Practice Exercises - Chapter: 04

*** Exercise 4.1:**

Write a program to print the positive number entered by the user. If the user enters a negative number, it is skipped.

Example 1:

Enter an integer: 5

You entered a positive number: 5

This statement is always executed.

Example 2:

Enter a number: -5

This statement is always executed.

Solution 4.1:

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

int main() {
    int number;

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

    // checks if the number is positive
    if (number > 0) {
        cout << "You entered a positive integer: " << number <<
endl;
    }
    cout << "This statement is always executed.";
    return 0;
}
```

*** Exercise 4.2:**

Write a program that asks the user to enter a number within the range of 1 through 10. Use a switch statement to display the Roman numeral version of that number. If the user input a number less than 1 or greater than 10, the program displays a message “Error”.

Solution 4.2:

```
#include <iostream>
```

```
using namespace std;
int main()
{
     int num;// Ask user to input a number.
     cout << "Enter a number within the range of 1 through
10,\n";
     cout << "and I will display the Roman numeral version of
that number.\n";
     cin >> num;
     if(num < 1 || num > 10){
          cout<< "Error!";
     }
     else
     cout << "The Roman numeral version of ";
     switch(num)
     {
          case 1:cout << num << " is I.\n";break;
          case 2:cout << num << " is II.\n";break;
          case 3:cout << num << " is III.\n";break;
          case 4:cout << num << " is IV.\n";break;
          case 5:cout << num << " is V.\n";break;
          case 6:cout << num << " is VI.\n";break;
          case 7:cout << num << " is VII.\n";break;
          case 8:cout << num << " is VIII.\n";break;
          case 9:cout << num << " is IX.\n";break;
          case 10:cout<< num << " is X.\n";break;
     }
     return 0;
```

*** Exercise 4.3:**

The date June 10, 1960, is special because when we write it in the following format (m/d/yy), the month times the day equals the year (6/10/60).

Write a program that asks the user to enter a month (in numeric form), a day, and a two-digit year. If the month times the day is equal to the year, the program should display a message" The date is magic". Otherwise, it should display a message" The date is not magic".

Example:

Enter a month (1-12): 6 [Enter]

Enter a day (1-31): 10 [Enter]

Enter a two-digit year: 60 [Enter]

Solution 4.3:

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

int main()
{
     int month, day, year;

     //Ask user to enter a month, a day, and a two-digit year.
     cout << "Enter (in numeric form) a month, a day, and a two-
digit year,\n"
          << "and the program will determine if the date is
magic.\n";
     cout << "Enter a month: ";
     cin  >> month;
     cout << "Enter a day: ";
     cin  >> day;
     cout << "Enter a two- digit year";
     cin  >> year;

     // Calculate and display whether the date is magic.
     if (year == month * day)
          cout << "The date is magic.\n";
     else
          cout << "The date is not magic.\n";
     return 0;
}
```

*** Exercise 4.4:**

Write a program to input three angles of a triangle and check whether the triangle is valid or not by using the if-else statement.

*** Exercise 4.5:**

The area of a rectangle is the rectangle's length times its width. Write a program that asks for the length and width of two rectangles. The program should tell the user which rectangle has the greater area, or if the areas are the same.

*** Exercise 4.6:**

Write a program to find all roots of a quadratic equation $ax^2+bx+c=0$. This program accepts coefficients of a quadratic equation from the user and displays the roots.

*** Exercise 4.7:**

Write a program to convert the US Dollar into different currencies:

1. Euro.
2. Japanese Yen.
3. British Pound.
4. Vietnamese Dong.

Use a switch statement to display the menu of currencies.

Input Validation: Only accept a number greater than 0.

*** Exercise 4.8:**

Write a program that determines a student's grade. The program will read three types of scores (quiz, mid-term, and final scores). The grade point average (GPA) be calculated as GPA =0.2* quiz score + 0.3*mid-term score +0.5*final score. Determine the grade based on the following rules:

- if the average score >=8.5 then grade A;
- if the average score >=7.0 and <8.5 then grade B;
- if the average score >=5.5 and <7.0 then grade C;
- if the average score >=4.0 and <5.5 then grade D;
- if the average score <4.0 then grade F.

*** Exercise 4.9:**

Write a program that asks the user to enter the month (letting the user enter an integer in the range of 1 through 12) and the year. The program should then display the number of days in that month. Use the following criteria to identify leap years:

1. Determine whether the year is divisible by 100. If it is, then it is a leap year if and only if it is divisible by 400. For example, 2000 is a leap year but 2100 is not.

2. If the year is not divisible by 100, then it is a leap year if and if only it is divisible by 4.

For example, 2008 is a leap year but 2009 is not.

Example:

Enter a month (1-12): 2 [Enter]

Enter a year: 2008 [Enter]

29 days

*** Exercise 4.10:**

Write a program that accepts three integers a, b, c (-999999999<=a, b, c<=999999999) from the user and prints them out in ascending order.

Example:

Input	Output
0 9 3 -1000000000 0 9999	0 3 9 Not valid

*** Exercise 4.11:**

Write a program to input all sides of a triangle and check whether the triangle is an equilateral (E), isosceles (I) or scalene (S) triangle using if-else statement. If the user input a number less than 0, the program displays a message "Not triangle".

Example:

Input	Output
66 66 7 12 19 0	I Not triangle

*** Exercise 4.12:**

Write a program to check whether a character is alphabet (A), digit (D) or special character (S).

Example:

Input	Output
b *	A S