

Part01

1. What is the default value assigned to array elements in C#?

This depends on the type of array.

- If it had numeric value, it would be 0
- If it had string or character value, it would be NULL
- If it had Boolean value, it would be false

2. What is the difference between `Array.Clone()` and `Array.Copy()`?

- `Clone`: perform a shallow copy and create a new array object with the same element of the original one.
- `Copy`: also do a shallow copy but it copies a subset of an array to the destination array and destination must be declared.

3. What is the difference between `GetLength()` and `Length` for multidimensional arrays?

- `GetLength`: return the length of a one dimension like `array[3, 5]` `GetLength(0)` return 3.
- `Length`: return the whole number of array elements in the case above it will return 15.

4. What is the difference between `Array.Copy()` and `Array.ConstrainedCopy()`?

- `Copy`: also do a shallow copy but it copies a subset of an array to the destination array and destination must be declared.
- `CostrainedCopy`: is the same but here you choose the start index of the copy and the start index to where it will be pasted.

5. Why is `foreach` preferred for read-only operations on arrays?

Cause it just cannot do write and no need to set range manually so no out of range index and any change happen to the element inside it only happen to the copy of the element not the original.

6. Why is input validation important when working with user inputs?

To avoid any exception can happen because of user input and because the user can enter anything.

7. How can you format the output of a 2D array for better readability?

By printing it as matrix every subarray in a separate row.

8. When should you prefer a switch statement over if-else?
In case of switching on the value of a single variable.
9. What is the time complexity of Array.Sort()?
 $O(n \log n)$
10. Which loop (for or foreach) is more efficient for calculating the sum of an array, and why?
For id better because it's access is by the index not by creating a new object like foreach.

Part02

1. What happens if the user enters a value outside the range of 1 to 7?
The output will be that out-of-range number.