Systems Design Bootcamp

Who we are

Housekeeping

Day 1
- Introduction
- System Design

Day 2
- Database design

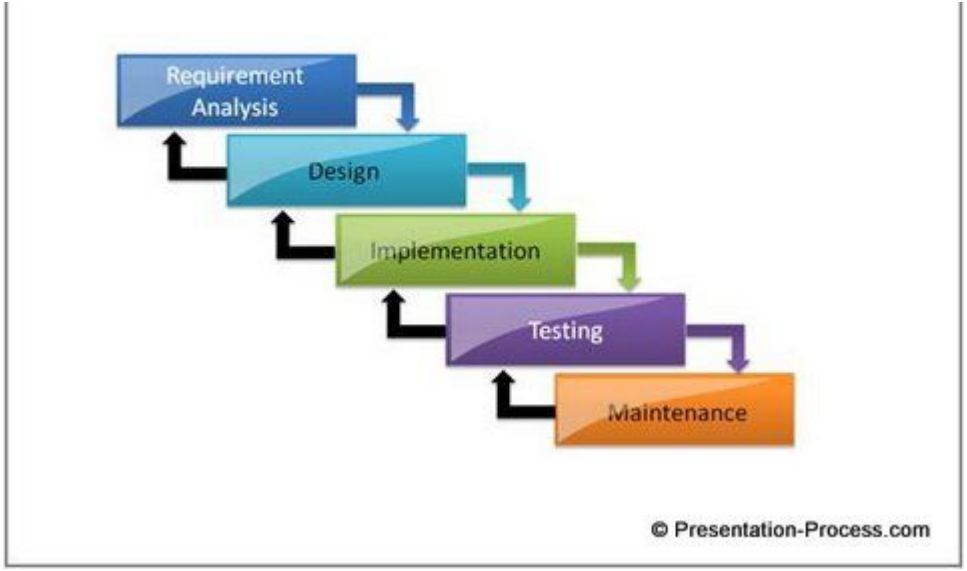
Day 1
- Part 1 9.30 - 11.00
- Part 2 11.0 - 12.30
-

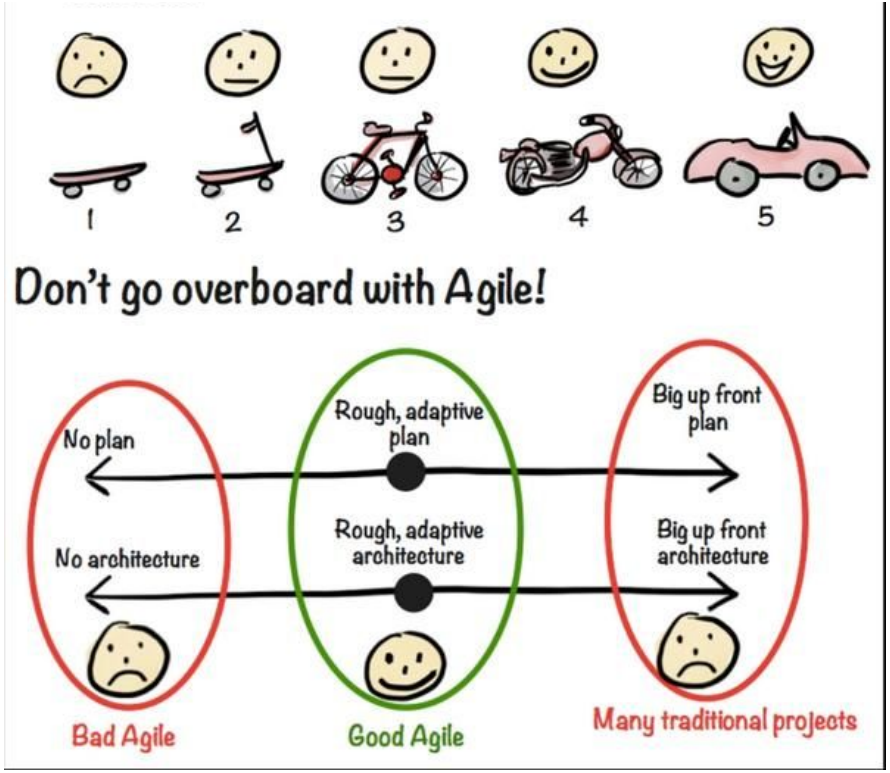
DISTRACTIONS

Why systems modelling is useful and why you should use it

- Tools to understand how you are going to solve a problem
  - Lets you spot problems upfront before you've written lots of code
  - Let's you know where to start
- Helps you communicate your solution to other people using a common language
- Documents your solution as you go

Where systems modelling fits in the Software Development Lifecycle




1
2
3
4
5
Don't go overboard with Agile!
No plan
Rough, adaptive plan
Big up front plan
No architecture
Rough, adaptive architecture
Big up front architecture
Bad Agile
Good Agile
Many traditional projects

What’s going to be covered over the next two days?

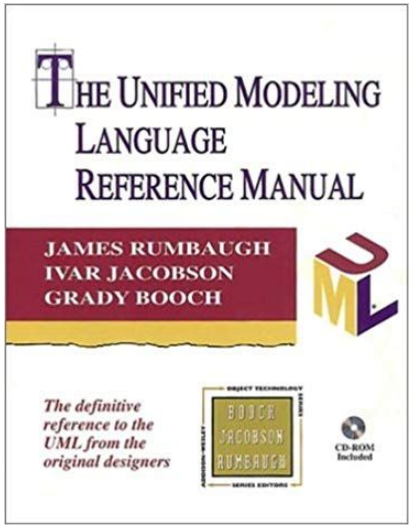
UML
- Activity diagrams
- Sequence diagrams
- Class diagrams

Sitemaps

Entity Relationship Diagrams (ERD)

Unified Modelling Language (UML)

- A standard set a diagrams to describe the design of software systems
- Don’t worry about being exact, people will still know what you mean
- The UML reference
  - 500 pages!
  - 1.4kg!
  - Includes a CD ROM!
- Don’t need to learn it all
  - Just a few diagrams will cover most things you need
- Good for working out how complicated things might work before coding them up
  - Collaborate with others on this, it’s works best when talking it through with others

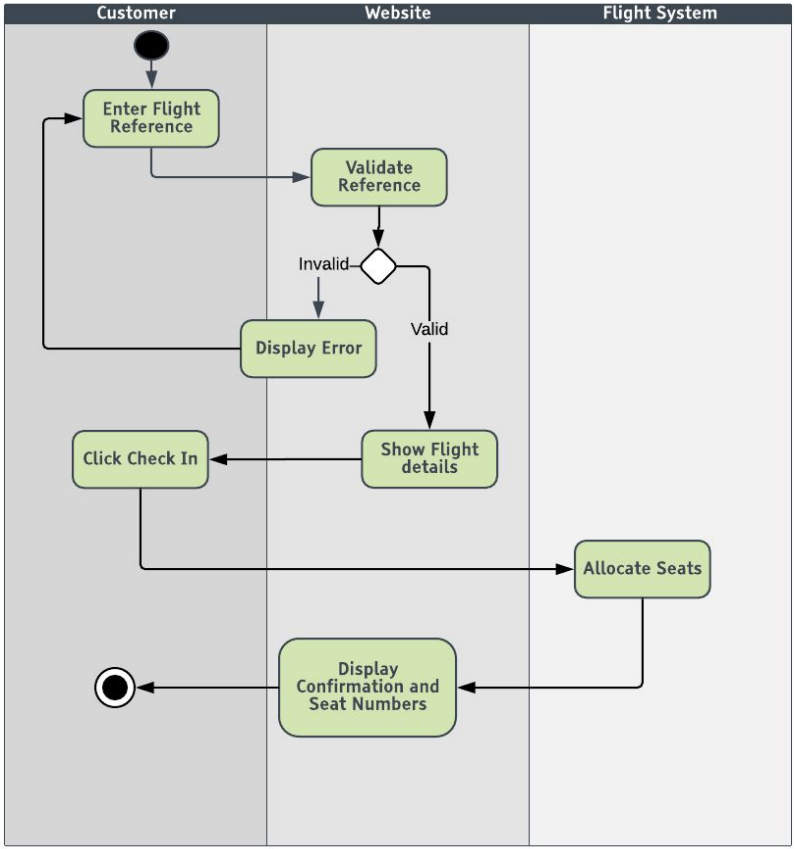


Activity Diagrams

Mapping out how users interact with your system

Can use Unified Modeling Language (UML) when creating them. Here it gives you standard shapes and patterns to notate flow/choice and start/stop points.

Useful for working out complex decision flows.



Exercise - Draw an Activity Diagram

Create activity diagrams for as many of your user stories as you can.

Duration: 30 minutes

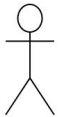
Sequence Diagrams

Sequence diagrams show the interactions between objects in the system, in the sequential order they occur.

- Used to model and visualise the logic behind a sophisticated function, operation or procedure.
- They are also used to show details of UML use case diagrams.
- Used to understand the detailed functionality of current or future systems.
- Visualise how messages and tasks move between objects or components in a system

Sequence Diagrams

Actors



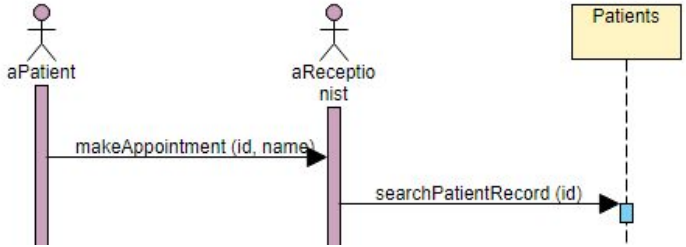
Interact with the system and its objects

Lifelines

Objects within the system

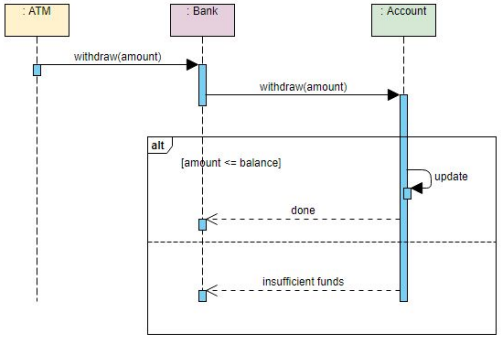
Sequence Diagrams

Messages



The flow of messages or data within the system

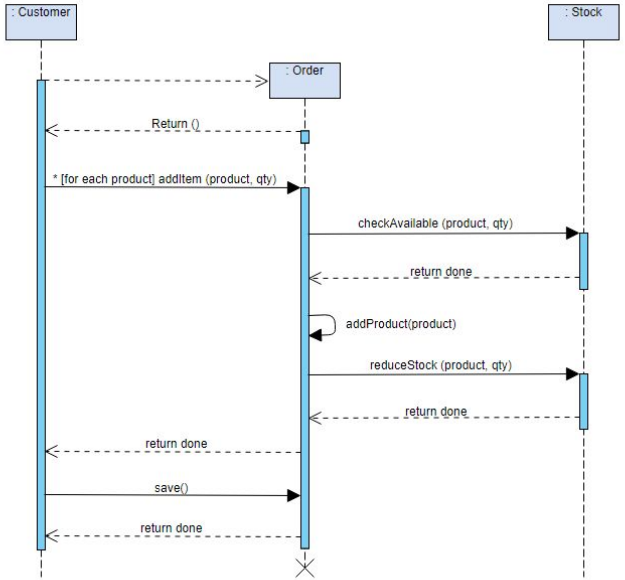
Guards



Conditions within your flow

Sequence Diagrams

Example



Exercise - Create Sequence Diagrams

For the stories that you've used so far, produce some sequence diagrams

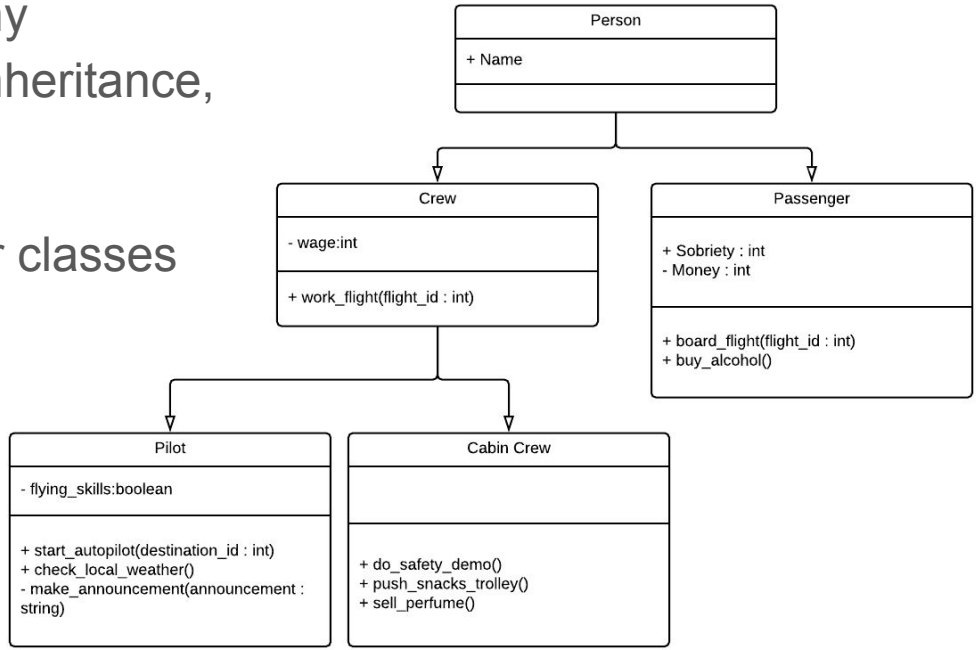
You can use either pen and paper

Duration: 30 minutes

Class Diagram

Class Diagrams show the attributes and operations of a class as well as any relationships with other classes (inheritance, interfaces, etc.)

Useful for understanding how your classes and objects are structured and the relationships between them.



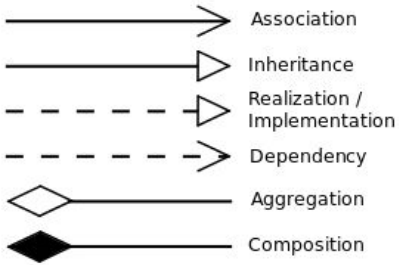
Class Diagram Notation

When declaring members:

- \+ Public
- \- Private

- / Inherited
- # Protected

Relationships between classes:



Multiplicity in relationships:

0..1	Zero or one
1	Exactly one
0..*	Zero or more
1..*	One or more

Methods:

name(arg : type) : return_type

Exercise - Create Class Diagrams

Try to create class diagrams for one or more of the stories that you're working with. Think about where you might use Object Oriented Principles such as Inheritance or Composition.

You can draw them on paper or use software to produce your diagrams.

https://www.draw.io/

Duration: 45 minutes

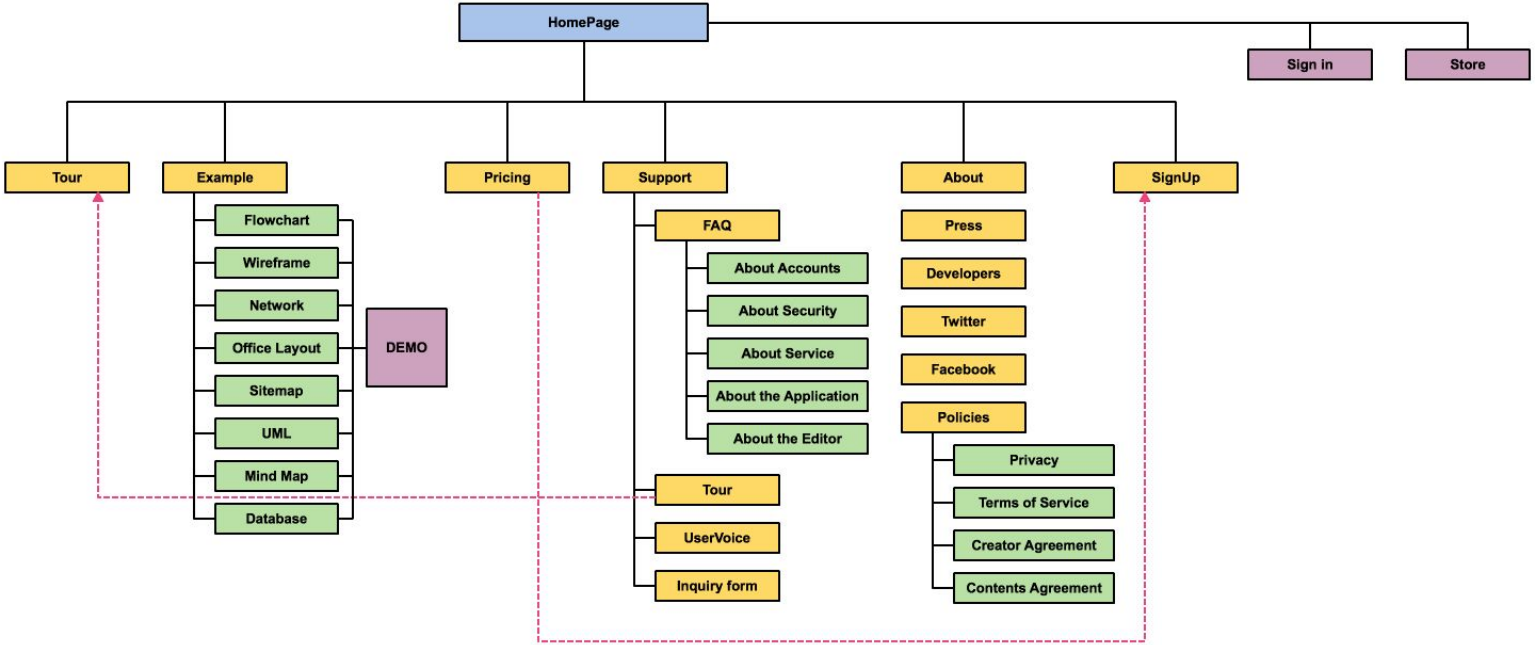
Sitemap Diagrams

Sitemap diagrams show the structure of a website using a tree structure to show the page hierarchy.

- Useful for working out what information will be where on your website
- Helps work out the URL structure
- The structure of the pages and URL structure are important for search engine optimisation

Sitemaps

Example



Sitemap Diagrams

Example

/tour

/examples

/examples/flowchart

/examples/wireframe

...

Exercise

Draw a sitemap diagram for the user stories we've been working on

Data Modeling

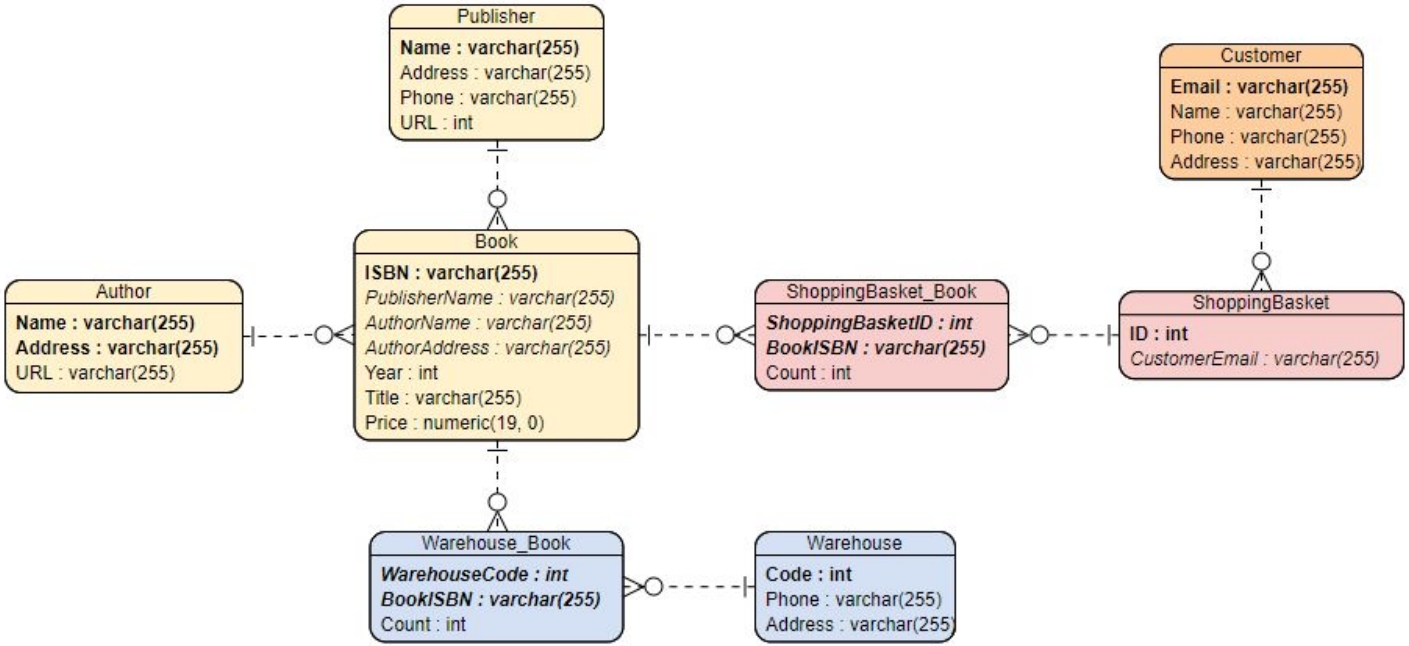
- Used to get a detailed understanding of the data involved in the system and how it fits together
- You can use data modeling techniques to determine how you store data (relational databases, etc.)

Entity Relationship Diagrams

Entity Relationship Diagrams have been covered in bootcamp 7

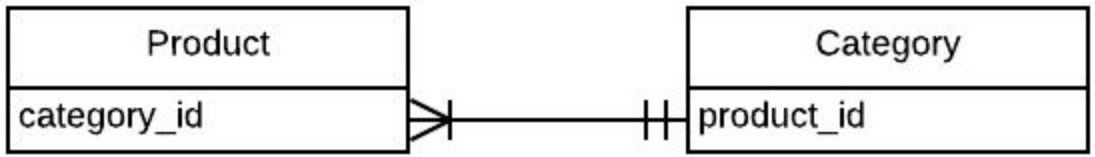
- Start to think about the data be stored in the system
- Relationships between the data

Entity Relationship Diagrams



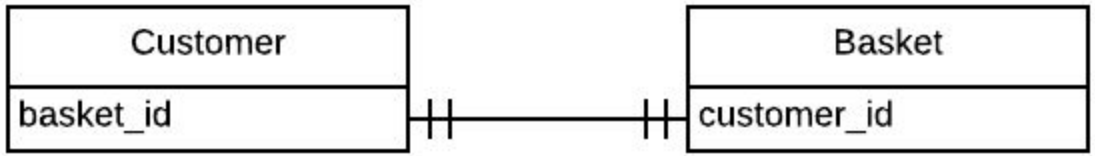
Example: Products and categories

- A product has one and only one category
- A category has one or many products

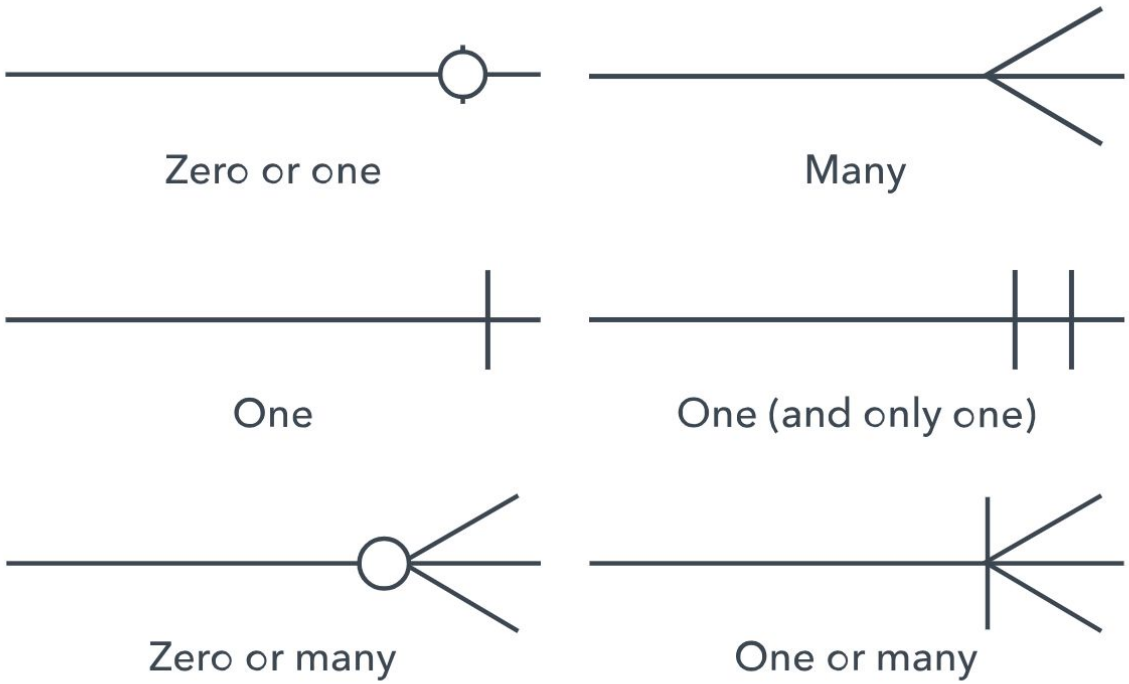


Example: customers and baskets

- A customer has one and only one basket
- A basket is owned by one and only one customer



Associations



Exercise - Create Entity Relationship Diagrams

Try to create an entity relationship diagrams for some of the data needed by one of your stories.

You can draw them on paper or use software to produce your diagrams.

Duration: 60 minutes

Link to feedback form