
AV CLUB
#APBio

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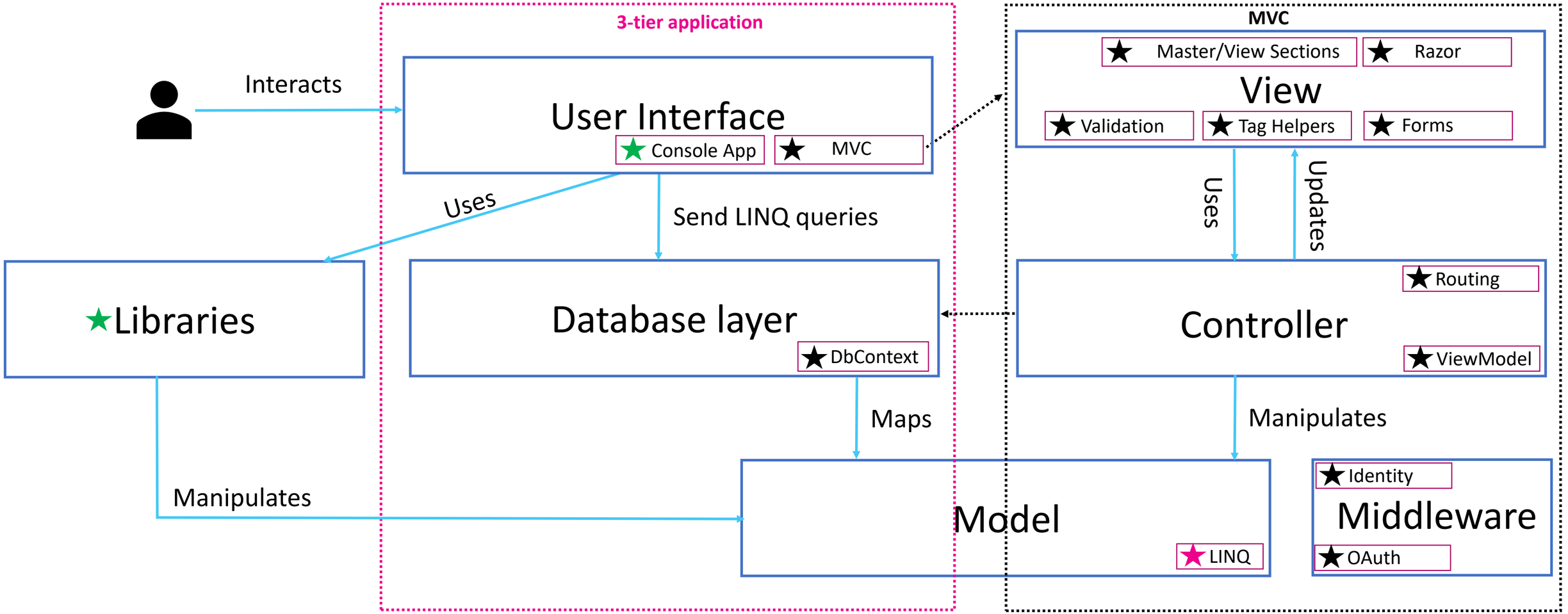
LINQ

S4 - .NET Technology CCCP-IBC



Roadmap .NET CCCP

Current topic(s)

Covered topic

Futured topic

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LINQ

LINQ
Language-Integrated Query

QUERY

QUERY

SELECT
FROM
WHERE
COUNT, MAX, SUM
GROUP BY
JOIN
…

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LINQ ADDS QUERY OPTIONS AS A FULL C# LANGUAGE ASPECT

LINQ

QUERY

SQL DATABASE

ENTITY FRAMWORK

DATASETS

XML DOCUMENTS

JSON

ARRAYS

DICTIONARIES

IENUMERABLE<T>

Example linq query

```
// IDE: LINQPAD
// string collection
IList<string> movies = new List<string>() {
    "The Shawshank Redemption",
    "The Godfather",
    "The Godfather: Part II",
    "The Dark Knight" ,
    "12 Angry Men",
    "Schindler's List",
    "The Lord of the Rings: The Return of the King",
    "Pulp Fiction",
    "The Good, the Bad and the Ugly",
    "The Lord of the Rings: The Fellowship of the Ring"
};

// LINQ Query Syntax
IEnumerable<string> result = movies.Where(s => s.Contains("The")).OrderBy(s => s);
result.Dump();
```

IOrderedEnumerable<String> (7 items)
The Dark Knight
The Godfather
The Godfather: Part II
The Good, the Bad and the Ugly
The Lord of the Rings: The Fellowship of the Ring
The Lord of the Rings: The Return of the King
The Shawshank Redemption

Namespace

```
using System.Linq;
```


DEMO

You can call any LINQ method on any object that implements IEnumerable<T>

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IENUMERABLE<T>

Most C# collections and all C# arrays implement IEnumerable<T>

IEnumerable<T>:

is an interface that defines one method: GetEnumerator

IEnumerable<T>

ITERABLE

FOREACH

Example IEnumerable<T> with Linq and foreach

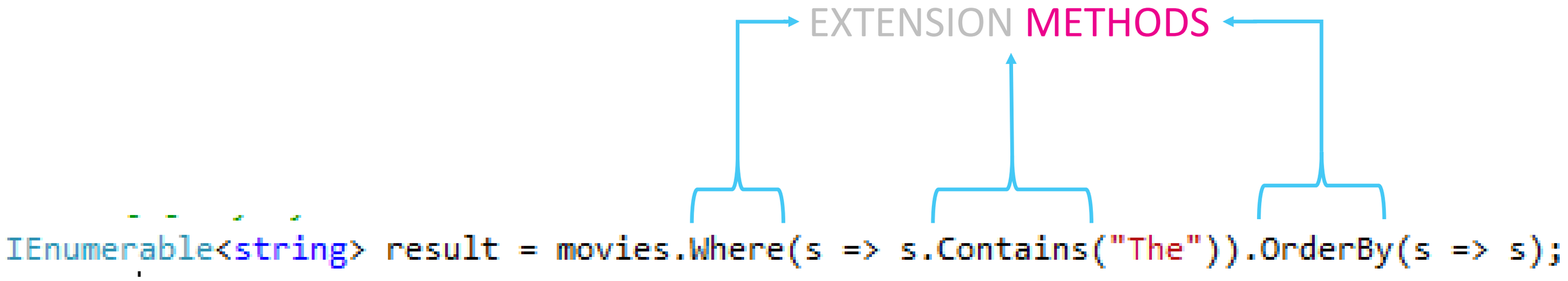
```
using System;
using System.Linq;
using System.Collections.Generic;

namespace linq_demo
{
    class Program
    {
        static void Main(string[] args)
        {
            IList<string> movies = new List<string>() {
                "The Shawshank Redemption",
                "The Godfather",
                "The Godfather: Part II",
                "The Dark Knight" ,
                "12 Angry Men",
                "Schindler's List",
                "The Lord of the Rings: The Return of the King",
                "Pulp Fiction",
                "The Good, the Bad and the Ugly",
                "The Lord of the Rings: The Fellowship of the Ring"
            };


            IEnumerable<string> result = movies.Where(s => s.Contains("The")).OrderBy(s => s);
            foreach(var movie in result){
                Console.WriteLine($"Title: {movie}");
            }//endforeach
        }
    }
}
```

LINQ methods are extension methods to IEnumerable<T>

Extension method



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LINQ

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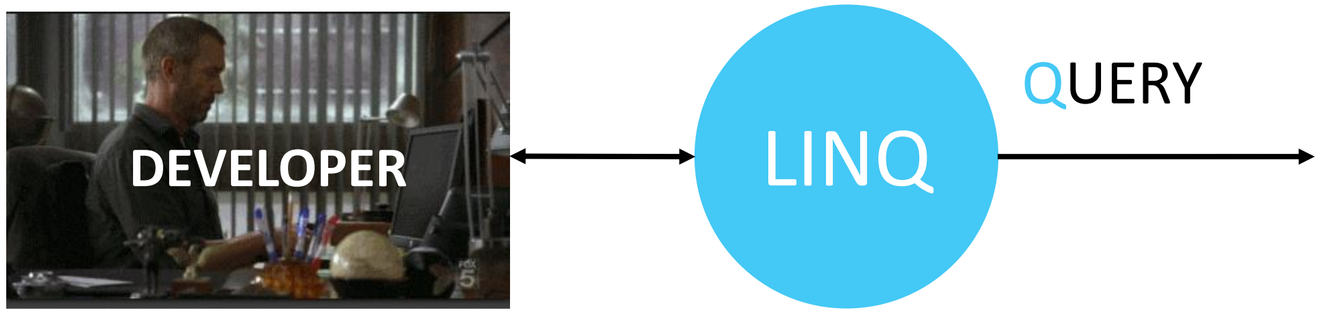
IENUMERABLE<T>

LINQ

QUERY

OWN CLASSES THAT IMPLEMENT IENUMERABLE<T>

Example IEnumerable<T>




```
public class Student
{
    public int StudentID { get; set; }
    public string StudentName { get; set; }
    public int Age { get; set; }
}
```

```
IEnumerable<int> list = new List<int> { 1, 2, 3 };
IEnumerable<string> array = new[] { "one", "two", "three" };
IEnumerable<int> set = new SortedSet<int> { 1, 2, 3 };
IEnumerable<Student> studentList = new List<Student>() {
    new Student() { StudentID = 1, StudentName = "John" },
    new Student() { StudentID = 2, StudentName = "Moin" },
    new Student() { StudentID = 3, StudentName = "Bill" },
    new Student() { StudentID = 4, StudentName = "Ram" },
    new Student() { StudentID = 5, StudentName = "Ron" }
};
```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Namespace

```
using System.Collection.Generic;
```

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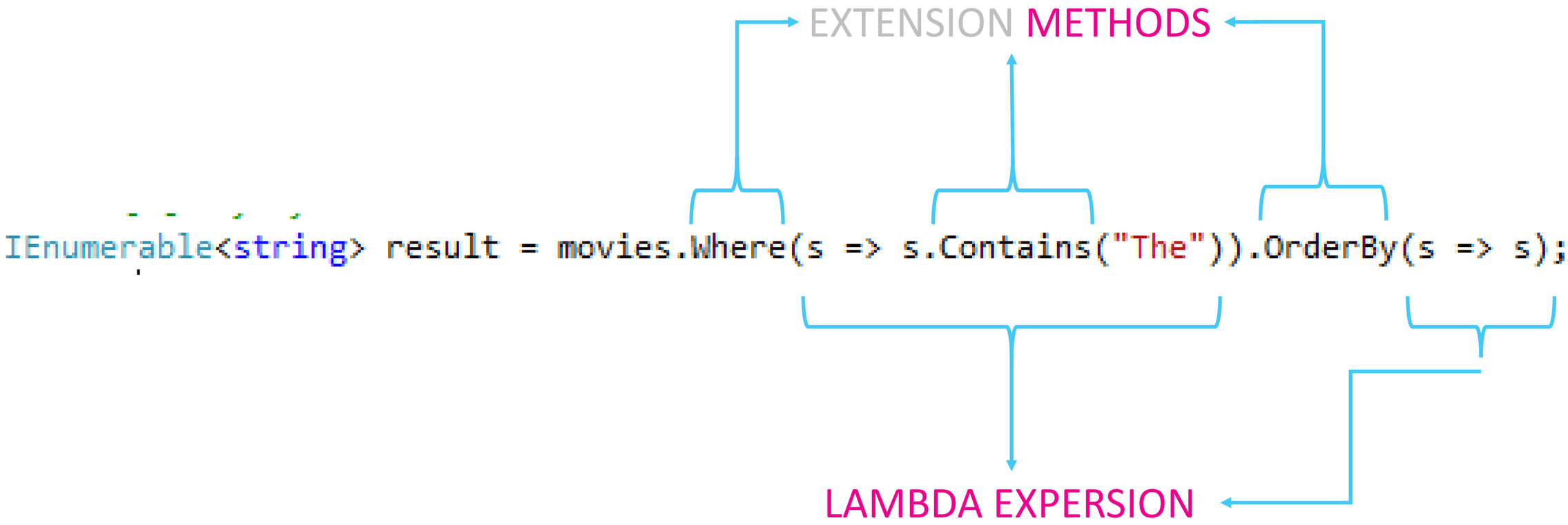
LAMBA EXPRESSIONS

AND
EXTENSION METHODS

Method syntax



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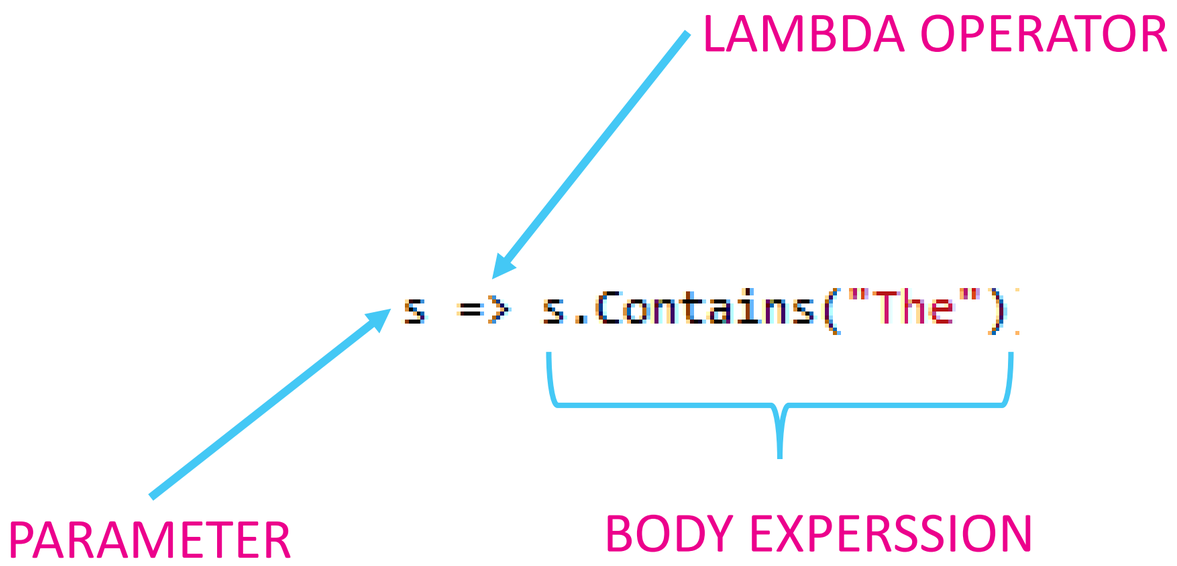
Lambda expression



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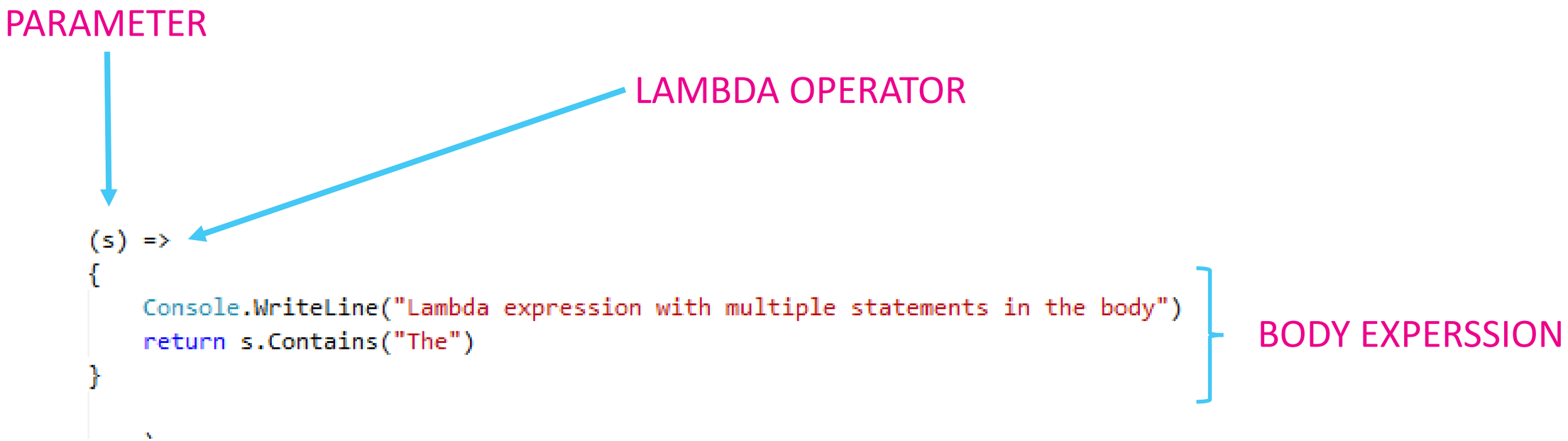
Multi statement lambda expression



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DEFERRED EXECUTION

Deferred execution

Deferred execution:
the query is not executed when declared.

It is executed when the query object is iterated over a loop.

Deferred execution

```
IEnumerable<string> result = movies.Where(s => s.Contains("The")).OrderBy(s => s);
foreach(var movie in result){
    Console.WriteLine($"Title: {movie}");
}//endforeach
```

EXECUTED HERE

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Immediate execution

Immediate Execution:

We can force our query to execute immediately with: .ToList()


DEMO