

Quiz #4, on November 15, 2019, will consist of questions taken or inspired from *the part I* of this homework and from the labs.

Part I – Questions

Q. 1 - Write a statement that creates a 10-elements `int` array named `numbers`.

Q. 2 - In the following, what is the value of the size declarator? What is the value of the index?

```
int[] numbers;  
numbers = new int[8];  
numbers[4] = 9;
```

Q. 3 - What is wrong with the following array declaration?

```
int[] books = new int[-1];
```

Q. 4 - What would be the size of the `test` array after the following statement has been executed?

```
int[] test = {3, 5, 7, 0, 9};
```

Q. 5 - What is “array bounds checking”? When does it happen?

Q. 6 - Draw the content of the `scores` array once those statements have been executed.

```
int[] scores = new int[3];  
scores[0] = 13;  
scores[2] = 25;
```

Q. 7 - Is there an error with the following code? If you think there is one, explain it, otherwise draw the content of the `myIncomes` array once those statements have been executed.

```
double[] myIncomes = new double[5];  
myIncomes[1] = 3.5;  
// No income on day two.  
myIncomes[3] = 5.8;  
myIncomes[4] = 0.5;  
myIncomes[5] = 1.5;
```

Q. 8 - Write a statement that creates and initializes a `double` array with the values 12.5, 89.0 and 3.24.

Q. 9 - What is the value of `count` and the content of `number` once the following has been executed?

```
int count=2;  
int[] number={3, 5, 7};  
number[count--] = 8;  
number[count]--;
```

Q. 10 - Suppose we have an array named `temp` that has been declared and initialized. How can we know the number of elements in this array?

Q. 11 - What will be displayed at the screen by the following program?

```
for (int num = 3 ; num <= 5 ; num++)  
    Console.Write(num + " ");
```

Q. 12 - Write a `for` loop that display at the screen the sequence "1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ".

Q. 13 - Adapt the code from Q. 12 so that the same sequence will be displayed at the screen, but *without the last comma*.

Q. 14 - Write a `for` loop that display at the screen the sequence "1 3 5 7 9".

Q. 15 - Given an `int` variable `myVar` initialized with a positive value, write a `for` loop that sums the integers between 0 and `myVar` (i.e., $0 + 1 + \dots + (\text{myVar} - 1) + \text{myVar}$).

Q. 16 - Consider the following code:

```
for (int y = 1; y <= 3; y++)  
{  
    for (int z = 1; z < 5; z++)  
        Console.WriteLine("Scene " + y + ", take " + z + ". ");  
    Console.WriteLine();  
}
```

How many times does the outer loop iterates (i.e., how many scenes are shot)? How many times does the inner loop iterates (i.e., how many takes for each scene)? Finally, what is the total number of iteration of the nested loops (i.e., how many takes are made, total)?

Q. 17 - Circle the pretest loops:

`do while` `switch` `while` `for` `if-else-if`

Q. 18 - What will be displayed at the screen by the following code?

```
int[] values = new int[6];  
for (int i = 0 ; i < 6 ; i++)  
    values[i] = (i*2);  
  
foreach (int j in values)  
    Console.WriteLine(j);
```

Q. 19 - Suppose we are given an `int` array `dailyPushUp` with 7 elements. Write a piece of code that display the value of the elements stored in the array `dailyPushUp`.

Q. 20 - Describe what the following code would do.

```
int[] record = { 3, 8, 11 };  
int accumulator = 0;  
foreach (int i in record)  
    accumulator += i;
```

Q. 21 - Assuming we have two `int` arrays of the same size, `firstA` and `secondA`, write a program that copy the content of `firstA` into `secondA`.

Q. 22 - Assuming we are given an `int` array named `arrayF`, write a program that adds one to each of its element. That is, if `arrayF` contains 3,5,7 and -2 before your program is executed, it should then contain 4,6,8 and -1 after your program was executed.

Q. 23 - Assuming we are given an `int` array named `arrayF`, write a program that display the product of its elements. That is, if `arrayF` contains 2,3 and -1 , then your program should display -6 .

Q. 24 - Write a static method (header included) that takes as argument an `int` array, and display at the screen the value of each element of that array.

Q. 25 - Write a static method (header included) that takes as argument an `int` array, and stores the value 10 in each element of that array.



Part II – Problems

This part contains the entirety of the final exam that was given on Spring 2019.

Problem 1

In this problem, you will be asked to 1. (partially) design, 2. implement, and 3. use a class to represent chocolate bars. A `Chocolate` (bar) has a **name**, a **price**, a **weight** (in grams) and a **type** (that should typically be white, dark, unsweetened or milk).

1. Draw the UML diagram for the `Chocolate` class, assuming it contains the aforementioned fields (attributes), an accessor (getter) for the name attribute and a mutator (setter) for the price attribute. Don't include any other method.
2. Write an accessor (getter) for the name attribute.
3. Write a mutator (setter) for the price attribute.
4. Write a constructor that takes 4 arguments and sets the value of the attributes to be the value of the arguments.
5. Write a constructor that takes a name, a weight, and a type. The price should then be set according to the following scale:

Type	white	dark	unsweetened	milk
Price per 1 g	\$0.04	\$0.05	\$0.06	\$0.04

If the type's value is not in the table, then the price should be set to -1 .

6. Write a *static* method `ToOunces` that takes as argument a weight in grams, and returns a weight in ounces (knowing that 1 g is 0.035 ounces).
7. Write a `ToString` method. The string returned should contains at least the weight in grams and ounces.
8. Write statement(s) that
 - (a) Displays how much in ounces is 100 g using your `ToOunces` method.

- (b) Creates a Chocolate object named `test1` with the values “Test”, 8, 100.00 and “white”.
- (c) Changes the price of `test1` to \$5.00.
- (d) Displays at the screen the name (and only the name) of `test1`.
- (e) Store the value returned by calling the `ToString` method with `test1` in a variable.

Problem 2

Assume that you are given an array of characters named `solution`, that contains characters corresponding to the correct answers to the questions of an exam. Assume you are given a different array of characters named `attempt`, with the same size as `solution`. It contains a person's answers.

Write a code fragment to display the number of correct answers using both arrays. For example, for the following two arrays of size 10, your program should display “You had 7 correct answers.”.

<code>solution</code>	'D'	'A'	'C'	'E'	'A'	'B'	'B'	'A'	'C'	'E'
<code>attempt</code>	'A'	'A'	'D'	'E'	'A'	'B'	'B'	'A'	'C'	'D'

Problem 3

We want to write a program for a coffee machine. The user should chose between three sizes (“Small”, “Medium” or “Large”) and a type of roast (“Light”, “Medium” or “Dark”). Then, the user should be given an amount to pay: a small coffee is \$1.00, a medium one is \$1.20, a large one is \$1.50, and a 10% extra fee is applied for the dark roast. Finally, the user should be asked how much they want to tip (\$0.00 being possible, but not negative numbers), and the program should display the total.

For the selection of the coffee, you can ask the user to enter only one letter, the whole string, a number that corresponds to the choice, ..., anything that seems appropriate, but you have to perform user input validation on all the data given by the user. Below is an example of running the program where user input is underlined, and hitting “return” is represented by `↵`. You do not have to reproduce it exactly, it is just to illustrate the expected behavior.

```
Do you want a small (1), a medium (2) or a large (3) coffee?
S ↵
Do you want a small (1), a medium (2) or a large (3) coffee?
1 ↵
Do you want a (L)ight, a (M)edium or a (D)ark small coffee?
D ↵
A small dark coffee is $1.10. How much do you want to tip?
-3 ↵
How much do you want to tip?
0.9 ↵
Your total is $2.00.
```

Problem 4

Answer the following short questions.

1. What is the escape sequence for a new line?
2. What is the return type of the operation `2M * 2`?
3. What is the return type of a constructor method?
4. What is the relational operator used to determine whenever two values are equal?
5. Write a statement that declares a constant of type `int` named `DaysInWeek` and sets its value to 7.

6. Write a condition that evaluates to `true` if an `int` variable named `age` is smaller than 18 or greater than 65 (both included).
7. Write a condition that evaluates to `true` if a `char` variable named `answer` is `'Y'` or `'y'`.
8. Write statement(s) that declares an array of `int` of size 100 with the values 1, 2, ..., 99, 100.

