Manish Jaiswal

Multithreading Series

MASTERING

Multithreading vs. Parallel Programming in .NET8

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01

What is Multithreading?

Multithreading allows multiple threads to run concurrently within a single process.

Real-World Analogy: Think of a restaurant kitchen where different chefs (threads) are preparing various dishes simultaneously, but they share the same workspace (memory).

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02

Example: Basic Multithreading

```
1   public void CookDish()
2   {
3       Console.WriteLine("Dish is being cooked!");
4   }
5
6   Thread chef1 = new Thread(CookDish);
7   Thread chef2 = new Thread(CookDish);
8
9   chef1.Start();
10  chef2.Start();
```

Here, two chefs (threads) are cooking dishes at the same time, but they are working on different orders (tasks) within the same kitchen (process).

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03

What is Parallel Programming?

Parallel Programming focuses on dividing a task into smaller subtasks that can be processed simultaneously across multiple cores.

Real-World Analogy: Imagine a construction project where multiple teams are working on different sections of a building at the same time.

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04

Example: Parallel Programming

```
1   var tasks = new List<Action>
2   {
3       () => BuildSection("Foundation"),
4       () => BuildSection("Walls"),
5       () => BuildSection("Roof")
6   };
7
8   Parallel.ForEach(tasks, task => task());
```

Each team (task) is working on a different section of the building, and they are working simultaneously across different cores, speeding up the construction process.

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05

Multithreading vs. Parallel Programming

- **Multithreading:** Multiple threads within a single process; ideal for I/O-bound tasks like reading files or handling multiple network requests.

- **Parallel Programming:** Splits a task into subtasks processed in parallel; best for CPU-bound tasks like large calculations or data processing.

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06

Top 5 Interview Questions

1. What is the difference between multithreading and parallel programming in C#?
2. When would you choose multithreading over parallel programming?
3. How does ThreadPool work in C#?
4. Can you explain the use of async and await in C# for handling asynchronous programming?
5. What are potential pitfalls of multithreading, and how can you avoid them?

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