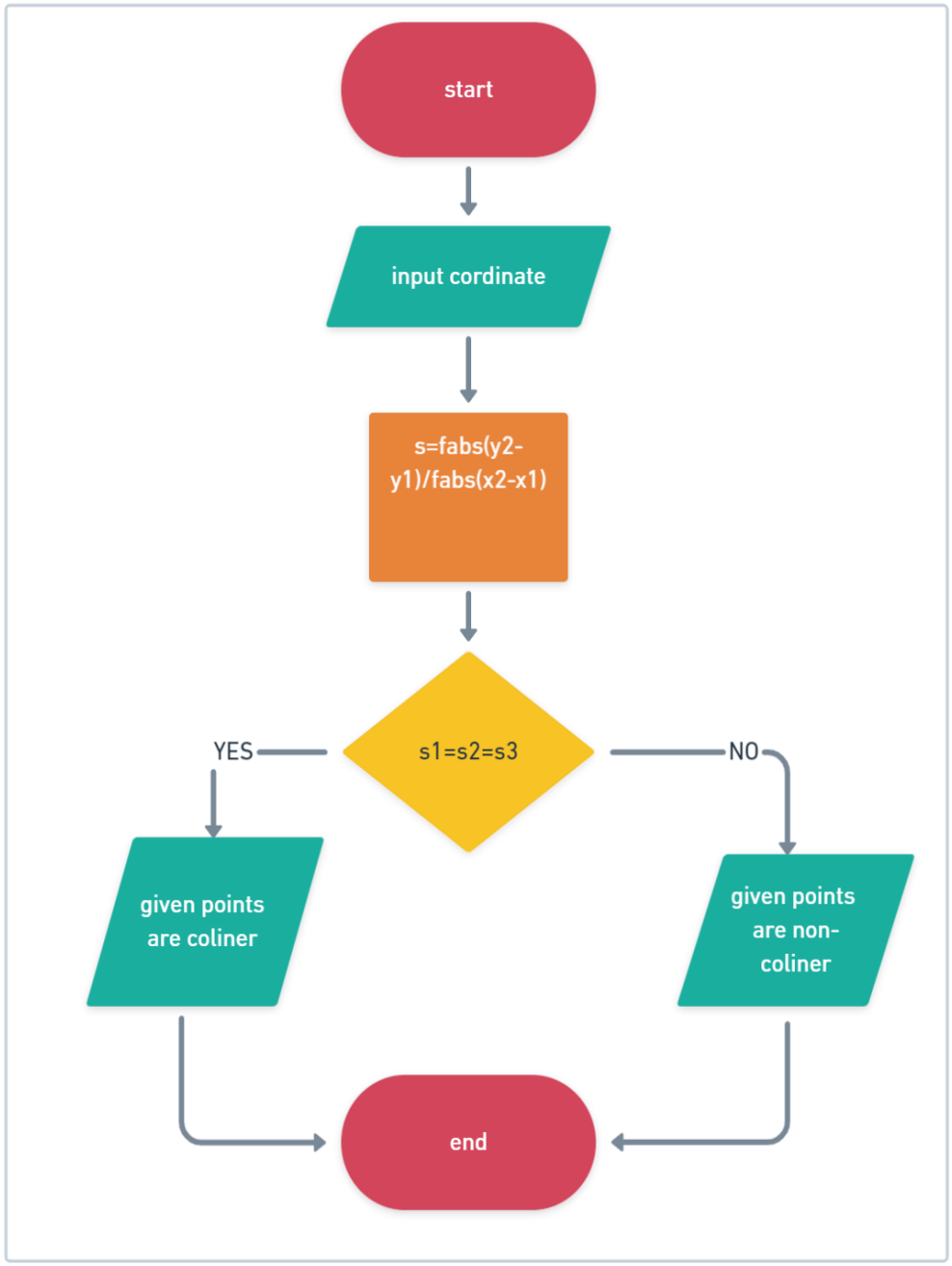
Output



Program 5.2

Three or more points are said to be collinear if they lie on a single straight line. If three points (x1,y1) , (x2, y2) and (x3,y3) are entered through the keyboard find if these points are collinear or not.
(Hint: Calculate slope of line between each pair of points. For example slope between first point and second point is s1=fabs(x2-x1)/fabs(y2-y1). If all the three slopes are equal they fall on straight line).
Use fabs() function of math.h header file. Use If..Else statement.

Flowchart

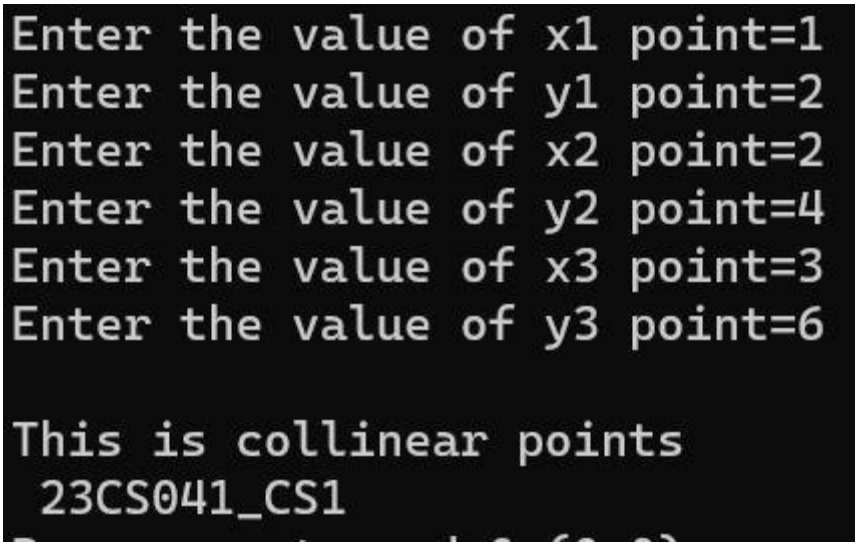
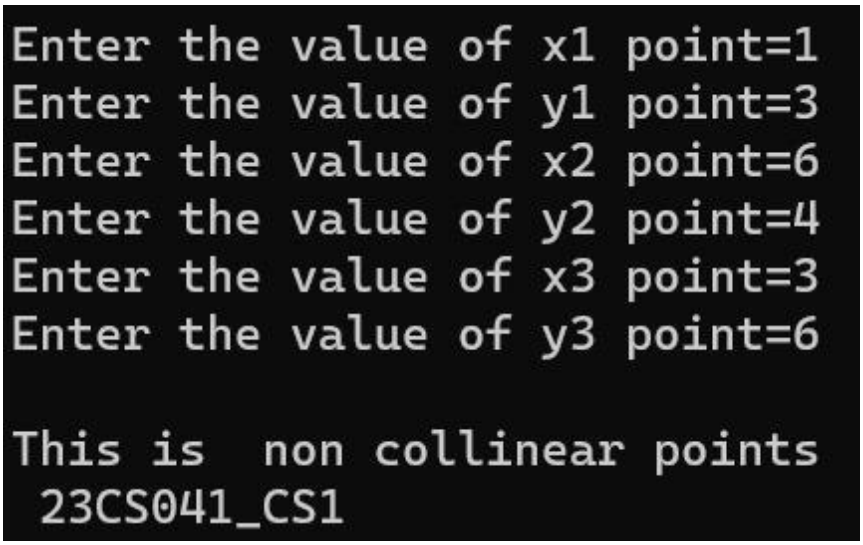


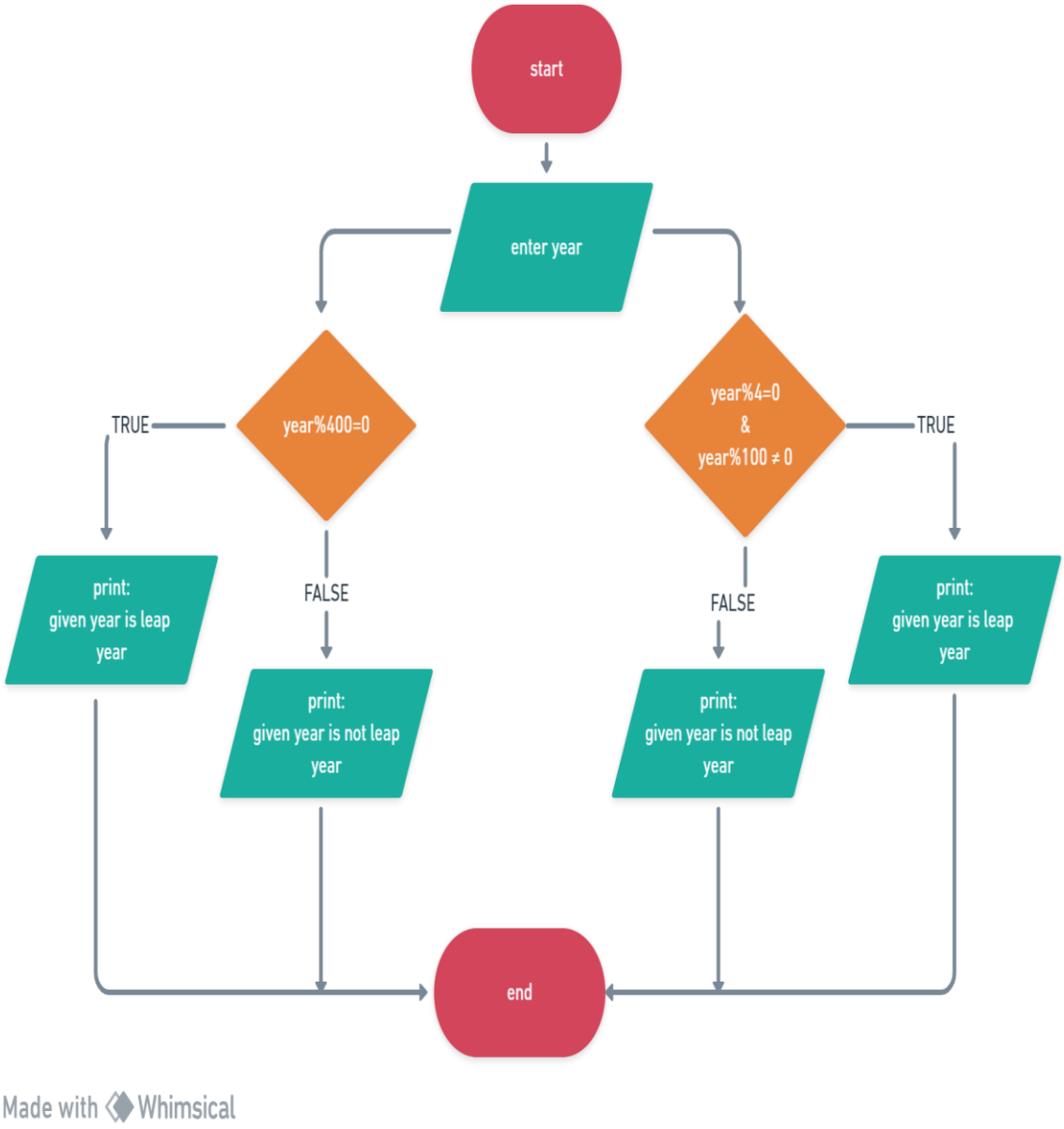
Algorithm

Step 1: start
Step 2: input coordinate
Step 3: calculate s=fabs(y2-y1)/fabs(x2-x1)
Step 4: if s1=s2=s3 then print given points are coliner
Step 5: else print given points are non-coliner pointd Step 6: end

Code

```
/* This program is Created by 23CS041 DHRUV LOKADIYA*/
 #include<stdio.h>
 #include<math.h>
   int main()
   {
    float x1,y1,x2,y2,x3,y3,s1,s2,s3;

     printf("Enter the value of x1 point=");
     scanf("%d",&x1);
     printf("Enter the value of y1 point=");
     scanf("%d",&y1);
     printf("Enter the value of x2 point=");
     scanf("%d",&x2);
     printf("Enter the value of y2 point=");
     scanf("%d",&y2);
     printf("Enter the value of x3 point=");
     scanf("%d",&x3);
     printf("Enter the value of y3 point=");
     scanf("%d",&y3);

     s1=fabs(x2-x1)/fabs(y2-y1);
     s2=fabs(x3-x2)/fabs(y3-y2);
     s3=fabs(x3-x1)/fabs(y3-y1);

     if(s1==s2 && s2==s3)
        printf("\nThis is collinear points");
     else
        printf("\nThis is  non collinear points");

    printf("\n 23CS041 CS1");
       return 0;
   }
```

Output	 
Program 5.3	Write a program to find whether the given Year is a Leap Year or not using Else…If Ladder.

Flowchart	
Algorithm	Step 1: start Step 2: enter year Step 3: cheak year%400=0 if true print leap year Step 4: cheak year%4=0 & year%100 !=0 if true print leap year Step 5: in another case print given year is't leap year Step 6: end

Code

```c
/This program is prepared by 23CS041_DHRUV_LOKADIYA/
  #include<stdio.h>

    int main()
{
     int year;
     printf("enter the year: ");
     scanf("%d",&year);

     if(year%4==0 && year%100!=0 || year%400==0)
     printf("it is leap year");
     else
     printf("it is not leap year");

     printf("\n 23CS041_CS1");
     return 0;
}
```

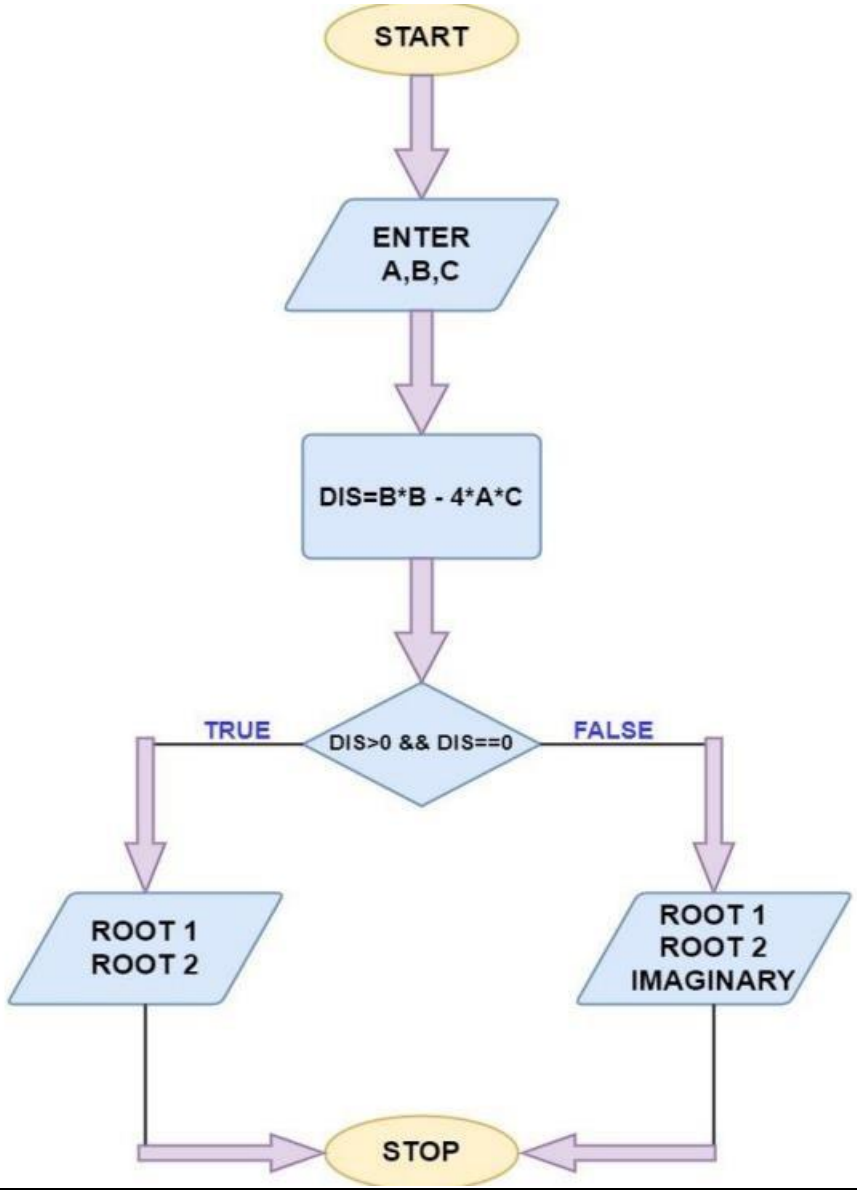
Output

```
enter the year: 1900
it is not leap year
 23CS041_CS1
```

```
enter the year: 2020
it is leap year
 23CS041_CS1
```

Program 5.4

Write a C program to find all roots of a Quadratic equation using nested switch case. Take three user inputs from keyboard for finding the discriminant (b2 – 4*a*c). Use the concept of nested switch case for finding the roots of equation. Get the outputs for roots till 2 decimal points only.

Flowchart	
Algorithm	Step 1) Start Step 2) Declare float variables `a`, `b`, `c`, `discriminant`, `root1`, `root2`, and `imaginaryPart`. Step 3) Read coefficients `a`, `b`, and `c` from the user. Step 4) Calculate `discriminant` using the formula. Step 5) Use a nested switch case for different cases of discriminant: -If `discriminant > 0`, calculate and display two real roots. -If `discriminant < 0`, calculate and display two imaginary roots. -If `discriminant = 0`, calculate and display two equal real roots. Step 6) Display the results using `printf()` with appropriate messages. Step 7) Stop.

Code

```c
/* This program is prepared by 23CS041_DHRUV_LOKADIYA*/
#include<stdio.h>
#include<math.h>

int main()
{
   float a,b,c,D,Root1,Root2,i;
   printf("enter a:");
   scanf("%f",&a);
   printf("enter b:");
   scanf("%f",&b);
   printf("enter c:");
   scanf("%f",&c);
   D=b*b-4*a*c;
   printf("here Discriminant is %.2f\n",D);

     switch(D>0)
     {
     case 1:
       Root1=(-b+sqrt(D))/(2*a);
       Root2=(-b-sqrt(D))/(2*a);
       printf("first Root is%.2f\n",Root1);
       printf("second Root is%.2f\n\n",Root2);
       break;

     case 0:
        switch(D<0)
       {
           case 1:
           Root1=Root2=(-b/(2*a));
           i=sqrt(-D)/(2*a);
           printf("Real root is %.2f\n",Root1);
           printf("imaginary root is %.2f\n\n",i);
           break;

           case 0:
           Root1=Root2=(-b/(2*a));
           printf("root is %.2f\n\n",Root1);
           break;
       }

     }
        printf("\n 23CS041_CS1");
        return 0;
}
```

Output

```
enter a:9
enter b:12
enter c:4
here Discriminant is 0.00
root is -0.67


 23CS041_CS1
```

```
enter a:3
enter b:-7
enter c:-5
here Discriminant is 109.00
first Root is2.91
second Root is-0.57


 23CS041_CS1
```

Question

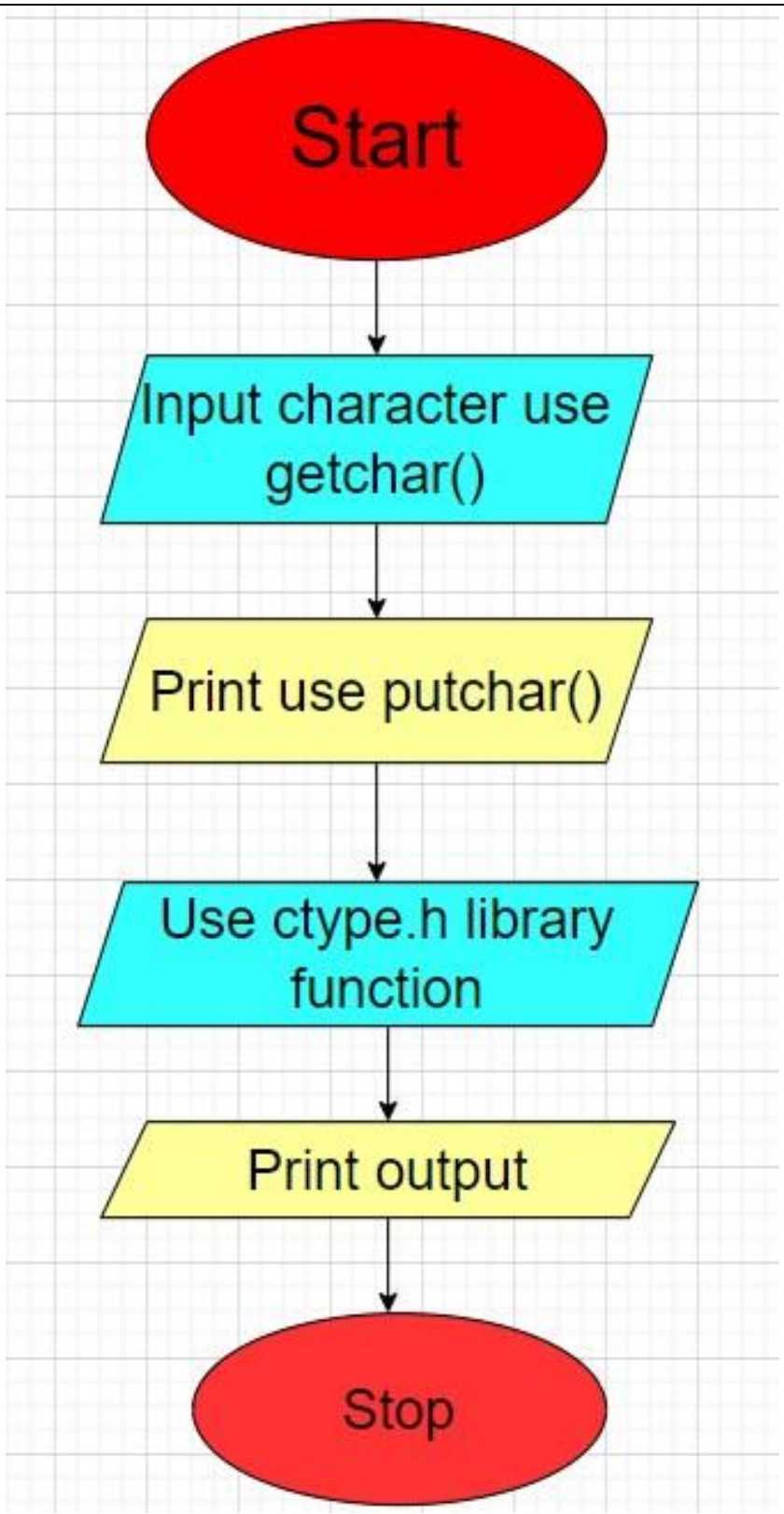
1. Have you learned about how to use normal switch case and nested switch case?
2. Is default case necessary for every switch case?
3. What if break statement is not mentioned between two consecutive cases?

Answers

1. Yes, I'm familiar with how to use both normal switch case and nested switch case.
2. No, the default case is not necessary for every switch case.
3. If the break statement is not mentioned between two consecutive cases, the program will continue to execute the code of subsequent cases even after a matching case is found.

Program 5.5

Write a program to input a character using getchar() and print the character using putchar() and check the character category. Also convert uppercase alphabet to lower case and vice versa. (Use Character Test Functions : isalnum(), isalpha(), isdigit(), islower(), isprint(), ispunct(), isspace(), isupper()) and (toupper() & tolower()) of header file.

Flowchart	

Start
Input character use getchar()
Print use putchar()
Use ctype.h library function
Print output
Stop

Algorithm	Step 1: Start Step 2: Input a character using getchar() Step 3: print the character using putchar() Step 4: use the functions of ctype.h library to do the following tasks Isdigit(), ispunct(), isspace(), islower(), isupper(), isprint(). Step 5: print the output Step 6: stop.

Code

```c
//This Program is Prepared by 23CS041_DHRUV_LOKADIYA
#include <stdio.h>
#include <ctype.h>

int main() {
    char input[100]; // Assuming a maximum of 100 characters

    printf("Enter a character or a string: ");

    fgets(input, sizeof(input), stdin);

    char ch = input[0]; // Assuming you're interested in the first character

    if (isalnum(ch)) {
        printf("The character is an alphanumeric character.\n");
    } else if (isalpha(ch)) {
        printf("The character is an alphabetic character.\n");
    } else if (isdigit(ch)) {
        printf("The character is a digit.\n");
    } else if (islower(ch)) {
        printf("The character is a lowercase alphabet.\n");
    } else if (isupper(ch)) {
        printf("The character is an uppercase alphabet.\n");
        printf("The character is an uppercase alphabet.\n");
    } else if (ispunct(ch)) {
        printf("The character is a punctuation symbol.\n");
    } else if (isspace(ch)) {
        printf("The character is a whitespace character.\n");
    } else if (isprint(ch)) {
        printf("The character is a printable character, but not in the above categories.\n");
    } else {
        printf("The character is not printable.\n");
    }

    if (islower(ch)) {
        ch = toupper(ch);
        printf("Character converted to uppercase: ");
    } else if (isupper(ch)) {
        ch = tolower(ch);
        printf("Character converted to lowercase: ");
    }

    putchar(ch);
    putchar('\n');
    printf("\n 23CS041_CS1");
    return 0;
}
```

Output

```
Enter a character or a string: 10
The character is an alphanumeric character.
1

 23CS041_CS1
```

```
Enter a character or a string: " "
The character is a punctuation symbol.
"

 23CS041_CS1
```

```
Enter a character or a string: D
The character is an alphanumeric character.
Character converted to lowercase: d

 23CS041_CS1
```

```
Enter a character or a string:
The character is a whitespace character.


 23CS041_CS1
```

Sign: Grade: