Exercise 3

1. Write a program, which asks the user for two numbers and prints them out in order of magnitude, or the text "The numbers are the same" if they are the same.

2. Let n and k be known integers. Write a program which prints out the following expressions, one by one, and after each expression asks the user, what the numbers are. If the user's answer is correct, the program ends. (Let a friend test it.)

   - $2n - k$
   - nk
   - $k/(3n)$
   - $k + n$

   If after the last expression the user can't get them right, the program prints out the correct answer.

   Note that the quotient of two integers may not be an integer. You must do a type cast from `int` to `double` as follows:

   ```
   double quotient = (double)n/(double)k;
   ```

3. Write a program which tests whether a given integer is divisible by three and five. The program should print out one of the following sentences (the one which is true).

   - The number is divisable by three and five.
   - The number is divisable by three or five.
   - The number is neither divisable by three nor five.

   Write the program using the `if-else` structure, and also with the `switch` structure.

   Hint: Divisibility is determined by calculating the remainder, `n%k`*. While using the* `switch` *structure, calculate the sum of the comparison statements.*

4. Write a program which takes as input the numerical value of temperature and its unit (C, F or K), and converts the value into all other units. Do this with the `switch` structure, e.g.

   ```
   switch(unitchar)
   {
     case 'C':
       ...
   ```

Hint: create a `double` *type variable for the numerical value and a* `char` *variable for the unit. All calculations must be performed inside the* `switch` *command.*

5. Another way to implement choice between two possibilities is by

   ```
   condition ? iftrue : ifnottrue;
   ```

   which executes the commands `iftrue`, if `condition` evaluates to true, and the commands `ifnottrue`, if `condition` is not true. (Note that there is no semicolon after the `iftrue` commands.) Using this structure, write a program which prints out two given letters in alphabetical order.

   Hint: You can compare characters just as you do with numbers.

6. Write a program which tests whether a given year is a leap year. Find the definition of a leap year in the Internet.