LAB 01:

1. Write a program that take input of your roll number along with the marks obtained in five subjects and display the total marks obtained and the percentage.

CODE:

```cpp
#include <iostream>
using namespace std;

int main() {
    int rollno;
    string subjects[5] = {"OOPs", "Calculus", "PS", "DS", "LDST"};
    int Marks[5];
    int total = 0;

    cout << "Enter your roll number: ";
    cin >> rollno;

    cout << "Enter your marks out of 100:" << endl;
    for (int i = 0; i< 5; i++) {
        cout << "Enter your marks in " << subjects[i] << ": ";
        cin >> Marks[i];
        total += Marks[i];
    }

    float percentage = (float(total) / 500) * 100;

    cout << "Roll Number: " << rollno << endl;
    cout << "Total Marks: " << total << endl;
    cout << "Percentage: " << percentage << "%" << endl;


}
```

OUTPUT:

```
D:\NED University\2nd Semester\Object Oriented Programming (OOPs)\Practicals\Lab 01\CT-25276_Q1.exe
Enter your roll number: 25276
Enter your marks out of 100:
Enter your marks in OOPs: 85
Enter your marks in Calculus: 92
Enter your marks in PS: 78
Enter your marks in DS: 84
Enter your marks in LDST: 86
Roll Number: 25276
Total Marks: 425
Percentage: 85%

--------------------------------
Process exited after 27.83 seconds with return value 0
Press any key to continue . . .
```

2. Write a program to swap three numbers entered by a user using pointers.

CODE:

```cpp
#include <iostream>
using namespace std;

void swap(int *a, int *b, int *c) {
    int temp = *a;
    *a = *b;
    *b = *c;
    *c = temp;
}

int main() {
    int x, y, z;
    cout << "Enter three integers: ";
    cin >> x >> y >> z;

    cout << "Before swapping: \n x = " << x << ", y = " << y << ", z = " << z << endl;

    swap(&x, &y, &z);

    cout << "After swapping: \n x = " << x << ", y = " << y << ", z = " << z << endl;
    return 0;
}
```

OUTPUT:

```
D:\NED University\2nd Semester\Object Oriented Programming (OOPs)\Practicals\Lab 01\CT-25276_Q2.exe
Enter three integers: 5 10 15
Before swapping:
 x = 5, y = 10, z = 15
After swapping:
 x = 10, y = 15, z = 5

--------------------------------
Process exited after 14.49 seconds with return value 0
Press any key to continue . . .
```

3. Write a program to convert temp from Fahrenheit to Celsius unit using equation

(C=(F-32)/1.8).

CODE:

```cpp
#include <iostream>
using namespace std;

int main() {

    float fahrenheit, celsius;
    cout << "Enter temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = (fahrenheit - 32) / 1.8;

    cout << "Temperature in Celsius: " << celsius << " C" << endl;


    return 0;
}
```

OUTPUT:

```
D:\NED University\2nd Semester\Object Oriented Programming (OOPs)\Practicals\Lab 01\CT-25276_Q3.exe
Enter temperature in Fahrenheit: 98
Temperature in Celsius: 36.6667 C

--------------------------------
Process exited after 9.568 seconds with return value 0
Press any key to continue . . .
```

4. Using 2-D arrays, write a program that allows the user to input two, 3x3 matrices.

Write a function for adding two matrices. Write another function for multiplying

the two matrices.

CODE:

```cpp
#include <iostream>
using namespace std;

const int size  = 3;

void readMatrix(int a[size][size], int b[size][size]) {

    cout << "Enter elements of first 3x3 matrix: " << endl;

    for(int i = 0; i< size; i++) {
        for(int j = 0; j < size; j++) {  //input matrix1 elements
            cin >> a[i][j];
        }
    }
    cout << "Enter elements of second 3x3 matrix: " << endl;

    for(int i = 0; i< size; i++) {
        for(int j = 0; j < size; j++) {    //input matrix2 elements
            cin >> b[i][j];
        }
    }
}

int displaysum(int a[size][size], int b[size][size]) {
    int sum[size][size] = {0};

    for(int i = 0; i< size; i++) {
        for(int j =0 ; j< size; j++) {
            sum[i][j] = a[i][j] + b[i][j];
            cout << sum[i][j] << " ";
        }
        cout << endl;
```

```
32          cout << endl;
33      }
34      cout << "Sum of the two matrices is: " << endl;
35
36      for (int i = 0; i< size; i++) {
37          for ( int j = 0; j< size; j++) {
38              cout << sum[i][j] << " ";
39          }
40          cout << endl;
41      }
42  }
43
44  int displayproduct(int a[size][size], int b[size][size]) {
45      int product[size][size] = {0};
46      int sum = 0;
47
48      for(int i = 0; i< size; i++) {
49          for (int j = 0; j < size; j++) {
50              for ( int k = 0; k < size; k++) {
51                  sum += a[i][k] * b[k][j];
52              }
53              product[i][j] = sum;
54              sum   = 0;
55          }
56      }
57
58      cout << "Product of the two matrices is: " << endl;
59      for( int i = 0; i< size; i++) {
60          for (int j = 0; j< size; j++) {
61              cout << product[i][j] << " ";
62          }
63          cout << endl;
64      }
```

```
59      for( int i = 0; i< size; i++) {
60          for (int j = 0; j< size; j++) {
61              cout << product[i][j] << " ";
62          }
63          cout << endl;
64      }
65
66  }
67
68  int main() {
69      int arr1[size][size];
70      int arr2[size][size];
71
72      readMatrix(arr1, arr2);
73      displaysum(arr1, arr2);
74      displayproduct(arr1, arr2);
75
76
77
78      return 0;
79  }
```

OUTPUT:

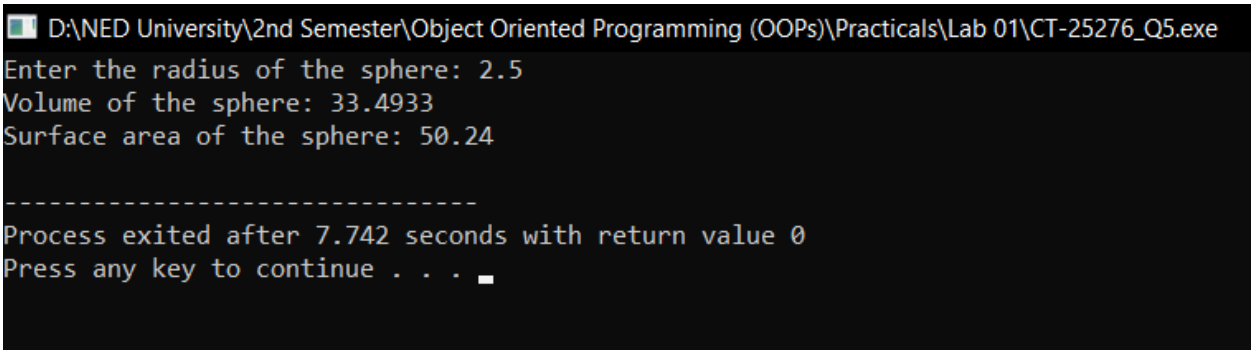
```
Enter elements of first 3x3 matrix:
1 2 3
4 5 6
7 8 9
Enter elements of second 3x3 matrix:
1 2 3
4 5 6
7 8 9



Sum of the two matrices is:
2 4 6
8 10 12
14 16 18
Product of the two matrices is:
30 36 42
66 81 96
102 126 150

--------------------------------
Process exited after 20.7 seconds with return value 0
Press any key to continue . . .
```

5. Write a program to find Surface area and volume of a sphere using functions.

CODE:

```cpp
#include <iostream>
using namespace std;

float Calculations(int* radius, float volume, float area) {
    volume = (4.0 / 3.0 ) * 3.14 * (*radius) * (*radius) * (*radius);
    area = 4 * 3.14 * (*radius) * (*radius);

    cout << "Volume of the sphere: "  << volume << endl;
    cout << "Surface area of the sphere: " << area << endl;

    return 0;
}

int main() {
    int r;
    float volume, area;
    cout << "Enter the radius of the sphere: ";
    cin >> r;

    Calculations(&r, volume, area);

}
```

OUTPUT:



6. Write a program to help a bank create its withdrawal system. Your program should allow the user to input their account type. Account types are: savings, current.

Following business rules apply when withdrawing from a certain account:

1. Savings:

- User must provide the savings account number and code 'S' (for savings). When withdrawing from a savings account, users need to pay a set 2% of the money that they withdraw. If the amount of money withdrawn is over 50,000, then a 5% tax will be deducted. The money deducted shall be from the remaining money in the account.

2. Current:

- User must provide the current account number and code „C" (for current).

When withdrawing from a current account, users need to pay a withdrawal fee of 100. If the amount of money withdrawn is over 50,000, then a 5% tax will be deducted. The money deducted shall be from the remaining money in the account.

Assume all users have the 200,000 in their accounts, and cannot withdraw more than 100,000 at a time.

CODE:

```cpp
#include <iostream>
using namespace std;

 int saving(double* a)  {
    int amount;
    cout << "Enter the amount you want to withdraw from your Account: ";
    cin >> amount;

    if (amount > 100000) {
        cout << "You cannot withdraw more than 100000 from your Account. " << endl;
        return *a;

    }else if(amount > 50000) {
        *a = *a - amount - (amount * 0.02) - (amount * 0.05);
        cout << "You have withdrawn " << amount << " from your Savings Account." << endl;
        cout << "Your remaining balance is: " << *a << endl;

        return *a;

    }

    *a = *a - amount - (amount * 0.02);
    cout << "You have withdrawn " << amount << " from your Savings Account." << endl;
    cout << "Your remaining balance is: " << *a << endl;

    return *a;

 }
```

```cpp
int current(double* a) {
     int amount;
     cout << "Enter the amount you want to withdraw form your Current Account: ";
     cin >> amount;

if(amount > 100000) {
         cout << "You cannot withdraw more than 100000 from your Account. " << endl;
         return *a;

 }else if(amount > 50000) {
         *a = *a - amount - (amount * 0.05) - 100;
         cout << "You have withdrawn " << amount << " from your Current Account." << endl;
         cout << "Your remaining balance is: " << *a << endl;
         return *a;
     }

     *a = *a - amount - 100;
     cout << "You have withdrawn " << amount << " from your Current Account." << endl;
     cout << "Your remaining balance is: " << *a << endl;


     return *a;
}
```

```cpp
int main(){
    double initial_amount = 200000;
    char option;
    int account_number;

    cout << "Enter your account number: ";
    cin >> account_number;
    cout << "What account type do you want to open?\n (S) Savings Account \n (C) Current Account " << endl;
    cin >> option;

    switch(option){
        case 'S':
            cout << "You have chosen Savings Account." << endl;

            saving(&initial_amount);

            break;
        case 'C':
            cout << "You have chosen Current Account. " << endl;
            current(&initial_amount);

            break;
        default:
            cout << "Invalid option selected!" << endl;
            break;
    }

    return 0;
}
```

OUTPUT:

```
D:\NED University\2nd Semester\Object Oriented Programming (OOPs)\Practicals\Lab 01\CT-25276_Q6.exe
Enter your account number: 25276
What account type do you want to open?
 (S) Savings Account
 (C) Current Account
S
You have chosen Savings Account.
Enter the amount you want to withdraw from your Account: 53000
You have withdrawn 53000 from your Savings Account.
Your remaining balance is: 143290

--------------------------------
Process exited after 47.79 seconds with return value 0
Press any key to continue . . .
```

```
D:\NED University\2nd Semester\Object Oriented Programming (OOPs)\Practicals\Lab 01\CT-25276_Q6.exe
Enter your account number: 25276
What account type do you want to open?
 (S) Savings Account
 (C) Current Account
C
You have chosen Current Account.
Enter the amount you want to withdraw form your Current Account: 55000
You have withdrawn 55000 from your Current Account.
Your remaining balance is: 142150

--------------------------------
Process exited after 11.45 seconds with return value 0
Press any key to continue . . .
```