Keys

Question # 1

- Write a C program that should get temperatures (integer numbers) entered by a user to display the following results:
  - Average temperature
  - Lowest temperature
  - Highest temperature
  - Absolute difference between the lowest and highest
- User enters the numbers one at a time in a mixed order. Entering zero indicates termination of data-entry.

```
#include "stdafx.h"
#include <iostream.h>

int main(int argc, char* argv[])
{
    int temperature ;
    double average,absAverage ;
    int sum=0 ;
    int minTemperature,maxTemperature ;
    int numOfTemperatures=0;
    cout << "\n Enter temperature values:\n" ;
```

```
    while(true){
        cin >> temperature ;
        if (temperature==0) break ;
        sum += temperature ;
        if (numOfTemperatures==0){
            maxTemperature=temperature ;
            minTemperature=temperature ;
        }
        if (temperature>maxTemperature)
    maxTemperature=temperature ;
        if (temperature<minTemperature)
    minTemperature=temperature ;
        numOfTemperatures++;
    }
```

```cpp
average = (double)sum / numOfTemperatures ;
cout << "\n Average=" << average ;
cout << "\n Absolute Average=" << absAverage ;
cout << "\n Minimum=" << minTemperature ;
cout << "\n Maximum=" << maxTemperature ;
cout << "\n" ;
return 0;
}
```

Question # 2

- The Fibonacci sequence is 0, 1, 1, 2, 3, 5, 8, 13, 21, … where the first two terms are 0 and 1, and each term thereafter is the sum of the two preceding terms. Draw a flowchart and then write a C program that reads a positive value n and then calculates and displays the nth number in the Fibonacci sequence. The program should force reentry if the user enters 0 or negative value.

  Fib1 = 0
  Fib2 = 1
  Fib3 = Fib1 + Fib2 = 1
  Fib4 = Fib2 + Fib3 = 2
  .
  :
  Fibn = Fib(n-2) + Fib(n-1)

Question # 2

```
#include "stdafx.h"
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char* argv[])
{
    int n ;
    long fib_n=1,fib_n_1=1,fib_n_2=0 ;
    do{
      printf("\nEnter a positive integer: ");
       scanf("%d",&n) ;
    }while(n<=0);
```

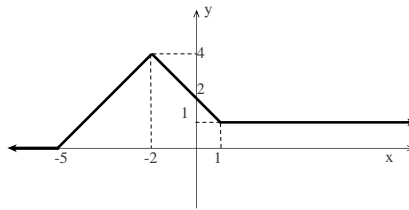## Question # 2

```
    for (int i=2;i<=n;i++){
        fib_n = fib_n_1 + fib_n_2 ;
         fib_n_2 = fib_n_1 ;
         fib_n_1 = fib_n ;
    }
    printf("\nFib(%d)=%d",n,fib_n) ;
    system("pause");
    return 0;
}
```

Question # 3

- Write a C program that produces a value regarding to the function depicted in Fig 1. The program should get an x value from user, and should print the corresponding y value.

Question # 3

```c
int main(int argc, char* argv[])
{
    float x,y ;
      printf("\nEnter x: ");
    scanf("%f",&x) ;
    if     (x<=-5.0){
       y=0.0 ;
    }
    else if ((x>-5.0)&&(x<=-2.0)){
       y = (4.0*x+20.0)/3.0 ;
    }
    else if ((x>-2.0)&&(x<=1.0)){
        y = -x+2.0 ;
    }
    else{
       y = 1.0 ;
    }
```

- A mathematician lives on a street where house numbers are consecutive starting from 1. He says that the sum of the house numbers less than his house number is equal to the sum of the house numbers greater than his house number. Knowing that his house number contains 3 digits design an algorithm (represent it by a flowchart) and write a C program to find his house number.

```c
int main(int argc, char* argv[]){
    int i,m ;
    int s1,s2 ;

    for (i=100;i<=999;i++){
        s1=0;
        for (s1=0,m=1;m<i;m++)
                s1+=m ;
      for (s2=0,m=i+1;s2<s1;m++)
                s2+=m ;
        if (s1==s2)
                printf("\n[1]...[%d]...[%d]",i,m);
    }
    system("pause");
    return 0;
}
```