

C# Fundamentals

INTRODUCING C# AND .NET

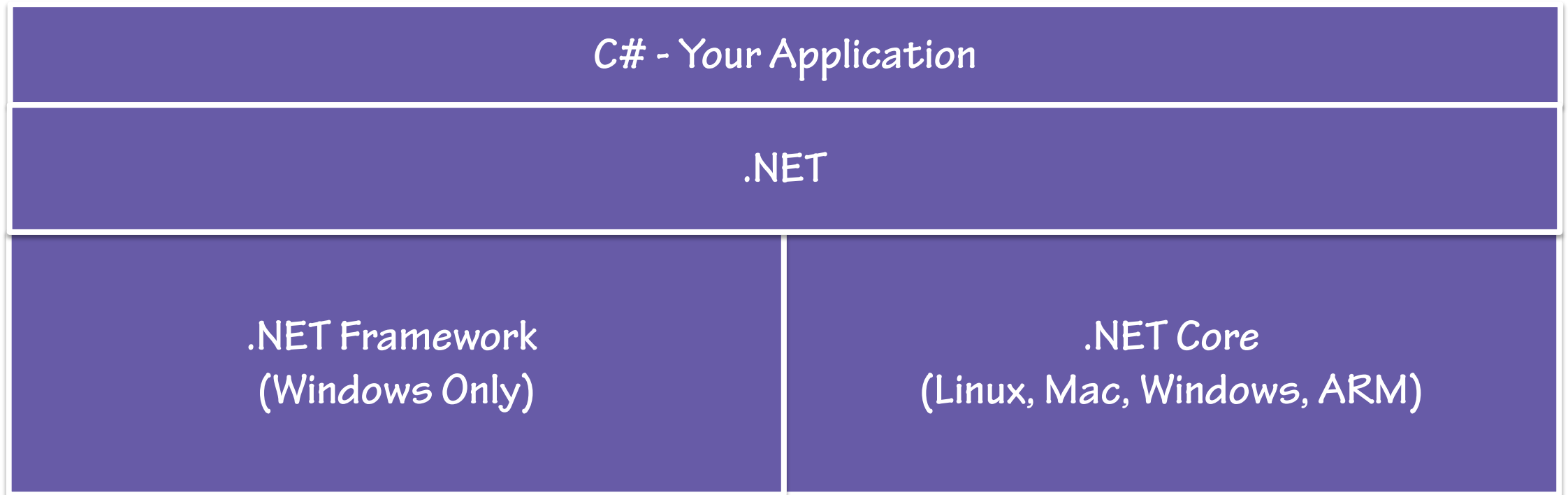


Scott Allen

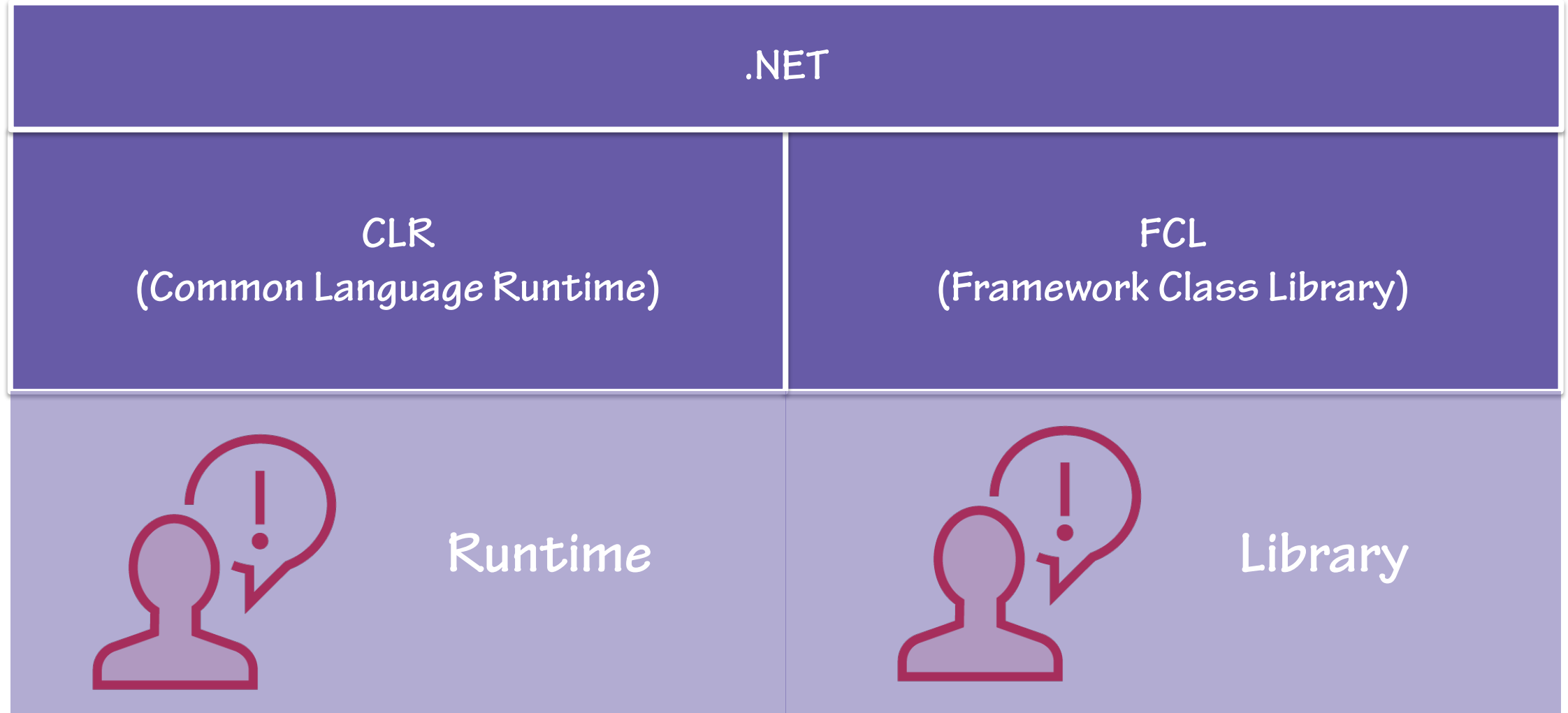
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Two .NET Frameworks



.NET



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Create .NET apps faster with NuGet

Search for packages...

1,520,812 package versions

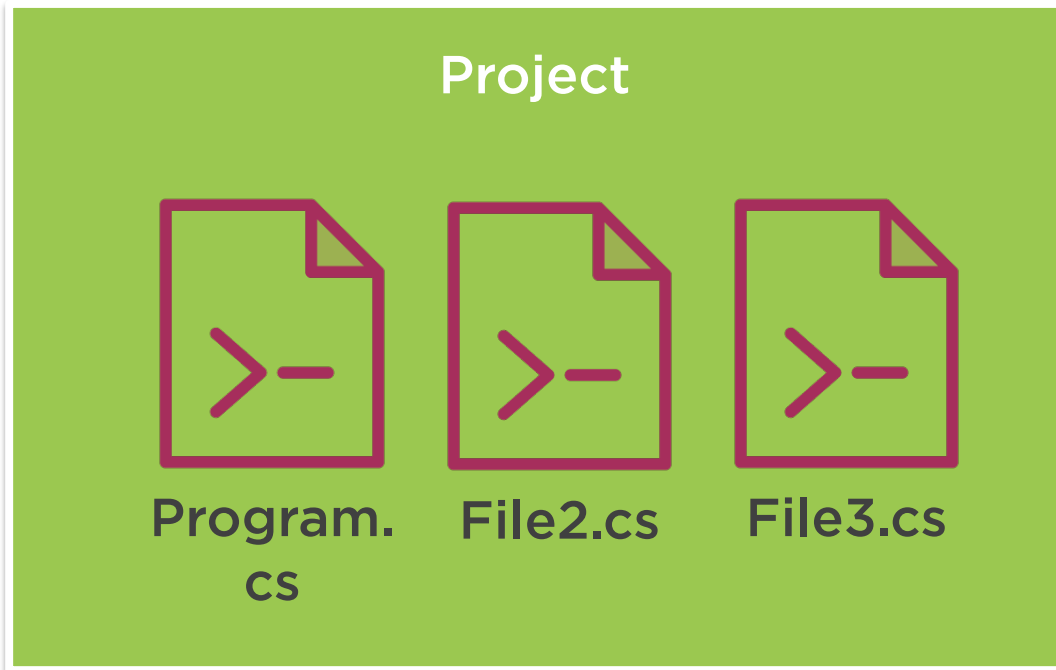
16,002,972,823 package downloads

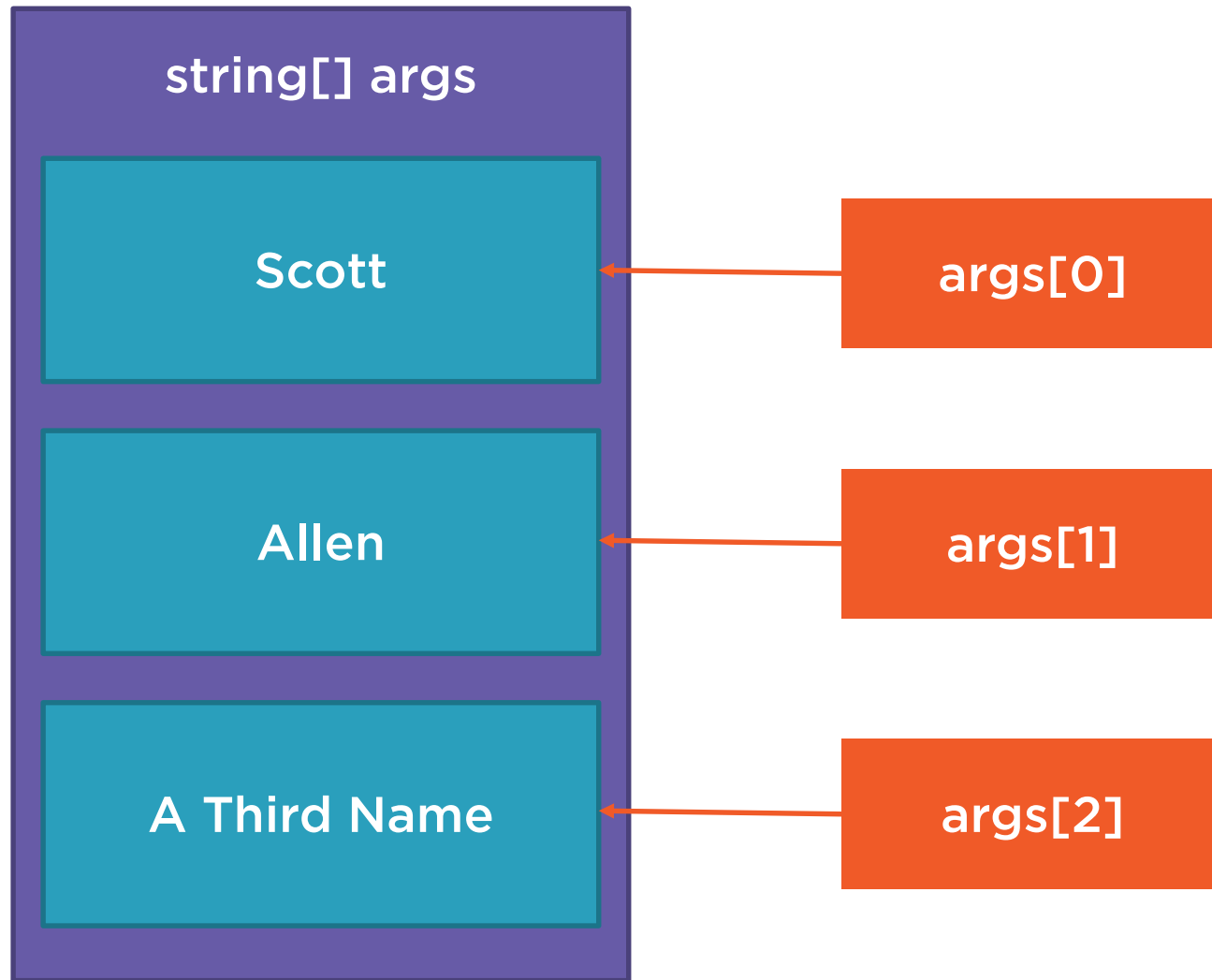
142,028 unique packages

What is NuGet?

NuGet is the package manager for .NET. The NuGet client tools provide the ability to produce and consume packages. The NuGet Gallery is the central package repository used by all package authors and consumers.







Summary



```
5  class Program
6  {
    0 references
7  static void Main(string[] args)
8  {
9      if(args.Length > 0)
10     {
11         Console.WriteLine($"Hello, {args[0]}!");
12     }
13     else
14     {
15         Console.WriteLine("Hello!");
16     }
17 }
18 }
19 }
```



Learning the C# Syntax



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We need an electronic grade book to read the scores of an individual student and then compute some simple statistics from the scores.

The grades are entered as floating point numbers from 0 to 100, and the statistics should show us the highest grade, the lowest grade, and the average grade.

- The Project Manager



Summary



```
var grades = new List<double>() { 12.7, 10.3, 6.11, 4.1 };
grades.Add(56.1);

var result = 0.0;
foreach(var number in grades)
{
    result += number;
}
result /= grades.Count;
Console.WriteLine($"The average grade is {result:N1}");
```



Working with Classes and Objects



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Summary



```
class Book
{
    public Book(string name) ...

    public void AddGrade(double grade) ...

    public void ShowStatistics() ...

    private List<double> grades;
    private string name;
}
```

Testing Your Code



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Unit Testing



Unit Testing



Verify



Investigate

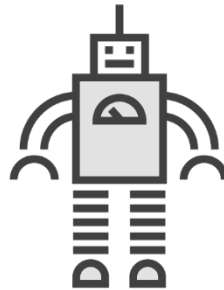
```
public void ShowStatistics()
{
    var result = 0.0;
    var highGrade = double.MinValue;
    var lowGrade = double.MaxValue;

    foreach(var number in grades)
    {
        lowGrade = Math.Min(number, lowGrade);
        highGrade = Math.Max(number, highGrade);
        result += number;
    }
    result /= grades.Count;
    Console.WriteLine($"The lowest grade is {lowGrade}");
    Console.WriteLine($"The highest grade is {highGrade}");
    Console.WriteLine($"The average grade is {result:M1}");
}
```

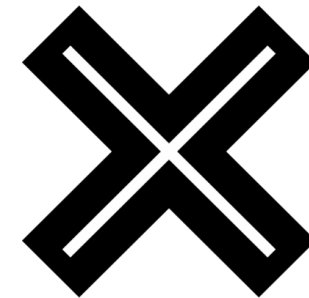
Small Units of Code



Test Runner



Automation



xUnit.net



Summary



```
class Book
{
    public Book(string name) ...

    public void AddGrade(double grade) ...

    public void ShowStatistics() ...

    private List<double> grades;
    private string name;
}
```


Controlling the Flow of Execution



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References versus Values

Reference Type

```
var b = new Book("Grades");
```

Memory

b

1072

Book
Object

grades
name



Value Type

```
var x = 3;
```

x

3



90 – 100	A
80-89	B
70-79	C
60-69	D
0-59	F



Controlling the Flow of Execution



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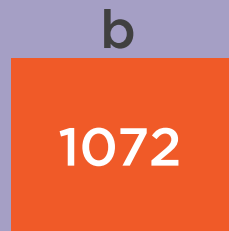


References versus Values

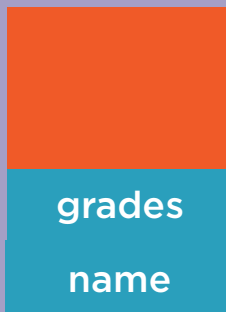
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Book
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Value Type

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90 – 100	A
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Building Types



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Value Type

```
var x = 3;
```

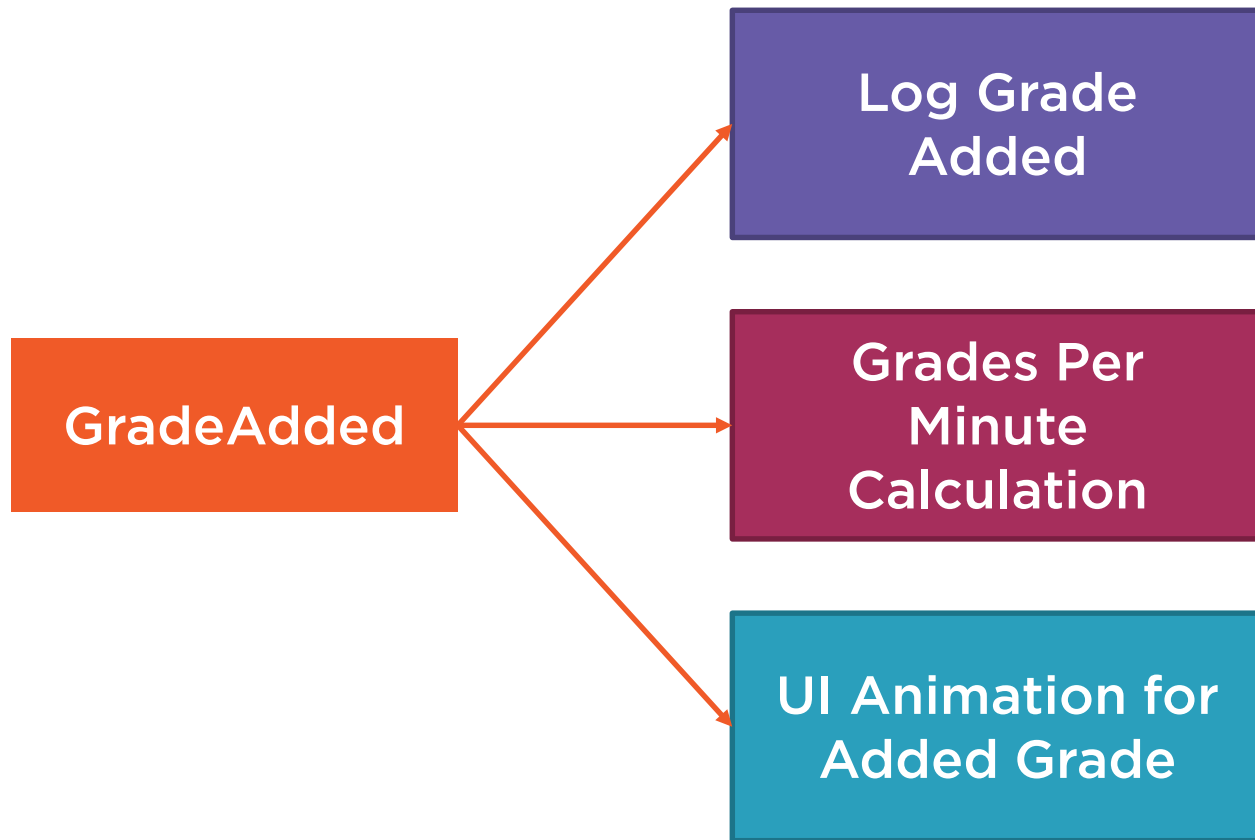
x

3




```
public string GetName()  
{  
    return name;  
}  
  
public void SetName(string newname)  
{  
    name = newname;  
}
```





Object-oriented Programming with C#



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Catching up with the Latest in C#



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References versus Values

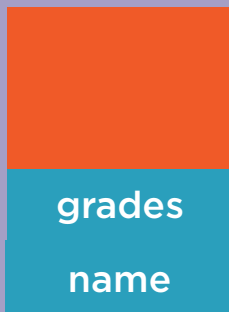
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Book
Object



Value Type

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var x = 3;
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Going Further with C#



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