A Little Bit Of UML
(for just enough design)

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Get the slides

http://www.codemanship.co.uk/files/littleuml.pdf

Schedule

10:00   Introduction

10:15   Test-driven Object Oriented Design

11:00   Break

11:15   TDOOD Exercise: The Video Library

12:30   Lunch

13:30   A Little Bit Of UML

14:15   Video Library (cont.)

15:00   Break

15:15   A Little Bit of User Experience Design

15:30   Video Library (cont.)

16:30   Show & tell / Wrap-up

17:00   Finish

Just Enough…

TEST-DRIVEN OBJECT ORIENTED DESIGN

Where do we start?

USERS & THEIR GOALS

Donate a DVD

As a video library **member**, I want to **donate a DVD to the library** so that other members can borrow it and I can earn points for priority services

What's the outcome?

TEST-DRIVEN

Examples: Be Specific…

<u>Given</u> a copy of The Abyss, which isn't in the library,

<u>When</u> Joe Peters donates his copy, specifying the name of the title, that it was directed by James Cameron and released in 1989

<u>Then</u> The Abyss is added to the library and his copy is registered against that title so that other members can borrow it,
AND an email alert with the subject "New DVD title" is sent to Bill Smith and Jane Jones, who specified an interest in titles matching "the abyss"(non-case-sensitive), stating "Dear <member's first name>, Just to let you know that another member has recently donated a copy of The Abyss (dir: James Cameron, 1989) to the library, and it is now available to borrow."
AND The Abyss is added to the list of new titles for the next member newsletter
AND Joe Peters receives 10 priority points for making a donation

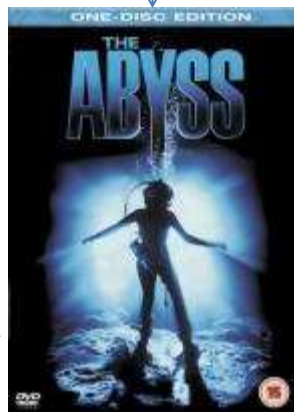Who are the characters, and how do they know each other?

OBJECT ORIENTED

Joe Peters

about

email alert

copies

because

donates

matches

member

titles

"the abyss"

interested in

members

to

new titles

Bill Smith

Jane Jones

What's the story?

DESIGN

Responsibilities: Passive Story

1. "The Abyss" is added to the library with title name "The Abyss", director "James Cameron" and year 1989
2. One rental copy is registered to "The Abyss"
3. An email is sent to any members who specified that they wanted to be alerted when a title matching "the abyss" (non-case sensitive) was donated
4. "The Abyss" is added to the list of new titles
5. Joe Peters is awarded 10 priority points

Roles: Active Story

1. The **library** adds "The Abyss" to itself with title name "The Abyss", director "James Cameron" and year 1989
2. The new **title** "The Abyss" registers one rental copy to itself
3. An **email alert** sends itself to any members who specified that they wanted to be alerted when a title matching "the abyss" (non-case sensitive) was donated
4. The **library** adds "The Abyss" to the list of new titles
5. **Member** Joe Peters awards himself 10 priority points

hidden complexity

Collaborations: Characters Interact

1. The **library** adds "The Abyss" to itself with title name "The Abyss", director "James Cameron" and year 1989, then tells
2. the new **title** "The Abyss" to register one rental copy to itself, who tells
3. an **email alert** to send itself to any members who specified that they wanted to be alerted when a title matching "the abyss" (non-case sensitive) was donated
4. The **library** adds "The Abyss" to the list of new titles, then tells
5. **member** Joe Peters to award himself 10 priority points

Class-Responsibility-Collaboration (CRC) Cards

Library

• Knows about titles	• Title
• Knows about new titles	• Member
• Adds donated titles	
• Adds new titles	

Title

• Knows its name, director & year of release	• Email Alert
• Knows about rental copies	
• Registers rental copy	

Email Alert

• Sends email to members who specified matching title	?

Member

• Knows about priority points	
• Awards priority points	

Put the behaviour where the data is

ENCAPSULATION

Data-driven Design

: Insurance Quote | : Customer | : DriversLicenseInfo

getDateOfBirth()

calculateAge()

getDriversLicenseInfo()

getDateIssued()

getPoints()

calculate risk based on age, time customer has had license and points
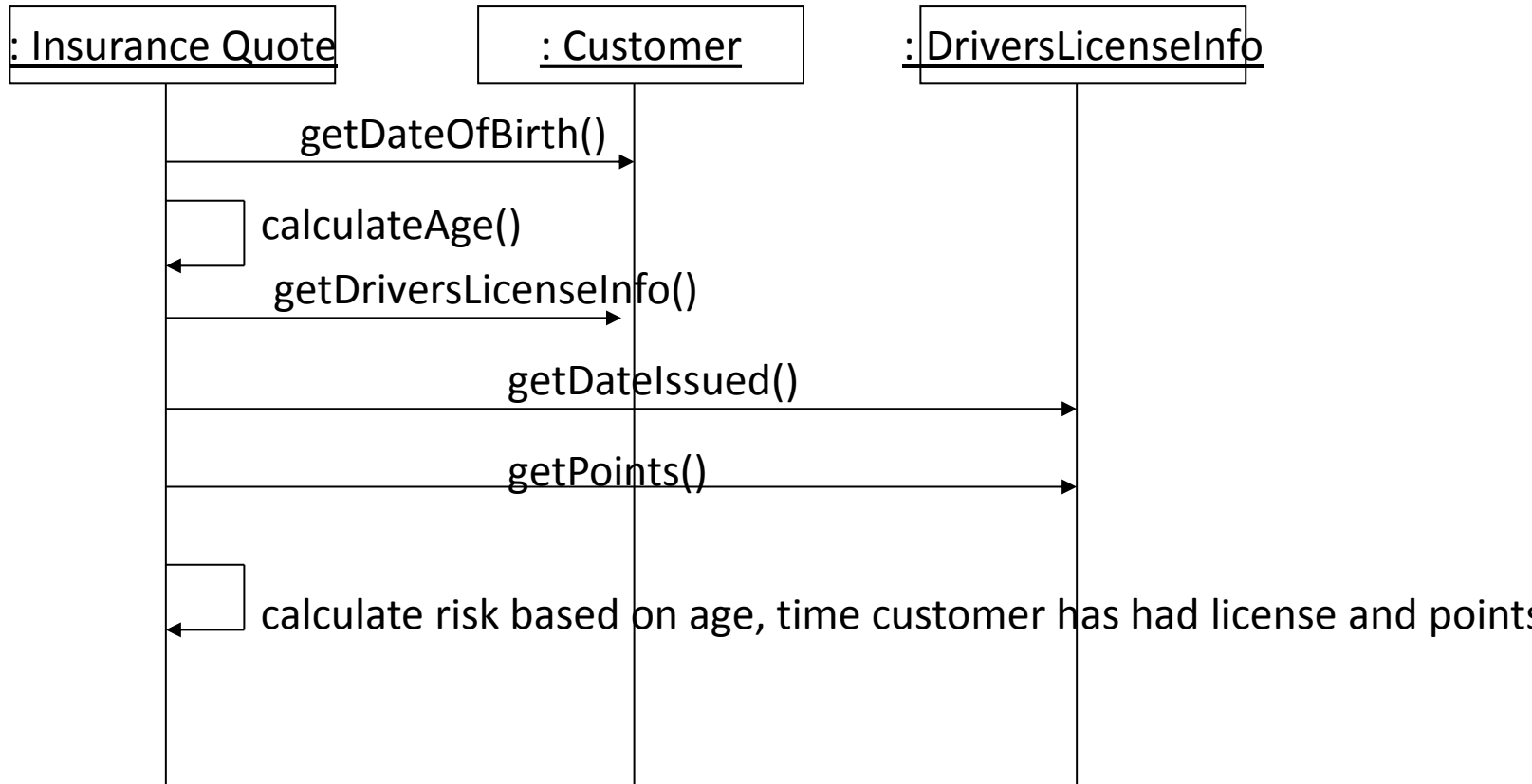
Tell, Don't Ask
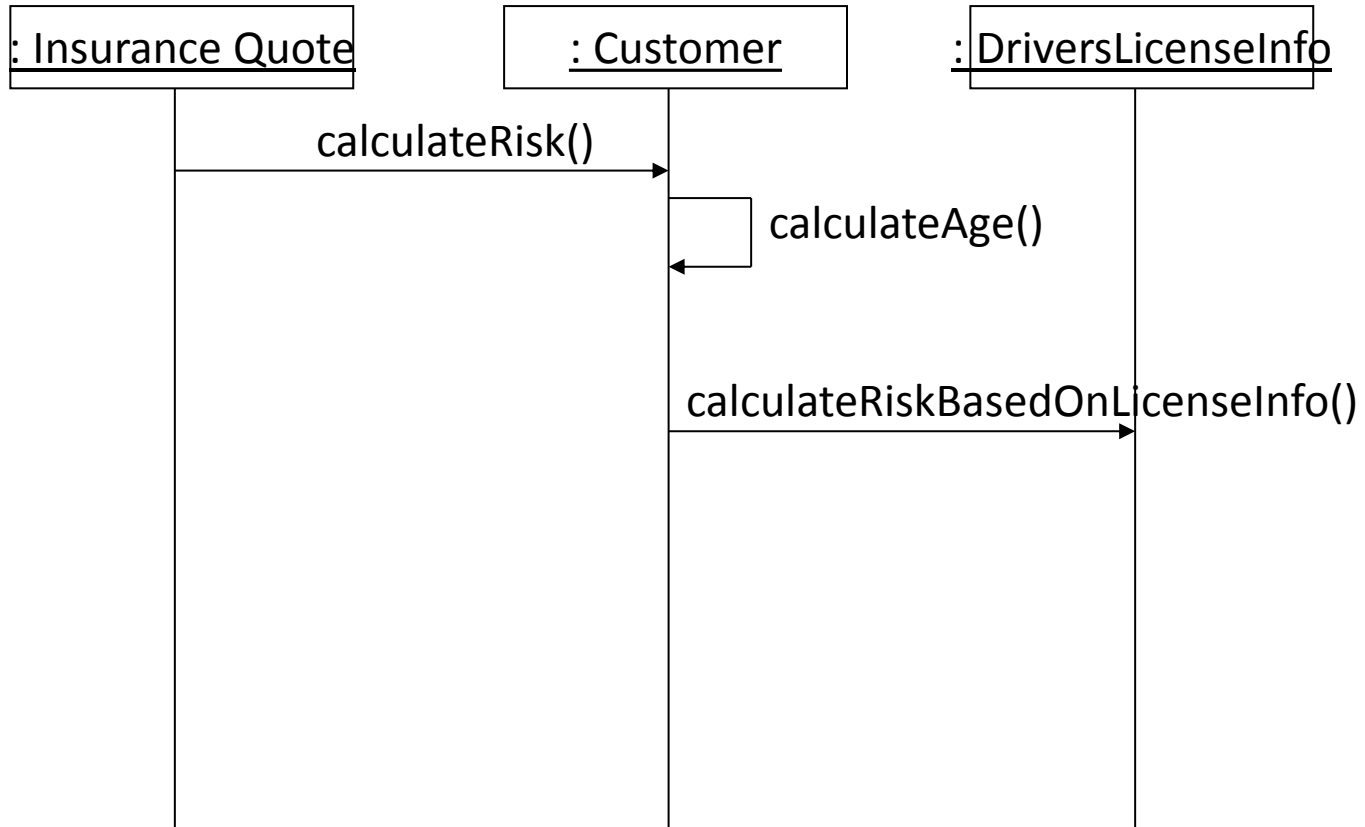
Classic TDD + London School

TESTS!

Title

- Knows its name, director & year of release
- Knows about rental copies
- Registers rental copy

- Email Alert

```java
@Test
public void registersRentalCopy() {
    EmailAlert emailAlert = mock(EmailAlert.class);
    Title title = new Title(null, null, null, emailAlert);
    title.registerCopy();
    assertEquals(1, title.getRentalCopyCount());
}
```

```java
@Test
public void tellsEmailAlertToSend() {
    EmailAlert emailAlert = mock(EmailAlert.class);
    Title title = new Title(null, null, null, emailAlert);
    title.registerCopy();
    verify(emailAlert).send(title);
}
```

Gluing It All Together From The

OUTSIDE-IN

Library

- Knows about titles
- Knows about new titles
- Adds donated titles
- Adds new titles

• Title
• Member

mock

Title

- Knows its name, director & year of release
- Knows about rental copies
- Registers rental copy

• Email Alert

mock

Email Alert

• Sends email to members who specified matching title	?

mock

Member

- Knows about priority points
- Awards priority points

Reusing Test Code

POLYMORPHIC TESTS

```java
public class TitleTests {

    @Test
    public void registersRentalCopy(){
        Title title = createTitle();
        title.registerCopy();
        assertEquals(1, title.getRentalCopyCount());
    }

    protected Title createTitle() {
        EmailAlert emailAlert = mock(EmailAlert.class);
        Title title = new Title(null, null, null, emailAlert);
        return title;
    }

}
```

```java
public class TitleEndToEndTests extends TitleTests {

    @Override
    protected Title createTitle() {
        EmailAlert emailAlert = new IMAPEmailAlert();
        Title title = new Title("X", "Y", "1999", emailAlert);
        return title;
    }

}
```

And so to business

VIDEO LIBRARY USER STORIES

Donate a DVD

As a video library member, I want to donate a DVD to the library so that other members can borrow it and I can earn points for priority services

Borrow a DVD

As a video library member, I want to borrow a copy of a DVD so that I can watch it without buying my own copy

Return a DVD

As a video library member, I want to return a copy of a DVD I've borrowed so that I can other members can borrow and earn priority points when I return it on time

Send weekly newsletter

As the video library administrator, I want a newsletter emailed to all members once a week listing all the new titles added since the last newsletter so that members can see what new titles are available

Join the video library

As a movie lover, I want to join the video library so that I can get access to its collection of titles

Reserve DVD

As a video library member, I want to reserve titles for which all rental copies are currently on loan so I can borrow it when copies are returned. If there's a queue for a title, I want to be able to use my priority points to fast-track myself up the queue.
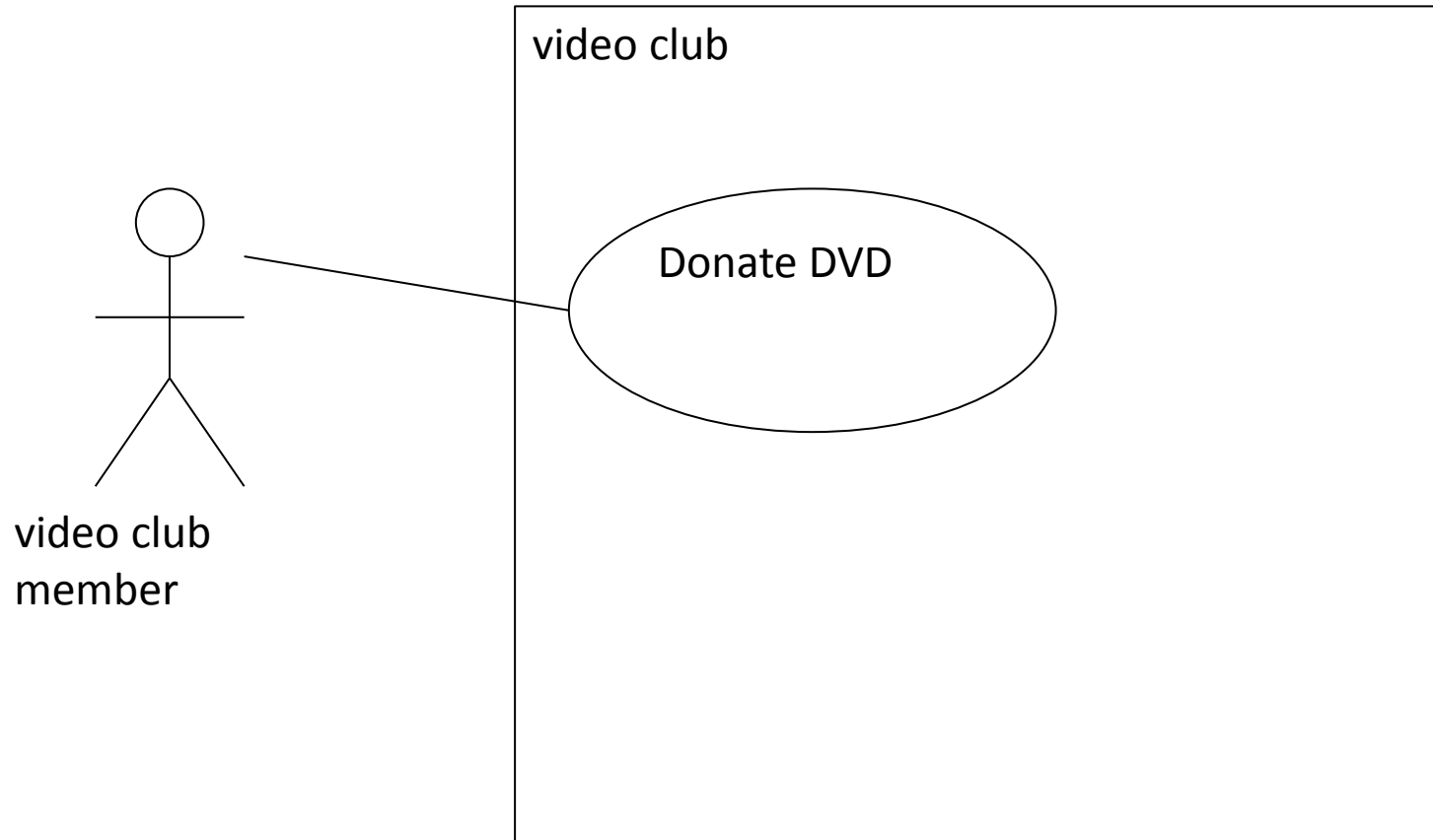
The 20% We Use 90% Of The Time

A LITTLE BIT OF UML

Users & Goals In Agile

As a **video club member**, I wish to *donate a DVD* so other members can borrow it

Actors & Use Cases

video club

video club
member

Donate DVD

Essential Scenarios
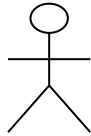
video club member

video club

video club member:

- Request list of DVD genres

- Select genre of DVD

- Enter title to find

- Select existing DVD title and request to add a copy

- Specify delivery date

video club:

- List DVD genres

- List DVDs in selected genre

- Filter list of DVDs with similar titles in selected genre

- Ask when member will bring DVD to club

- Add copy to library for selected DVD and mark as available on next working day after delivery date

Classes
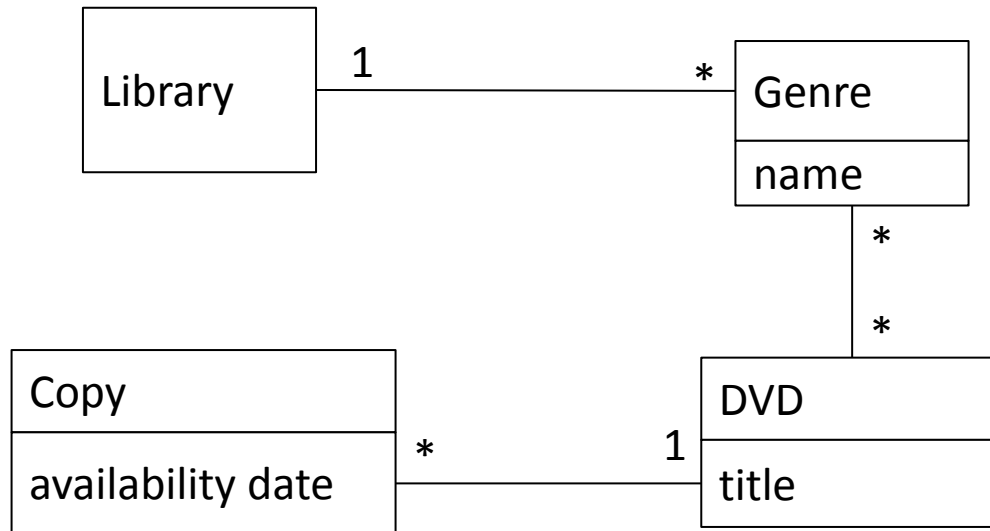
Responsibilities & Interactions

video club member

: Library

: Genre

: DVD

list genres

genres

select genre

find matching titles (title)

DVDs with matching titles

select DVD

add copy (delivery date)

(delivery date)

: Copy

calculate availability date

add to copies

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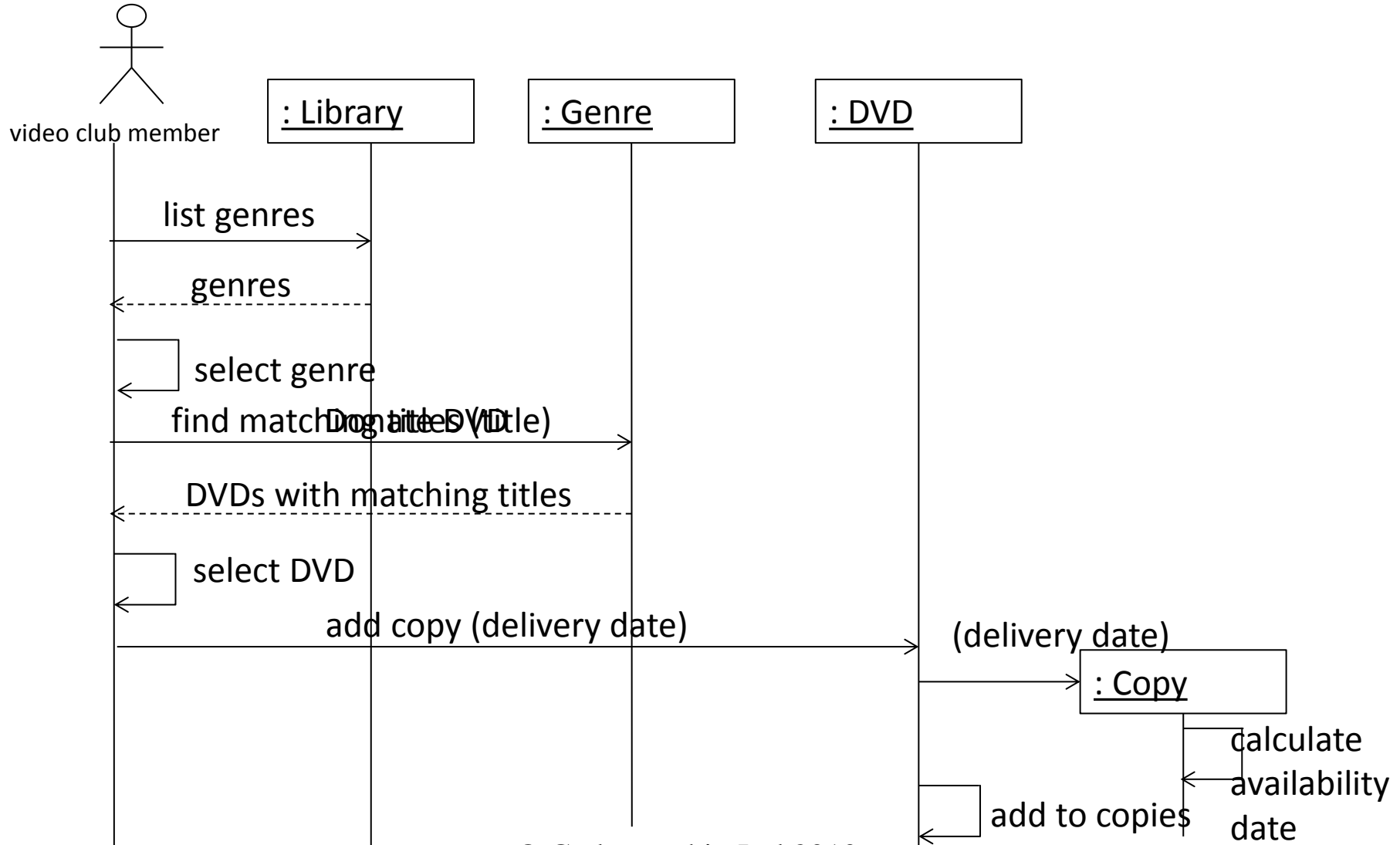
Classes With Responsibilities

Library
list genres()

Genre
name
find matching titles (title)

1 —— *

Copy
availability date
Copy(delivery date)

DVD
title
add copy(delivery date)

* —— 1

*

*

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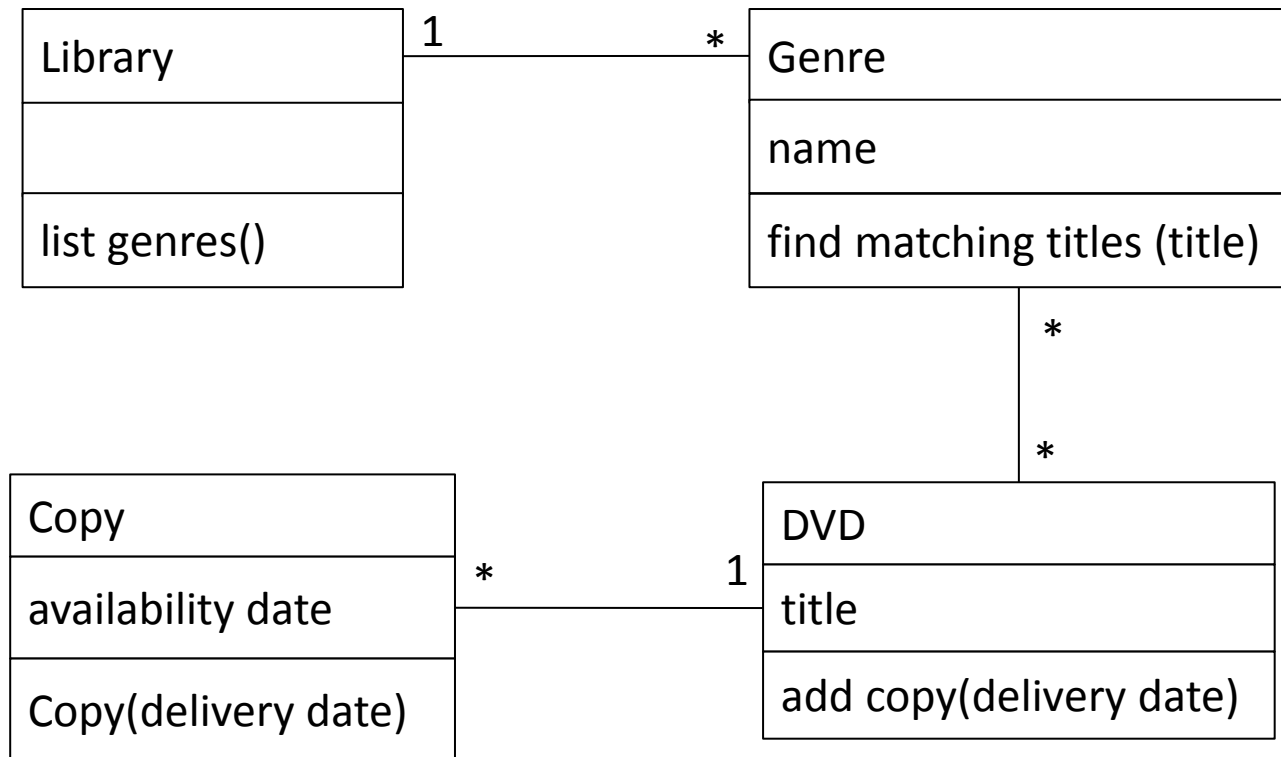
Generalisations & Interfaces

```
Library                    1                    *   Genre
                                                    name
list genres()                                       find matching titles (title)
                                                                          *

                                                                          *

Copy                                               LibraryItem
availability date          *                    1  title                          ◯
Copy(delivery date)                                add copy(delivery date)      Loanable

                                        DVD          VHSCassette          Book
```
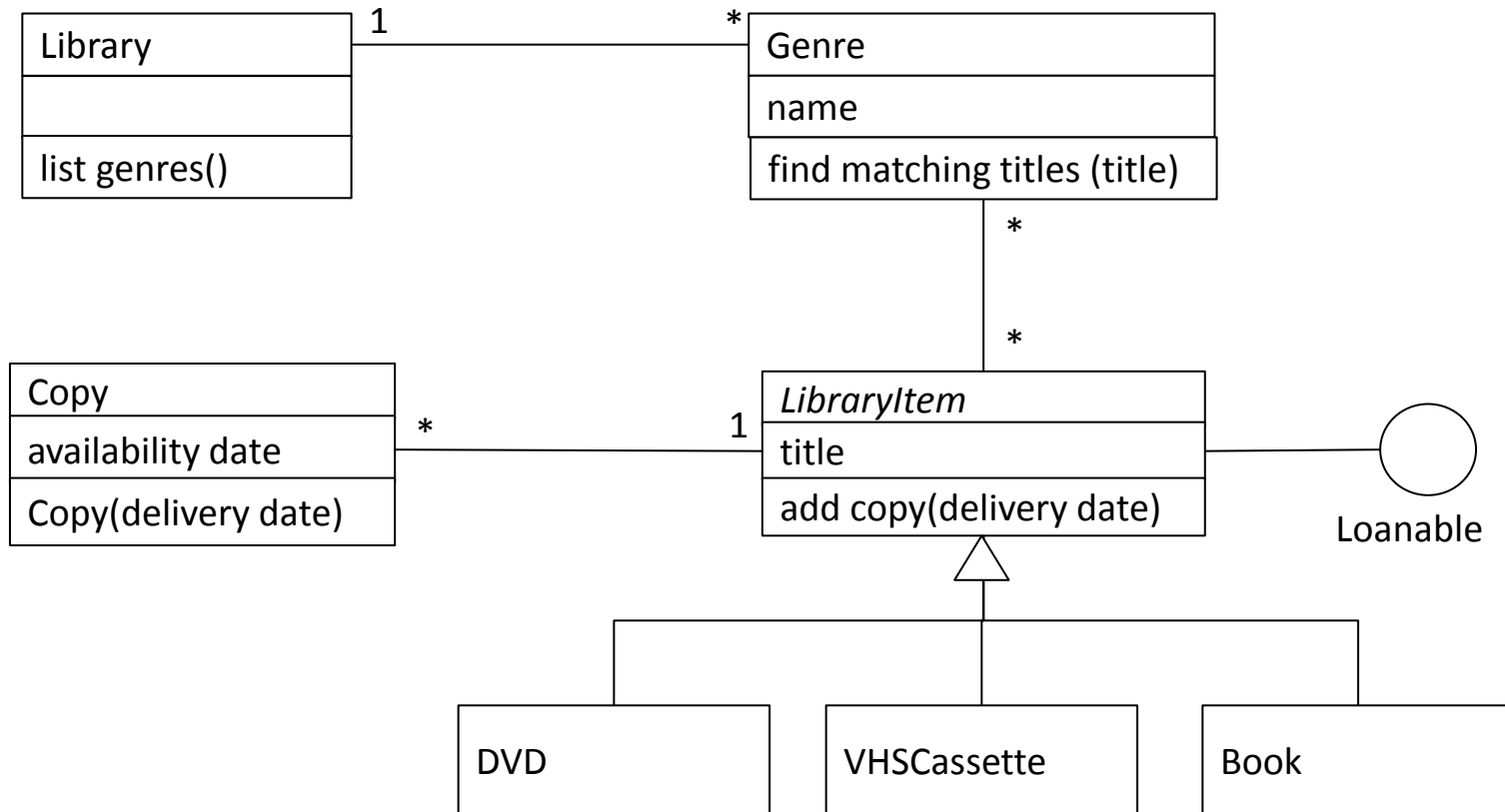
Because we want our software to be used…

A LITTLE BIT OF USER EXPERIENCE DESIGN

STORYBOARDING

"As a punter, I want to place a bet on a horse and see how much money I might win so I can budget for my weekend of debauchery"

Track	Chepstow
Meet	June 3rd 2011
Race	14:30

Punter	Runner	Odds	Stake	Winnings
J GORMAN	Jolly Roger	5/1	£100	£500
J GORMAN	Mrs Fry	10/1	£20	£200
S FRIEDMAN	Uncle Bob	2/1	£250	£500

```
> placebet "Chepstow", "3/6/11", "14:30", "J GORMAN", "Jolly Roger", 100
> Placing bet…
> Bet placed…
> Calculating winnings…
> Winnings: 500 at odds of 5/1
```

```
› punterlogin "J GORMAN"
› J GORMAN> selecttrack "Chepstow"
› J GORMAN/Chepstow> selectmeet "3/6/11"
› J GORMAN/Chepstow/3-6-11> selectrace "14:30"
› J GORMAN/Chepstoq/3-6-11> selectrunner "Jolly Roger"
› J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> placebet 100
› J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Placing bet…
› J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Bet placed…
› J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Calculating winnings…
› J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Winnings: 500 at odds of 5/1
```

registered punter

From list of tracks

From list of meets for that track

```
> punterlogin "J GORMAN"
> J GORMAN> selecttrack "Chepstow"
> J GORMAN/Chepstow> selectmeet "3/6/11"
> J GORMAN/Chepstow/3-6-11> selectrace "14:30"
> J GORMAN/Chepstoq/3-6-11> selectrunner "Jolly Roger"
> J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> placebet 100
> J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Placing bet…
> J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Bet placed…
> J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Calculating winnings…
> J GORMAN/Chepstow/3-6-11/14:30/Jolly Roger> Winnings: 500 at odds of 5/1
```

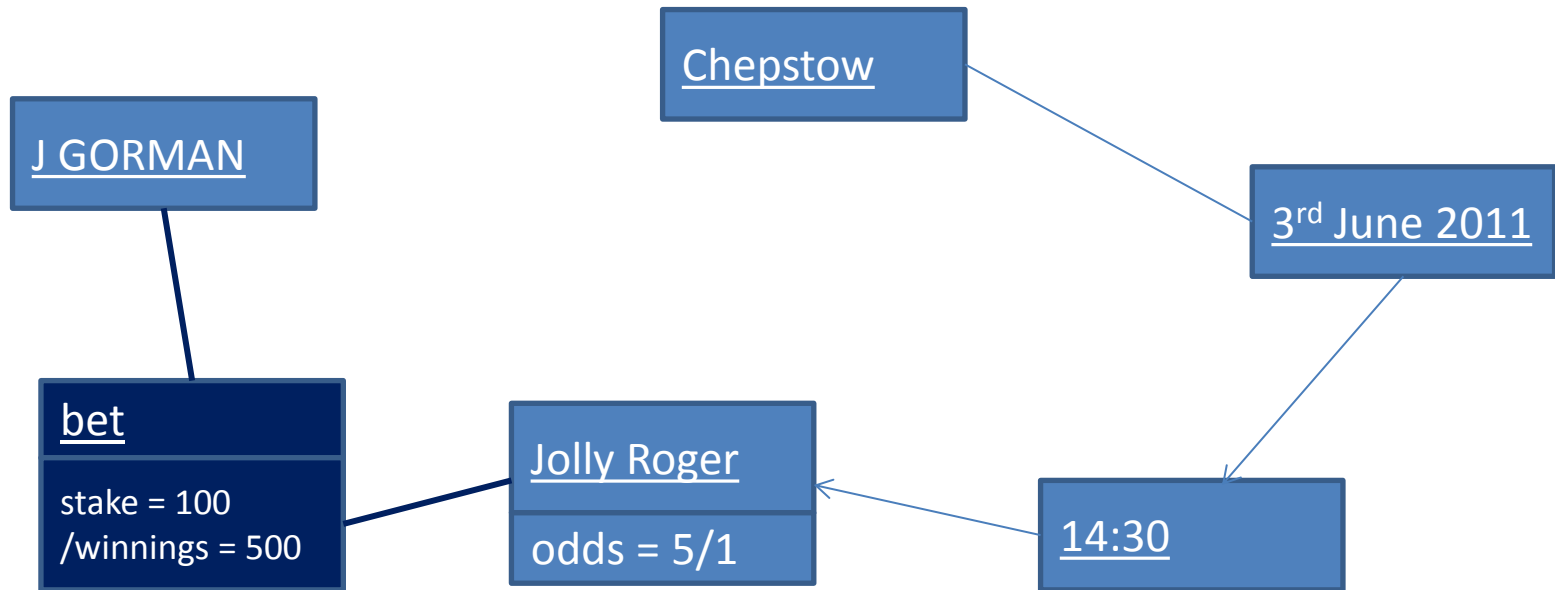From list of races in that meet

User input

Odds for that horse

= bet * odds

From list of horses running in that race

J GORMAN

bet
stake = 100
/winnings = 500

Jolly Roger
odds = 5/1

Chepstow

3rd June 2011

14:30

www.codemanship.com

J GORMAN

Chepstow
RACECOURSE
The Capital Racecourse of Wales

JUNE 2011

SUN	MON	TUES	WED	THURS	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Stake: £100
Winnings: £500

Jolly Roger

5/1

08:00
09:00
10:00
11:00 15
12:00 00
13:00 10
14:00 30
15:00

www.codemanship.com

Logged in as

J GORMAN

Race Courses

Logged in as

J GORMAN

Logged in as

J GORMAN

Chepstow
R A C E C O U R S E
The Capital Racecourse of Wales

JUNE 2011

SUN	MON	TUES	WED	THURS	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Time	
08:00	
09:00	
10:00	
11:00	:15
12:00	:00
13:00	:10
14:00	:30
15:00	

No Argument 5/1   Space Boy 9/1   Afleet Alex 5/1

Going Native 3/1   High Fly 9/2   Jolly Roger 5/1

Mongo Jerry 10/1   Mrs Fry 10/1   Neddy 3/1

Devil May Care 7/2   Uncle Bob 2/1   Wilko 15/1

www.codemanship.com

Logged in as

J GORMAN

Chepstow
RACECOURSE
The Capital Racecourse of Wales

JUNE 2011

SUN	MON	TUES	WED	THURS	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

08 00

09 00

10 00

11 00 :15

12 00 :00

13 00 :10

14 00 :30

15 00

No Argument 5/1   Space Boy 9/1   Afleet Alex 5/1

Going Native 3/1   High Fly 9/2   Jolly Rog

Mongo Jerry 10/1   Mrs Fry 10/1   Neddy 3/1

Devil May Care 7/2   Uncle Bob 2/1   Wilko 15/1

Enter Stake £ 100

OK   Cancel

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Logged in as

J GORMAN

Chepstow
RACECOURSE
The Capital Racecourse of Wales

JUNE 2011

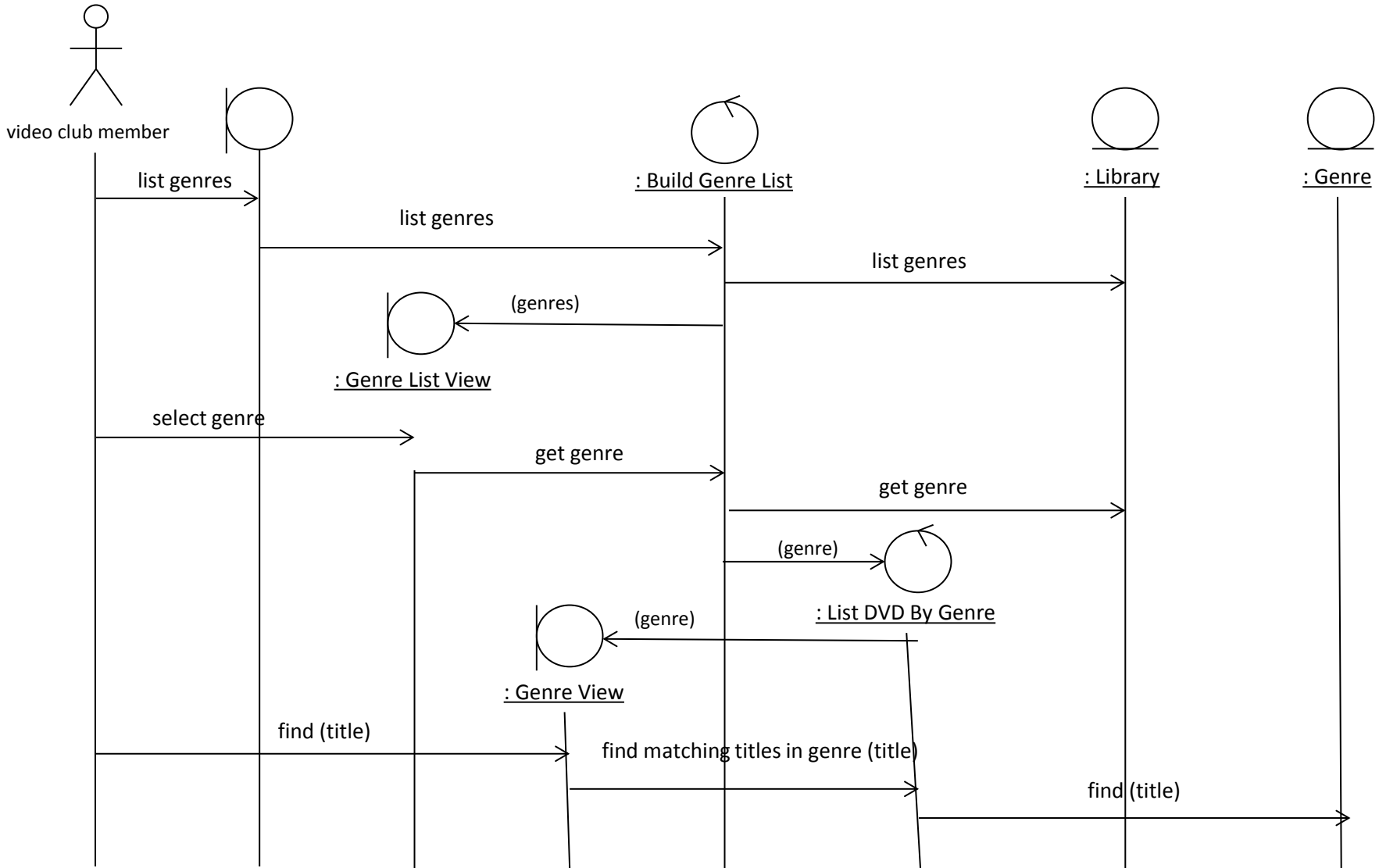| SUN	MON	TUES	WED	THURS	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

No Argument 5/1   Space Boy 9/1   Afleet Alex 5/1

Going Native 3/1   High Fly 9/2   Jolly Rog

Mongo Jerry 10/1   Mrs Fry 10/1   Neddy 3/1

Devil May Care 7/2   Uncle Bob 2/1   Wilko 15/1

Enter Stake   £   100

OK   Cancel

:15
:00
:10
:30

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Logged in as

J GORMAN

Chepstow
RACECOURSE
The Capital Racecourse of Wales

JUNE 2011

SUN	MON	TUES	WED	THURS	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

No Argument 5/1   Space Boy 9/1   Afleet Alex 5/1

Going Native 3/1   High Fly 9/2   Jolly Roger 5/1

stake: £100
winnings: £500

Mongo Jerry 10/1   Mrs Fry 10/1   Neddy 3/1

Devil May Care 7/2   Uncle Bob 2/1   Wilko 15/1

:15

:00

:10

:30

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ROBUSTNESS ANALYSIS

Models, Views & Controllers

video club member

list genres

list genres

list genres

: Build Genre List

: Library

: Genre

(genres)

: Genre List View

select genre

get genre

get genre

(genre)

: List DVD By Genre

(genre)

: Genre View

find (title)

find matching titles in genre (title)

find (title)

Robustness Diagrams