Please read 3.9, 6.11, 5.1 – 5.7 and 6.8 of the textbook and then answer the following, trying not to look at your notes or at the textbook. Quiz #4, on Thursday 15th March, will consist of questions taken or inspired from the Part I of this homework and from the lab.

Part I — Questions

1. What is a decision structure? What is sequential processing?

2. Decide if the following boolean expressions will evaluate to `true` or `false`:

- `3 > 2.0 && false`
- `(4 != 3) || false`
- `'A' == 'b' && ! false`
- `(! false) == (true || 4 == 3)`

3. What is the relational operator used to determine whenever two values are different?

4. What is a flag?

5. Give three relational operators, and then two logical operators.

6. What would be displayed on the screen by the following code?

```
if (false)
{
        Console.WriteLine("Hello!");
}
Console.WriteLine("Hi!");
```

7. Is there a simpler way to write the expression "`over21 == true`", assuming that `over21` is a Boolean variable?

8. Assume that `x` and `y` are two `int` variables that have already been initialized (i.e., declared and assigned), write an `if` statement that assigns 10 to `x` if `y` is (strictly) greater than 5.

9. Is there any difference between = and ==? Write a statement that uses them both.

10. Is the following statement correct, i.e., would it compile, assuming `myFlag` is a `bool` variable, and `myAge` is an initialized `int` variable?

```
if ( myAge > 20 )
{
        myFlag = true
};
```

11. Write an `if` statement that prints "Bonjour !" if the value of the `char` variable `lang` is `'f'`.

12. Write the resulting value of

- `x || y && z`
- `!x || y && z`
- `!(x || y) && (z && y)`
- `(!x && x) || (!x || x)`

when `x`, `y` and `z` are all set to `true`. Do the same when they are all set to `false`.

13. Write a `boolean` expression that evaluates to `true` if a variable `x` is greater than 3 and less than or equal to 5.

14. Write an `if-else` statement that assigns 0.1 to `z` if `y` is greater or equal than 0, and that assigns −0.1 to `z` otherwise.

15. What will be displayed on the screen by the following program?

```
int x = 3, y = 2, z = 4;
if (x > y) {z += y;}
if (x > z) {y -= 4;}
Console.WriteLine($"x is {x}, y is {y}, and z is {z}.");
```

16. What will be displayed on the screen by the following program?

```
int x = 3, y = 2, z = 4;
if (x >= z) {z += y;} else if (x != y) {z *= y;}
y -= 4;
Console.WriteLine($"x is {x}, y is {y}, and z is {z}.");
```

17. (*We'll use the 24-hour clock, sometimes called the "military time".*) Assuming that an `int` variable `hour` has been initialized, write part of a program that would display on the screen "Good morning" if `hours` is less than or equal to 12, and "Hello" otherwise.

18. Assuming that `myString` is a String variable, write a statement that print "Hello, Mélodie!" if the value of `myString` is equal to `Mélodie`.

19. What will be displayed on the screen by the following program?

```
int x = 3, y = 2, z = 4;
if (y >= z) {z += y;}
else if (x != y) { if (false) {z -= 3;} else {z += x;}}
Console.WriteLinef($"x is {x}, y is {y}, and z is {z}.");
```

20. Rewrite, if possible, the three following `if-else-if` statements as `switch` statements:

```
1 if (myLang == 'f') { Console.WriteLine("Vous parlez Français ?"); }
2         else if (myLang == 'e') { Console.WriteLine("Do you speak English?"); }
3         else if (myLang == 'd') { Console.WriteLine("Sprechen Sie Deutsch?"); }
4         else { Console.WriteLine("I don't know your language!"); }
```

```
        if (myCity == "Augusta") { Console.WriteLine("I also live here!"); }
                else if (myCity == "Paris" || myCity == "Boone")
                {
                        Console.WriteLine("I used to live there!");
                }
                else
                {
                        Console.WriteLine("I never lived there.");
                }

        if (temp == 100.0) { Console.WriteLine("It's ready!"); }
                else if (temp >= 90.0) { Console.WriteLine("Almost ready!"); }
                else { Console.WriteLine("You have to wait."); }
```

If you think it is not possible or not feasible, explain why.

21. Given an `int` variable `counter`, write three statements that use three different operators to decrement its value by 1.

22. What will be displayed on the screen?

```
int x = 3, y = 7;
Console.WriteLine (x++ +" and "+ --y);
```

Part II — Programming Exercises

This time, the two exercises **do not** require a computer, and are here to craft on your problem-solving skills, and to prepare you for the exam. Make sure you feel ready before starting them, try to do them with a limited amount of time and without notes, and check your answer using VS.

Problem 1

Write a program that asks the user to write a country name and stores the user's input into a string variable. Then, compare that string with `"france"`: if it is equal, then print "Bienvenue en France !". Then, compare that string with `"usa"`: if it is equal, then print "Welcome to the US!". If the string is different from both `"france"` and `"usa"`, then print "Welcome to" followed by the name of the country the user typed in.

Can you think of two ways to implement this program, one using `if-else-if` statements, the other using `switch`?

Problem 2

You want to write a small program for an on-line printing company.

Your program should ask the user to chose a format (10×15 centimeters, or 8×11 inches), ask if it is the first time the customer order through your company, and a number of copies.

Then, calculate the total cost of printing those pictures, knowing that

- Printing a 10×15 centimeters picture costs \$0.20, printing a 8×11 inches picture costs \$0.25,
- A new customer gets a \$3 coupon if the order is more than \$5,
- A 10% discount is given if more than 50 copies were ordered,
- The two previous offers can be cumulated.

```
Enter 'c' for 10x15cm, anything else for 8x11in.
c
Is this your first time here? Type 'y' for 'yes'.
y
Enter a number of copies.
90
Welcome!
We cherish our new customers, so we are giving you a $3 discount!
Your total is $13,50. You had a 10% discount!
```

Listing 1: A First Example of Execution

```
Enter 'c' for 10x15cm, anything else for 8x11in.
p
Is this your first time here? Type 'y' for 'yes'.
Not at all
Enter a number of copies.
120
Your total is $27,00. You had a 10% discount!
```

Listing 2: A Second Example of Execution

Print a message starting by "Welcome!", then a new line, then "We cherish our new customers" if it is the first time the user uses your company, ", so we're giving you a $3 discount!" if the user is allowed to get the coupon, then print the total and "You had a 10% discount!" if the user ordered more than 50 copies.

See Listings 1 and 2 for examples of execution.