Practical No 1

Shaikh Zainab Arif 220459

Exercise:

Q1}

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

int main() {
    double a, b, c;
    cout << "Shaikh Zainab Arif 220459 \n";
    cout << "Enter coefficients a, b, and c: ";
    cin >> a >> b >> c;

    double discriminant = b * b - 4 * a * c;

    if (discriminant > 0) {
        cout << "Roots are real and distinct." << endl;
        double root1 = (-b + sqrt(discriminant)) / (2 * a);
        double root2 = (-b - sqrt(discriminant)) / (2 * a);
        cout << "Root 1: " << root1 << endl;
        cout << "Root 2: " << root2 << endl;
    } else if (discriminant == 0) {
        cout << "Roots are real and equal." << endl;
        double root = -b / (2 * a);
        cout << "Root: " << root << endl;
    } else {
        cout << "Roots are imaginary." << endl;
        double realPart = -b / (2 * a);
        double imaginaryPart = sqrt(-discriminant) / (2 * a);
        cout << "Root 1: " << realPart << " + " << imaginaryPart << "i" << endl;
        cout << "Root 2: " << realPart << " - " << imaginaryPart << "i" << endl;
    }

    return 0;
}
```

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rig

C:\Users\Yusuf\Desktop\zainab>a.exe
Shaikh Zainab Arif 220459
Enter coefficients a, b, and c: 2
3
4
Roots are imaginary.
Root 1: -0.75 + 1.19896i
Root 2: -0.75 - 1.19896i

C:\Users\Yusuf\Desktop\zainab>
```

Q2}

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

int main() {
    int a = 10, b = 5, c = 2;
    cout << "Shaikh Zainab Arif 220459 \n";

    int result1 = a + b * c;
    int result2 = (a + b) * c;
    int result3 = a + (b * c);
    int result4 = (a + b)/c + (a * c);

    cout << "a + b * c = " << result1 << endl;
    cout << "(a + b) * c = " << result2 << endl;
    cout << "a + (b * c) = " << result3 << endl;
    cout << "(a + b)/c + (a * c) = " << result4 << endl;

    return 0;
}
```

```
C:\Users\Yusuf\Desktop\zaina
Shaikh Zainab Arif 220459
a + b * c = 20
(a + b) * c = 30
a + (b * c) = 20
(a + b)/c + (a * c) = 27

C:\Users\Yusuf\Desktop\zaina
```

Practical No 2

Shaikh Zainab Arif 220459

Exercise:

Q1}

```cpp
#include <iostream>
using namespace std;
int main() {
    int year;
    cout << "Shaikh Zainab Arif 220459 \n";
    cout << "Enter a year: ";
    cin >> year;

    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
        cout << year << " is a leap year." << endl;
    else
        cout << year << " is not a leap year." << endl;

    return 0;
}
```

```
C:\Users\Yusuf\Desktop\zainab>
Shaikh Zainab Arif 220459
Enter a year: 2024
2024 is a leap year.

C:\Users\Yusuf\Desktop\zainab>
Shaikh Zainab Arif 220459
Enter a year: 1996
1996 is a leap year.

C:\Users\Yusuf\Desktop\zainab>
Shaikh Zainab Arif 220459
Enter a year: 2023
2023 is not a leap year.

C:\Users\Yusuf\Desktop\zainab>
```

Q2}

```cpp
#include <iostream>
using namespace std;
int main() {
    int num, reversedNum = 0, originalNum, remainder;
    cout << "Shaikh Zainab Arif 220459 \n";
    cout << "Enter an integer: ";
    cin >> num;
    originalNum = num;
    while (num != 0) {
        remainder = num % 10;
        reversedNum = reversedNum * 10 + remainder;
        num /= 10;
    }
    if (originalNum == reversedNum)
        cout << originalNum << " is a palindrome number." << endl;
    else
        cout << originalNum << " is not a palindrome number." << endl;

    return 0;
}
```

```
C:\Users\Yusuf\Desktop\zainab>a.ex
Shaikh Zainab Arif 220459
Enter an integer: 2112
2112 is a palindrome number.

C:\Users\Yusuf\Desktop\zainab>a.ex
Shaikh Zainab Arif 220459
Enter an integer: 2007
2007 is not a palindrome number.

C:\Users\Yusuf\Desktop\zainab>a.ex
Shaikh Zainab Arif 220459
Enter an integer: 747
747 is a palindrome number.

C:\Users\Yusuf\Desktop\zainab>
```

Q3}

```cpp
#include <iostream>
#include <cmath>
using namespace std;
int main() {
    int num, originalNum, remainder, n = 0;
    double result = 0.0;
    cout << "Shaikh Zainab Arif 220459 \n";

    cout << "Enter an integer: ";
    cin >> num;

    originalNum = num;

    while (originalNum != 0) {
        originalNum /= 10;
        ++n;
    }

    originalNum = num;

    while (originalNum != 0) {
        remainder = originalNum % 10;
        result += pow(remainder, n);
        originalNum /= 10;
    }

    if ((int)result == num)
        cout << num << " is an Armstrong number." << endl;
    else
        cout << num << " is not an Armstrong number." << endl;

    return 0;
}
```

```
C:\Users\Yusuf\Desktop\zainab>a.e
Shaikh Zainab Arif 220459
Enter an integer: 1634
1634 is an Armstrong number.

C:\Users\Yusuf\Desktop\zainab>a.e
Shaikh Zainab Arif 220459
Enter an integer: 153
153 is an Armstrong number.

C:\Users\Yusuf\Desktop\zainab>a.e
Shaikh Zainab Arif 220459
Enter an integer: 548834
548834 is an Armstrong number.

C:\Users\Yusuf\Desktop\zainab>a.e
Shaikh Zainab Arif 220459
Enter an integer: 100
100 is not an Armstrong number.

C:\Users\Yusuf\Desktop\zainab>
```