**Data Structure**

Data Structure has two type:

* Non-Linear: graph, tree (), jungle
* Linear: List, Array, ArrayList, Stack, Queue, Deque

Big O() shows the worst case in data structure

1. Linear:

* List: là một data structure liên tiếp, nếu muốn access member bất kì (VD: index 3), nó phải access one-by-one in order which start from index 0, index 1, index 2 trước. All members of List can have **different** data types from each other
* Array: là một data structure cho phép random access members, nó có thể access thẳng vào index 3 mà không cần access vào index 0, 1, 2. All members of Array must have the **same** data type
* The best case scenario in query is the number you want to find at index 0 => o(1). The worst case in query is the value has been found at the last index which is Big O(n) (Big O means the worst scenario). The average case is in the middle => o(n/2)

1. Exercise:

* Ex1: Assuming an array is given to you which has ‘m’ dimension. Write a code to find a specific value in this array

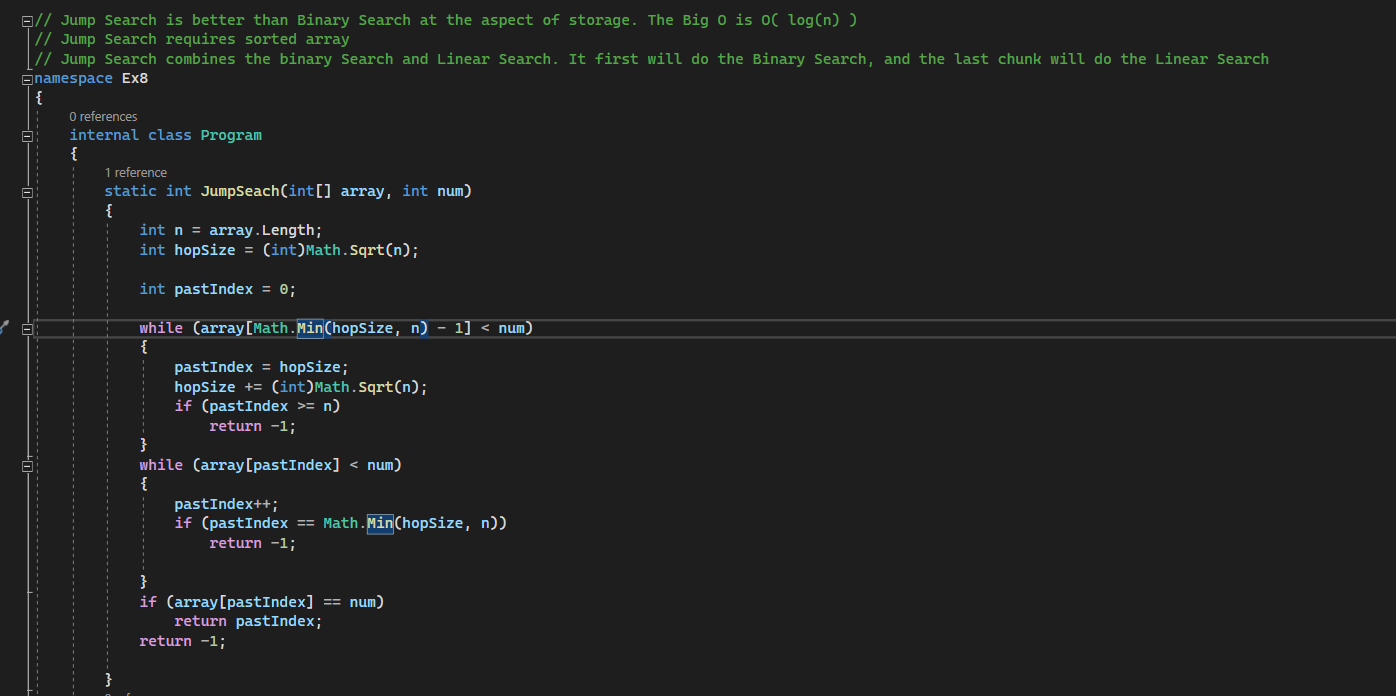
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* Ex2: Write a code to find the maximum value in a array and analyze Big O
* Ex3: Jump Search to search a number in array



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1. Stack:

* A stack is a linear data structure that the element which gets in first will be the last element fetch out (LIFO: Last I)
* Recursion is a method call itself
* Binary Search: has two ways to implement which are loop based and recursion-based
* Recursion requires a stack
* Exercise of Recursion:
  + Factorial Number:

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* + Fibonacci Serial number:

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Big O(n) of Fibonacci

A picture containing schematic

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1. Question:

* Members of List in C# need the same data type