

First Steps in DDD

Combined Slide Deck
(3 hours total, inc. 2 x 5 min breaks)

Hello,
welcome
& thank
you



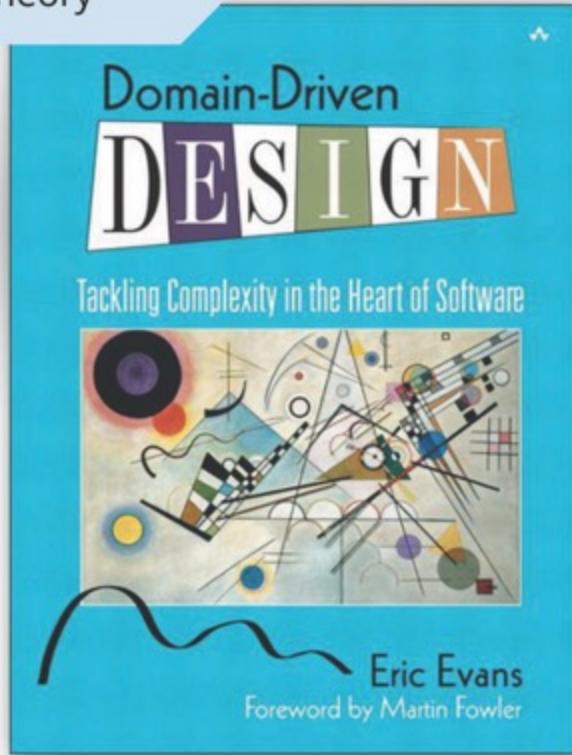
S1: Why Are We Here?

(5 + 5 minutes)

Content Warning and Code of Conduct

Expectations?

DDD Theory



“The heart of software is its ability to solve [...] problems for its user. All other features [...] support this basic purpose.”

-- Eric Evans, “Domain-Driven Design: Tackling Complexity in the Heart of Software” (2003)

DDD Theory

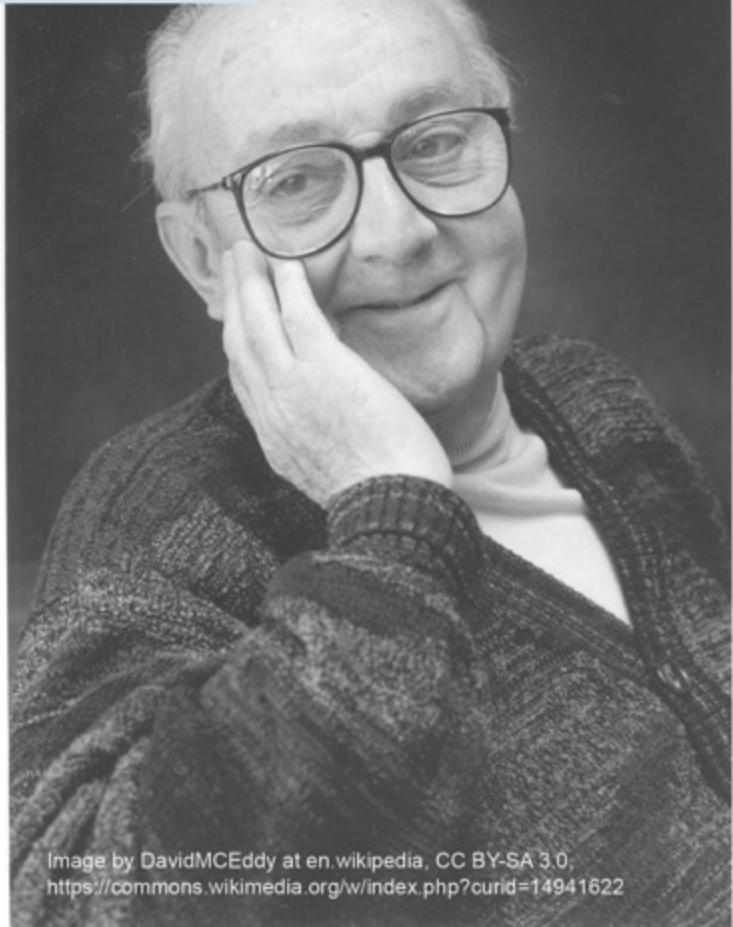


Image by DavidMCEddy at en.wikipedia, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=14941622>

“All models are wrong, but some are useful.”

-- George Box (1976)

Questions?

S2: Collaborating with Domain Experts

(5 + 10 minutes)

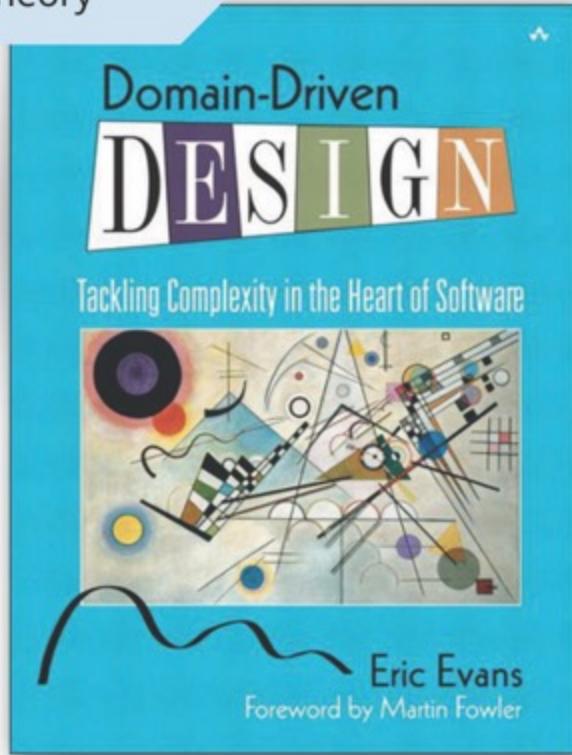
Poll: Do you use models when you write code?

- Always
- Sometimes
- Never

Poll: Do you
use diagrams
when you
write code?

- Always
- Sometimes
- Never

DDD Theory



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DDD Theory



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DDD Theory

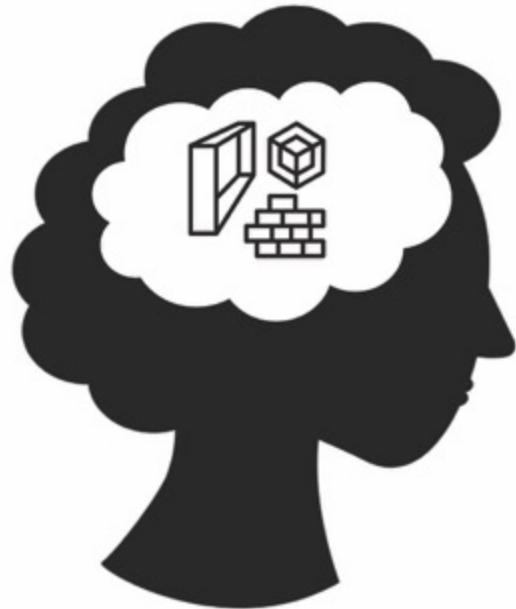


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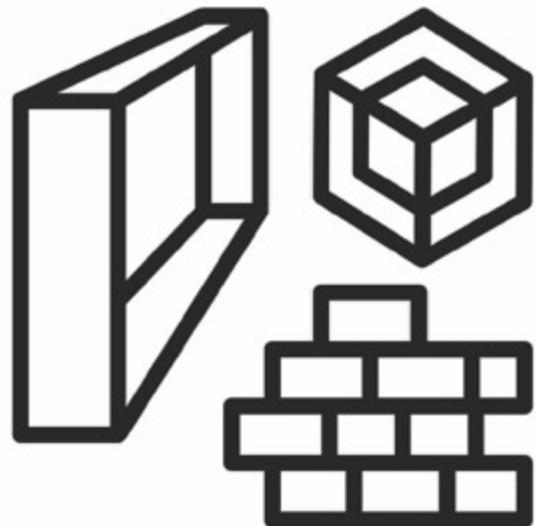
DDD Theory



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Domain experts
are developers
who can't code.
So how do we get
at their mental
models?



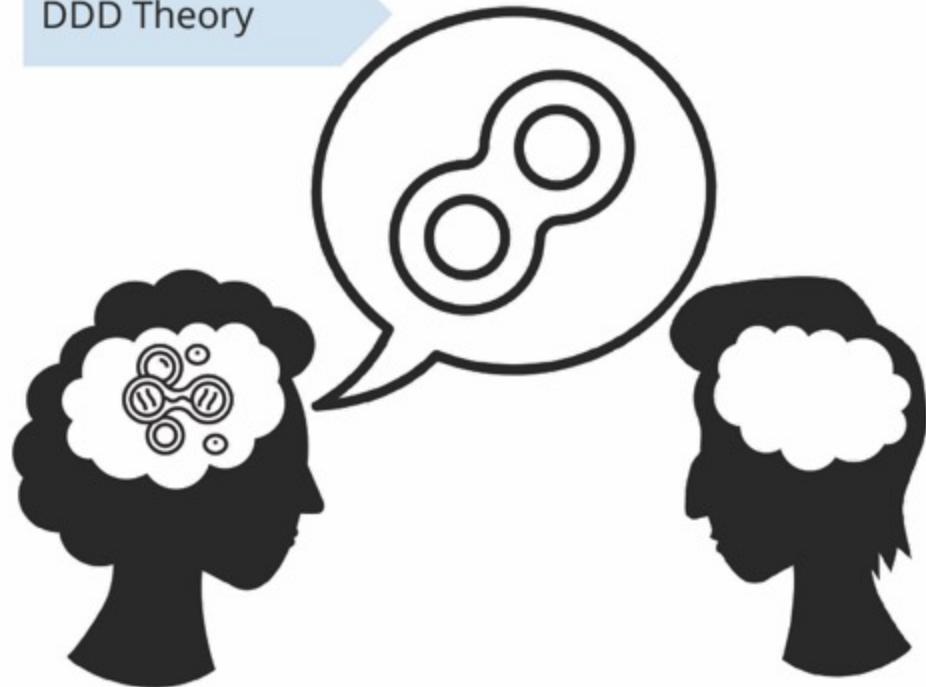
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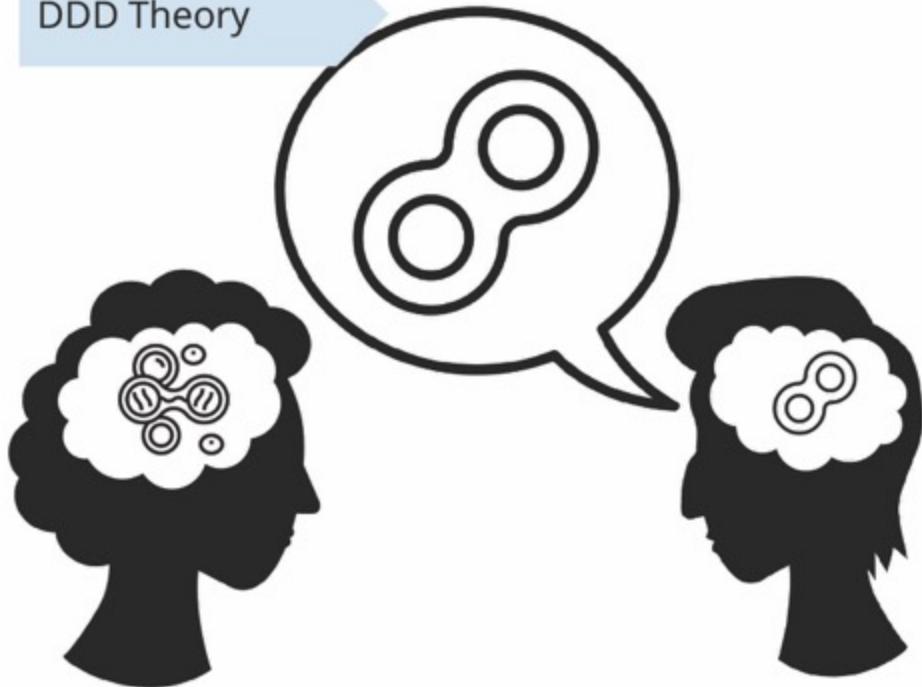
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DDD Theory



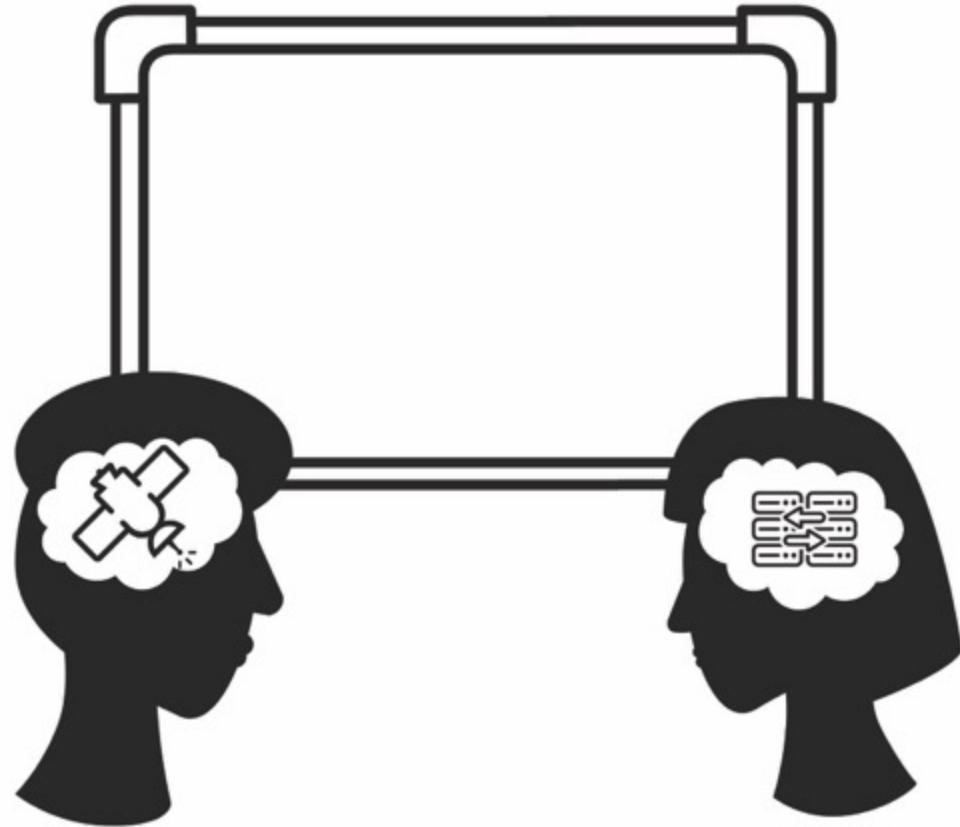
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DDD Theory



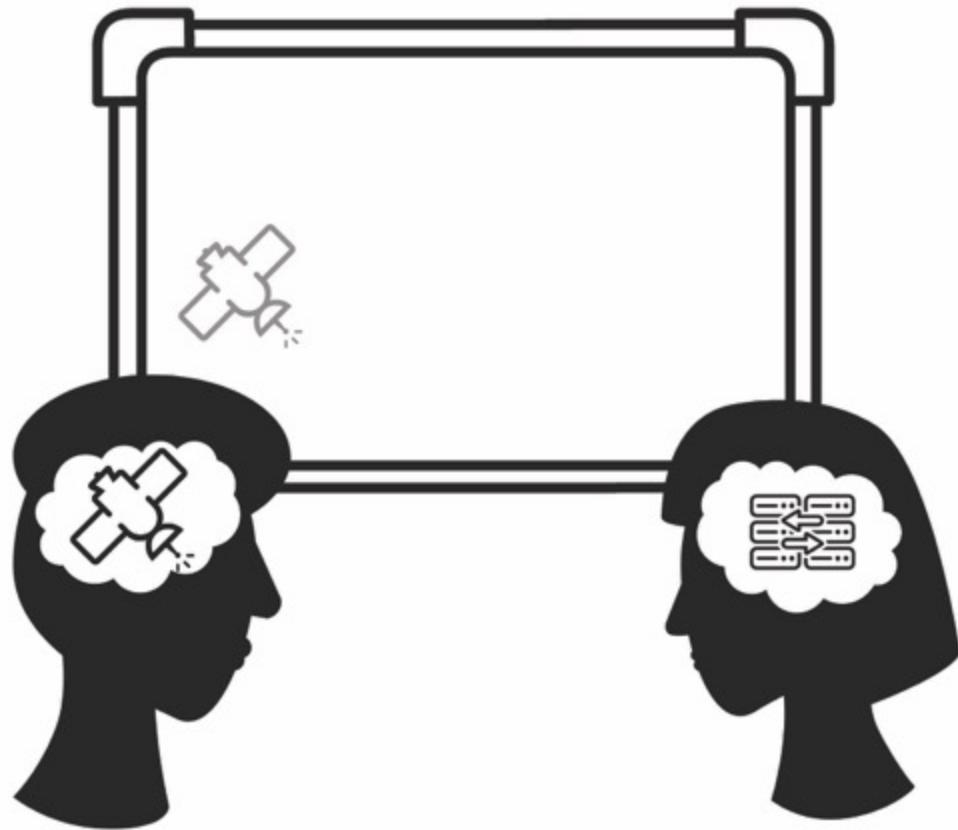
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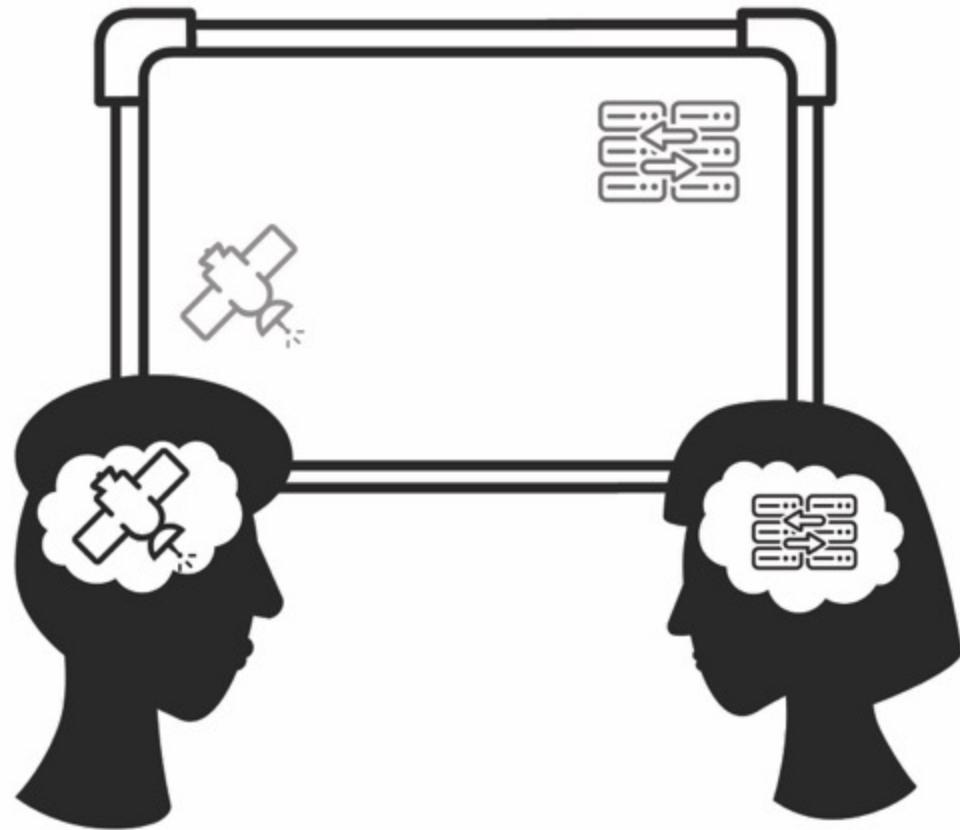
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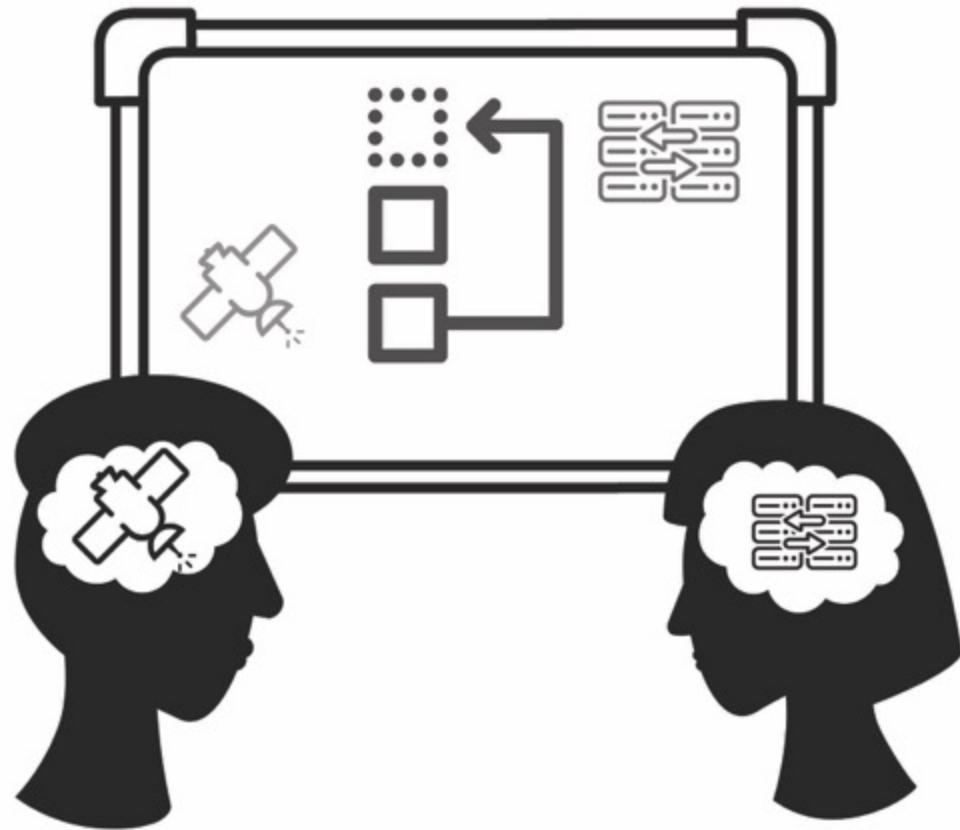
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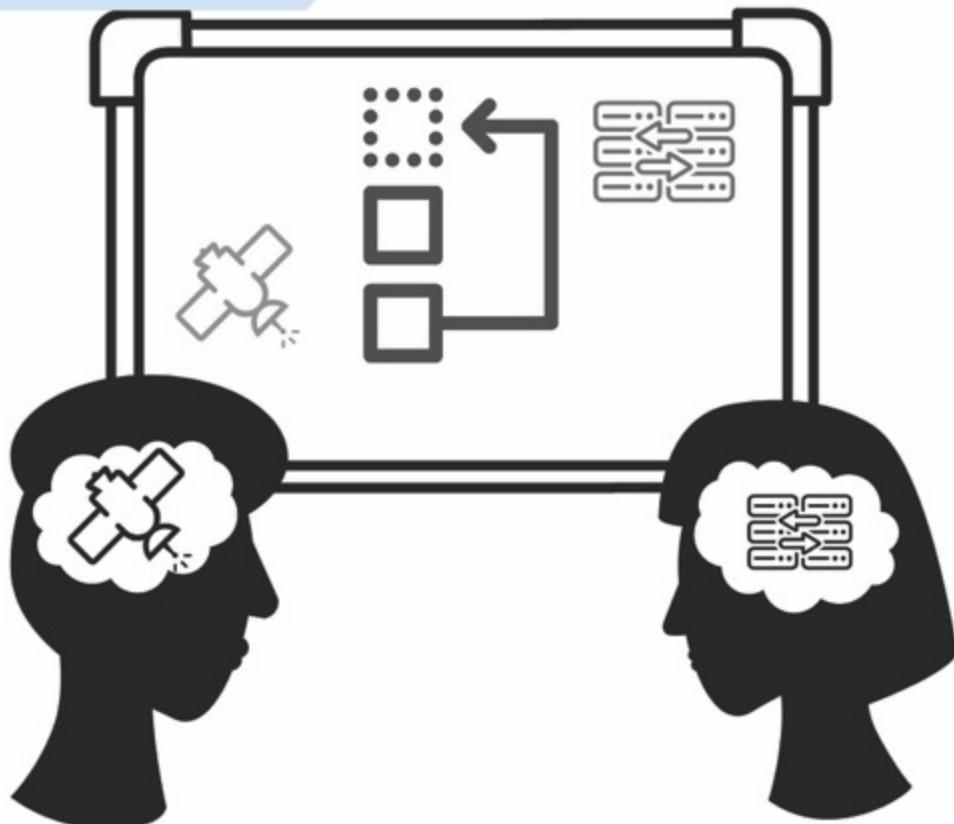
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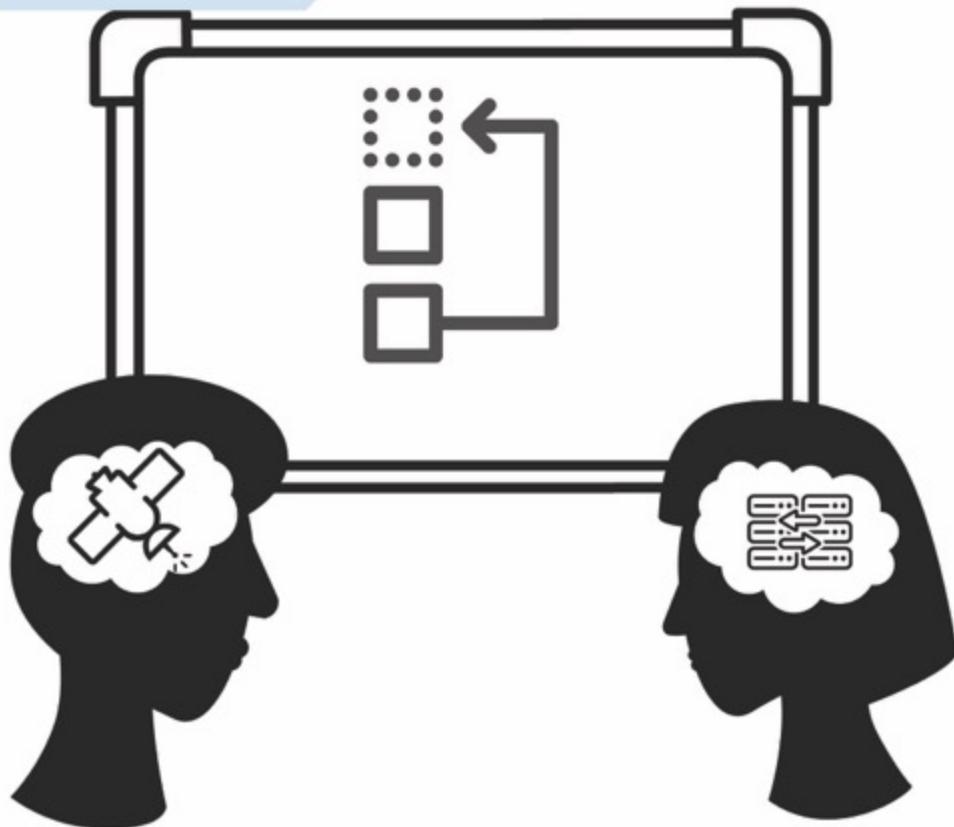
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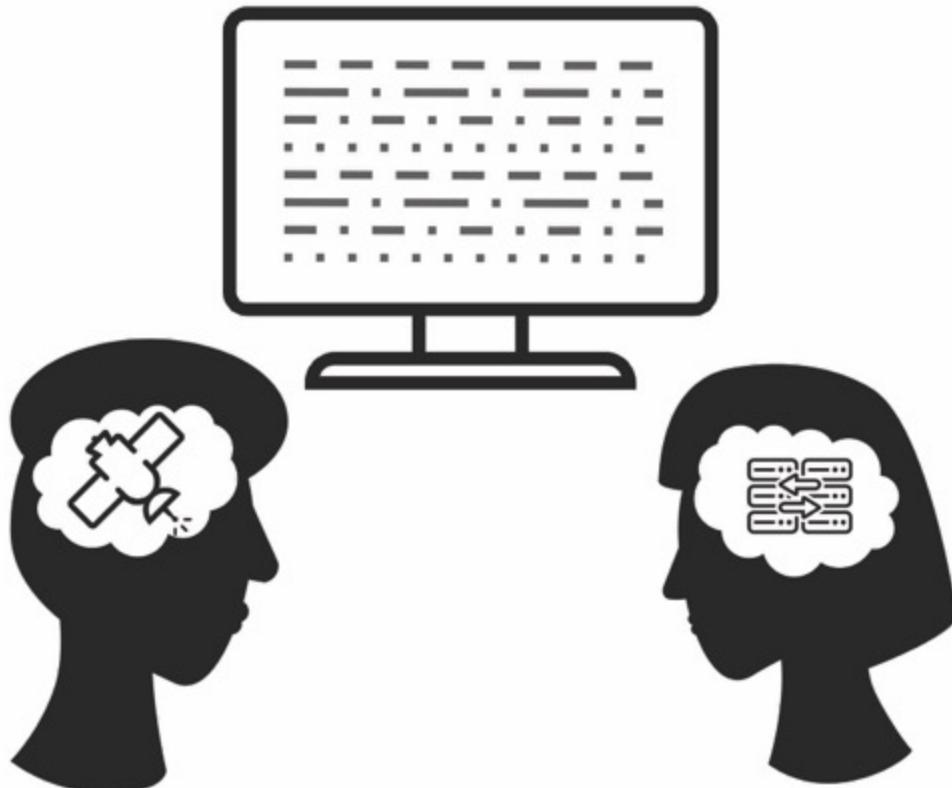
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DDD Theory



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DDD Theory



@al94781 #FirstStepsInDDD

Questions?

S3: Exercise 1

First Steps Modelling Our Domain
(20 + 5 minutes)

Overall Goal:

Create a case management system for the English Public Prosecution Service

Exercise 1

Focus:

Explore this domain, and start to build *your* mental model

Public Prosecutor Domain Expert Statement - Full (Beta)

As a Public Prosecutor, my first job regarding a potentially new criminal case is to advise the Police regarding their ongoing investigations.

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I, as a Public Prosecutor, carefully read and consider all the provided case information. I mainly

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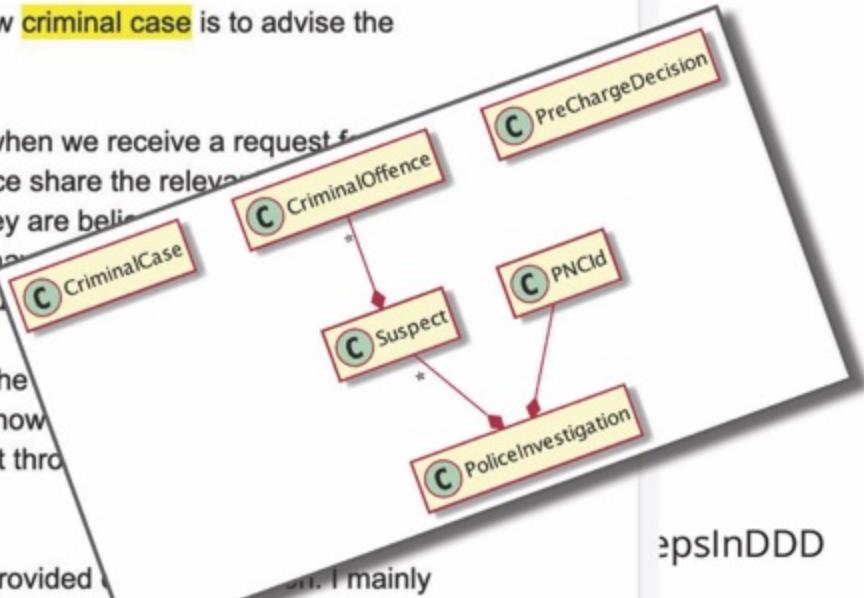
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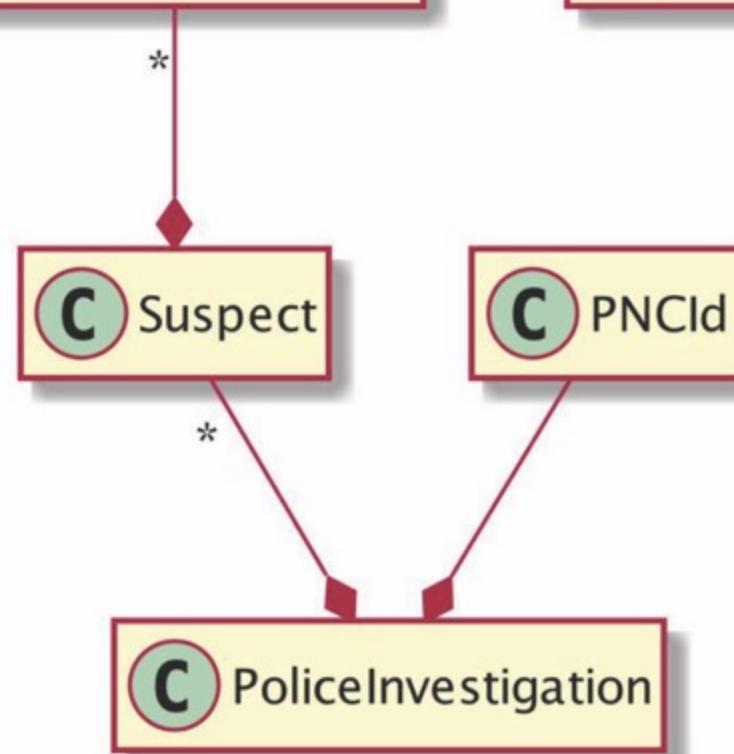
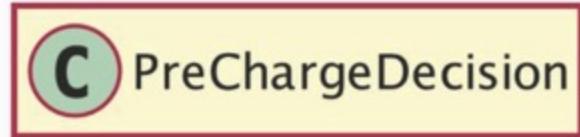
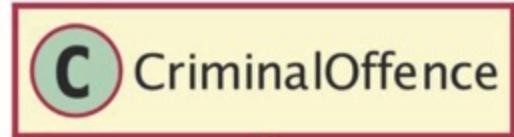
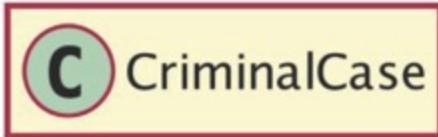
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Hands-On

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Hands-On

```
~/Workspaces/Personal/tmp2/firs  
1 package com.harmellaw;  
2  
3 import ...  
4  
5 public class APreChargeDecision {  
6  
7     @BeforeEach  
8     public void setup() {  
9         ...  
10    }  
11  
12    @Disabled("So the CI build stays green")  
13    @Test  
14    public void shouldRe...  
15        fail();  
16    }  
17  
18    ...  
19  
20}  
21  
22}
```

The diagram shows a UML Class Diagram with four classes: CriminalCase, Suspect, PNCLd, and PoliceInvestigation. CriminalCase has a *-to-* association with Suspect. Suspect has a *-to-* association with PNCLd. PNCLd has a *-to-* association with PoliceInvestigation.

```
graph TD; CC(CriminalCase) *-- "*" S(Suspect); S *-- "*" PNCLd(PNCLd); PNCLd *-- "*" PI(PoliceInvestigation)
```

~/Workspaces/Personal/tmp2/firs

.gradle
.idea
build
config
gradle
src
main
java
com.harmellaw
CriminalCase
CriminalOffence
PNCLd
PoliceInvestigation
PreChargeDecision
Suspect

test

java
com.harmellaw
ACriminalCase
APoliceInvestigation
APreChargeDecision

Remove the
AdviceA

Exercise 1 Focus: Explore this domain, and start to build a mental model

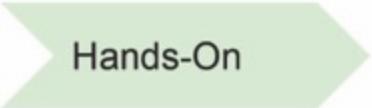
Starting Point:

Implement the (currently ignored) failing test:

```
APrechargeDecision.  
shouldRecordAlternativeOffence  
AdviceAgainstSuspects() { ... }
```

Tips:

- Model just enough with boxes and lines to get quickly to code
- Then “think in code” - start putting more of the domain statement detail into your tests and classes



Hands-On

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Poll: Could your
Domain Expert
tell if you'd
misunderstood
them by looking
at your code ?

- Yes
- No
- I'm not sure

Questions?

S4: What Can a Model Do?

(5 + 10 + 10 minutes)

DDD Theory



“All models are wrong, but some are useful.”

-- George Box (1976)

Discussion: What are models used for?

What can a model do?

- Help us perform tasks and solve problems effectively and efficiently

They do this by *abstracting and simplifying*.

- Focusing on important information
- Ignoring irrelevant information

DDD Theory

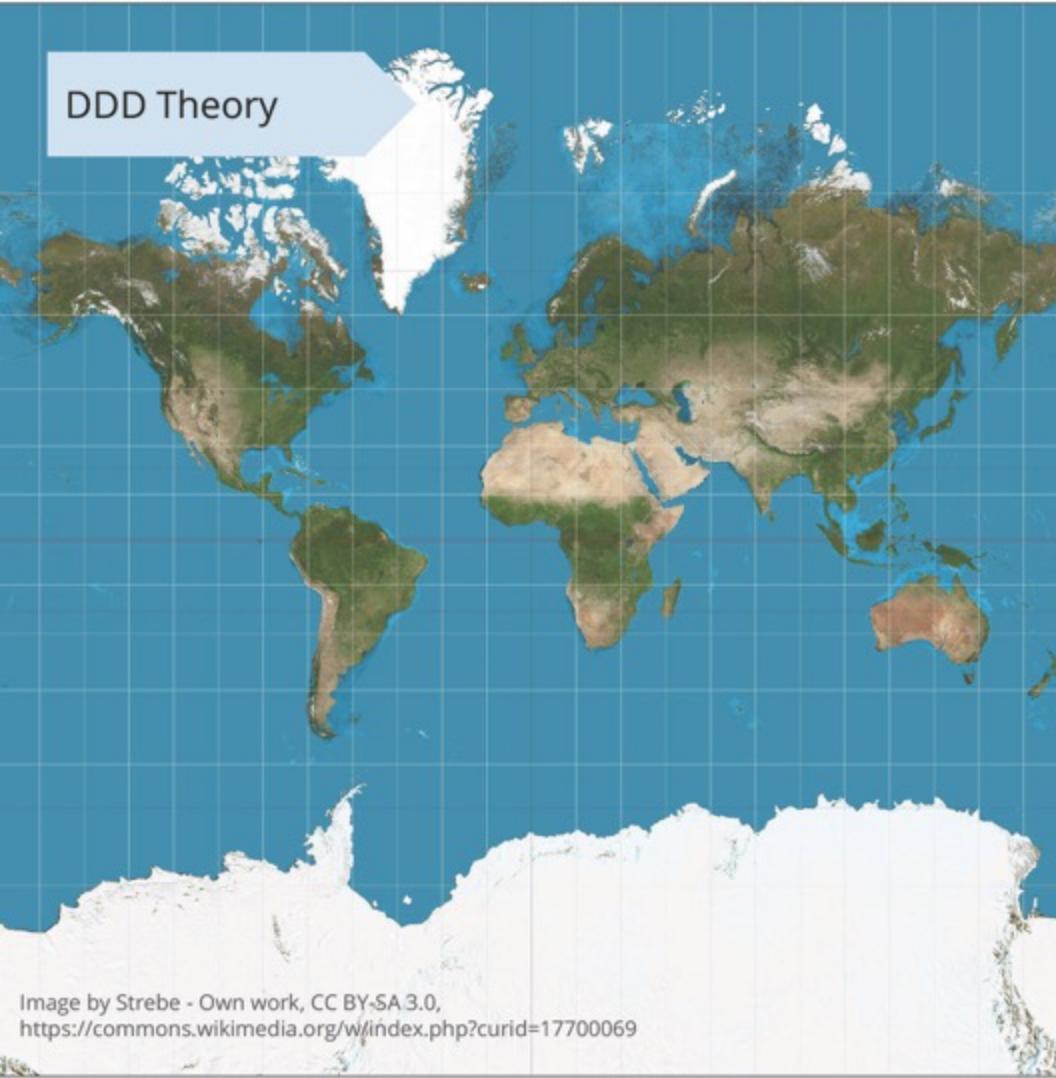


Image by Streebe - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=17700069>

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DDD Theory

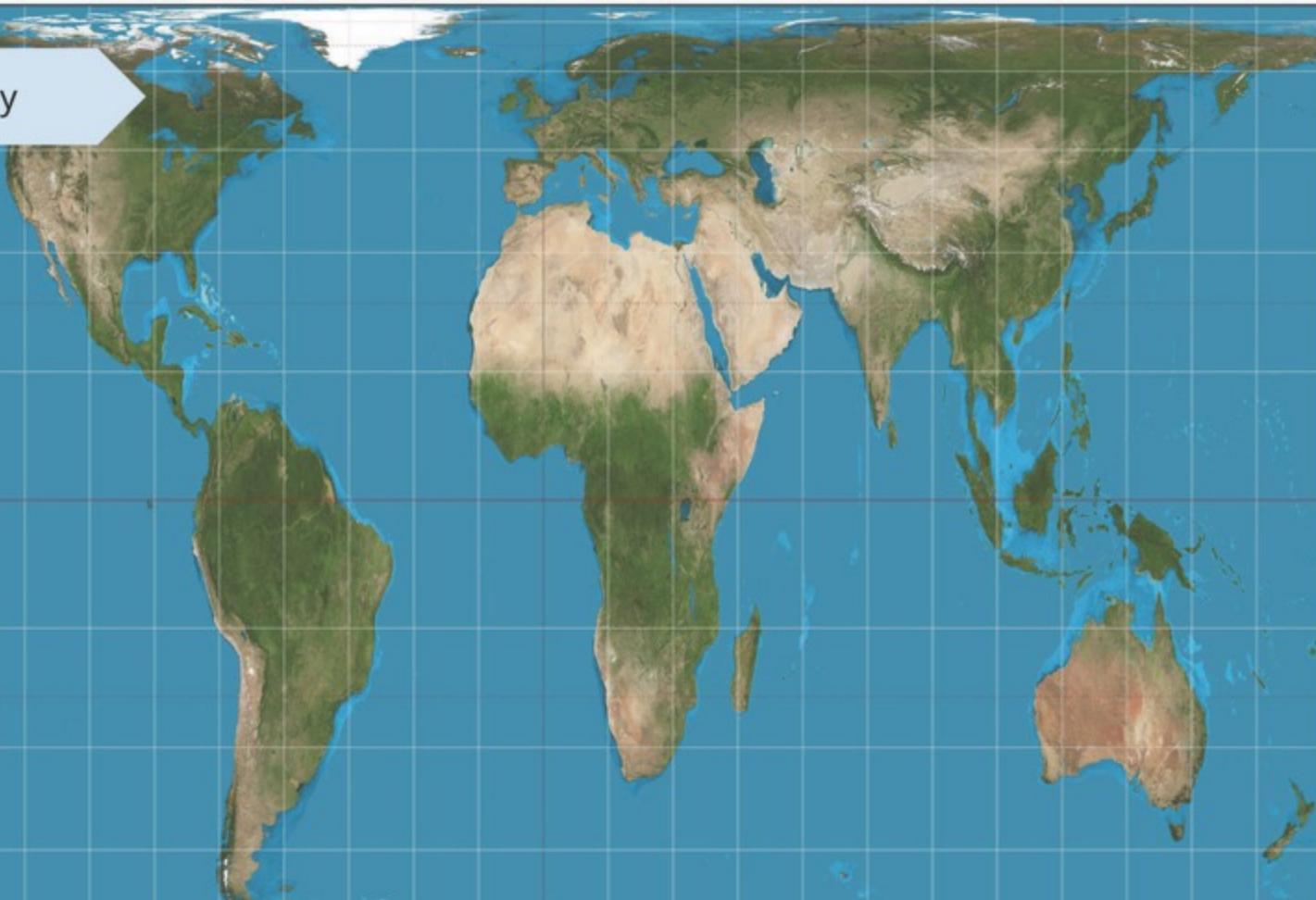
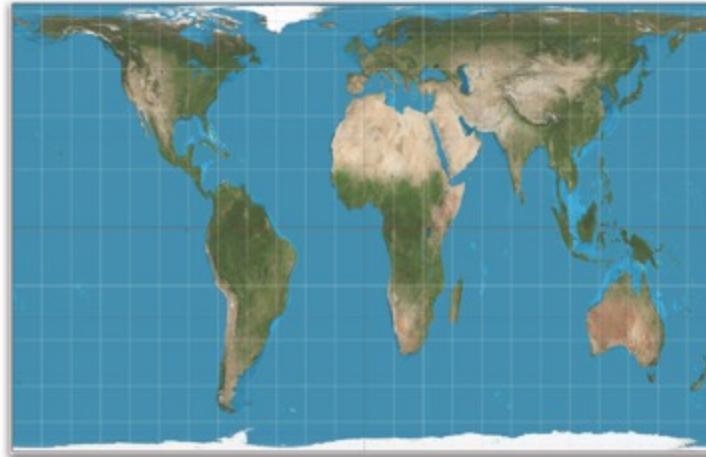


Image by Strebe - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=15115242>

epsInDDD

DDD Theory

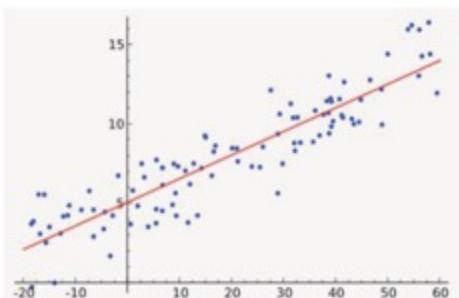


Mercator projection map image by Strebe - own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=17700069>
Gall-Peters projection map image by Strebe - own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=16115242>
London tube map from (WP:NFCC#4), fair use, <https://en.wikipedia.org/w/index.php?curid=46817649>

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Models don't have to be graphical

$$E = MC^2$$



```
package com.harmellaw.hey;  
  
public class HelloWorld  
{  
    public static void main(String[] args) {  
        System.out.println("Hello World!");  
    }  
}
```

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Discussion: Did we model too much or too little in the first exercise?

Questions?

S5: Exercise 2

Actors, activities & fewer *things*
(5 + 20 minutes)

Poll: What are the most important things to put in your model?

- Classes and attributes
- Methods and behaviour
- Actors
- Services
- Business rules and constraints

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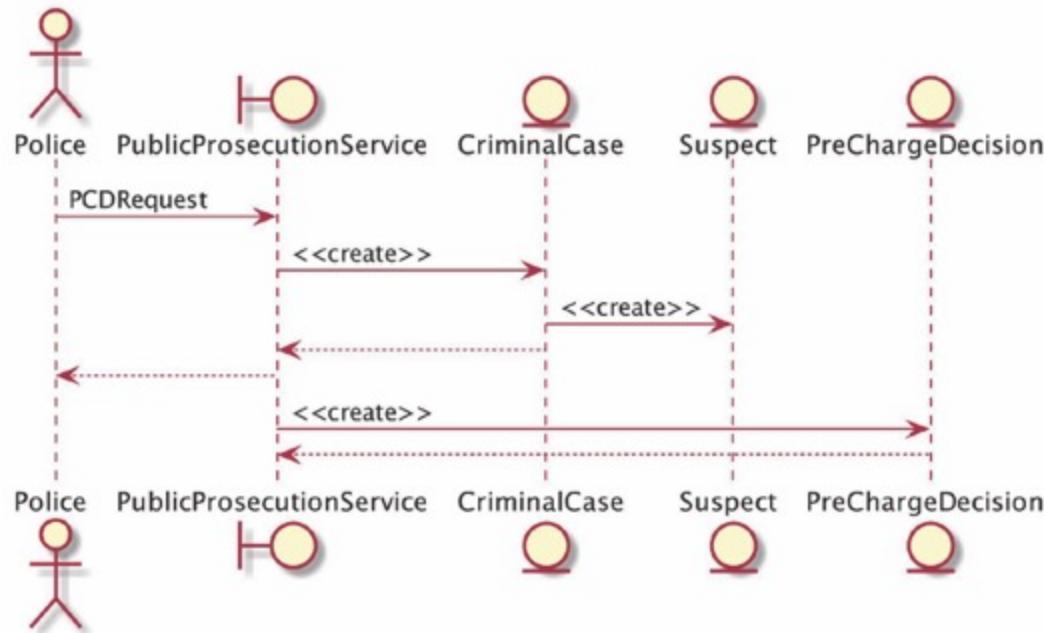
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A Conversation with the Domain Expert

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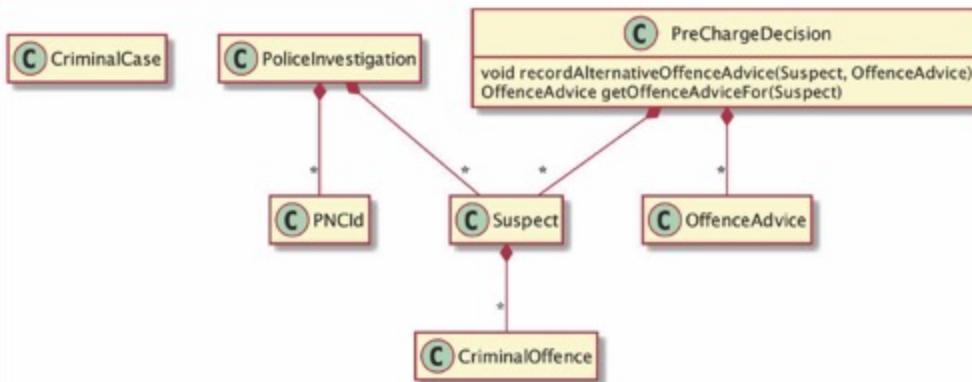
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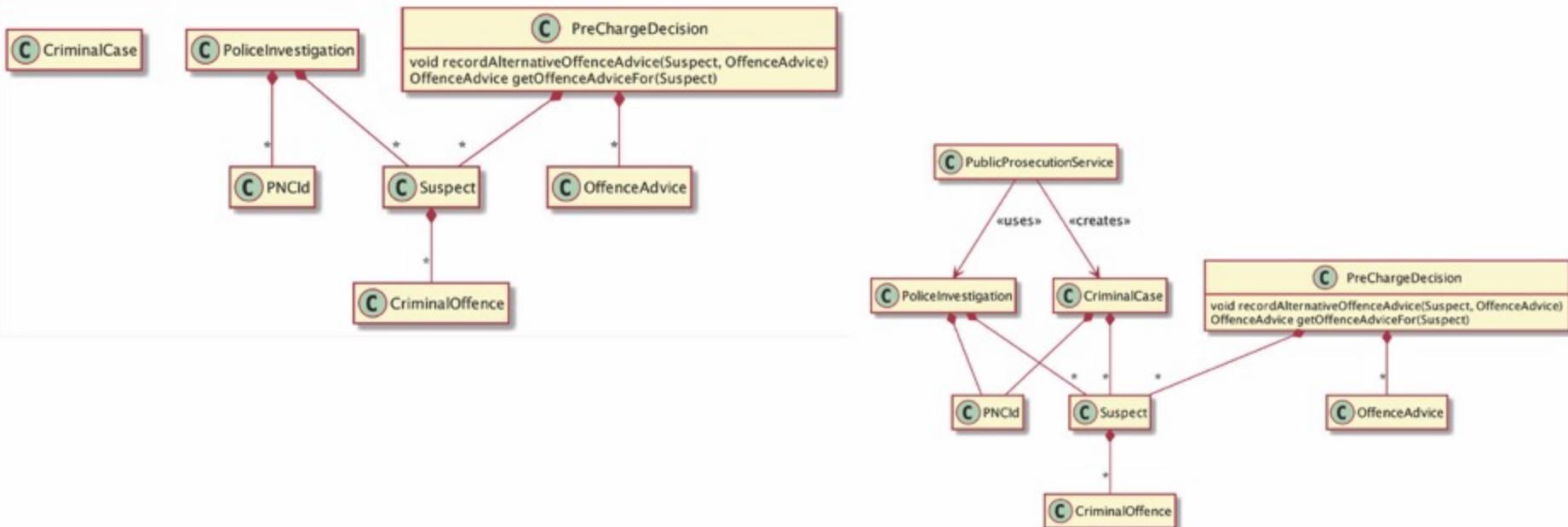
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A Conversation with our Domain Expert

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Exercise 2 Focus: Shift the model's focus to actors and activities

Starting Point:

Implement the following test:

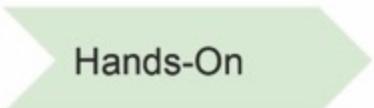
```
ThePublicProsecutionService  
.shouldCreateACaseWhenReceivingAPCD  
Request() { ... }
```

Goal:

- Add actor / activity elements to our model

Tips:

- Make the implicit explicit - the Case concept behind a Pre-Charge Decision
- Think about the domain language - the "decision" here is both a thing and an activity



Hands-On

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Questions?

S6: Exercise 3

Refactoring for greater clarity
(10 minutes)

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I may also take the opportunity to remind them of evidential requirements, pre-charge procedures, and necessary disclosure management steps to be taken to ensure any future case can be taken safely to prosecution.

When I'm finished I collate all this and send it back as the PPS's "pre-charge decision". The Police then consider this advice, and act on none, part, or all of it.

At some point in the future, when the Police consider their inquiries to have gone as far as necessary, they will make a decision to pursue the case or not. If they do, they will make a decision about each suspect, formally charging them with one or more crimes, and from now on calling them "defendants". "Dropping charges" is the term both we and the Police use for a charge that is no longer being pursued. Once this is finished they make up a single case file containing the relevant details of their investigation - the defendants and charges, the evidence, and all the statements. The Police then send this case file to us at the Public Prosecution Service.

We then have a criminal case on our hands. At the point the case file is accepted the ownership of the case transfers to us at the PPS.

We then begin the work of preparing the case for trial. We need to be able to answer "yes" to both these two questions:

- Is there enough evidence against the defendant? (to secure a conviction)
- Is it in the public interest for the PPS to bring the case to court?

If the answer to either of these is "no" then the prosecution of the case against a defendant will be stopped.

To achieve this we weigh up whether the evidence can be used in court and is reliable and credible, and there is no other material that might affect the sufficiency of evidence. We must be satisfied there is enough evidence to provide a "realistic prospect of conviction" against each defendant.

We also ensure that the correct information is shared with the correct parties in the appropriate ways within the appropriate timescales.

As the case makes its way through the courts, it remains under review. This review is a continuing process and we must take account of any change in circumstances that occurs as the case develops. This includes what becomes known of the defence case, any further reasonable lines of inquiry that should be pursued, and receipt of any unused material that may undermine the prosecution case or assist the defence case, to the extent that charges should be altered or discontinued or the prosecution should not proceed.

If it transpires that the case is to be dropped, care should be taken when choosing the method of termination, as this can affect the victim's position under the Victims' Right to Review scheme.

Hands-On

Here, the Police are asking the Public Prosecution Service for help *investigating*

Here, the Public Prosecution Service are *preparing*

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Exercise 3 Focus: Packages (Plus: check domain language in tests and code)

Starting Point:

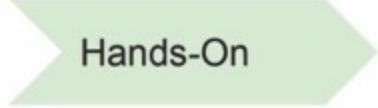
- .investigation
- .preparation

Goal:

- Greater structure in our code, and a lower cognitive load as a result

Tips:

- Think about who owns what when you put things into packages
- Read the tests as if you were the domain expert - they should make sense to a non-developer



Hands-On

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Questions?

S7: Exercise 4

Our Model Breaks / We Have a Breakthrough
(5 + 15 + 5 minutes)

Poll: Do your systems contain a single model?

- Always
- Sometimes
- Never

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- Is it in the public interest for the PPS to bring the case to court?

If the answer to either of these is "no" then the prosecution of the case again  will be stopped. [@al94781 #FirstStepsInDDD](#)

Exercise 4 Focus: Probe the second key aspect of the domain; accepting Case Files and Criminal Cases

Starting Point:

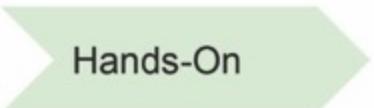
```
APublicProsecutionService  
.shouldCreateACriminalCaseWhen  
APoliceCaseFileIsAccepted()
```

Goal:

- Broaden our understanding to *all* of our domain

Tips:

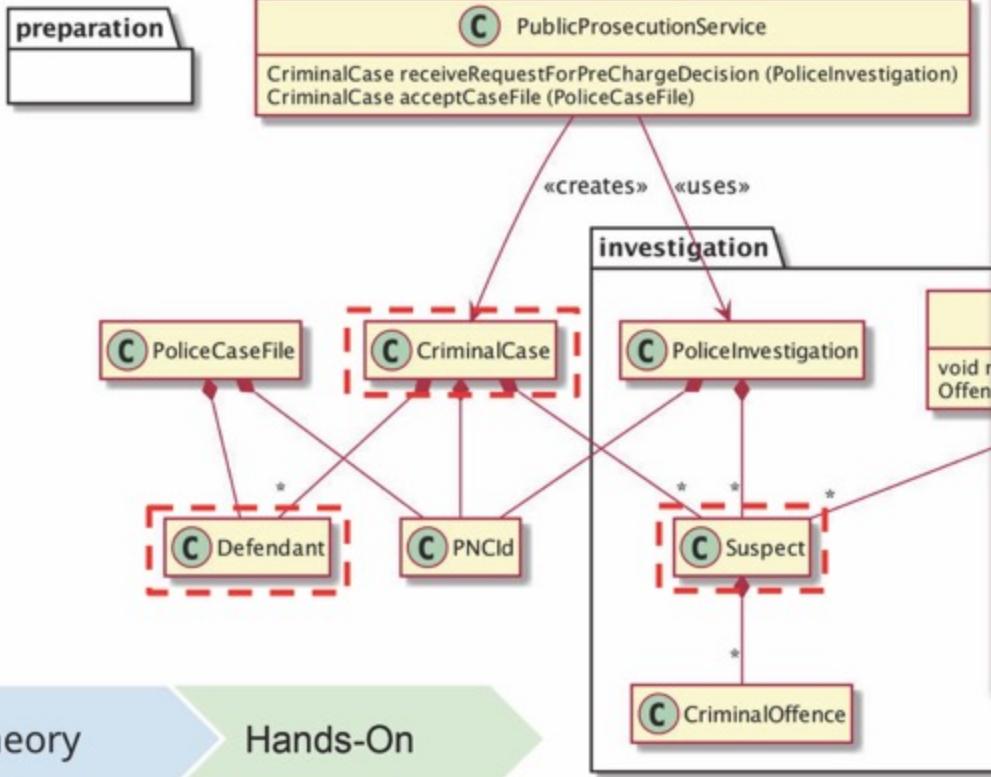
- Send an actors/activities test probe into the second aspect of our domain



Hands-On

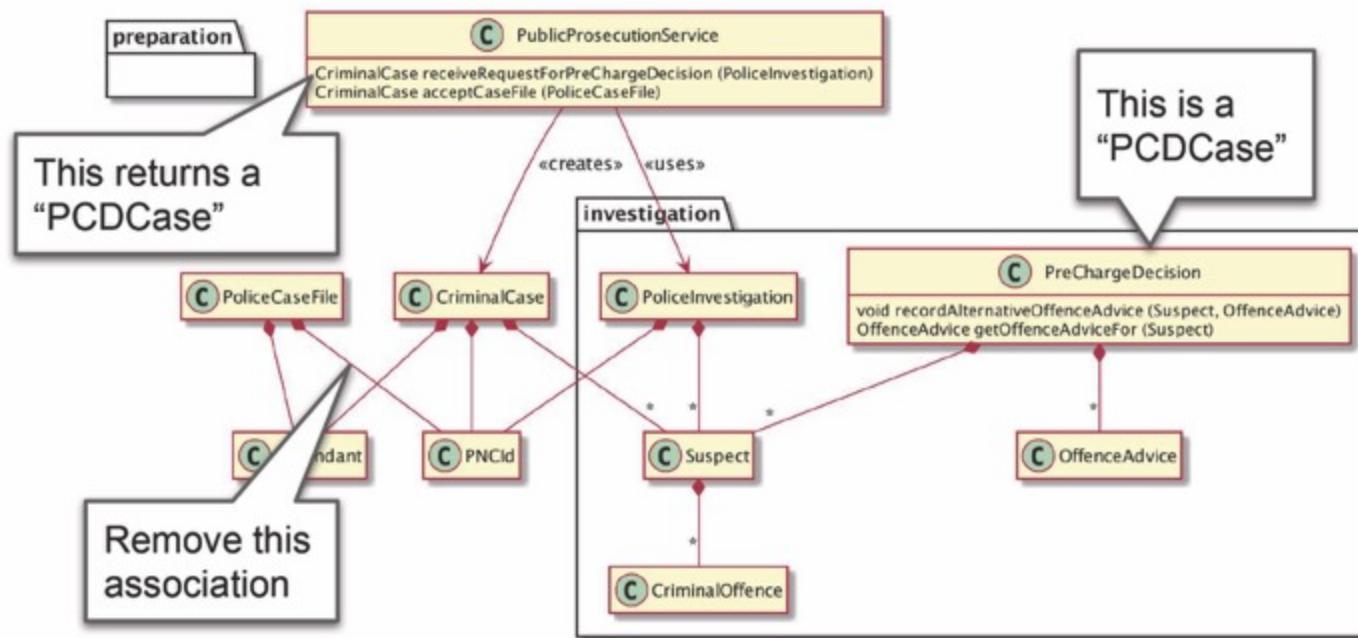
@al94781 #FirstStepsInDDD

Snap!



“...they will make a decision about each suspect, formally charging them with one or more crimes, and from now on calling them ‘defendants’...”

Another Conversation with the Domain Expert



Breakthrough:

Case != CriminalCase

Case == PCDCase ||
CriminalCase

Discussion: How did that feel?

Questions?

S8: Exercise 5

Splitting Our Model
(10 + 10 minutes)

Exercise 5 Focus: Split our model into two parts

Starting Point:

Fix the test name, and body:

```
ThePublicProsecutionService.  
shouldCreateA PreChargeDecisionCase  
WhenReceivingAPcdRequest()
```

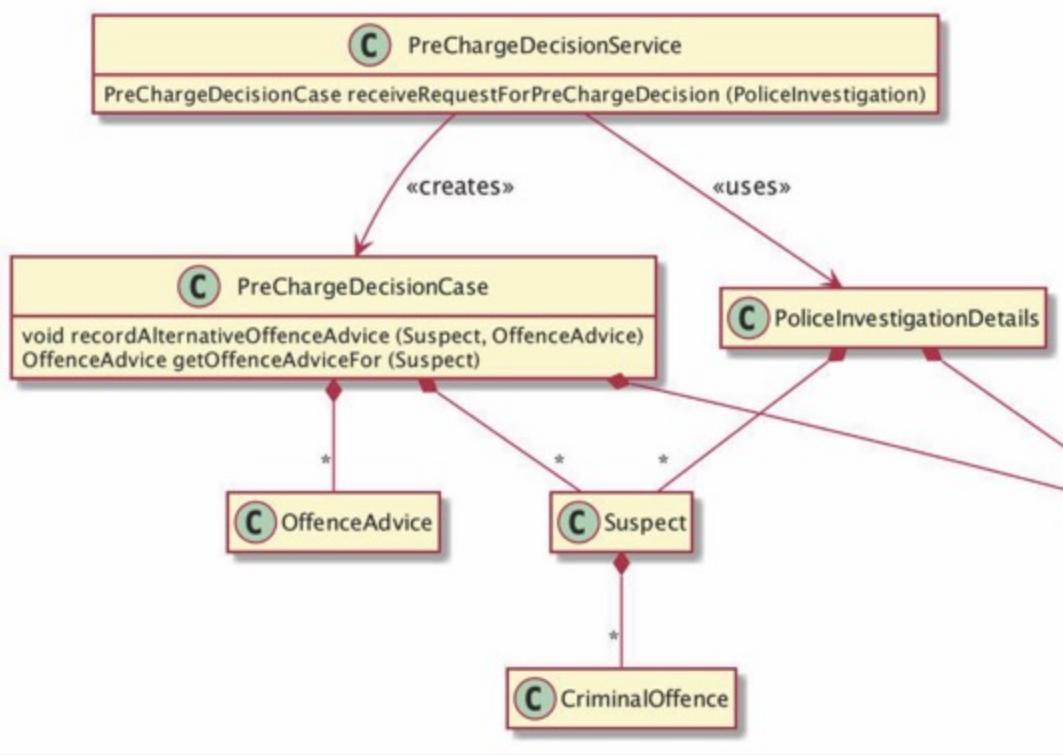
Final Goal:

Two expressive models, split according to the needs of the domain expert and other users

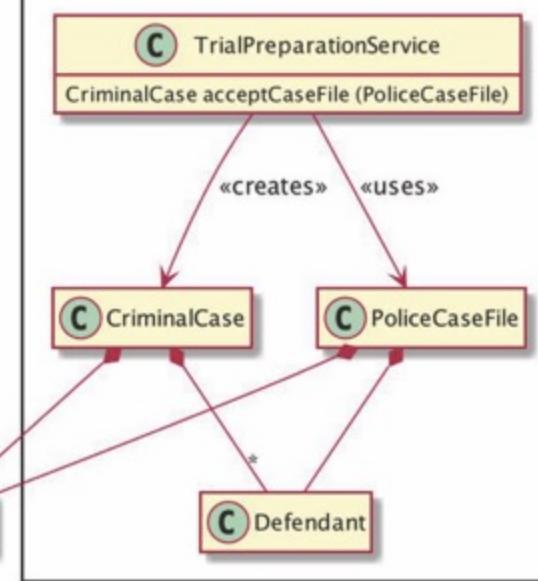
Tips:

- Remember our packages
- Read your tests and code - pay attention to the names of things
- If you don't own it, it's probably immutable
- If a class (hint: a service?) does two things, see if you can separate them

investigation



preparation



Discussion: How does having duplication between your models make you feel?

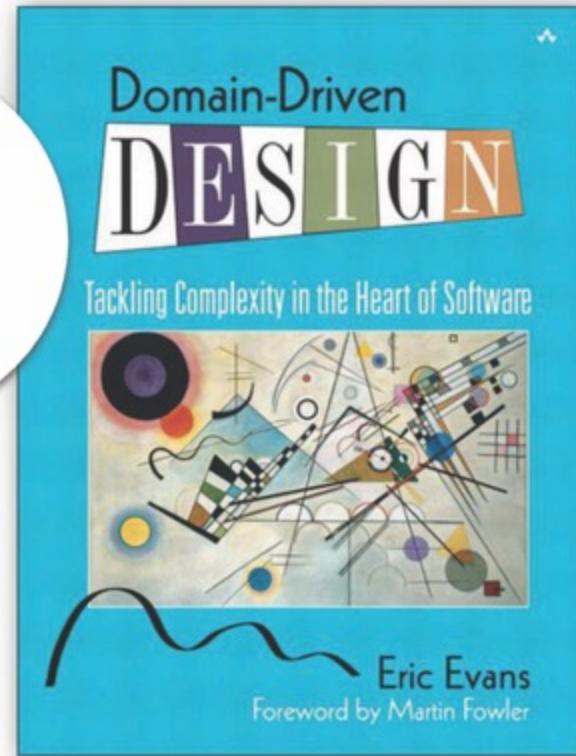
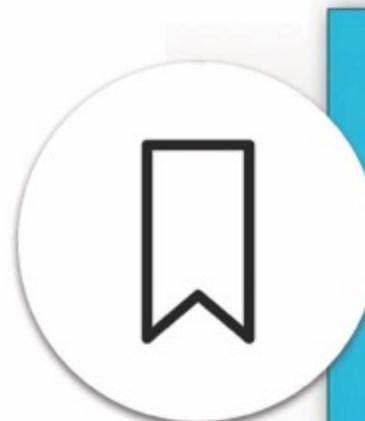
Questions?

S9: Recap and Your Next Steps

(5 + 10 minutes)

Domain-Driven Design Concepts we covered

- *Ubiquitous language* (page 24)
- *Hands-on modellers* (pages 60)
- Modules (page 109)
- Breakthroughs (page 193)
- *Multiple, distinct models* (page 335)



Book image from DDDCommunity.org
https://dddcommunity.org/wp-content/uploads/2012/10/Domain_Driven_Design-EricEvans.jpg

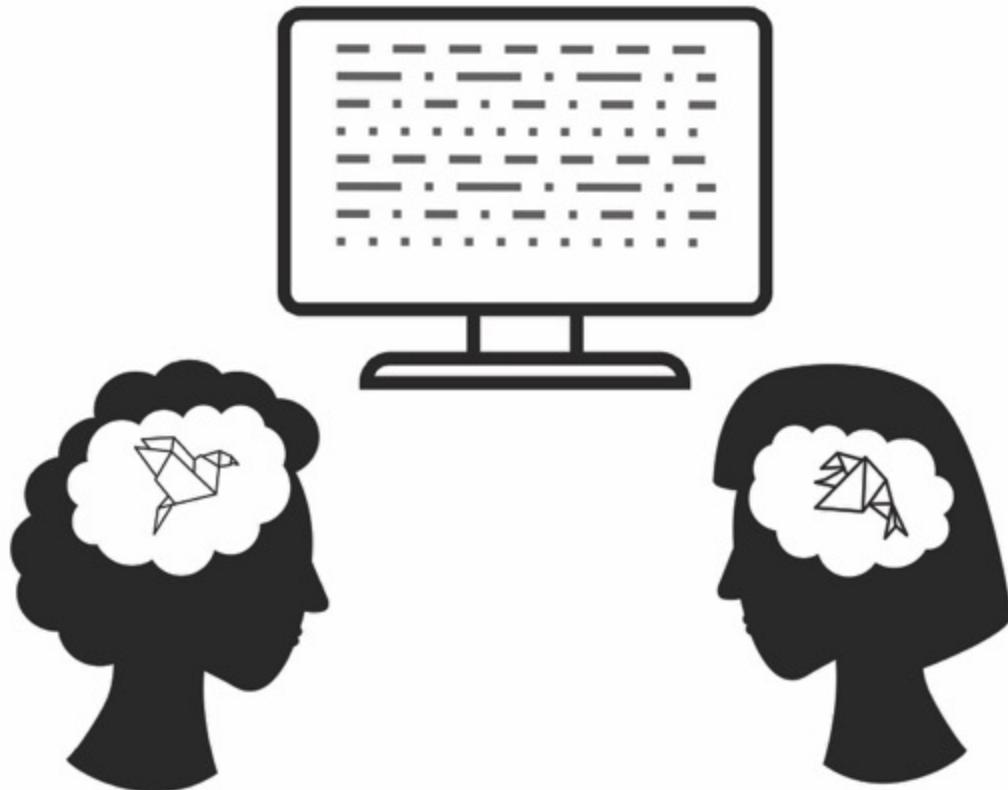
DDD Theory

Hands-On

@al94781 #FirstStepsInDDD

Techniques we employed

- Just-enough sketch-modelling
- Thinking about the jobs being done
- Just-enough domain-focused code
- Making the implicit explicit
- Test-driven probes based on statements from domain experts
- Packages to lower the cognitive load - thinking about ownership
- Splitting models in two when having only one doesn't work



DDD Theory

Hands-On

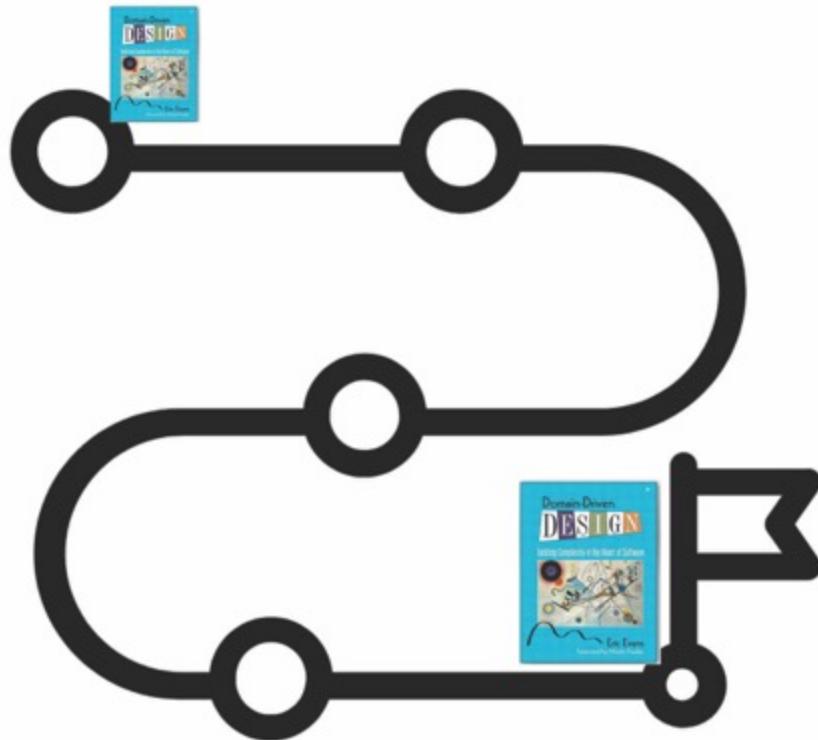
@al94781 #FirstStepsInDDD

Your Next Steps

- Read about the domain-driven concepts we covered in the Blue Book
- Keep domain-modelling
- Watch out for the chance to employ the techniques

DDD Theory

Hands-On



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https://dddcommunity.org/wp-content/uploads/2012/10/Domain_Driven_Design-EricEvans.jpg

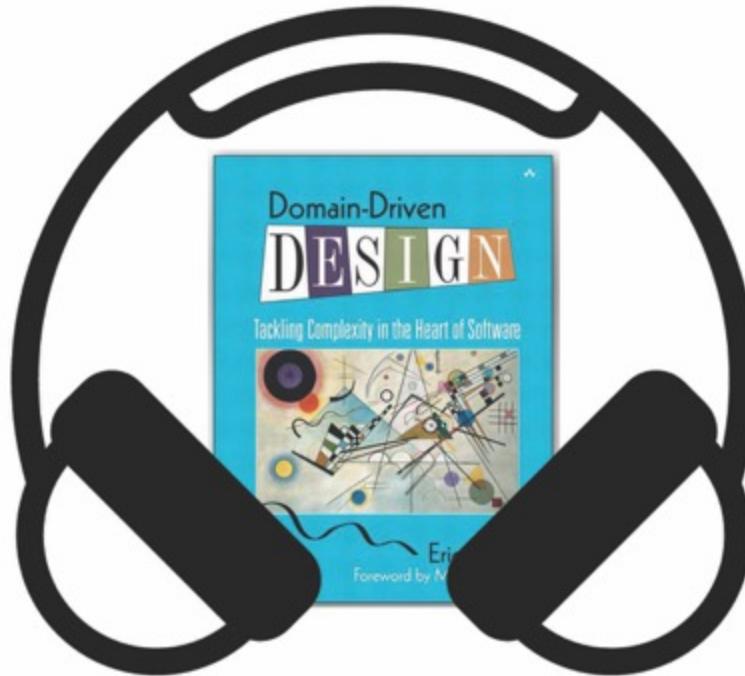
@al94781 #FirstStepsInDDD

Domain-driven design concepts to ignore (for now)

- “Entities and Value Objects”
- “Aggregates”
- “Repositories”
- “Sub-domains”
- “Tactical” and “Strategic” Patterns

DDD Theory

Hands-On



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https://dddcommunity.org/wp-content/uploads/2012/10/Domain_Driven_Design-EricEvans.jpg

@al94781 #FirstStepsInDDD

Closing Discussion:
Did this course meet
your expectations?

Questions?