Day 47/60 - Difference Between Select and SelectMany in C# LINQ

When working with LINQ, both Select and SelectMany are used to transform collections, but they behave differently when dealing with nested collections.

Select - Projects Each Item One-to-One

Transforms each element individually.
Returns a collection of collections when selecting from nested lists.

Example:

```
var numbers = new List<int[]> { new int[] { 1, 2 }, new int[] { 3, 4 } };

var result = numbers.Select(arr => arr); // Returns a collection of arrays

foreach (var arr in result)
{
 Console.WriteLine(string.Join(", ", arr));
}
```

Output:

```
1, 2
3, 4
```

Here, Select maintains the nested structure.

SelectMany - Flattens Nested Collections

Merges all inner collections into a single sequence.
Best for handling nested lists or arrays.

Example:

```
var numbers = new List<int[]> { new int[] { 1, 2 }, new int[] { 3, 4 } };

var result = numbers.SelectMany(arr => arr); // Flattens into one list

Console.WriteLine(string.Join(", ", result));
```

Output:

```
1, 2, 3, 4
```

SelectMany flattens the nested structure into a single list.

When to Use What?

Use Select when transforming elements individually.
Use SelectMany when you need a flat list from nested collections.

Understanding Select vs SelectMany helps you write cleaner LINQ queries and process data efficiently.