C++ Exercises

1. Write a program that prompts the user to enter a number and checks whether it is positive, negative, or zero. Print an appropriate message to the console.
2. Write a program that prompts the user to enter two numbers and checks whether the first number is divisible by the second number. Print an appropriate message to the console.
3. Write a program that prompts the user to enter three numbers and finds the maximum and minimum of those numbers. Print the maximum and minimum values to the console.
4. Write a program that prompts the user to enter the lengths of the sides of a triangle and checks whether it is a right triangle. Print an appropriate message to the console.
5. Write a program that prompts the user to enter a year and checks whether it is a leap year. Print an appropriate message to the console.
6. Write a program that prompts the user to enter a number and checks whether it is a prime number. Print an appropriate message to the console.
7. Write a program that prompts the user to enter a character and checks whether it is a letter (uppercase or lowercase), a digit, or a special character. Print an appropriate message to the console.
8. Write a program that prompts the user to enter a grade (a number between 0 and 100) and converts it to a letter grade (A, B, C, D, or F) according to the following scale: A for grades 90-100, B for grades 80-89, C for grades 70-79, D for grades 60-69, and F for grades below 60. Print the letter grade to the console.
9. Write a program that prompts the user to enter a month (a number between 1 and 12) and prints the number of days in that month. Assume that it is not a leap year.
10. Write a program that prompts the user to enter three integers and checks whether they form a Pythagorean triple. A Pythagorean triple is a set of three integers a, b, and c, such that a^2 + b^2 = c^2. Print an appropriate message to the console

C++ Exercises and Solution

1. Write a program that prompts the user to enter a number and checks whether it is positive, negative, or zero. Print an appropriate message to the console.

```
#include <iostream>
using namespace std;
int main() {
   int num;
   cout << "Enter a number: ";
   cin >> num;
   if (num > 0) {
      cout << "The number is positive.";
   } else if (num < 0) {
      cout << "The number is negative.";
   } else {
      cout << "The number is zero.";}
   return 0;}
```

2. Write a program that prompts the user to enter two numbers and checks whether the first number is divisible by the second number. Print an appropriate message to the console.

```
#include <iostream>
using namespace std;
int main() {
   int num1, num2;
   cout << "Enter two numbers: ";
   cin >> num1 >> num2;
   if (num1 % num2 == 0) {
      cout << num1 << " is divisible by " << num2;
   } else {
```

```
    cout << num1 << " is not divisible by " << num2;
  }
  return 0;}
```

3. Write a program that prompts the user to enter three numbers and finds the maximum and minimum of those numbers. Print the maximum and minimum values to the console.

```
#include <iostream>
using namespace std;
int main() {
  int num1, num2, num3;
  cout << "Enter three numbers: ";
  cin >> num1 >> num2 >> num3;
  int maxNum = num1;
  if (num2 > maxNum) {
    maxNum = num2;}
  if (num3 > maxNum) {
    maxNum = num3;}
 int minNum = num1;
  if (num2 < minNum) {
    minNum = num2;}
  if (num3 < minNum) {
    minNum = num3;}
  cout << "Maximum number: " << maxNum << endl;
  cout << "Minimum number: " << minNum << endl;
  return 0;}
```

4. Write a program that prompts the user to enter the lengths of the sides of a triangle and checks whether it is a right triangle. Print an appropriate message to the console.

```
#include <iostream>
using namespace std;
int main() {
  int side1, side2, side3;
```

```
    cout << "Enter the lengths of the sides of a triangle: ";
    cin >> side1 >> side2 >> side3;
    if (side1*side1 + side2*side2 == side3*side3 ||
       side2*side2 + side3*side3 == side1*side1 ||
       side3*side3 + side1*side1 == side2*side2) {
       cout << "The triangle is a right triangle.";
    } else {
       cout << "The triangle is not a right triangle.";    }
    return 0;}
```

5. Write a program that prompts the user to enter a year and checks whether it is a leap year. Print an appropriate message to the console.

```
#include <iostream>
using namespace std;
int main() {
    int year;
    cout << "Enter a year: ";
    cin >> year;
    if (year % 4 == 0) {
       if (year % 100 == 0) {
          if (year % 400 == 0) {
             cout << year << " is a leap year.";
          } else {
             cout << year << " is not a leap year.";
          }
       } else {
          cout << year << " is a leap year.";
       }
    } else {
       cout << year << " is not a leap year.";}
    return 0;}
```

6. Write a program that prompts the user to enter a number and checks whether it is a prime number. Print an appropriate message to the console.

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

int main() {
   int num;
   cout << "Enter a number: ";
   cin >> num;
   if (num > 0) {
      cout << "The number is positive." << endl;
   } else if (num < 0) {
      cout << "The number is negative." << endl;
   } else {
      cout << "The number is zero." << endl;
   }
   return 0;
}
```

7. Write a program that prompts the user to enter a character and checks whether it is a letter (uppercase or lowercase), a digit, or a special character. Print an appropriate message to the console.

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

int main() {
   int grade;
   cout << "Enter your grade (0-100): ";
   cin >> grade;
   if (grade >= 90 && grade <= 100) {
      cout << "Your letter grade is A." << endl;
   } else if (grade >= 80 && grade <= 89) {
      cout << "Your letter grade is B." << endl;
   } else if (grade >= 70 && grade <= 79) {
      cout << "Your letter grade is C." << endl;
```

```
    } else if (grade >= 60 && grade <= 69) {
        cout << "Your letter grade is D." << endl;
    } else if (grade >= 0 && grade < 60) {
        cout << "Your letter grade is F." << endl;
    } else {
        cout << "Invalid input. Grade must be between 0 and 100." << endl;
    }
    return 0;
}
```

8. Write a program that prompts the user to enter a grade (a number between 0 and 100) and converts it to a letter grade (A, B, C, D, or F) according to the following scale: A for grades 90-100, B for grades 80-89, C for grades 70-79, D for grades 60-69, and F for grades below 60. Print the letter grade to the console.

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

int main() {
    int year;
    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;
}
```

9. Write a program that prompts the user to enter a month (a number between 1 and 12) and prints the number of days in that month. Assume that it is not a leap year.

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

```
int main() {
  int num1, num2, num3, largest;

  cout << "Enter three numbers: ";
  cin >> num1 >> num2 >> num3;

  if (num1 > num2 && num1 > num3) {
    largest = num1;
  } else if (num2 > num1 && num2 > num3) {
    largest = num2;
  } else {
    largest = num3;
  }

  cout << "The largest number is " << largest;

  return 0;
}
```

10. Write a program that prompts the user to enter three integers and checks whether they form a Pythagorean triple. A Pythagorean triple is a set of three integers a, b, and c, such that a^2 + b^2 = c^2. Print an appropriate message to the console.

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

int main() {
  int a, b, c;

  cout << "Enter three integers: ";
  cin >> a >> b >> c;

  if ((a * a) + (b * b) == (c * c) || (a * a) + (c * c) == (b * b) || (b * b) + (c * c) == (a * a)) {
```

```
    cout << "The numbers form a Pythagorean triple.";
  } else {
    cout << "The numbers do not form a Pythagorean triple.";
  }

  return 0;
}
```