

Controlling Program Flow in C#

Getting Started with C# Statements



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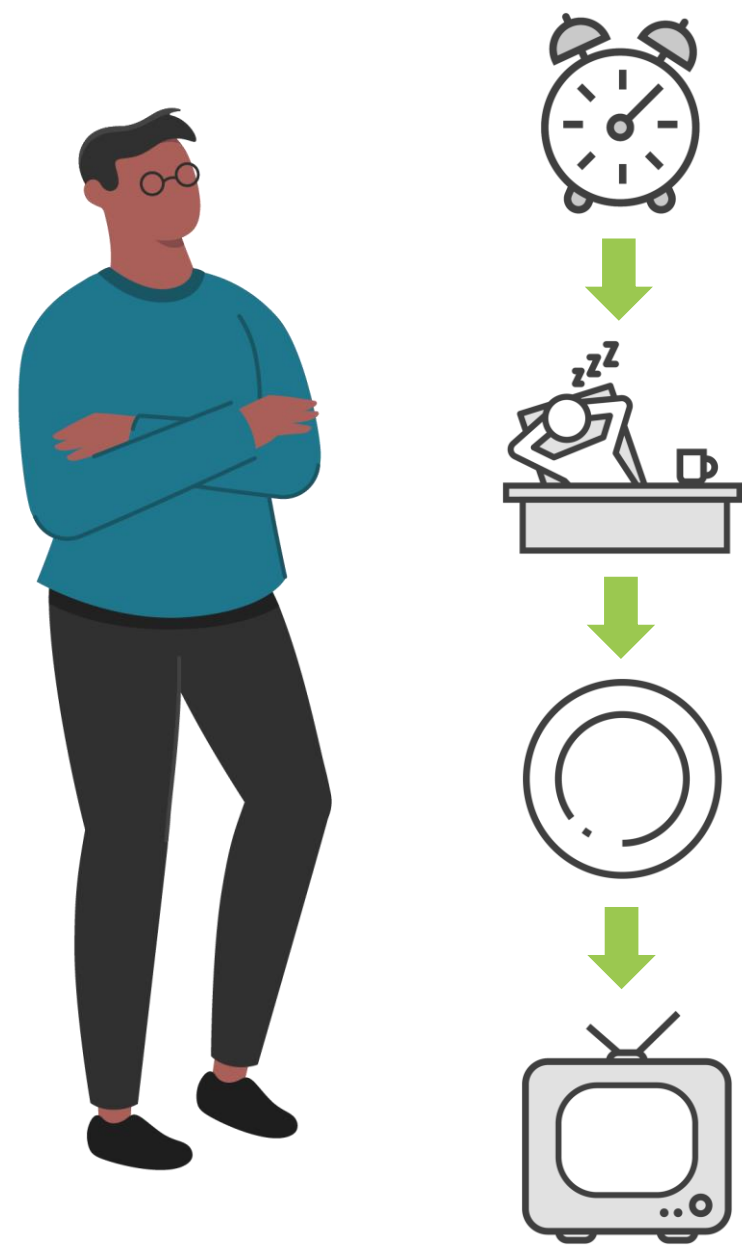


This is Phil.

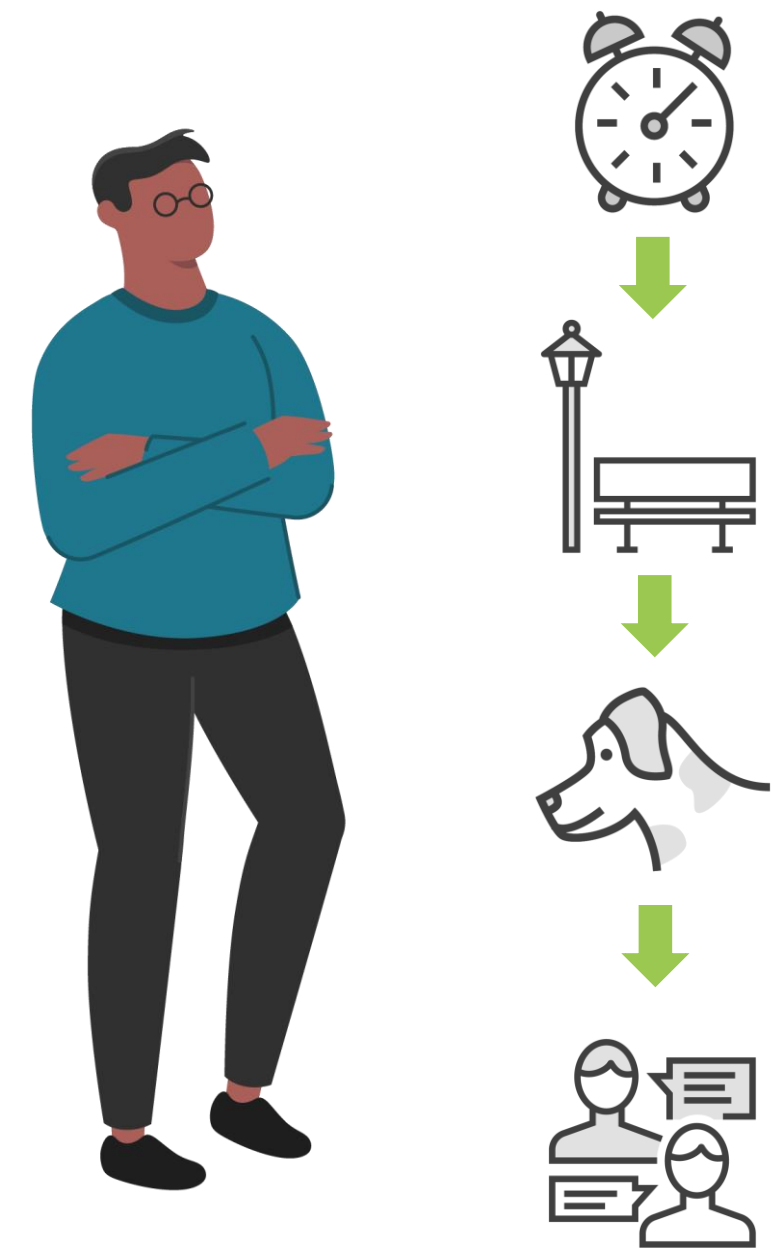
- **His life has a routine**
- **That routine changes based on various factors**



The Flow of Life



Monday



The weekend

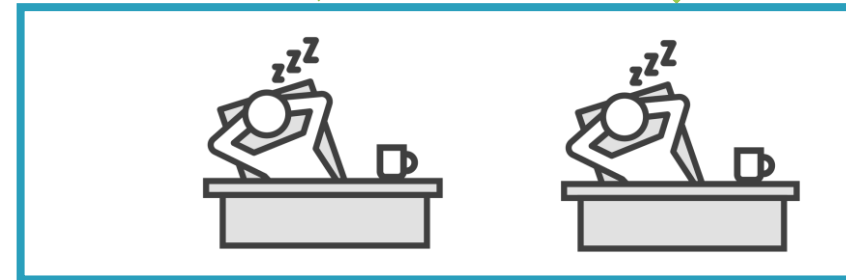


Consistent and Variable Routines

Occurs every day



Occurs every week day



Occurs every day with different criteria



Varies almost every day of the week



Week days

The weekend



Simple Program Execution

Code file

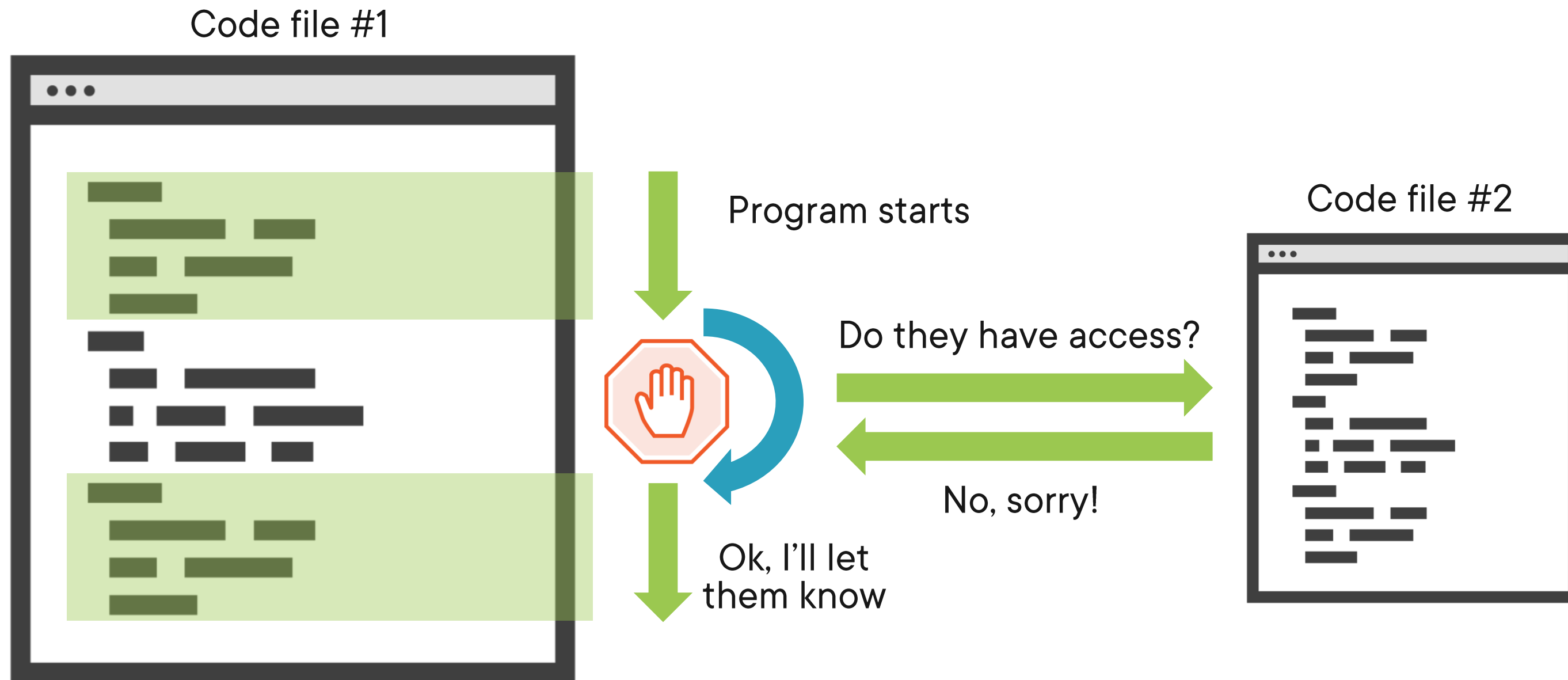


Every line of code
executes in order...

...every time.



Complex Program Execution

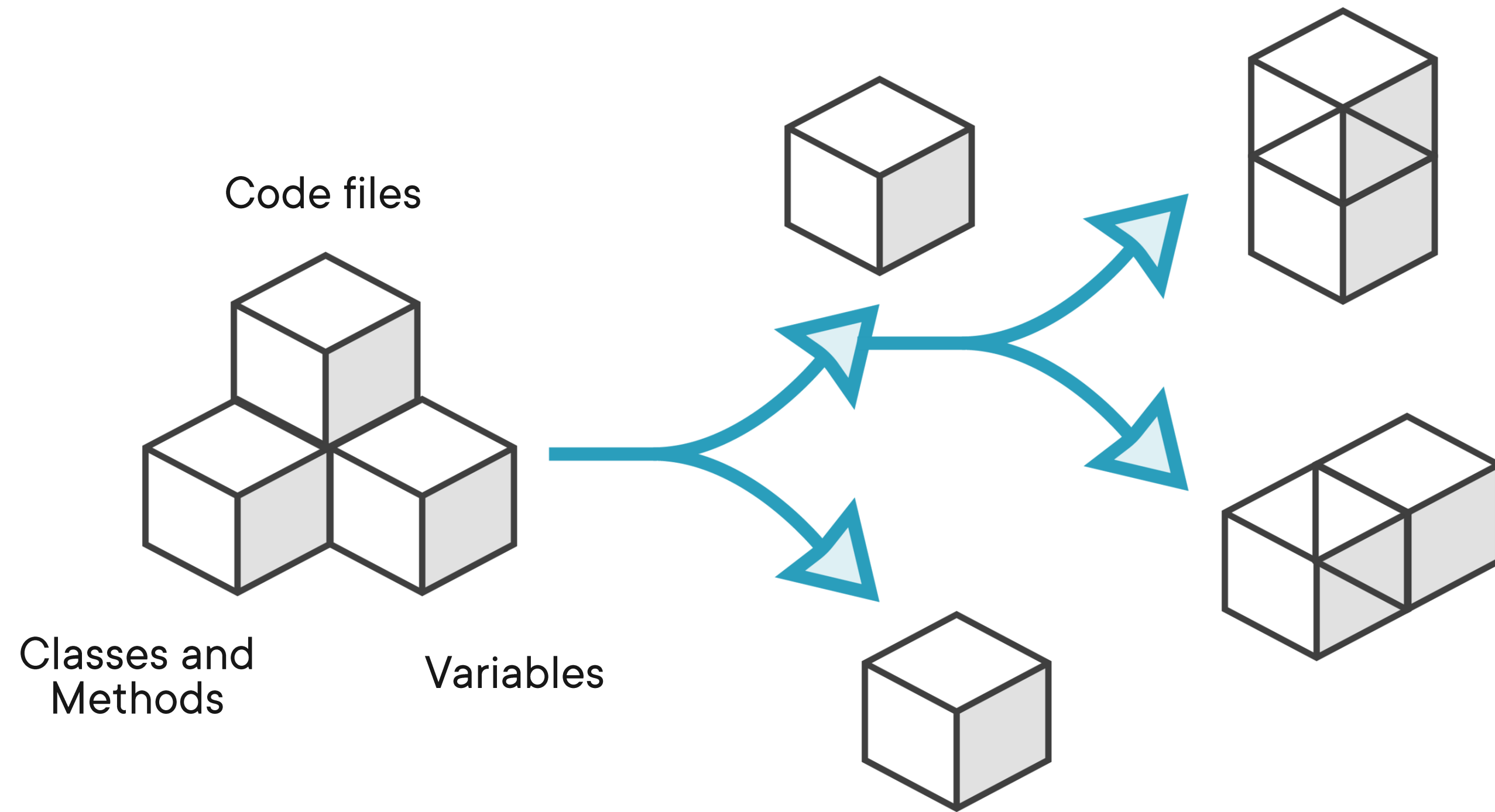


Program Flow

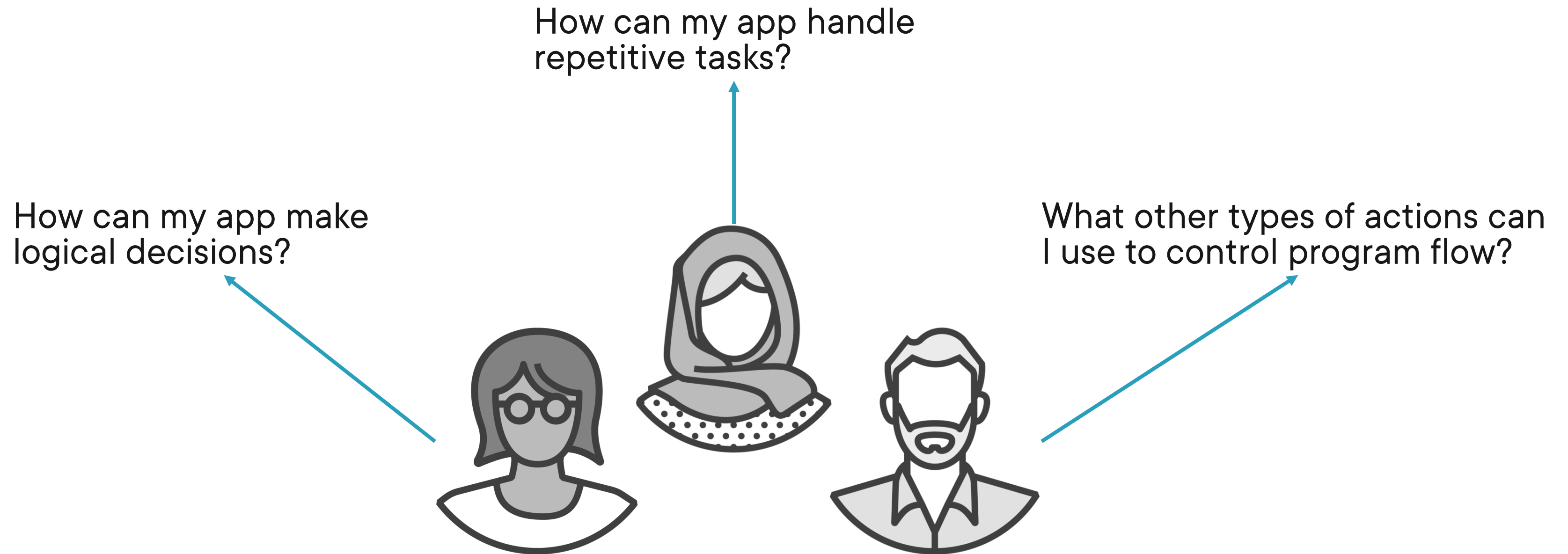
The order and conditions under which different parts of an application are executed.



Building Complexity from Simplicity



Common Program Flow Questions



Setting up the Sample Application





Introducing the Wired Brain Coffee app

- Rapidly growing
- Would like to survey customers
- Has put together a quarterly survey



The Wired Brain Survey Workflow



GitHub Links

<https://github.com/alex-wolf-ps/csharp-program-flow>



Understanding Statements



Statements

A basic instruction a C# program executes to take action.



Example Statements

Program.cs

```
// declare and assign a variable
```

```
string greeting = "hello world";
```

```
// add two numbers and store the result
```

```
int sum = 2 + 2;
```

```
// Log an error to the console
```

```
Console.WriteLine("Something went wrong.");
```

```
// Run function get the current user
```

```
var user = getCurrentUser();
```


Statements and Program Flow

Simple statements
executing in order



Branching logic to
other statements



Statements
execute multiple
times in a row



Selection Statements

How can my app make logical decisions?



```
if (todayIsMonday)
{
```

```
    sendEmailReminder();
```



Executes on
Monday

```
    }
else
{
```

```
    sendTextReminder();
```



Executes on
other days

```
}
```



Iteration Statements

How can my app repeat tasks many times?



// Sends an email to every customer on the list

```
foreach (customer in mailingList)
{
    sendEmail(customer);
}
```



Essential Types of Statements

Selection statements

```
if (condition) { // do something }
```

Iteration statements

```
foreach (item in list) { // do something }
```

Declaration statements

```
string greeting = "Hey there";
```

Expression statements

```
int sum = 50 + 50;  
int tax = calculateSalesTax();
```

Exception handling statements

```
try { // risky code } catch { // fallback }
```



Single Line Statements

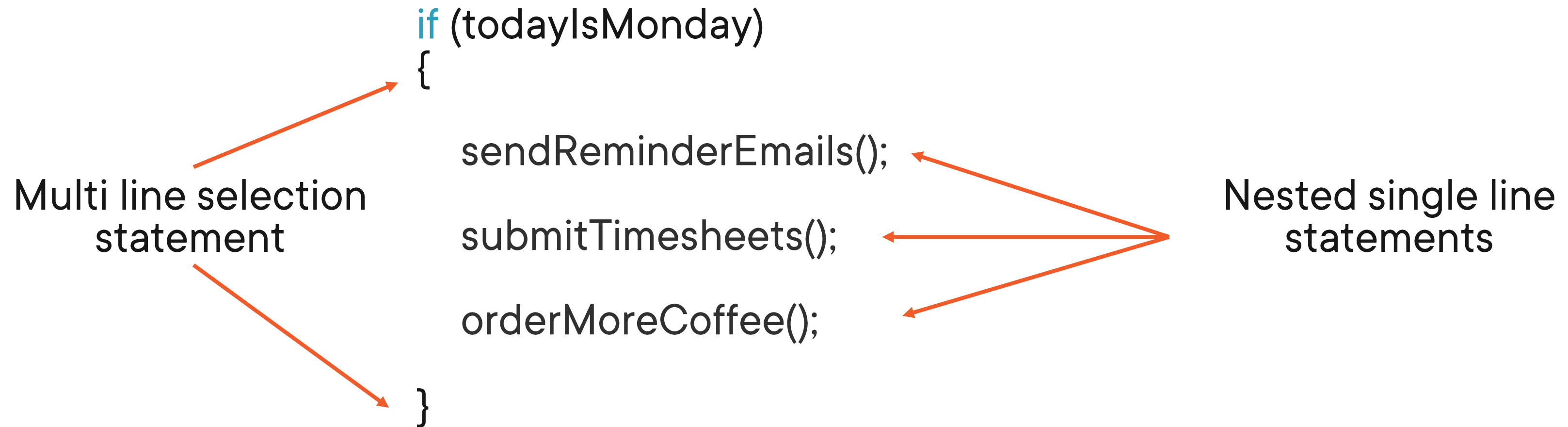
Complete function

```
public decimal GetSalesTax(product item)
{
    var price = item.Price;
    var salesTax = price * 1.06;
    return salesTax;
}
```

Each a statement



Multi Line Statements



Our Course Agenda

Essentials of Statements

Selection Statements

Iteration Statements

Statements and Program Flow



Exploring Statements and Expressions



Statements

A basic instruction a C# program executes to take action.

They are written using a combination of C# **keywords** and **expressions**.



C# Keywords

Access modifiers	public	private	protected
Data types	int	bool	double
Statements	if	else	foreach
Others....			

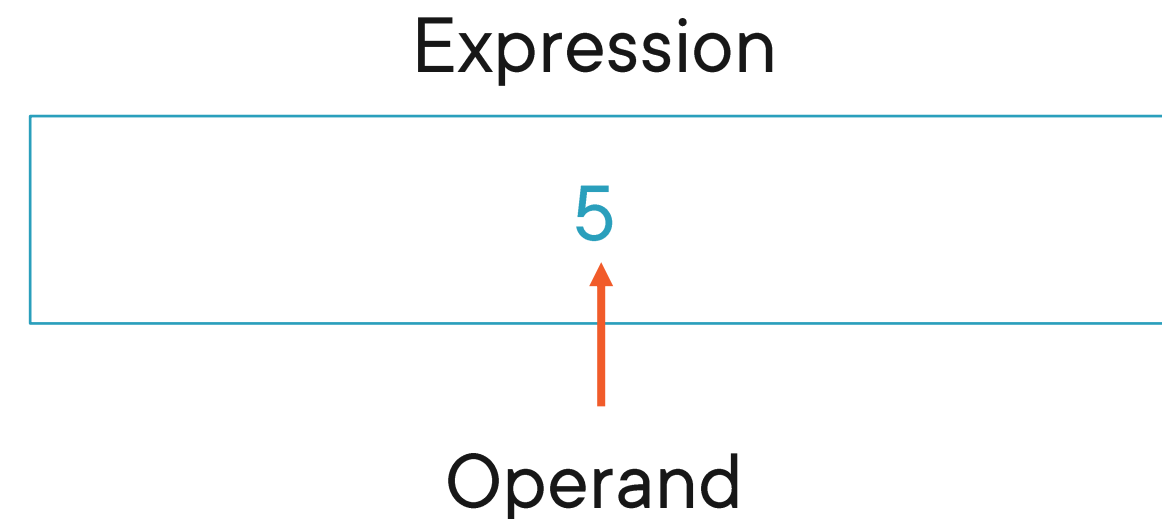
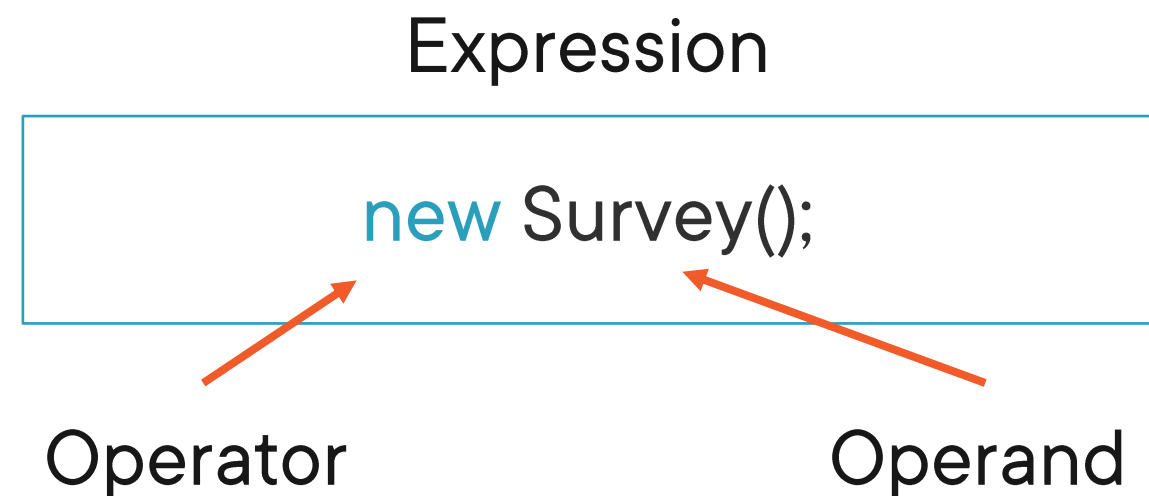
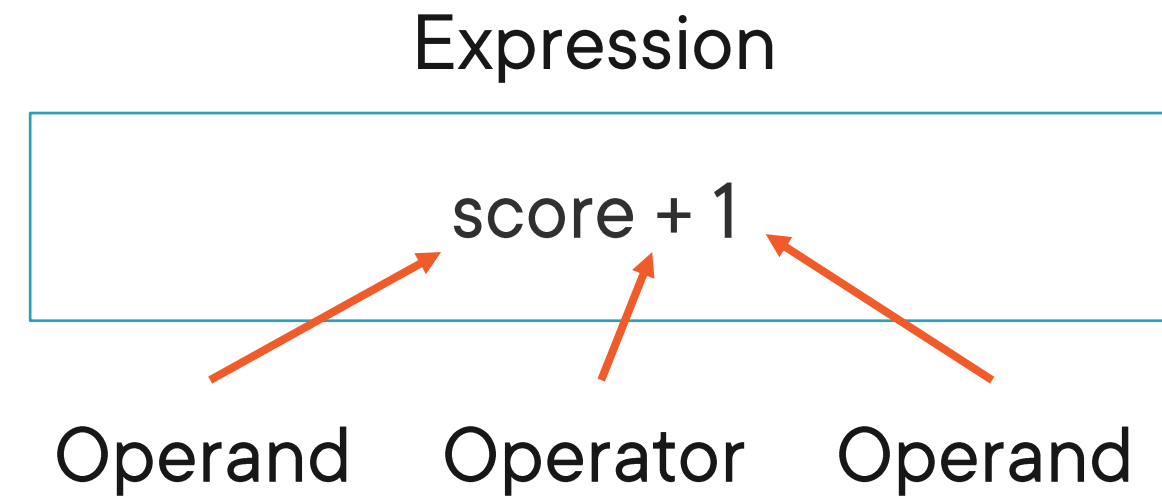
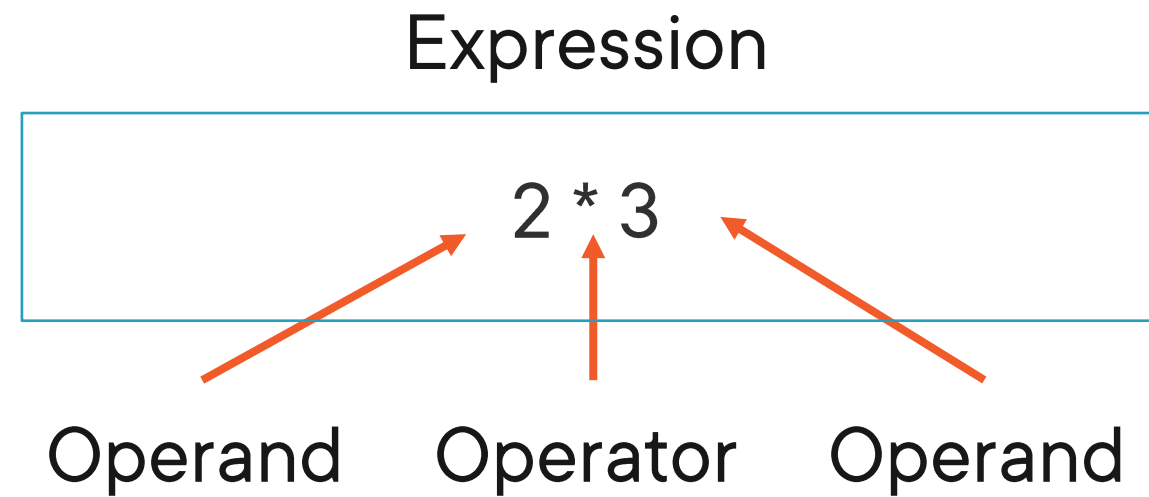


Expressions

The combination of one or more **operands**, and optionally one or more **operators**.



The Structure of Expressions



An operator performs an action
on an operand.



C# Operators

new	+	/	=
&&	==	 	%
?	??	await	nameof
typeof	=>	::	>



Expressions \neq Statements



Expressions vs Statements

Expression

`2 + 2`

`isLoggedIn && isAdmin`

`new Survey()`

`Console.WriteLine()`

Statement

`int sum = 2 + 2;`

`bool hasAccess = isLoggedIn && isAdmin;`

`var survey = new Survey();`

`Console.WriteLine();`



Key Statement Concepts



Statements are written using C# **Keywords** and **Expressions**



Expressions are constructed using **operators** and **operands**



Operators act upon **operands** to produce a result



Overview/ Summary



- **Program flow controls the order of statement execution**
- **Statements are the smallest complete actions or instructions of a C# program**
- **Statements are composed of reserved C# keywords and expressions**
- **Expressions include one or more operands and optionally one or more operators**
- **Statements can execute in a single line of code, or in code blocks of multiple lines**
- **Some types of statements can manipulate Program flow and the order of execution**

