# LINQ Examples in C#

This document provides a collection of LINQ examples in C# for querying arrays, lists, sorting, filtering, aggregation, grouping, joining, and pagination.

## 1. LINQ with Arrays

using System;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 int[] numbers = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };  
  
 var evenNumbers = from num in numbers  
 where num % 2 == 0  
 select num;  
  
 Console.WriteLine("Even Numbers: " + string.Join(", ", evenNumbers));  
 }  
}

## 2. LINQ with Lists

using System;  
using System.Collections.Generic;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 List<string> names = new List<string> { "Alice", "Bob", "Charlie", "David", "Eve" };  
  
 var filteredNames = names.Where(name => name.StartsWith("C"));  
  
 Console.WriteLine("Names starting with C: " + string.Join(", ", filteredNames));  
 }  
}

## 3. LINQ Sorting (OrderBy & OrderByDescending)

using System;  
using System.Collections.Generic;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 List<int> numbers = new List<int> { 5, 3, 8, 1, 9 };  
  
 var sortedNumbers = numbers.OrderBy(n => n);  
 Console.WriteLine("Sorted Ascending: " + string.Join(", ", sortedNumbers));  
  
 var sortedDescending = numbers.OrderByDescending(n => n);  
 Console.WriteLine("Sorted Descending: " + string.Join(", ", sortedDescending));  
 }  
}

## 4. LINQ Aggregate Functions

using System;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 int[] numbers = { 10, 20, 30, 40, 50 };  
  
 Console.WriteLine("Sum: " + numbers.Sum());  
 Console.WriteLine("Count: " + numbers.Count());  
 Console.WriteLine("Average: " + numbers.Average());  
 Console.WriteLine("Max: " + numbers.Max());  
 Console.WriteLine("Min: " + numbers.Min());  
 }  
}

## 5. LINQ Grouping

using System;  
using System.Collections.Generic;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 List<string> words = new List<string> { "Apple", "Banana", "Avocado", "Blueberry", "Cherry" };  
  
 var groupedWords = words.GroupBy(w => w[0]);  
  
 foreach (var group in groupedWords)  
 {  
 Console.WriteLine($"Words starting with '{group.Key}': {string.Join(", ", group)}");  
 }  
 }  
}

## 6. LINQ Join

using System;  
using System.Collections.Generic;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 var students = new List<(int Id, string Name)>() { (1, "Alice"), (2, "Bob"), (3, "Charlie") };  
 var scores = new List<(int StudentId, int Score)>() { (1, 90), (2, 85), (3, 95) };  
  
 var studentScores = from student in students  
 join score in scores on student.Id equals score.StudentId  
 select new { student.Name, score.Score };  
  
 foreach (var item in studentScores)  
 {  
 Console.WriteLine($"{item.Name} scored {item.Score}");  
 }  
 }  
}

## 7. LINQ FirstOrDefault and SingleOrDefault

using System;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 string[] names = { "Alice", "Bob", "Charlie", "David" };  
  
 string firstName = names.FirstOrDefault(n => n.StartsWith("B"));  
 Console.WriteLine("First name starting with B: " + firstName);  
  
 string singleName = names.SingleOrDefault(n => n == "Charlie");  
 Console.WriteLine("Single match: " + singleName);  
 }  
}

## 8. LINQ Select Transformation

using System;  
using System.Collections.Generic;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 var numbers = new List<int> { 1, 2, 3, 4, 5 };  
 var transformedNumbers = numbers.Select(n => n \* 10);  
  
 Console.WriteLine("Transformed Numbers: " + string.Join(", ", transformedNumbers));  
 }  
}

## 9. LINQ Skip and Take (Pagination)

using System;  
using System.Linq;  
  
class Program  
{  
 static void Main()  
 {  
 int[] numbers = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };  
  
 var skipFirstThree = numbers.Skip(3);  
 var takeFirstFive = numbers.Take(5);  
  
 Console.WriteLine("After Skipping First 3: " + string.Join(", ", skipFirstThree));  
 Console.WriteLine("First 5 Numbers: " + string.Join(", ", takeFirstFive));  
 }  
}