**Conditionals**

1. We want to create a program that displays the letter grade for a student, given their grade in percentage, according to the following table:

|  |  |
| --- | --- |
| **Grade** | **Letter** |
| 90% – 100% | A |
| 80% – 89% | B |
| 70% – 79% | C |
| 60% – 69% | D |
| < 60% | F |

1. Write an algorithm that reads two triplets day1, month1, year1, and day2, month2, year2, representing two dates, and that determines whether the first date comes before the second.

1. Write an algorithm that reads three numbers and determines whether these numbers, considered as the lengths of the three sides of a triangle, would correspond to:

* An equilateral triangle (three equal sides)
* An isosceles triangle (two equal sides)
* A scalene triangle (three different sides)

1. An automobile insurance company wants to computerize the calculation of renewals for the premiums of its clients. The increase of a client’s premium is a function of the number of accidents, according to the table below:

|  |  |
| --- | --- |
| **Number of accidents** | **Increase** |
| 0 | 2% |
| 1 or 2 | 5% |
| 3 | 10% |
| 4 and more | 30% |

You are asked to create a program that calculates the new value of a premium, according to the old premium and the number of accidents.

1. In a competition where scores are given by 6 judges, a competitor’s final score is calculated as follows: first the highest and the lowest of the initial scores are eliminated, and then one takes the average of the other 4 scores. You are asked to create a program that reads 6 scores and determines the final score according to this method.

1. Write the algorithm of a program that reads a date (3 integers: day, month, year) and that displays the date of the next day (in numbers). Suppose that the year is not a leap year.

34 – Create an algorithm that determines whether a year provided by the user is a leap year. To be a leap year, a year must be divisible by 4 but not divisible by 100; despite this, if it is divisible by 400, it is a leap year after all.  
Example: 2000 is a leap year, but 1700, 1800, and 1900 are not.

**For loops and while loops**

Complete numbers 35 to 48 two times: first with a **for** loop, and then with a **while** loop.

1. Write an algorithm that calculates the sum of all the integers contained (inclusively) between two positive integer limits entered by the user. The program reads the smallest limit first.  
   Example: the sum of the integers between 5 and 10, inclusively.

1. Create four algorithms, each displaying the corresponding one of the following sequences:  
   1. 5 10 15 20 25 30 35 40
   2. 3 5 7 9 11 13 15
   3. 80 70 60 50 40 30 20
   4. 1 2 6 24 120 720

1. Write an algorithm that reads a positive integer ( > 0 ) and determines whether it is a prime number. (Hint: try dividing the number by the numbers coming before it.) Validate the input.

1. Write an algorithm that displays a table for converting Celsius units into Fahrenheit units. The table should display all of the values from –40 to 40 degrees Celsius, at increments of 5 degrees. The conversion formula is:
2. Write a program that calculates the average of 1000 grades. The program asks the user for each of the grades.

40 – Write a program that reads 1000 numbers and determines the largest and the smallest.