

Quiz #4, on Thursday, November 1, will consist of questions taken or inspired from Parts I and II 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 single 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.WriteLine($"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!"); }
```

```
1         if (myCity == "Augusta") { Console.WriteLine("I also live here!"); }
2     else if (myCity == "Paris" || myCity == "Boone")
3     {
4         Console.WriteLine("I used to live there!");
5     }
6     else
7     {
8         Console.WriteLine("I never lived there.");
9     }

1    if (temp == 100.0) { Console.WriteLine("It's ready!"); }
2    else if (temp >= 90.0) { Console.WriteLine("Almost ready!"); }
3    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);
```

23. What will be displayed at the screen by the following program?

```
int counter = 2;
while (counter != 5)
{
    Console.Write(counter + "\n");
    counter++;
}
```

24. What will be displayed at the screen by the following program?

```
int counter = 10;
while (counter != 5) ;
Console.Write(counter + "\n");
counter--;
```

25. What will be displayed at the screen by the following program?

```
int counter = 7;
while (counter != 2)
Console.Write(counter + "\n");
counter--;
```

26. What is input validation? Name a control structure that can be used to perform it. Why is it important?

27. What will be displayed at the screen by the following program?

```
int myCounter = 7;
do
{
    Console.WriteLine(myCounter);
    myCounter++;
} while (myCounter != 12);
```

28. What will be displayed at the screen by the following program?

```
int t = 3;
do
{
    Console.WriteLine(t);
    t *= 2;
} while (t != 24);
```

Part II – Problems

This time, the two exercises **do not** require a computer, and are here to craft on your problem-solving skills. 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.

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.



```
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