

Roll No: 220950320059

Name: Tushar Sugriv Kadam

Roll No: 220950320059

Assignment 2: Operators and Loops.

Q1. Write a C Program to calculate the absolute value of an integer.

Ex - 1) Input = 100

Expected Output = 100

2) Input = -200

Expected Output = 200

Code:

```
// program to find the absolute of the number.
```

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

```
int main()
```

```
{
```

```
    int a;
```

```
    printf("enter the number\n");
```

```
    scanf("%d",&a);
```

```
    int b = a;
```

```
    if (a < 0)
```

```
    {
```

```
        a = -(a);
```

```
    }
```

```
    else
```

```
    {
```

```
        a = a;
```

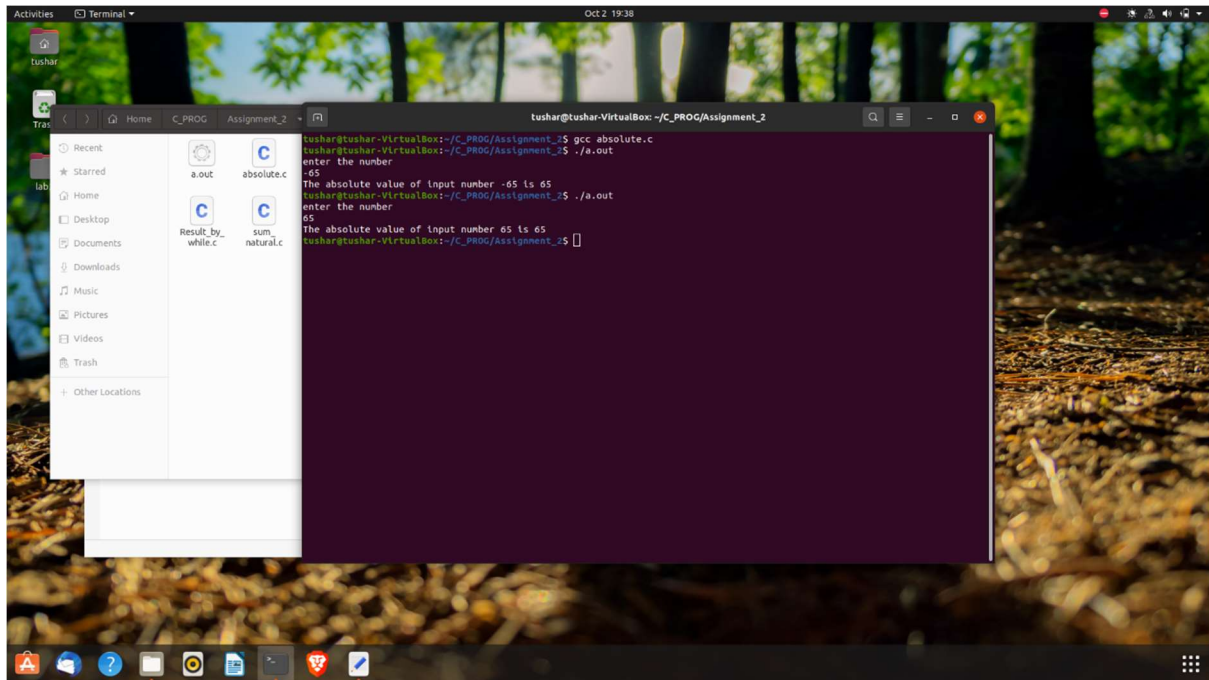
```
    }
```

```
    printf("The absolute value of input number %d is %d\n",b,a);
```

```
    return 0;
```

```
}
```

Output:



Q2. Write a C Program to Calculate the Average of a Set of Grades and Counting the Number of Failing Test Grades (Take Grade as fail if less than 65)

A) Use for loop

B) Use While loop

C) Use Do-While

Ex - 1) Expected Output :

Enter the number of grades : 7

Enter grade #1 : 93

Enter grade #2 : 63

Enter grade #3 : 87

Enter grade #4 : 65

Enter grade #5 : 62

Enter grade #6 : 88

Enter grade #7 : 76

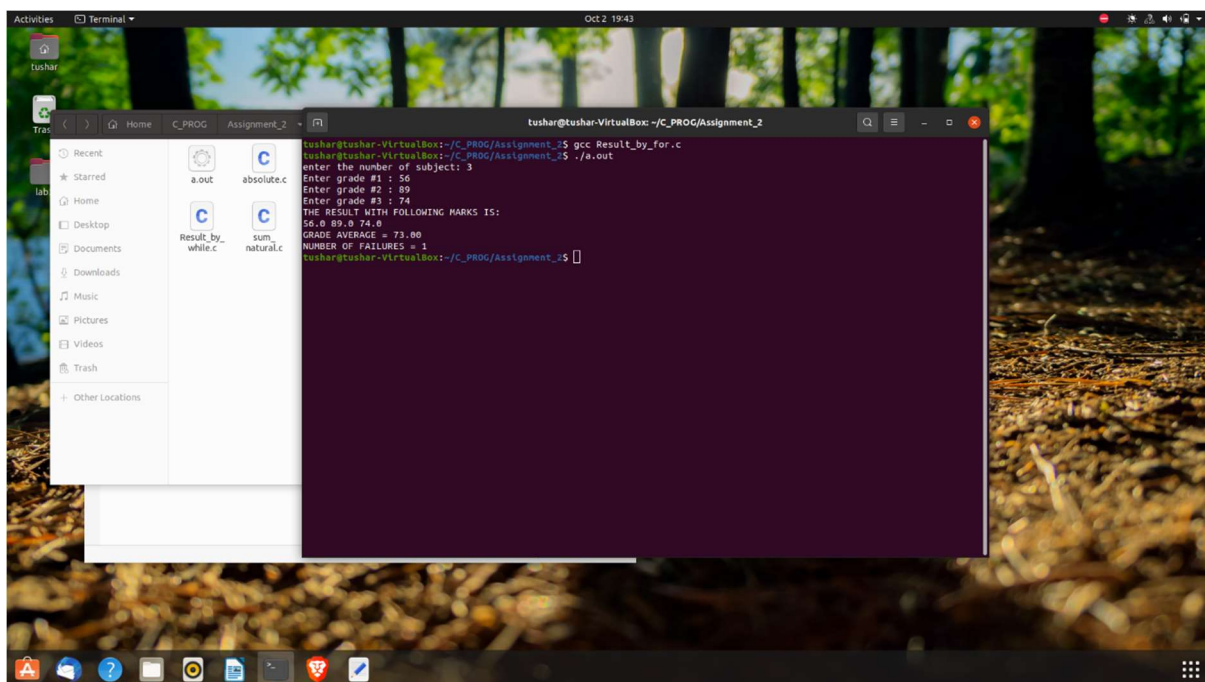
a) Code for for loop:

```
#include<stdio.h>

int main()
{
    float average=0, sum = 0;
    int count=0, n,i = 0, j = 0, k = 0;
    printf("enter the number of subject: ");
    scanf("%d",&n);
    float a[100];
    do
    {
        printf("Enter grade #%d : ",i+1);
        scanf("%f",&a[i]);
        i++;
    }while (i < n);
    do
    {
```

```
sum = sum + a[j];  
j++;  
}while ( j < n);  
average = sum / n;  
do  
{  
    if (a[k]<65)  
    {  
        count++;  
    }  
    k++;  
}while ( k < n );  
printf("\nTHE RESULT WITH ABOVE GRADES IS\n\n");  
printf("GRADE AVERAGE = %.2f\n",average);  
printf("NUMBER OF FAILURES = %d\n",count);  
return 0;  
}
```

Output(a):



The screenshot shows a Linux desktop environment. A terminal window is open, displaying the execution of a C program. The program prompts the user to enter the number of subjects (3), then the grades for each subject (56, 89, 74). It then outputs the result with the following marks, the grade average (73.00), and the number of failures (1). A file manager window is also open, showing the contents of the 'C_PROG' directory, which includes the source code files 'a.out', 'absolute.c', 'Result_by_while.c', and 'sum_natural.c'.

```
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_25  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_25 gcc Result_by_for.c  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_25 ./a.out  
enter the number of subject: 3  
Enter grade #1 : 56  
Enter grade #2 : 89  
Enter grade #3 : 74  
THE RESULT WITH FOLLOWING MARKS IS:  
56.0 89.0 74.0  
GRADE AVERAGE = 73.00  
NUMBER OF FAILURES = 1  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_25
```

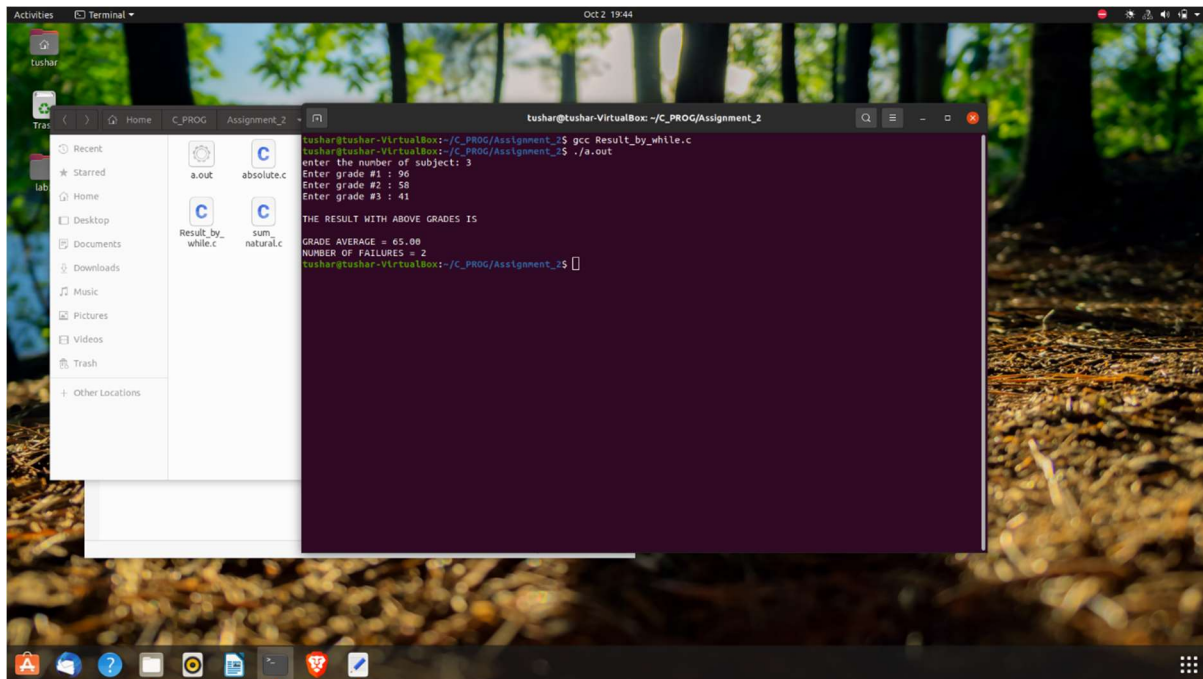
Code(b) for while loop :

```
#include<stdio.h>

int main()
{
    float average=0, sum = 0;
    int count=0, n;
    printf("enter the number of subject: ");
    scanf("%d",&n);
    float a[100];
    for (int i = 0; i < n; i++)
    {
        printf("Enter grade # %d : ",i+1);
        scanf("%f",&a[i]);
    }
    for (int j = 0; j < n; j++)
    {
        sum = sum + a[j];
    }
    average = sum / n;
    for (int k = 0; k < n; k++)
    {
        if (a[k]<65)
        {
            count++;
        }
    }
    printf("THE RESULT WITH FOLLOWING MARKS IS:\n");
    for (int i = 0; i < n; i++)
    {
        printf("%.1f ",a[i]);
    }
```

```
printf("\n");  
printf("GRADE AVERAGE = %.2f\n",average);  
printf("NUMBER OF FAILURES = %d\n",count);  
return 0;  
}
```

Output(b):



The screenshot shows a terminal window titled "tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2". The user has compiled a program using `gcc Result_by_while.c` and executed it with `./a.out`. The program prompts for the number of subjects (3) and three grades (96, 58, 41). It then displays the results: "THE RESULT WITH ABOVE GRADES IS", "GRADE AVERAGE = 65.00", and "NUMBER OF FAILURES = 2". The terminal output is as follows:

```
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ gcc Result_by_while.c  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out  
Enter the number of subject: 3  
Enter grade #1 : 96  
Enter grade #2 : 58  
Enter grade #3 : 41  
THE RESULT WITH ABOVE GRADES IS  
GRADE AVERAGE = 65.00  
NUMBER OF FAILURES = 2  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$
```

Code(c)for do ...while :

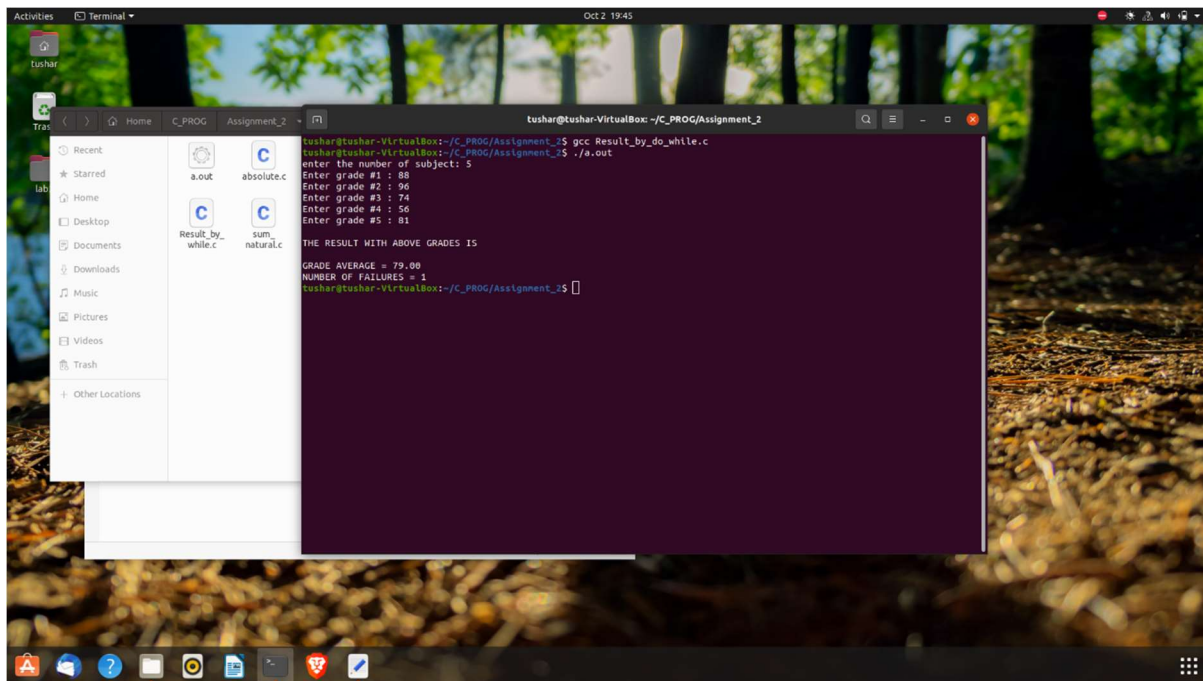
```
#include<stdio.h>

int main()
{
    float average=0, sum = 0;
    int count=0, n,i = 0, j = 0, k = 0;
    printf("enter the number of subject: ");
    scanf("%d",&n);
    float a[100];
    while (i < n)
    {
        printf("Enter grade #%%d : ",i+1);
        scanf("%f",&a[i]);
        i++;
    }
    while ( j < n)
    {
        sum = sum + a[j];
        j++;
    }
    average = sum / n;
    while ( k < n )
    {
        if (a[k]<65)
        {
            count++;
        }
        k++;
    }
    printf("\nTHE RESULT WITH ABOVE GRADES IS\n\n");
    printf("GRADE AVERAGE = %.2f\n",average);
}
```

Roll No: 220950320059

```
printf("NUMBER OF FAILURES = %d\n",count);  
  
return 0;  
  
}
```

Output:



```
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ gcc Result_by_do_while.c  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out  
enter the number of subject: 5  
Enter grade #1 : 88  
Enter grade #2 : 96  
Enter grade #3 : 74  
Enter grade #4 : 56  
Enter grade #5 : 81  
THE RESULT WITH ABOVE GRADES IS  
GRADE AVERAGE = 79.00  
NUMBER OF FAILURES = 1  
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$
```


Q3. Write a C Program to determine if a Number is Even or Odd

Ex - 1) Expected Output :

Enter the number : 25

The number entered is Odd

2) Expected Output :

Enter the number : 54

The number entered is Even.

Code:

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

```
int main()
```

```
{
```

```
    int n, x;
```

```
    printf("Enter the number: ");
```

```
    scanf("%d",&n);
```

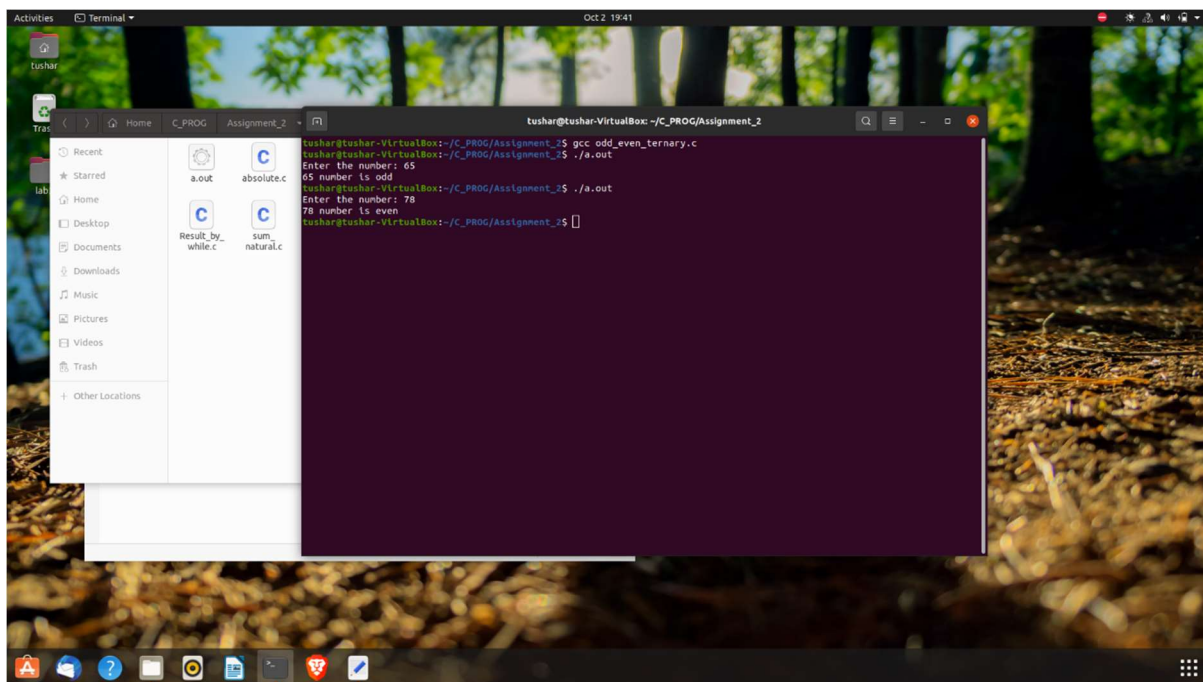
```
    x = (n%2 == 0)? 0 : 1;
```

```
    x==1 ? printf("%d number is odd\n",n): printf("%d number is even\n",n);
```

```
    return 0;
```

```
}
```

Output:



Q4. Write a C Program to check the year entered is a Leap Year or not

Ex - 1) Expected Output :

Enter the year : 1955

No, it's not a Leap Year

Expected Output :

Enter the year : 2000

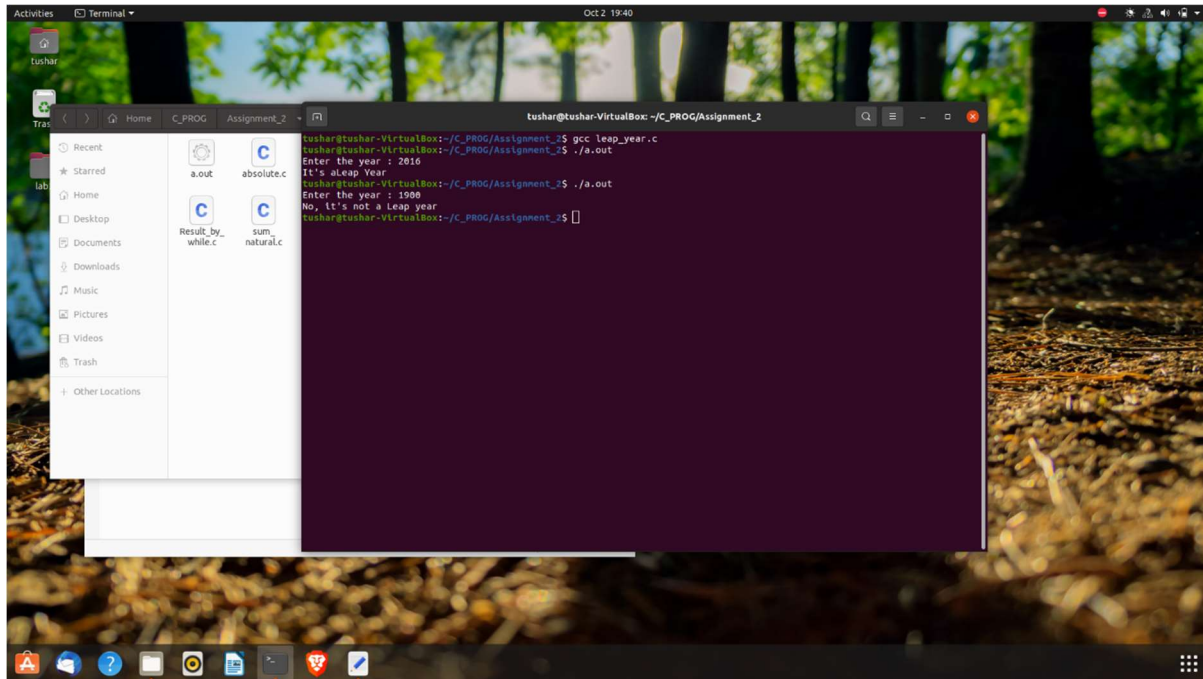
It's a Leap Year

Code:

```
#include<stdio.h>

int main()
{
    int year;
    printf("Enter the year : ");
    scanf("%d",&year);
    if (year%4 == 0 && year%100 != 0)
    {
        printf("It's aLeap Year\n");
    }
    else if (year%400 == 0)
    {
        printf("It's a Leap Year\n");
    }
    else
    {
        printf("No, it's not a Leap year\n");
    }
    return 0;
}
```

Output:



The screenshot shows a Linux desktop environment. On the left, a file manager window displays the contents of the 'C_PROG/Assignment_2' directory, including files like 'a.out', 'absolute.c', 'Result_by_while.c', and 'sum_natural.c'. In the center, a terminal window titled 'tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2' shows the execution of a C program. The program prompts the user to 'Enter the year :', and the user enters '2016'. The program outputs 'It's a Leap Year'. The user then enters '1900', and the program outputs 'NO, it's not a Leap year'. The terminal window is dark-themed with a purple background. The desktop background is a scenic image of a forest path. The system clock at the top right indicates 'Oct 2, 19:40'.

```
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ gcc leap_year.c
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
Enter the year : 2016
It's a Leap Year
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
Enter the year : 1900
NO, it's not a Leap year
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$
```

Q5. Write a program to create a simple calculator to perform Addition, Subtraction, Multiplication and Division using switch statement. Take the required operation as input from the user.

Code:

```
#include<stdio.h>

int main()
{
    int o, addition, subtraction, multiplication;
    float division, a, b;
    printf("enter two numbers\n");
    scanf("%f%f",&a,&b);
    printf("enter\n1 for addition\n2 for subtraction\n3 for multiplication\n4 for division\n\n");
    scanf("%d",&o);
    switch (o)
    {
        case 1:
            addition = a + b;
            printf("addition is %d\n", addition);
            break;
        case 2:
            subtraction = a - b;
            printf("subtraction is %d\n", subtraction);
            break;
        case 3:
            multiplication = a * b;
            printf("multiplication is %d\n", multiplication);
            break;
        case 4:
            division = a / b;
            printf("division is %f\n", division);
```

```
        break;

default:

    printf("enter valid number for operation\n");

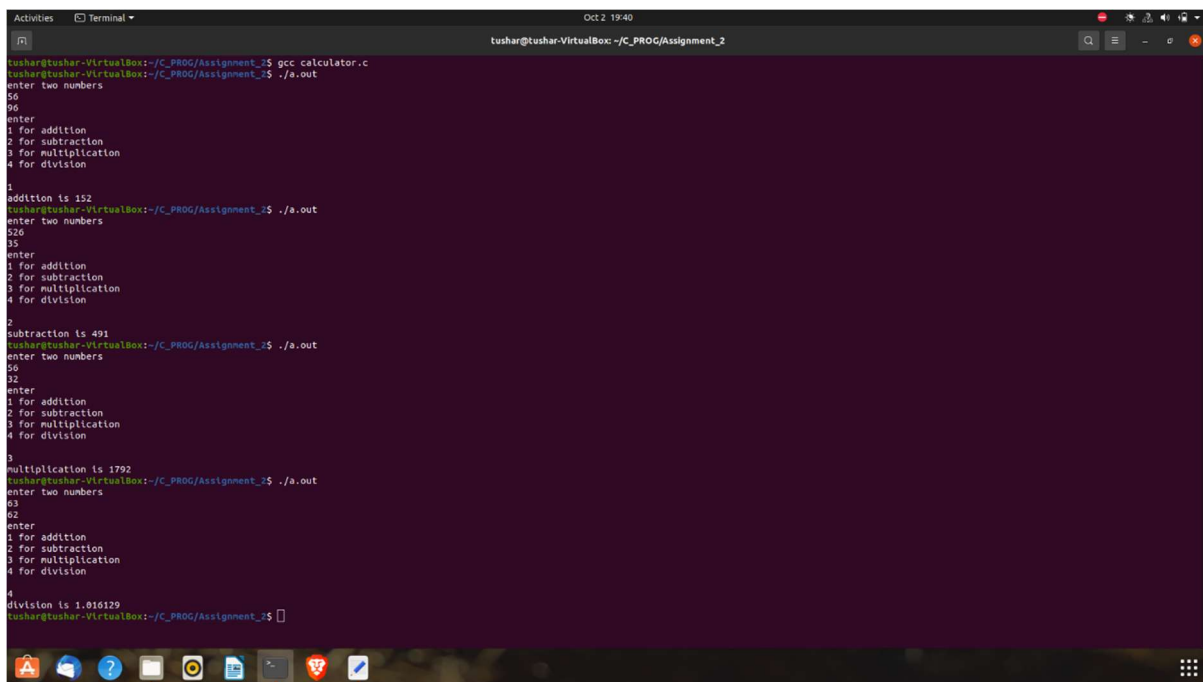
    break;

}

return 0;

}
```

Output:



```
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ gcc calculator.c
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
enter two numbers
50
96
enter
1 for addition
2 for subtraction
3 for multiplication
4 for division
1
addition is 152
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
enter two numbers
520
15
enter
1 for addition
2 for subtraction
3 for multiplication
4 for division
2
subtraction is 491
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
enter two numbers
50
32
enter
1 for addition
2 for subtraction
3 for multiplication
4 for division
3
multiplication is 1792
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$ ./a.out
enter two numbers
03
02
enter
1 for addition
2 for subtraction
3 for multiplication
4 for division
4
division is 1.016129
tushar@tushar-VirtualBox:~/C_PROG/Assignment_2$
```

Q6. Write a program to find out the sum of first n natural numbers.

Take n as input from the user.

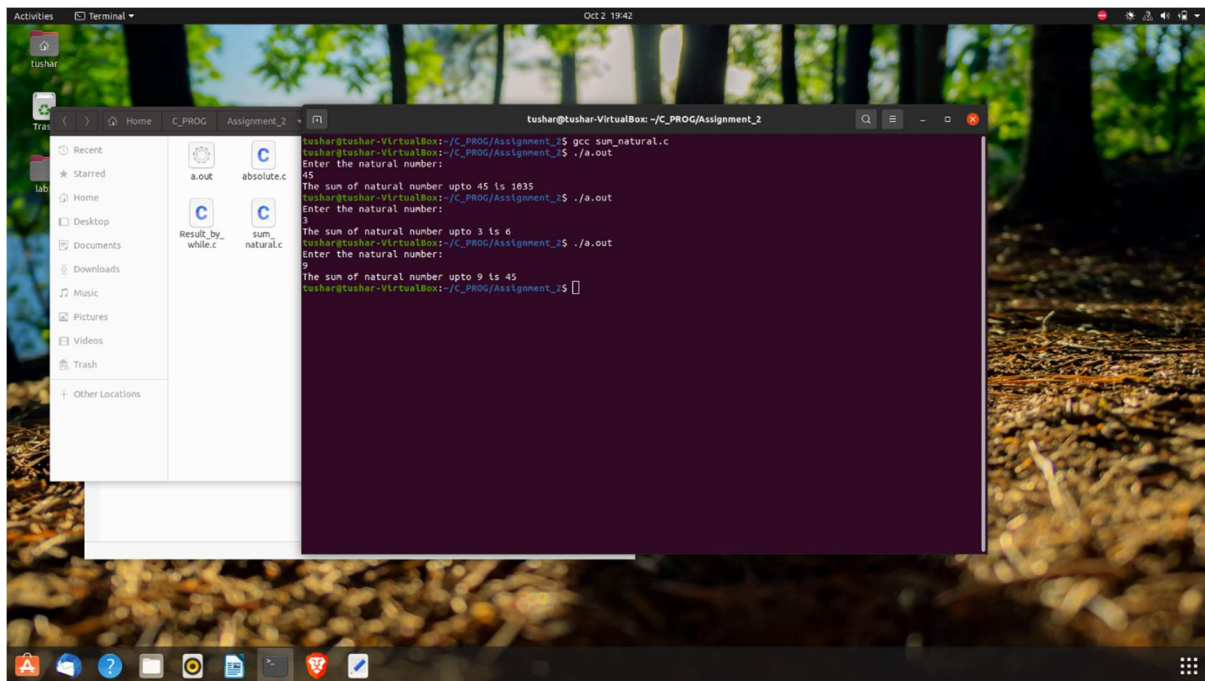
Code:

```
#include<stdio.h>

int main()
{
    int n, sum = 0;
    printf("Enter the natural number: \n");
    scanf("%d",&n);
    if (n!=0)
    {
        for (int i = 1; i <= n ; i++)
        {
            sum = sum + i;
        }
        printf("The sum of natural number upto %d is %d\n",n,sum);
    }
    else
    {
        printf("Enter the natural number, given number is not natural\n");
    }
    return 0;
}
```

Roll No: 220950320059

Output:



```
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2$ gcc sun_natural.c
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2$ ./a.out
Enter the natural number:
45
The sum of natural number upto 45 is 1035
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2$ ./a.out
Enter the natural number:
3
The sum of natural number upto 3 is 6
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2$ ./a.out
Enter the natural number:
9
The sum of natural number upto 9 is 45
tushar@tushar-VirtualBox: ~/C_PROG/Assignment_2$
```

The screenshot shows a Linux desktop with a file manager on the left and a terminal window on the right. The file manager displays a directory containing source code files (a.out, absolute.c, Result_by_while.c, sum_natural.c) and their corresponding output files. The terminal window shows the execution of the C program, which calculates the sum of natural numbers up to a given input. The output of the program is displayed in the terminal window.