

Object-oriented Design with C#

Introduction to Object-oriented
Design



Mel Grubb

Developer

@melgrubb | www.melgrubb.com

Version Check



This course was created by using:

- C# 10
- Visual Studio 2022 (v17.4.0)
- Markdown Editor v2 (v2.0.130)
- NUnit 3 (v3.13.3)
 - NUnit3TestAdapter (v4.3.0)



Version Check

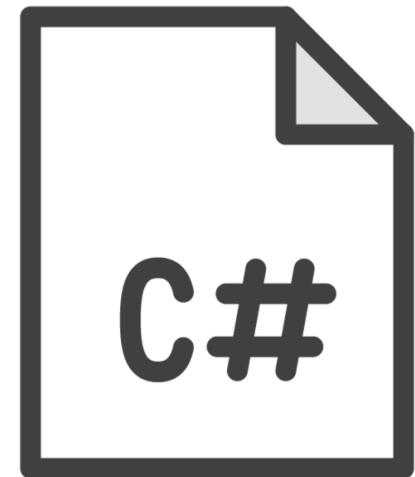


This course is 100% applicable to:

- C# 12
- Visual Studio 2022 (v17.8.4)
- Markdown Editor v2 (v2.0.149)
- NUnit (v3.14.0)
 - NUnit3TestAdapter (v4.5.0)



Object-oriented Language Examples



C#



Java



Python



Ruby



PHP



Visual Basic



Object-oriented Programming

!= Object-oriented Design

!= Object-oriented Language



Procedural C#

Main()

{



}



Object-oriented Basic

Program

```
    
```

```
    
```

```
    
```

```
    
```

```
    
```

```
    
```

```
    
```

```
    
```

```
    
```

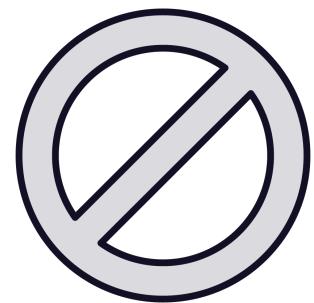
```
    
```

```
    
```

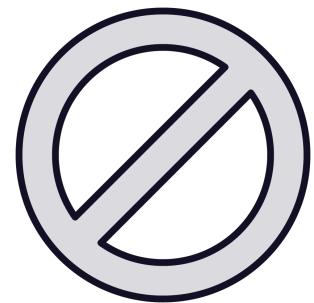
```
    
```



Object-oriented Languages



Best fit for implementing object-oriented designs



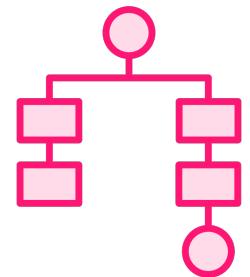
Can't do it all for you



Object-oriented Design



Thinking in objects



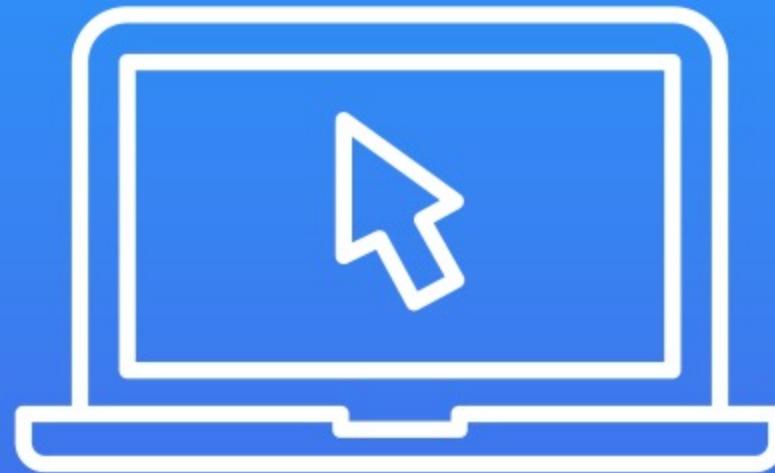
Commitment to organization of responsibilities



Classes are tools, used by other classes with other responsibilities



Demo

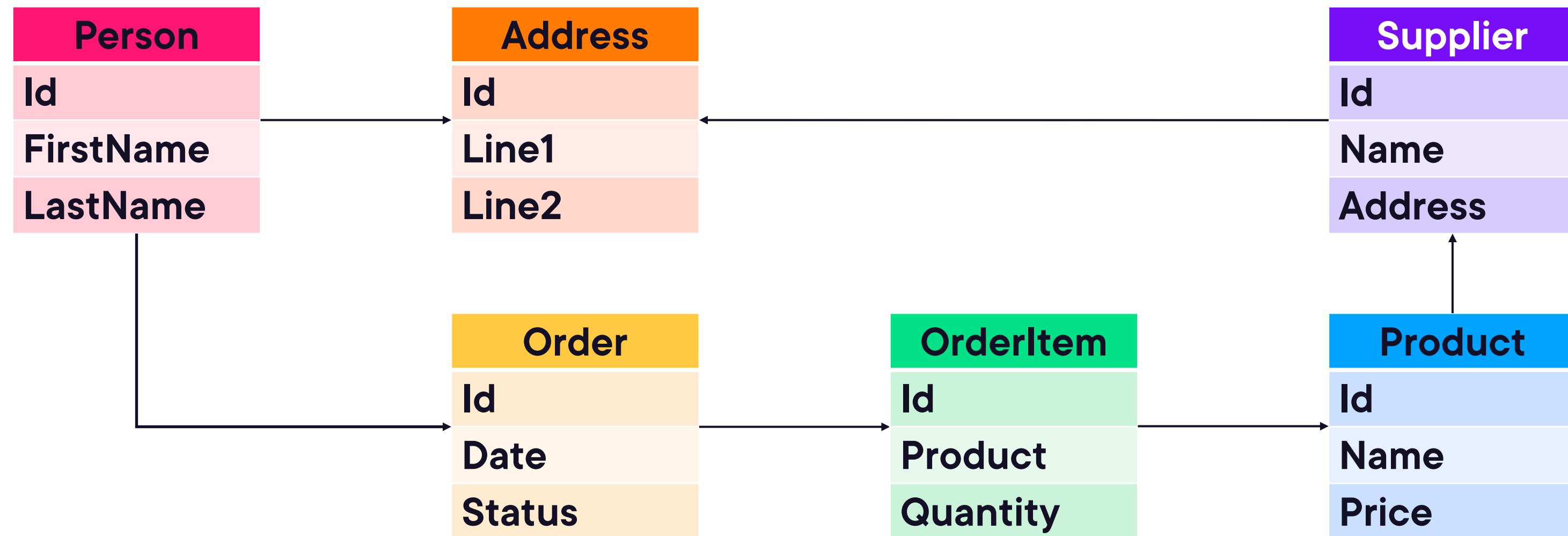


Mermaid

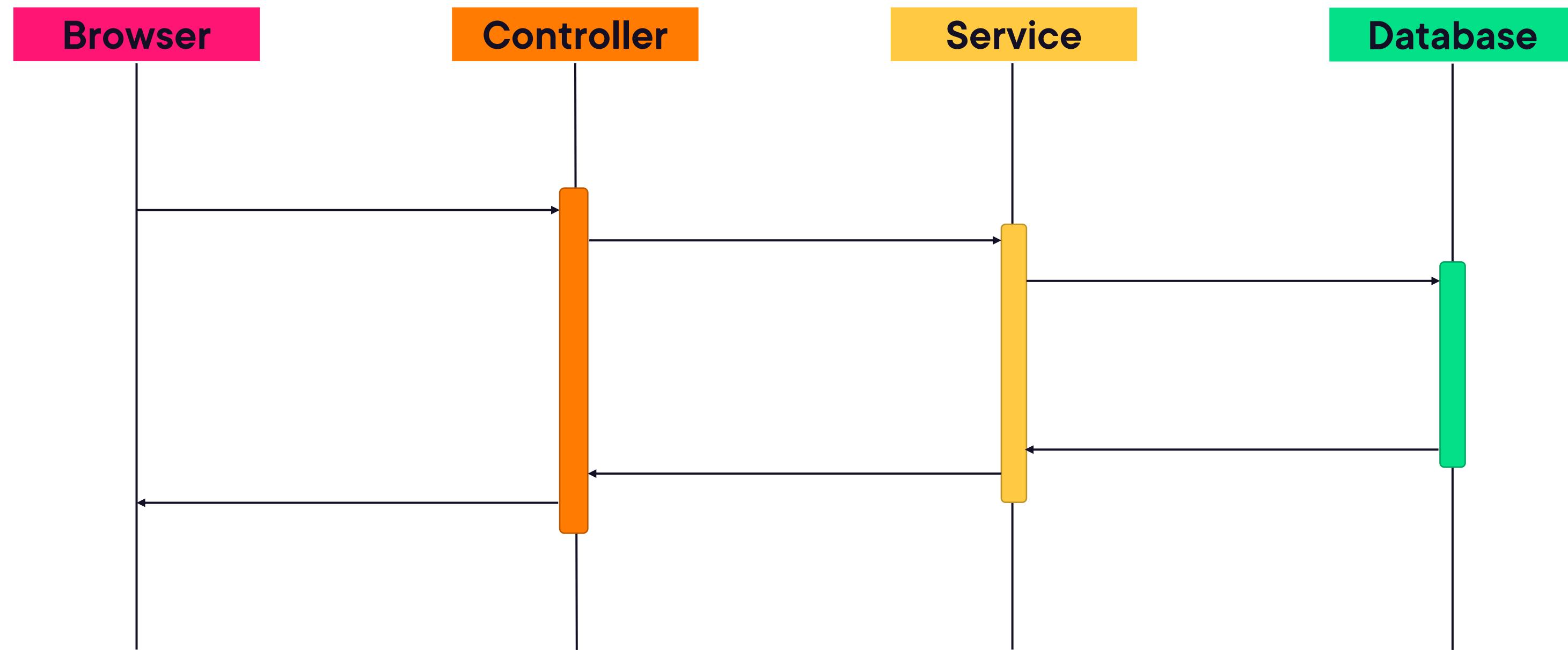
- UML diagrams right in your documentation
- Editable from within your IDE



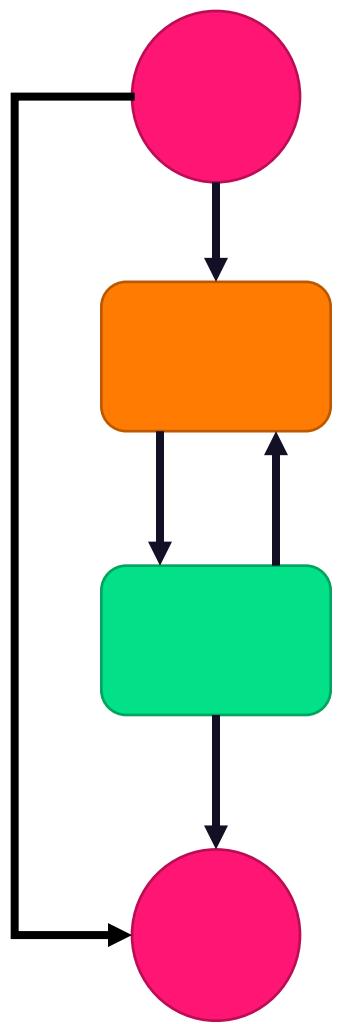
Class Diagram



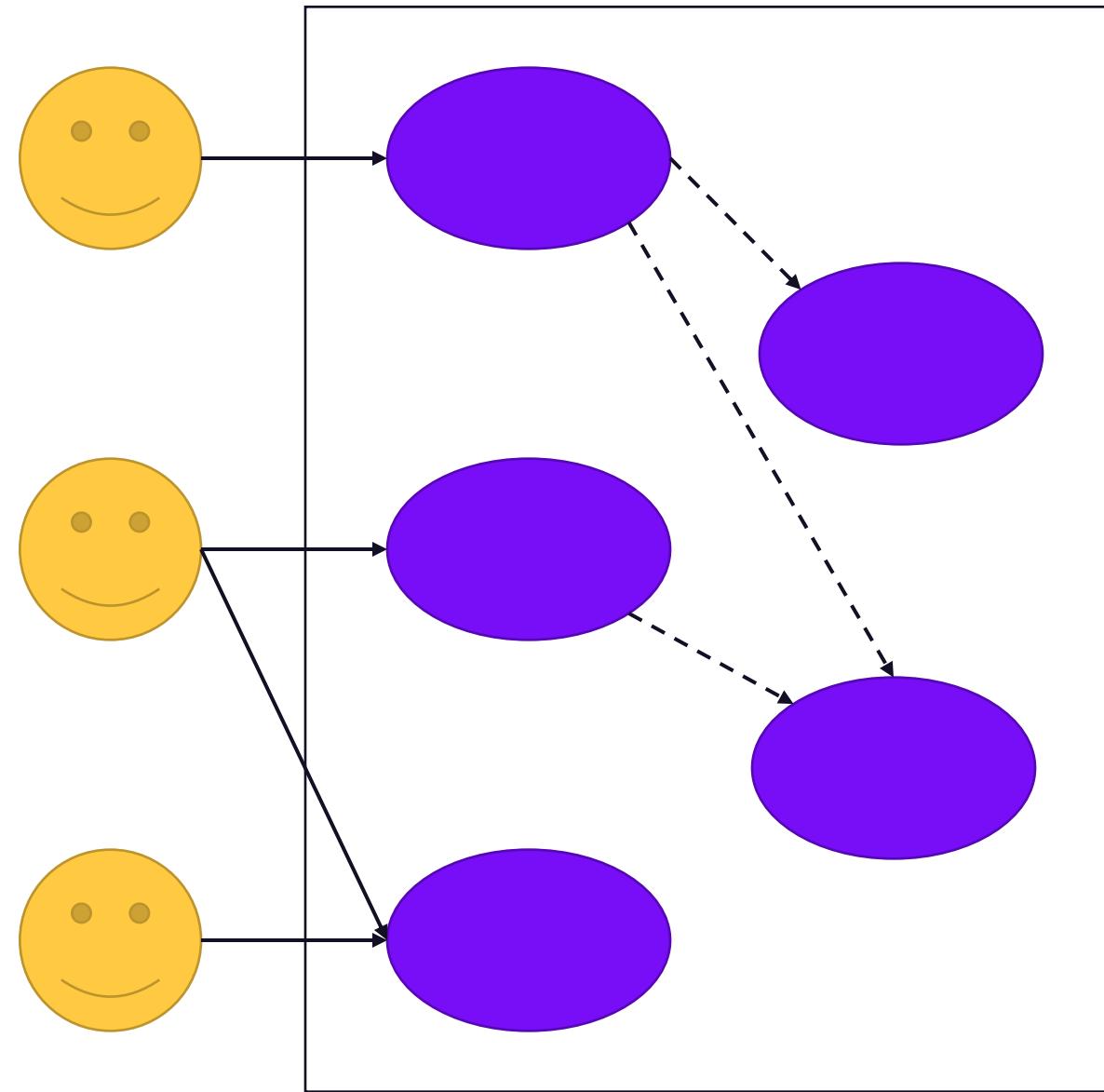
Sequence Diagram



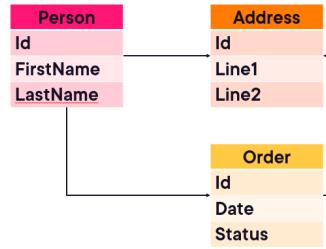
State Diagram



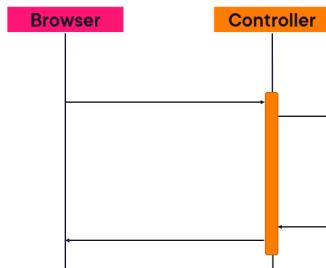
Use Case Diagram



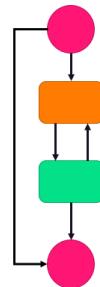
Unified Modeling Language (UML)



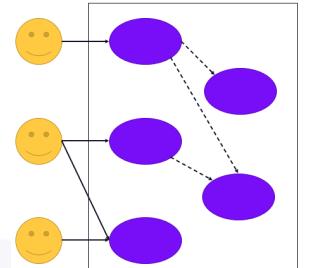
Class diagrams



Sequence diagrams



State diagram



Use case diagram



Mermaid-js

Type to search

mermaid

- Introduction
 - About Mermaid
 - Deployment
 - Syntax and Configuration
- Diagram Syntax
 - Flowchart
 - Sequence Diagram
 - Class Diagram
 - State Diagram
 - Entity Relationship Diagram
 - User Journey
 - Gantt
 - Pie Chart
 - Requirement Diagram
 - Gitgraph (Git) Diagram 🔥
 - C4C Diagram (Context) Diagram 🚨⚠️
 - Other Examples
- Deployment and Configuration
 - Tutorials
 - API-Usage
 - Mermaid API Configuration
 - Directives
 - Theming

[Edit this Page](#)

About Mermaid

Mermaid lets you create diagrams and visualizations using text and code.

It is a JavaScript based diagramming and charting tool that renders Markdown-inspired text definitions to create and modify diagrams dynamically.

If you are familiar with Markdown you should have no problem learning [Mermaid's Syntax](#).

build passing npm v9.1.7 coverage 45% slack join chat

Object-oriented Design Is



~~Code written in an object-oriented language~~



~~Code that uses language features like inheritance and interfaces~~



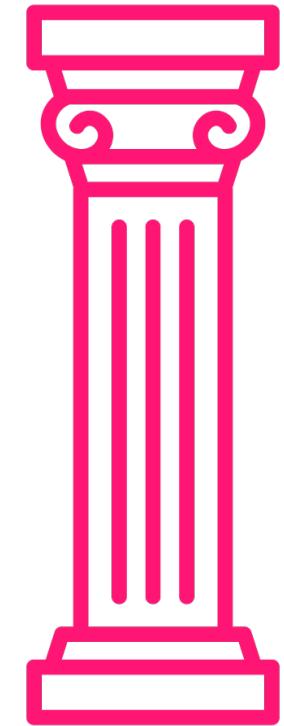
Planning out a system in terms of objects and their responsibilities





Pillars and Principles

The Four Pillars



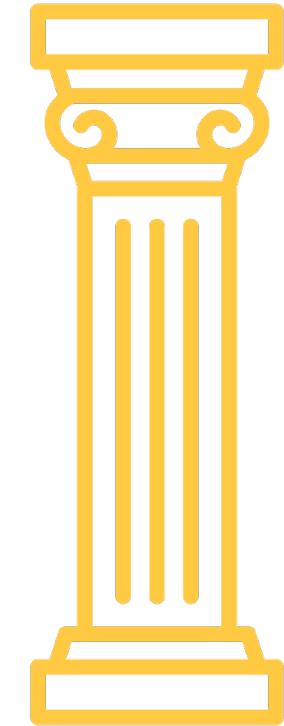
Abstraction

**Implementation
Hiding**



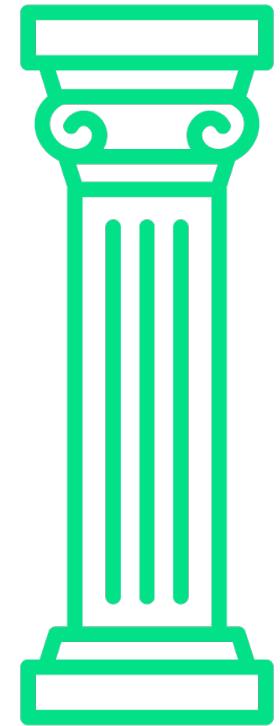
Encapsulation

**Data
Hiding**



Inheritance

**Object
Taxonomy**



Polymorphism

**Object
Interchangeability**



The SOLID Principles

S

Single Responsibility Principle

O

Open-Closed Principle

L

Liskov Substitution Principle

I

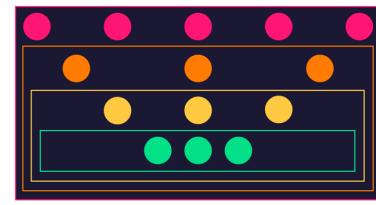
Interface Segregation Principle

D

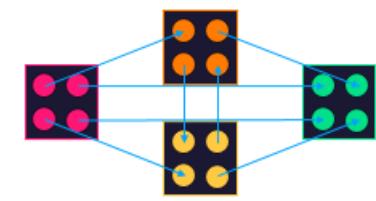
Dependency Inversion Principle



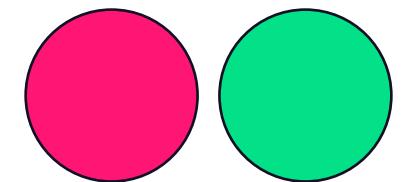
Other Object-oriented Vocabulary



Cohesion



Coupling

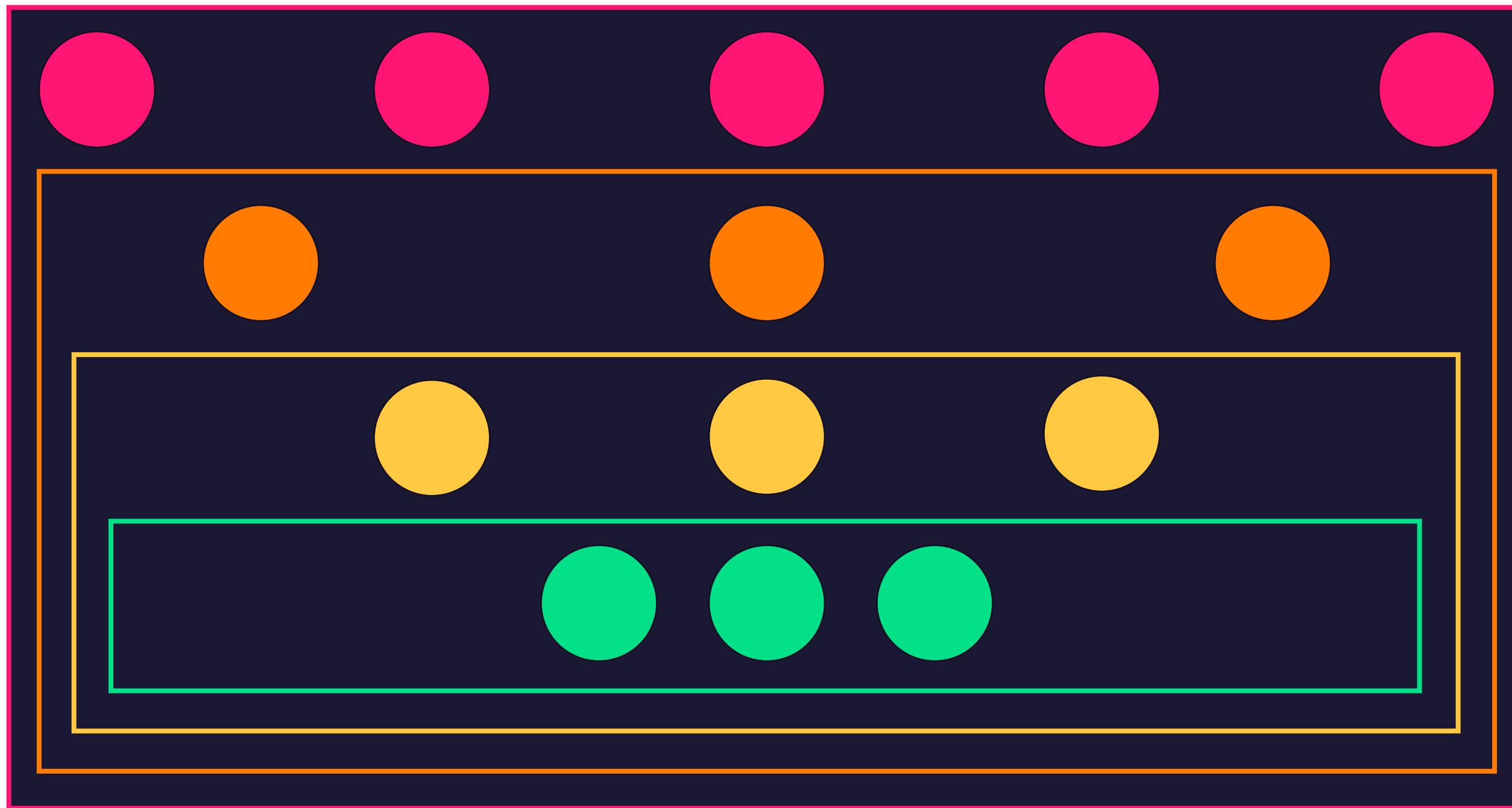


Orthogonality



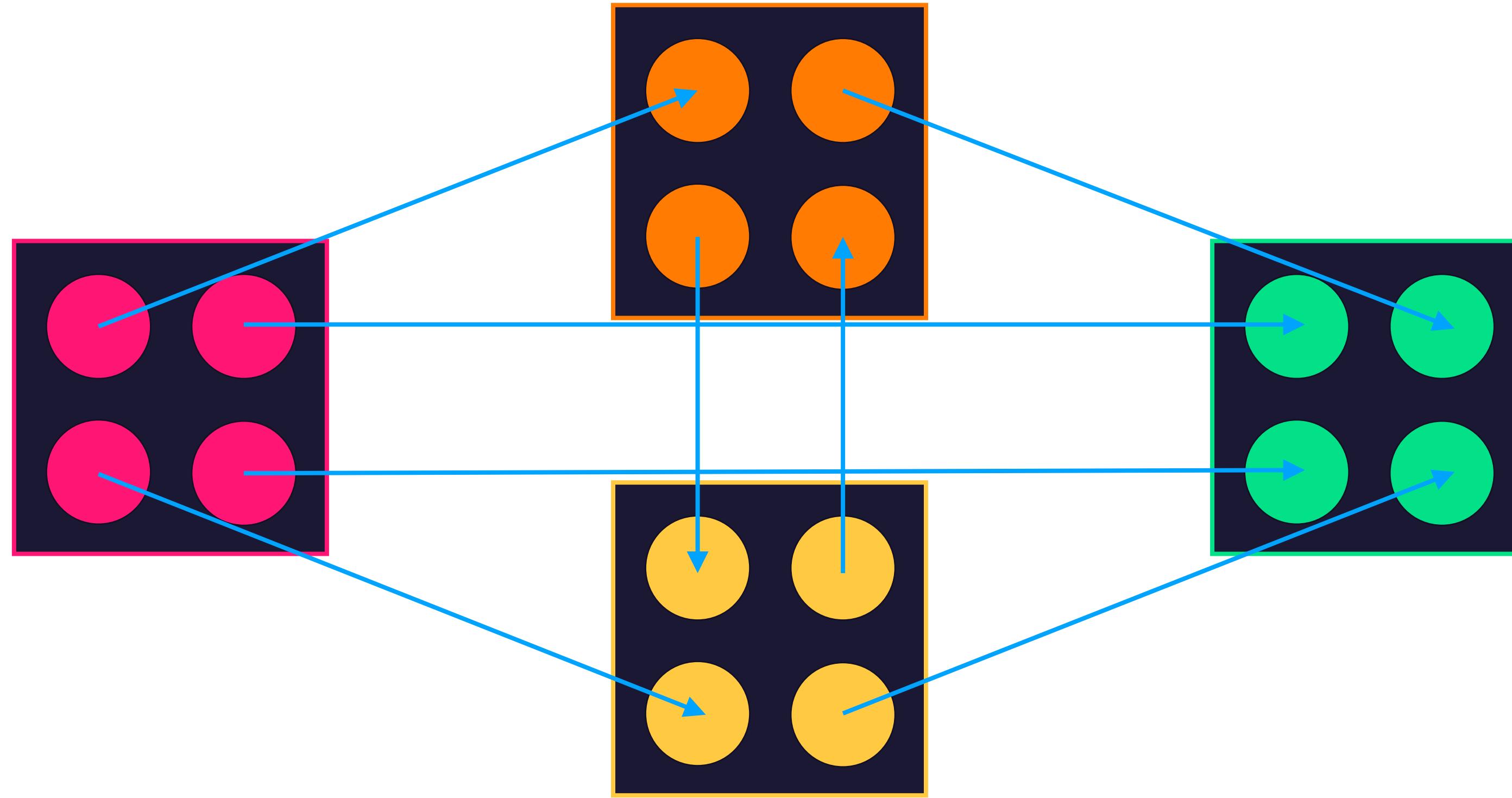
Cohesion

Cohesion



Coupling

Coupling



Nouns, Verbs, Adjectives, and Entities

Nouns and Verbs

Nouns

Classes

Verbs

Methods



Nouns = Classes



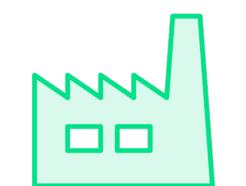
Customer – The public users of the system



Order – A heading for collections of purchased items



Shipment – Tracking details for sending orders to clients



Supplier – Manufacturer or reseller of items available to clients



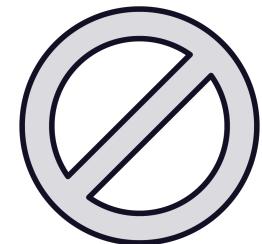
Logger – Behind-the-scenes tracing of system operations



Verbs = Methods



Ship – Send an order's items to the customer



Cancel – Stop an order from further processing



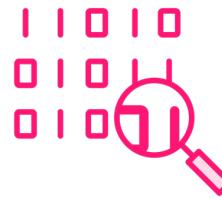
Complete – Mark an order as successfully finished



CalculateTotal – Add up the cost of an order's items and shipping



Adjectives = Interfaces



ISerializable – Object can be transported or stored



IEnumerable – Represents a collection of items that can be iterated



IDisposable – Object is responsible for cleaning up after itself



INotifyPropertyChanged – Object raises events when data changes



Parts of Speech

Nouns

Classes

Includes entities such as Customer, Order, and Product

Also includes non-entity objects like loggers, controllers, and messages

Verbs

Methods

The things your classes can do, both to itself or to other objects

Adjectives

Interfaces

Abstract capabilities that an object *has*, composed of its methods and properties combined



Summary



Object-oriented Design vs. Programming

Four pillars

SOLID principles

Mermaid introduction

Cohesion

Coupling

Parts of speech metaphor



Up Next:

The Four Pillars

