

Arrays

An array is a data structure that stores a collection of items of the same data type. The size of the array is fixed when it is initialized. An array uses indexes to access its elements. The first element in the array starts at index 0 for most programming languages. An advantage to using an array is that retrieving elements is very fast if its index is known. A disadvantage is that the insertion and deletion of elements is not as efficient compared to other data structures. Because of its fixed size, adding additional elements past the maximum size necessitates copying the array into an entirely new array with a larger capacity. This process of dynamically resizing the array is abstracted using an ArrayList/Vector. The

following code snippet is an example of how to declare and initialize an array in C#.

```
C#

class TestArraysClass
{
    static void Main()
    {
        // Declare a single-dimensional array of 5 integers.
        int[] array1 = new int[5];

        // Declare and set array element values.
        int[] array2 = new int[] { 1, 3, 5, 7, 9 };

        // Alternative syntax.
        int[] array3 = { 1, 2, 3, 4, 5, 6 };

        // Declare a two dimensional array.
        int[,] multiDimensionalArray1 = new int[2, 3];

        // Declare and set array element values.
        int[,] multiDimensionalArray2 = { { 1, 2, 3 }, { 4, 5, 6 } };

        // Declare a jagged array.
        int[][] jaggedArray = new int[6][];

        // Set the values of the first array in the jagged array structure.
        jaggedArray[0] = new int[4] { 1, 2, 3, 4 };
    }
}
```