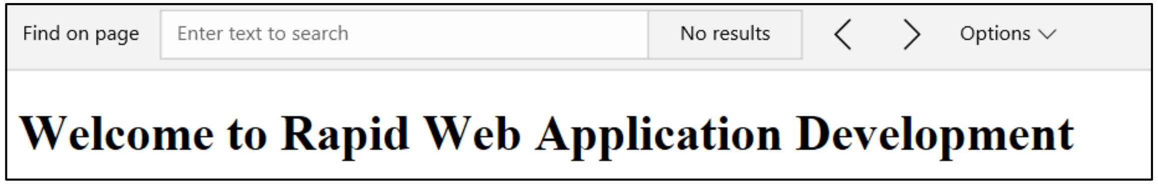
IAB207- Rapid Web Application Development, 2019

An Introduction to Web Application Development

Dr. Renuka Sindhgatta

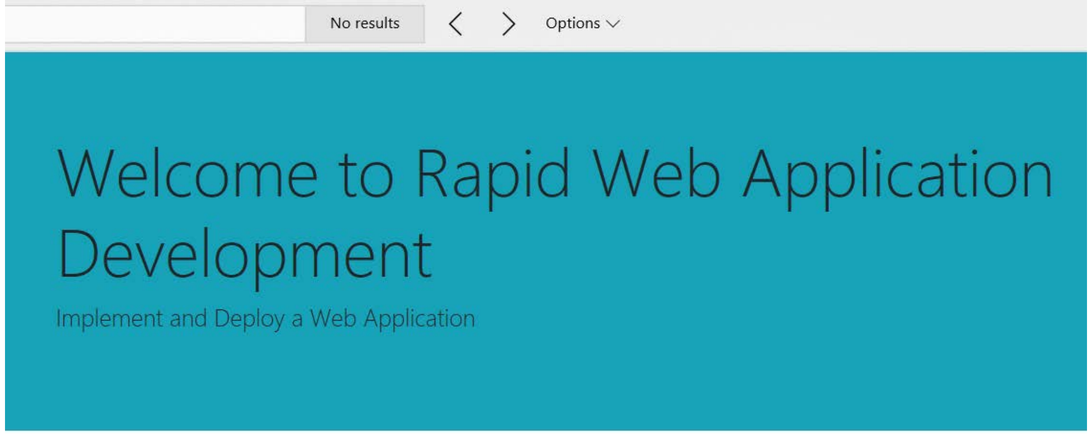
Course Objective

Start with simple ‘hello world’



Welcome to Rapid Web Application Development

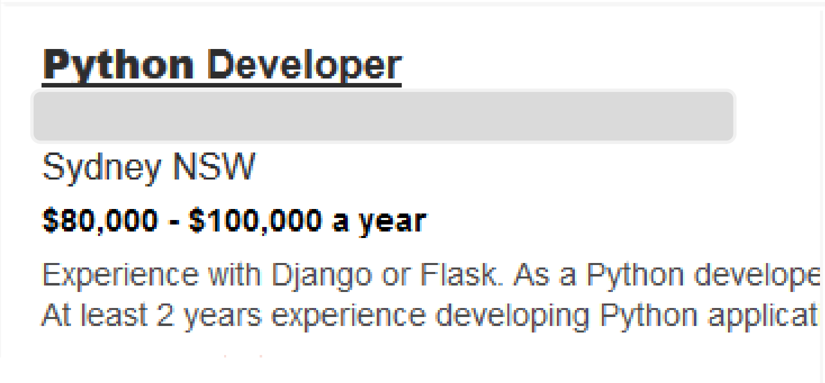
End with a near real-world application



Welcome to Rapid Web Application Development

Implement and Deploy a Web Application

Why do you need a unit such as this?



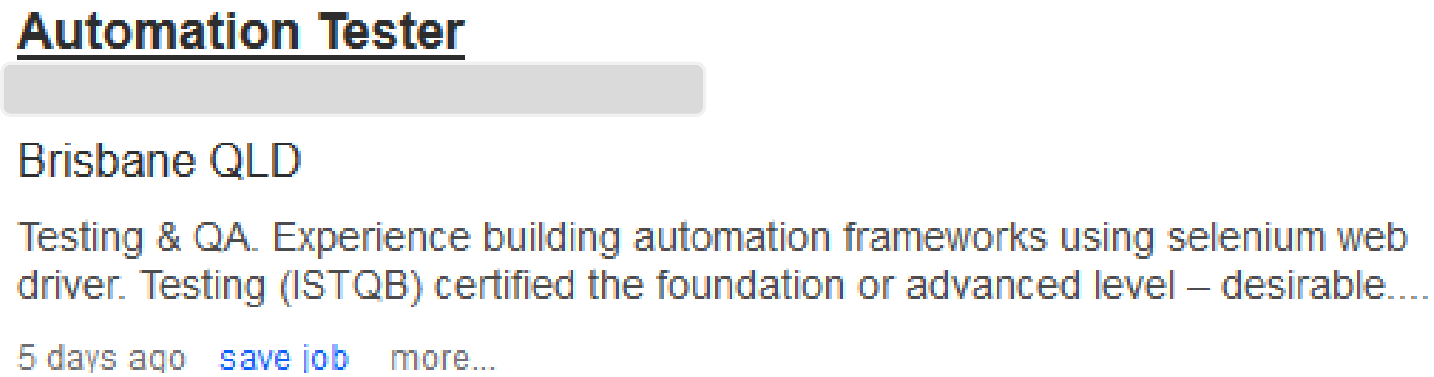
Python Developer

[redacted]

Sydney NSW

$80,000 - $100,000 a year

Experience with Django or Flask. As a Python develope
At least 2 years experience developing Python applicat



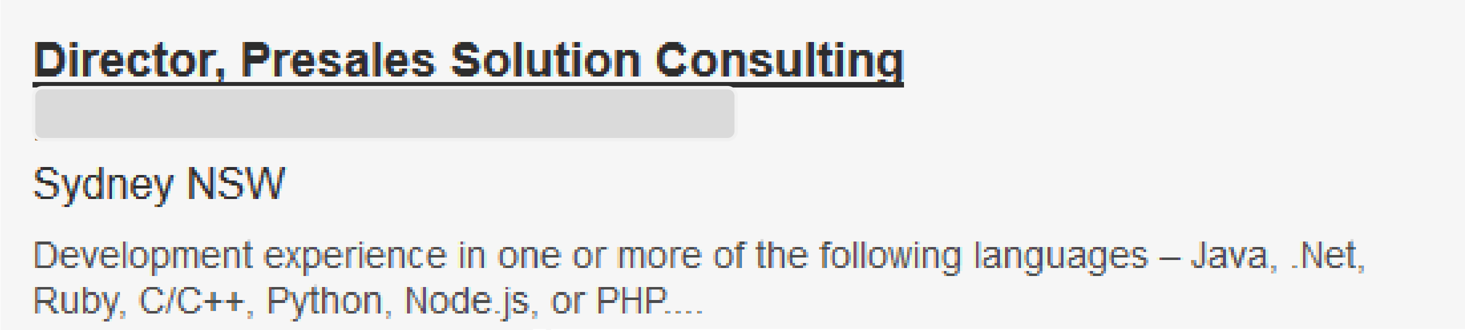
Automation Tester

[redacted]

Brisbane QLD

Testing & QA. Experience building automation frameworks using selenium web driver. Testing (ISTQB) certified the foundation or advanced level – desirable....

5 days ago save job more...

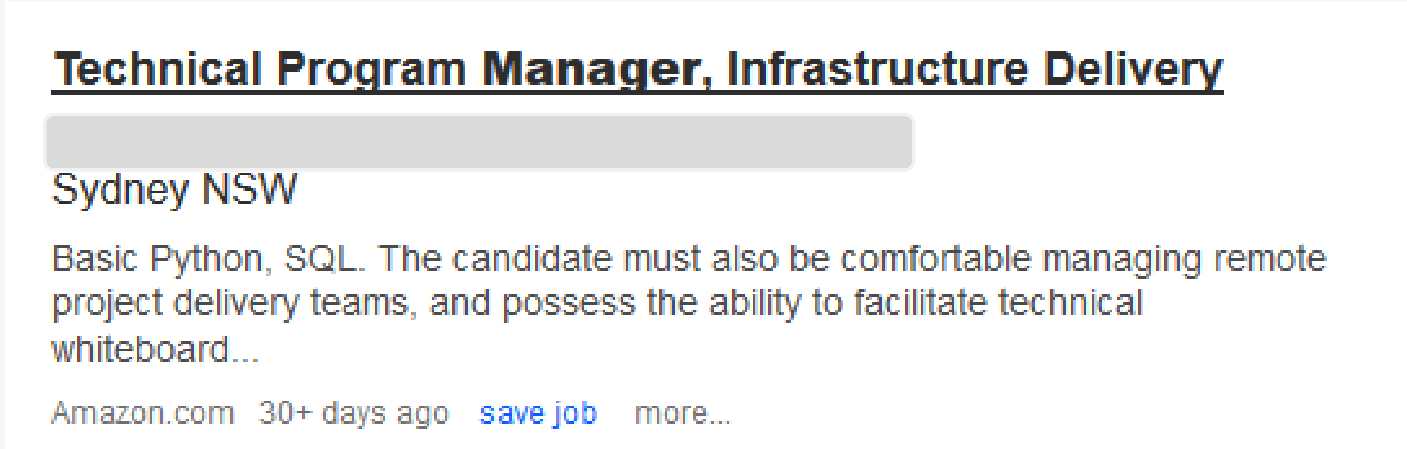


Director, Presales Solution Consulting

[redacted]

Sydney NSW

Development experience in one or more of the following languages – Java, .Net, Ruby, C/C++, Python, Node.js, or PHP....



Technical Program Manager, Infrastructure Delivery

[redacted]

Sydney NSW

Basic Python, SQL. The candidate must also be comfortable managing remote project delivery teams, and possess the ability to facilitate technical whiteboard...

Amazon.com 30+ days ago save job more...

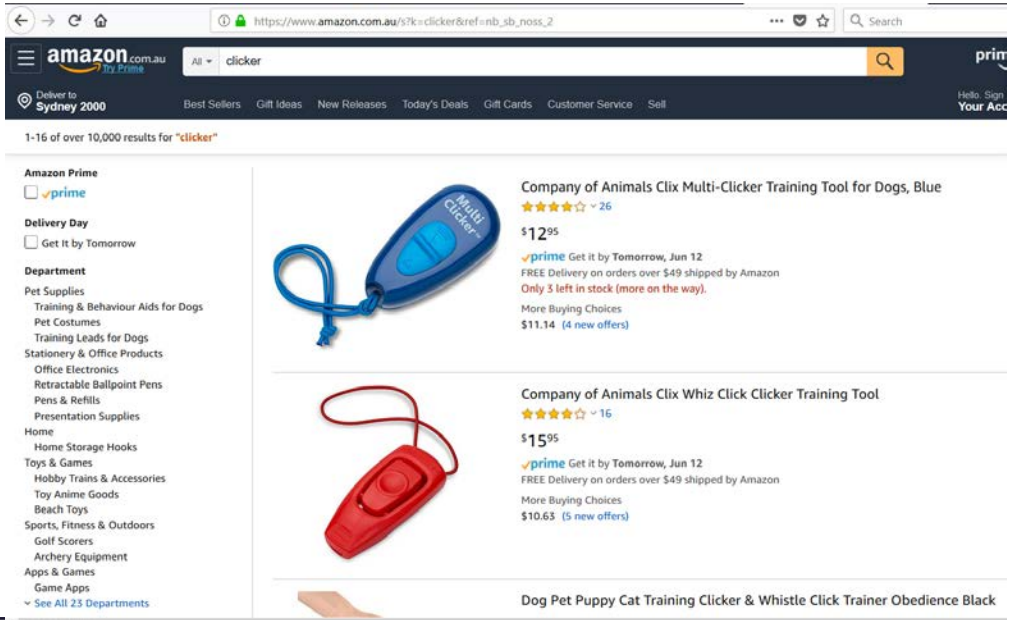
What are the characteristics of a web application ?

Characteristics of a web application

- Runs on a **web browser**

- **Interactive**
  - Allow user actions and responds to them

- **Dynamic**
  - Provides content based on user context



1-16 of over 10,000 results for "clicker"

Amazon Prime

□ prime

Delivery Day

□ Get It by Tomorrow

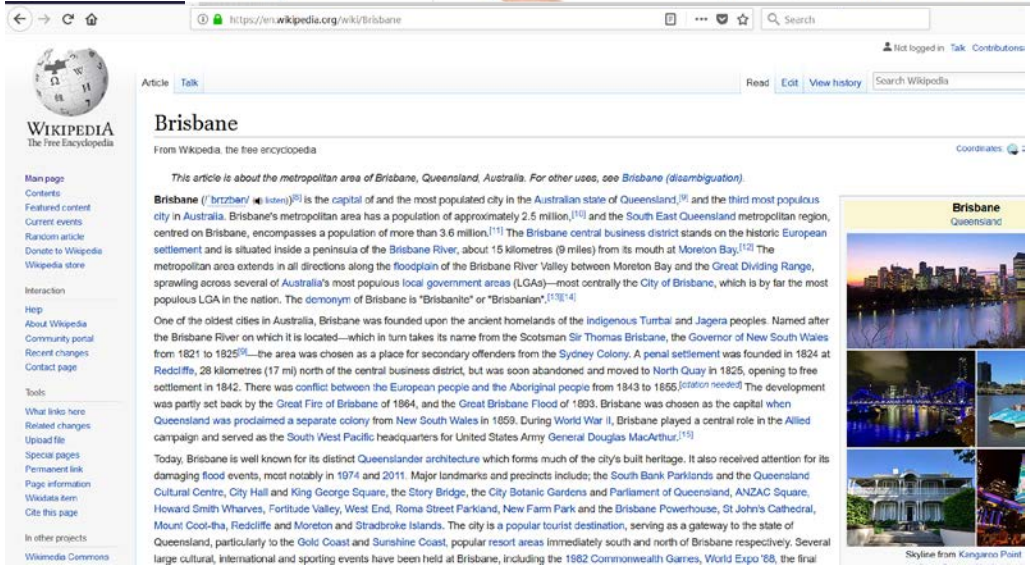
Department

Pet Supplies
Training & Behaviour Aids for Dogs
Pet Costumes
Training Leads for Dogs
Stationery & Office Products
Office Electronics
Retractable Ballpoint Pens
Pens & Refills
Presentation Supplies
Home
Home Storage Hooks
Toys & Games
Hobby Trains & Accessories
Toy Anime Goods
Beach Toys
Sports, Fitness & Outdoors
Golf Scorers
Archery Equipment
Apps & Games
Game Apps
See All 23 Departments

Company of Animals Clix Multi-Clicker Training Tool for Dogs, Blue
★★★★☆ 26
$12.95
prime Get it by Tomorrow, Jun 12
FREE Delivery on orders over $49 shipped by Amazon
Only 3 left in stock (more on the way).
More Buying Choices
$11.14 (4 new offers)

Company of Animals Clix Whiz Click Clicker Training Tool
★★★★☆ 16
$15.95
prime Get it by Tomorrow, Jun 12
FREE Delivery on orders over $49 shipped by Amazon
More Buying Choices
$10.63 (5 new offers)

Dog Pet Puppy Cat Training Clicker & Whistle Click Trainer Obedience Black



Brisbane

From Wikipedia, the free encyclopedia

This article is about the metropolitan area of Brisbane, Queensland, Australia. For other uses, see Brisbane (disambiguation).

Brisbane (/ˈbrɪzbən/ listen))[8] is the capital of and the most populated city in the Australian state of Queensland,[9] and the third most populous city in Australia. Brisbane's metropolitan area has a population of approximately 2.5 million,[10] and the South East Queensland metropolitan region, centred on Brisbane, encompasses a population of more than 3.6 million.[11] The Brisbane central business district stands on the historic European settlement and is situated inside a peninsula of the Brisbane River, about 15 kilometres (9 miles) from its mouth at Moreton Bay.[12] The metropolitan area extends in all directions along the floodplain of the Brisbane River Valley between Moreton Bay and the Great Dividing Range, sprawling across several of Australia's most populous local government areas (LGAs)—most centrally the City of Brisbane, which is by far the most populous LGA in the nation. The demonym of Brisbane is "Brisbanite" or "Brisbanian".[13][14]

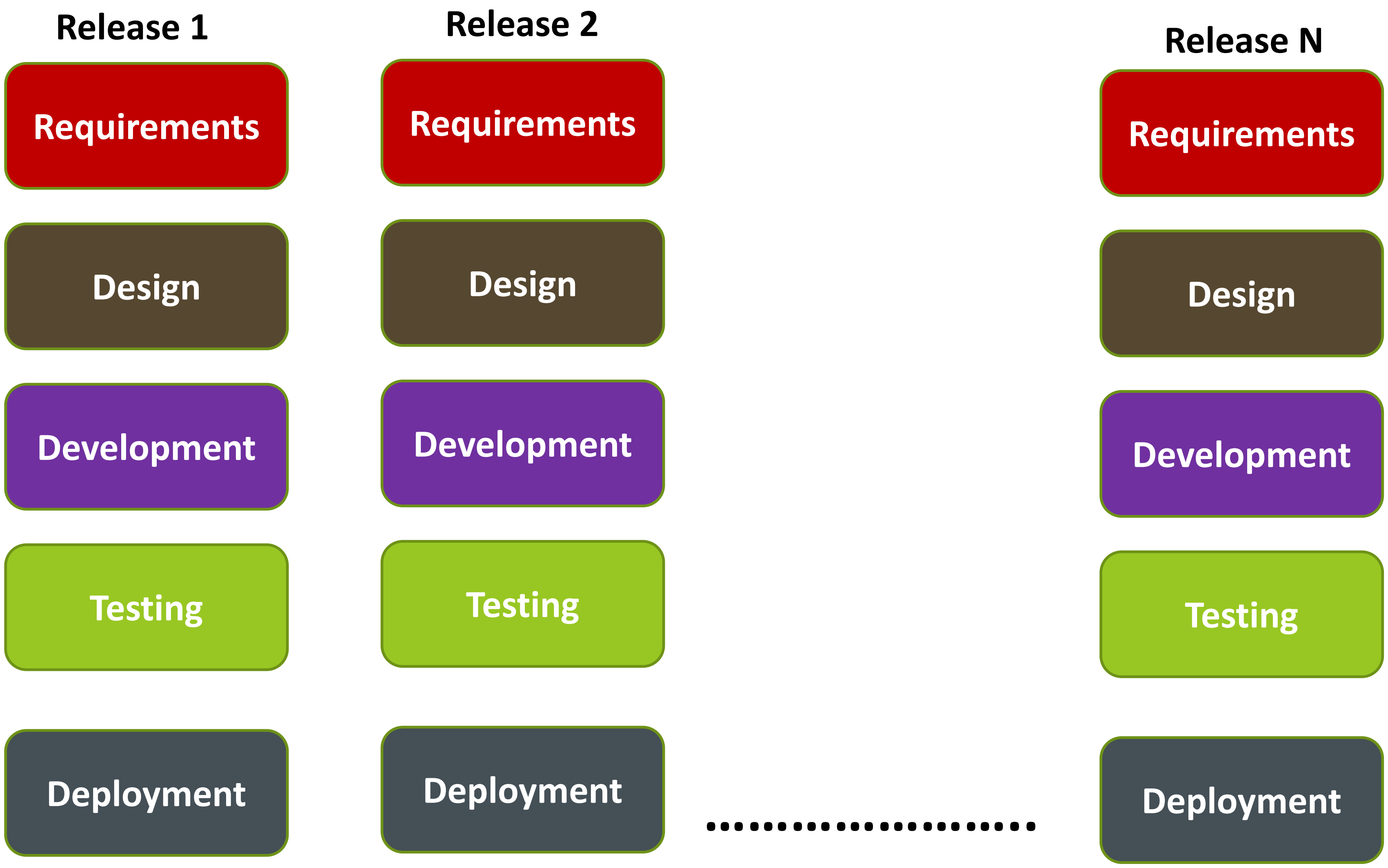
One of the oldest cities in Australia, Brisbane was founded upon the ancient homelands of the indigenous Turrbal and Jagera peoples. Named after the Brisbane River on which it is located—which in turn takes its name from the Scotsman Sir Thomas Brisbane, the Governor of New South Wales from 1821 to 1825[9]—the area was chosen as a place for secondary offenders from the Sydney Colony. A penal settlement was founded in 1824 at Redcliffe, 28 kilometres (17 mi) north of the central business district, but was soon abandoned and moved to North Quay in 1825, opening to free settlement in 1842. There was conflict between the European people and the Aboriginal people from 1843 to 1855.[citation needed] The development was partly set back by the Great Fire of Brisbane of 1864, and the Great Brisbane Flood of 1893. Brisbane was chosen as the capital when Queensland was proclaimed a separate colony from New South Wales in 1859. During World War II, Brisbane played a central role in the Allied campaign and served as the South West Pacific headquarters for United States Army General Douglas MacArthur.[15]

Today, Brisbane is well known for its distinct Queenslander architecture which forms much of the city's built heritage. It also received attention for its damaging flood events, most notably in 1974 and 2011. Major landmarks and precincts include; the South Bank Parklands and the Queensland Cultural Centre, City Hall and King George Square, the Story Bridge, the City Botanic Gardens and Parliament of Queensland, ANZAC Square, Howard Smith Wharves, Fortitude Valley, West End, Roma Street Parkland, New Farm Park and the Brisbane Powerhouse, St John's Cathedral, Mount Coot-tha, Redcliffe and Moreton and Stradbroke Islands. The city is a popular tourist destination, serving as a gateway to the state of Queensland, particularly to the Gold Coast and Sunshine Coast, popular resort areas immediately south and north of Brisbane respectively. Several large cultural, international and sporting events have been held at Brisbane, including the 1982 Commonwealth Games, World Expo '88, the final

Characteristics of a web application

- Web applications are thin client and differ from:
  - Client server applications where there was substantial program code run on the client (MySQL workbench)
  - Native mobile applications that require specific code to run on the mobile device (Recent increase in mobile apps)

Building a Web Application



Release 1

Requirements

Design

Development

Testing

Deployment

Release 2

Requirements

Design

Development

Testing

Deployment

……………………

Release N

Requirements

Design

Development

Testing

Deployment

Widely used architecture pattern to design web application:

Model-View-Controller

Design

Model View Controller (MVC)

- Core principle from Smalltalk (1979)
- (Data) should be isolated from the presentation (User Interface)
- Could have multiple presentations (user interface) for the same data.

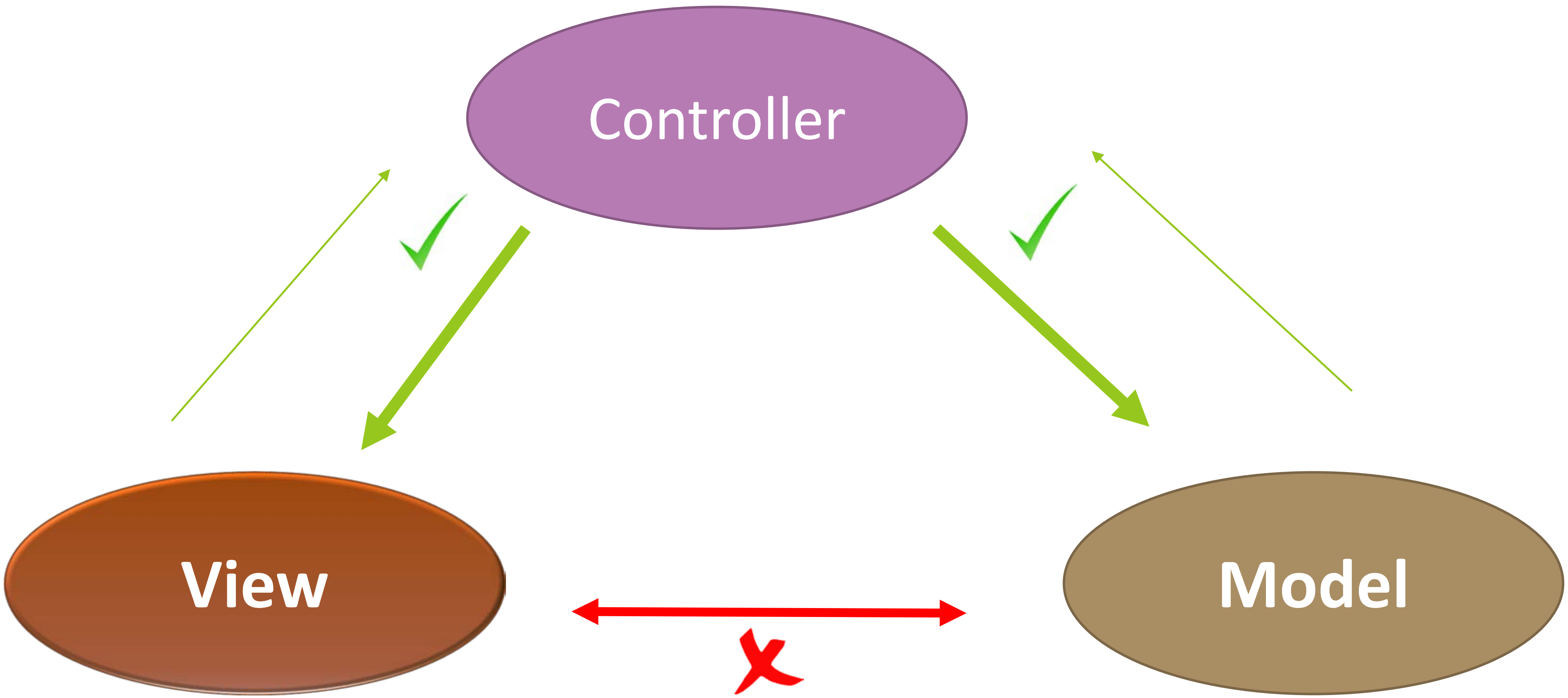
Divide all functions or responsibilities of your application into **three** groups

Model View Controller (MVC)

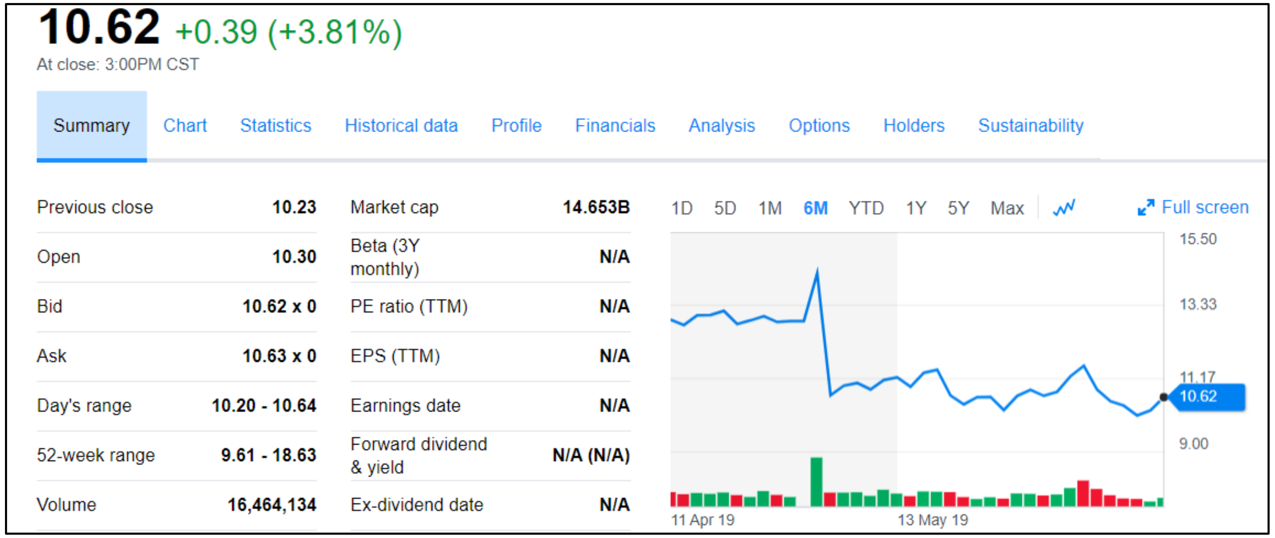
- The intent is to isolate the what, how and its rendering
  - Model (What)
    - Data or information of your application (system)
  - Controller (How)
    - The controller interprets/processes/formats the information in the model
  - View
    - Displays/renders the model and allows user interact with the model through the controller.

Model View Controller (MVC)

Communication protocol



Design Approach (MVC – Model View Controller)



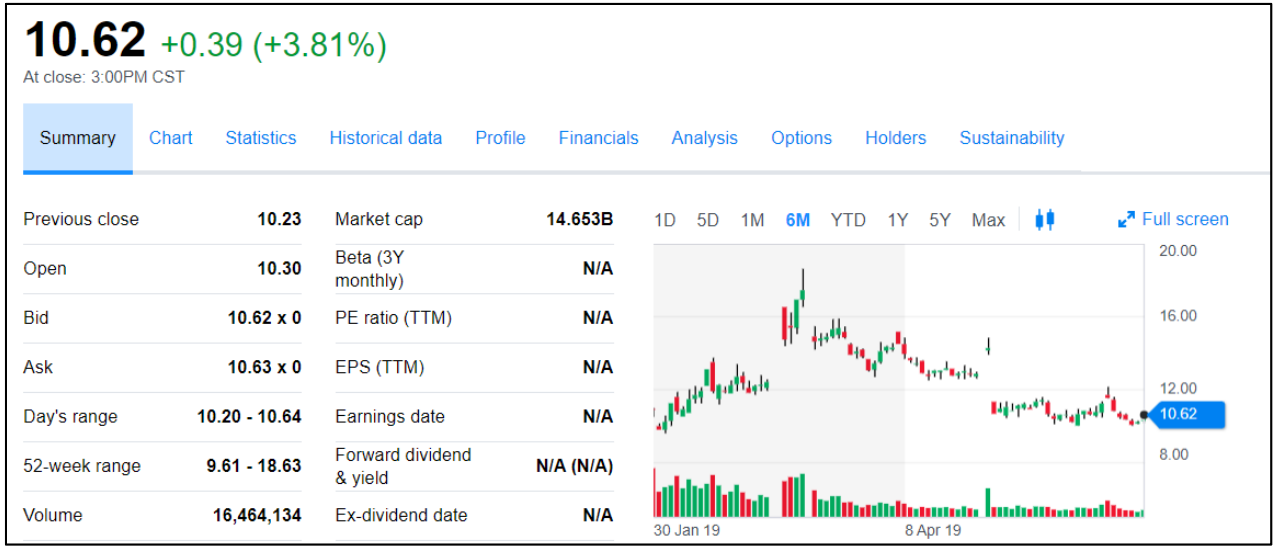
10.62 +0.39 (+3.81%)

At close: 3:00PM CST

Summary | Chart | Statistics | Historical data | Profile | Financials | Analysis | Options | Holders | Sustainability

Previous close	10.23	Market cap	14.653B
Open	10.30	Beta (3Y monthly)	N/A
Bid	10.62 x 0	PE ratio (TTM)	N/A
Ask	10.63 x 0	EPS (TTM)	N/A
Day's range	10.20 - 10.64	Earnings date	N/A
52-week range	9.61 - 18.63	Forward dividend & yield	N/A (N/A)
Volume	16,464,134	Ex-dividend date	N/A

Same data but different views



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Model

- The Model's responsibilities
  - Provide access to the systems’ data and business rules
  - Can contain some business logic – managing data consistency

View

- The view's responsibilities
  - Render the state of the model to the user

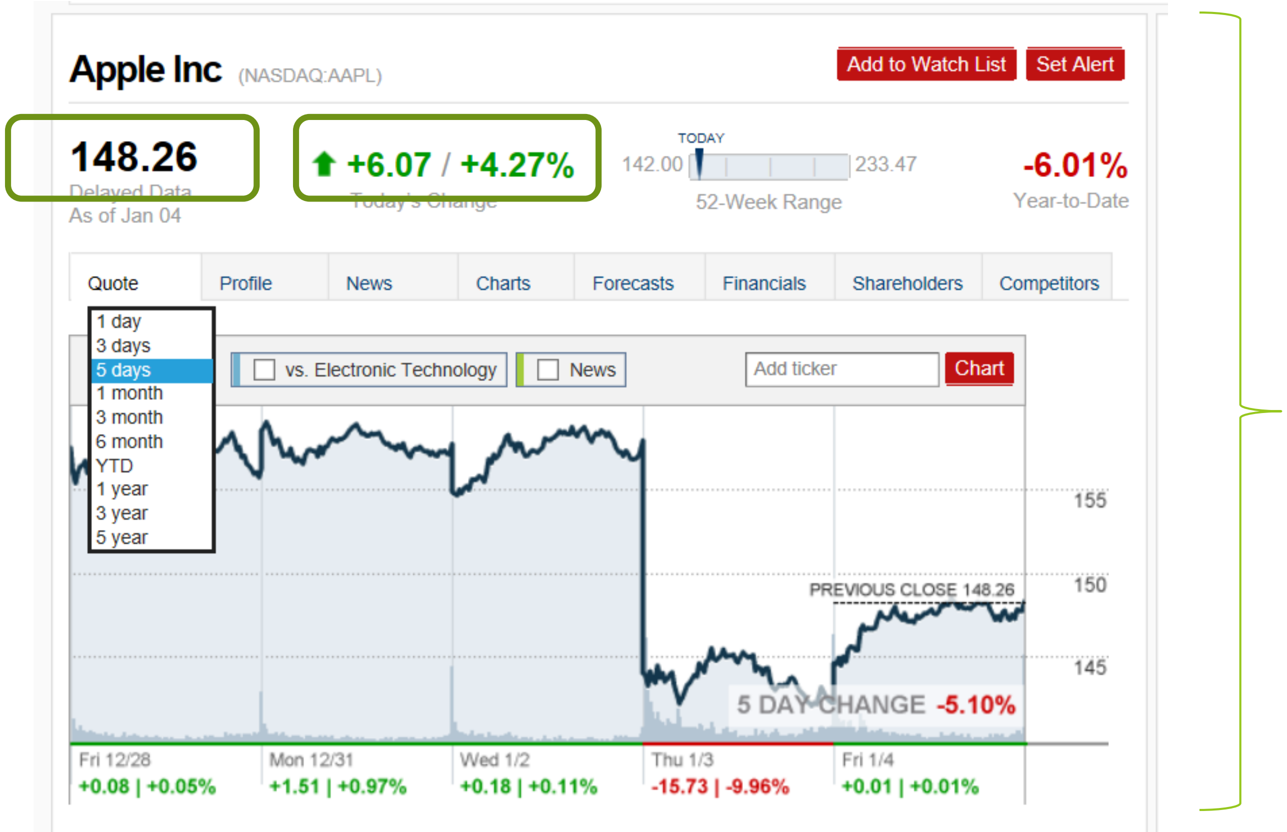
- All interactions that allow user to edit the model where relevant

- The advantage of the separation is , you can change the view without impacting the rest of your system

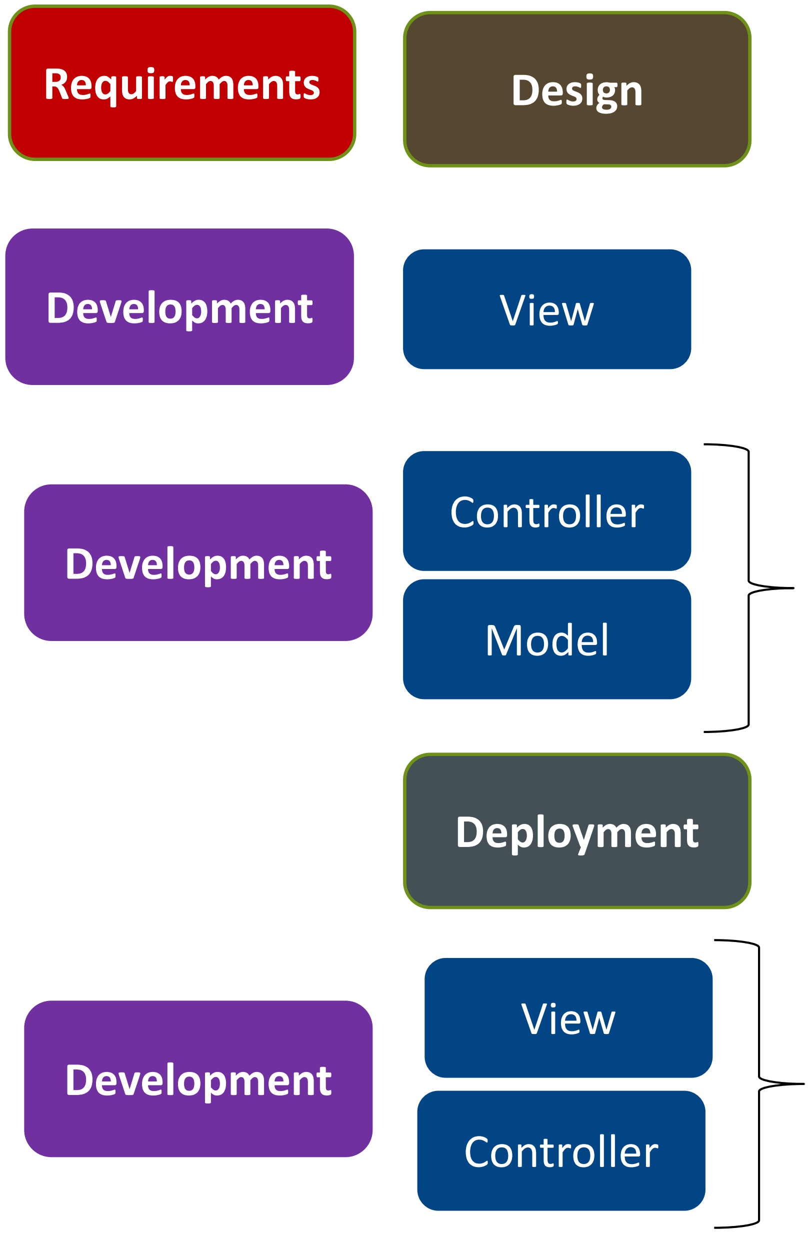
Controller

- The controller's responsibilities
  - Send messages to the model to update.
  - Send appropriate messages to the view.
  - Orchestration of model elements, apply some business rules
    - Check the order, apply relevant discounts, update customer loyalty points

Design Approach (MVC – Model View Controller)



In this unit



Requirements

Design

Week 1 will cover key aspects of requirements and design
Recap of IFB103,IFB105

Development

View

Week 2, Week 3 will focus on HTML, CSS and Bootstrap **(Sri Nair)**

Development

Controller

Model

Week 5 – Week 9 will cover controller and model using a Python framework (Flask)

Deployment

Week 10 will focus on deploying these applications on cloud platforms

Development

View

Controller

Week 11, Week 12 introduces another common paradigm of JavaScript for view and RESTful APIs for controller

Assignments

- Week 5 – First Assignment (Worth 20%) – Individual
- Week 8 – Second Assignment (Worth 30%) – Individual
- Week 13/ End of Semester – Final Assignment (Worth 50%) – Group

Teaching Team

- Abdul Obeid
- Dilesha Dissenayake
- Monika Jain
- Sri Nair
- Renuka Sindhgatta

Requirements – Hotel Room Booking Application

- Hotel room booking application capable of the following:

1. Show various hotels and their locations
2. Show different types of rooms at each hotel
3. Check availability of a hotel room
4. Let users register and login
5. Allow logged in user to book a room
6. Let logged in user post comments about a hotel
7. Allow users to see the comments posted

Requirements

User Stories

- User stories short descriptions of functionality from a user’s perspective.
- Used in Agile development approach (short and quick)
- They have a specific format

As an **<actor/role>** I want to **<do something/action/feature>** because **<reason>**

User story

Title: View hotels and their locations

As a user I want to **view all the hotels of the hotel chain and their locations** because I want **choose a convenient place to stay**.

Acceptance Criteria:

1. A single view provides the user a list of all hotels
2. For each hotel, the location and address should be visible

User story

Title: View rooms of a hotel

As a user I want to **view the different types of rooms, their rates, and amenities for any chosen hotel** because I need to choose the a suitable room for a rate.

Acceptance Criteria:

1. Details of the types of rooms and the rates should be available
2. A list of amenities should be provided for each room.

User story

Title: Check availability of a hotel room

As a user I want to **check availability of a hotel room for certain check-in date and check-out date** before I decide to book a room.

Acceptance Criteria:

1. User should be able to enter a check-in and check-out date.
2. The dates entered by the user should be valid – check-out date can only be after check-in date.
3. The availability of the room is provided.

User story

Title: Book a room

As a user who has logged in, I want to choose and book the room. I want to book by providing a check-in date to a check-out date and receive a confirmation, so I can be sure that the room has been booked.

Acceptance Criteria:

1. The check-in and check-out date should be validated before booking.
2. The number of guests by default should be 1, user can change it
3. A confirmation should be provided with a booking reference number.

User story

Title: Post review of a hotel

As a user who has logged in, I want to post a review of the hotel or the room. I should be able enter sufficient information because I want to share my views.

Acceptance Criteria:

1. If the user has not logged in, he/she should be prompted to login
2. The comment should have a minimum set of words 3-4 words.

Conceptual Model

Why?

It helps identify relevant concepts/entities for the problem at hand.

When?

Object oriented design and analysis

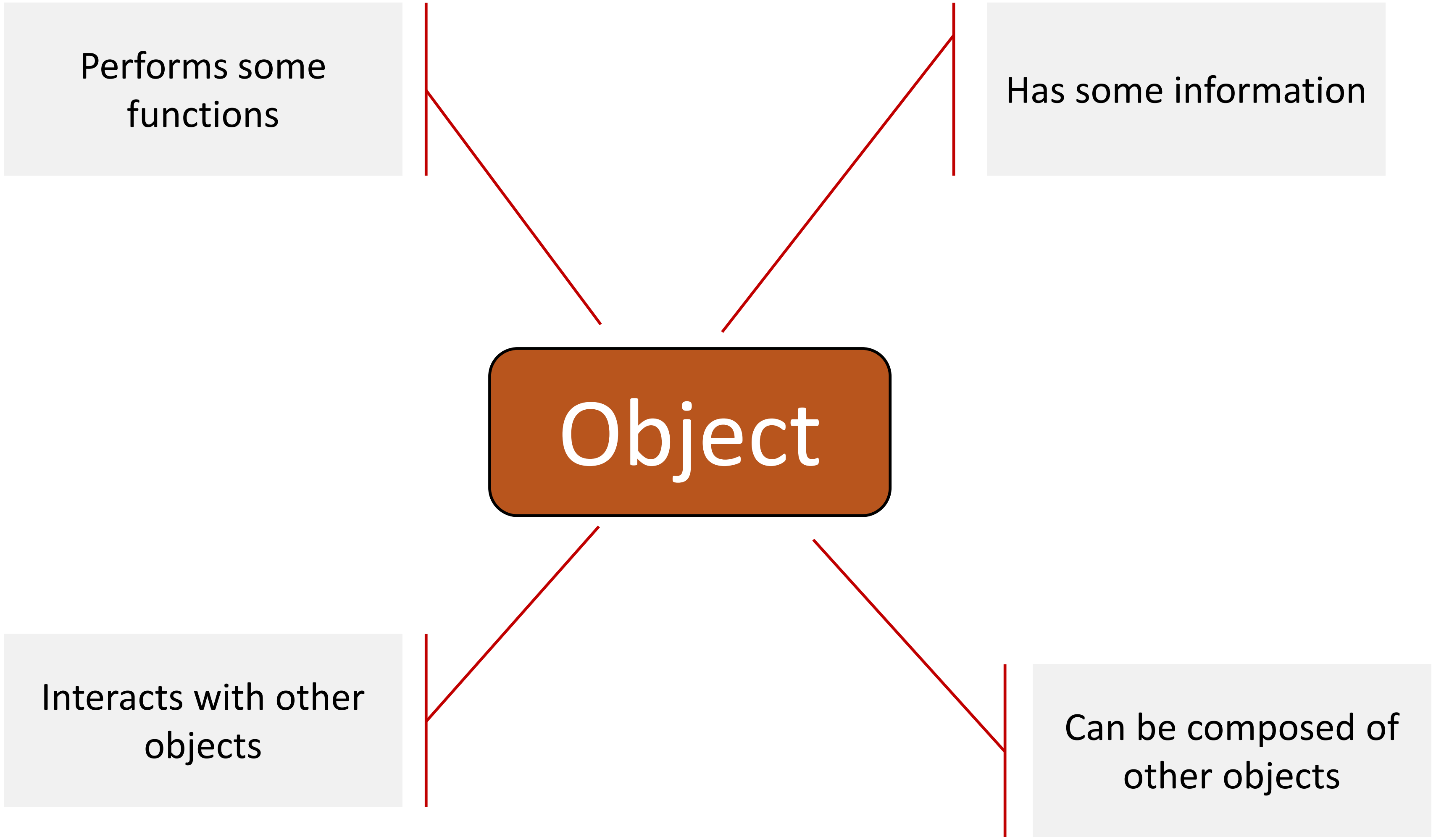
Guideline

- Use user stories to identify the concepts
- Limit it to the system being built

The conceptual model is also called domain model, domain object model

‘What’ of the application – Objects

Represents some real-world entity, thing



Performs some functions

Has some information

Object

Interacts with other objects

Can be composed of other objects

What is a Class?

- A class is a description of a <u>group of objects </u>that have:
  - Common attributes
  - Common behaviour
  - Common relationships
  - Common semantics
- Classes are ‘templates’ or common characteristics of the objects

As a user I want to view all the hotels of the hotel chain and their locations because I want to choose a convenient place to stay.

As a user I want to view the different types of rooms, their rates, and amenities for any chosen hotel because I need to choose the a suitable room for a rate.

As a user I want to check availability of a hotel room for certain check-in date and check-out date before I decide to book a room.

As a user who has logged in, I want to choose a room and book a room. I want to book from a check-in date to a check-out date and receive a confirmation, so I can be sure that the room has been booked.

As a user who has logged in, I want to post a review of the hotel or the room. I should be able enter sufficient information because I want to share my views.

As a user I want to register and provide my name, mail id and set my account password, so I can book a room or post reviews

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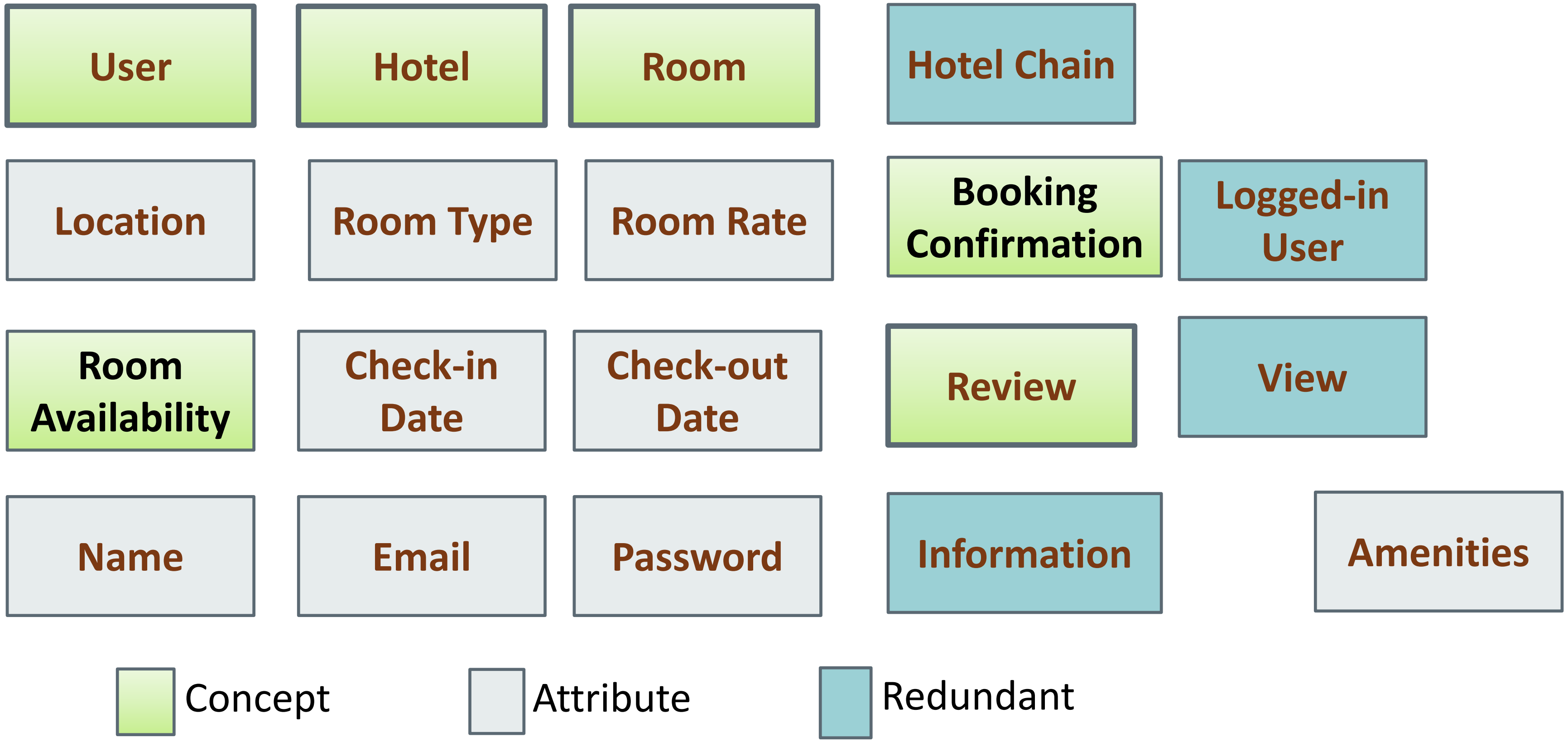
Discovering Concepts or Classes

- User
- Room
- Room Availability
- Name
- Amenities
- Hotel
- Room Type
- Check-in Date
- Email
- Loggedin User
- Location
- Room Rate
- Check-out Date
- Password
- View
- Hotel Chain
- Booking Confirmation
- Review
- Information

Refining the list of Concepts

- Can these concepts live independently (they may be attributes)
- Redundant or duplicate concepts



User

Hotel

Room

Hotel Chain

Location

Room Type

Room Rate

Booking Confirmation

Logged-in User

Room Availability

Check-in Date

Check-out Date

Review

View

Name

Email

Password

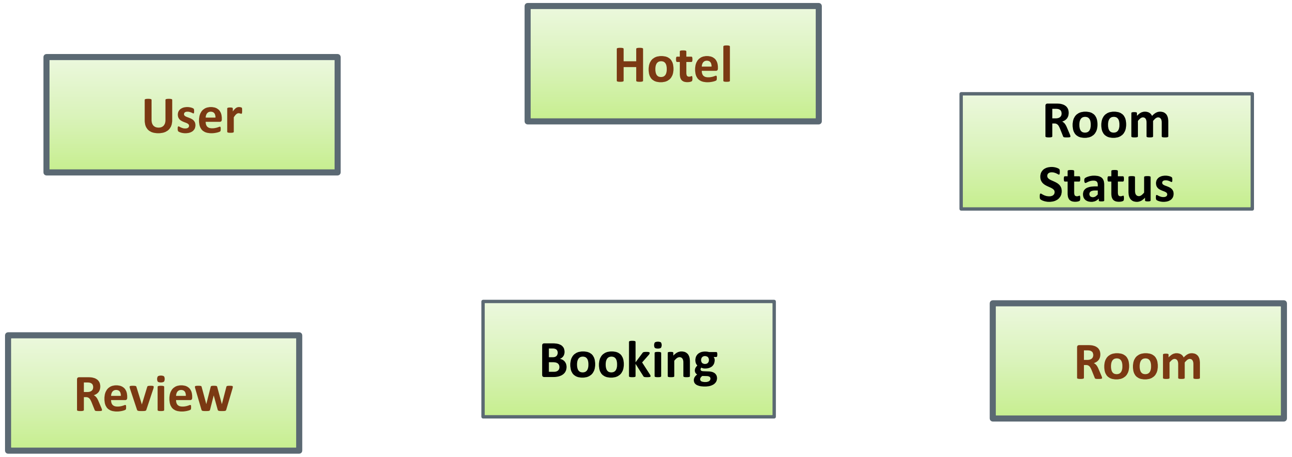
Information

Amenities

🟩 Concept ⬜ Attribute 🟦 Redundant

Concepts and their relationships

- **Association**: Is one **object** related to another object in the user story (semantically).
  - Object knows about another object



User

Hotel

Room Status

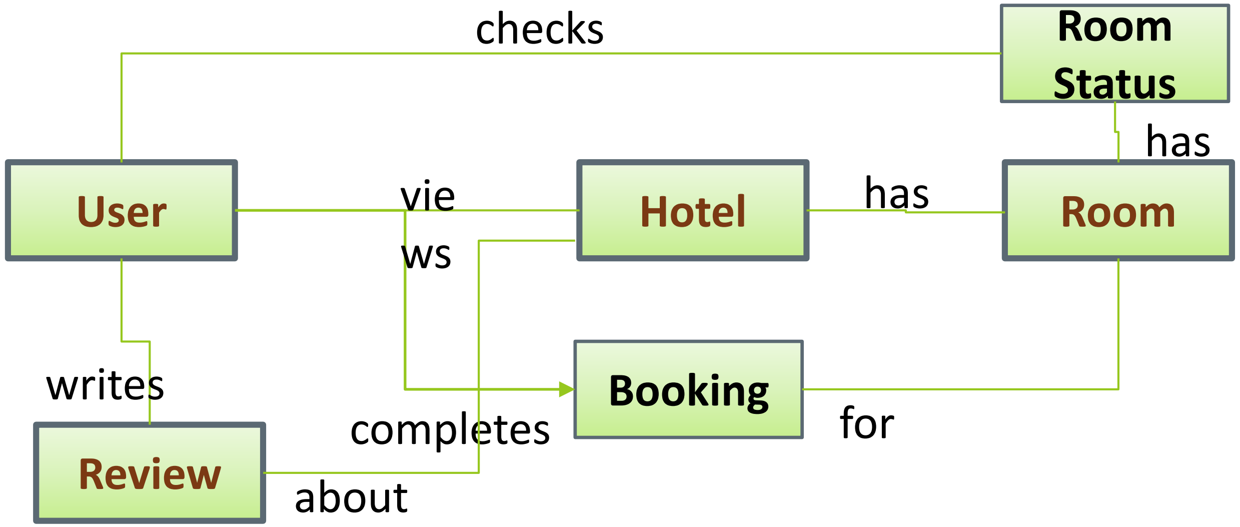
Review

Booking

Room

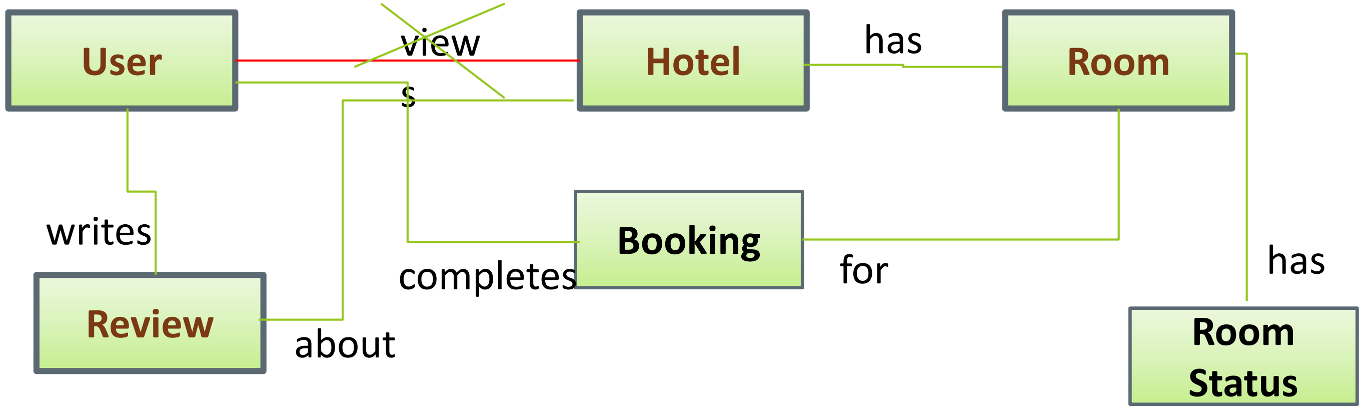
Concepts and their relationships

- **Association**: Is one **object** related to another object in the user story (semantically).
  - Object knows about another object



Concepts and their relationships

- Association: Is one **object** related to another object
- User always appears to be associated with most objects
  - Reason: user stories are from a user perspective
  - Remove relationships that do not need to know about the user
- Not specifying a direction, implies the association is bi-directional



Concepts and their relationships

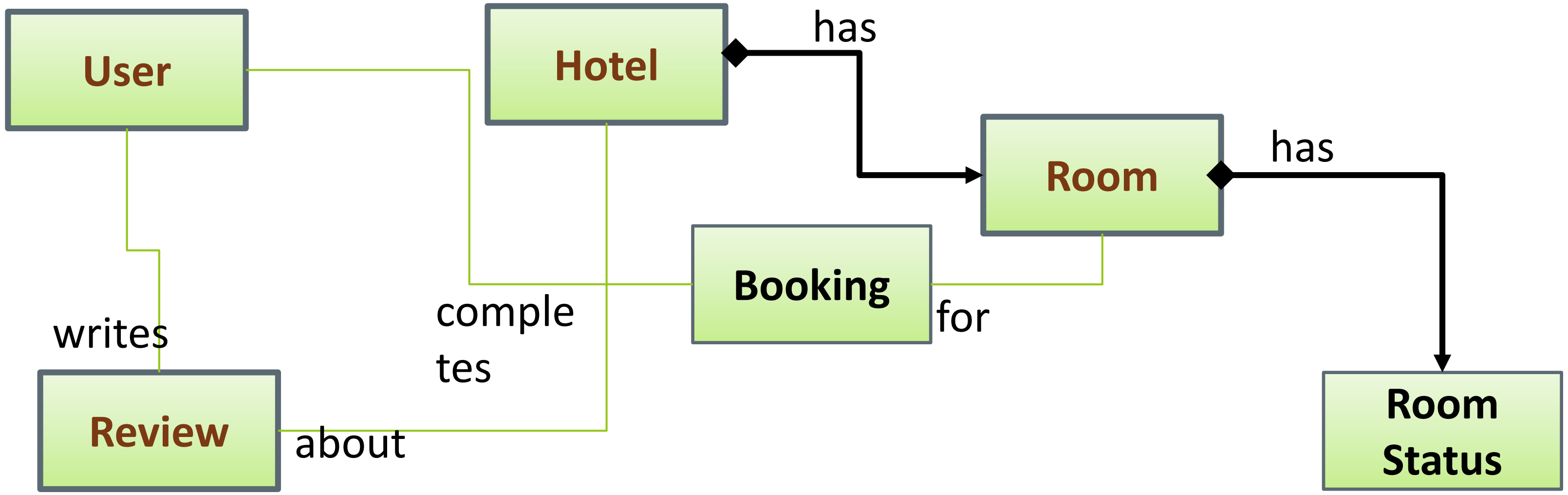
- Aggregation : Relationship when an object contains some other objects (**has-a** relationship)
  - E.g. – Class has student(s)

- Composition : Same as Aggregation, but it implies an ownership
  - E.g. – Book has page(s)

- Aggregation when the objects can exist independently.
- Composition if the objects can’t logically exist without that composing object.

Concepts and their relationships

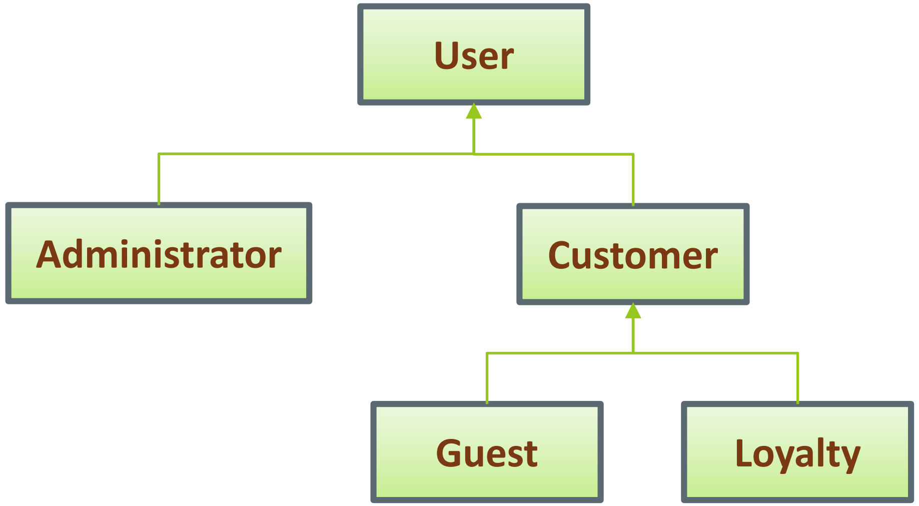
- Composition – Hotel has Room(s)
- Room cannot exist independently



Concepts and their relationships

- Inheritance : Is an object **is-a** type of another object

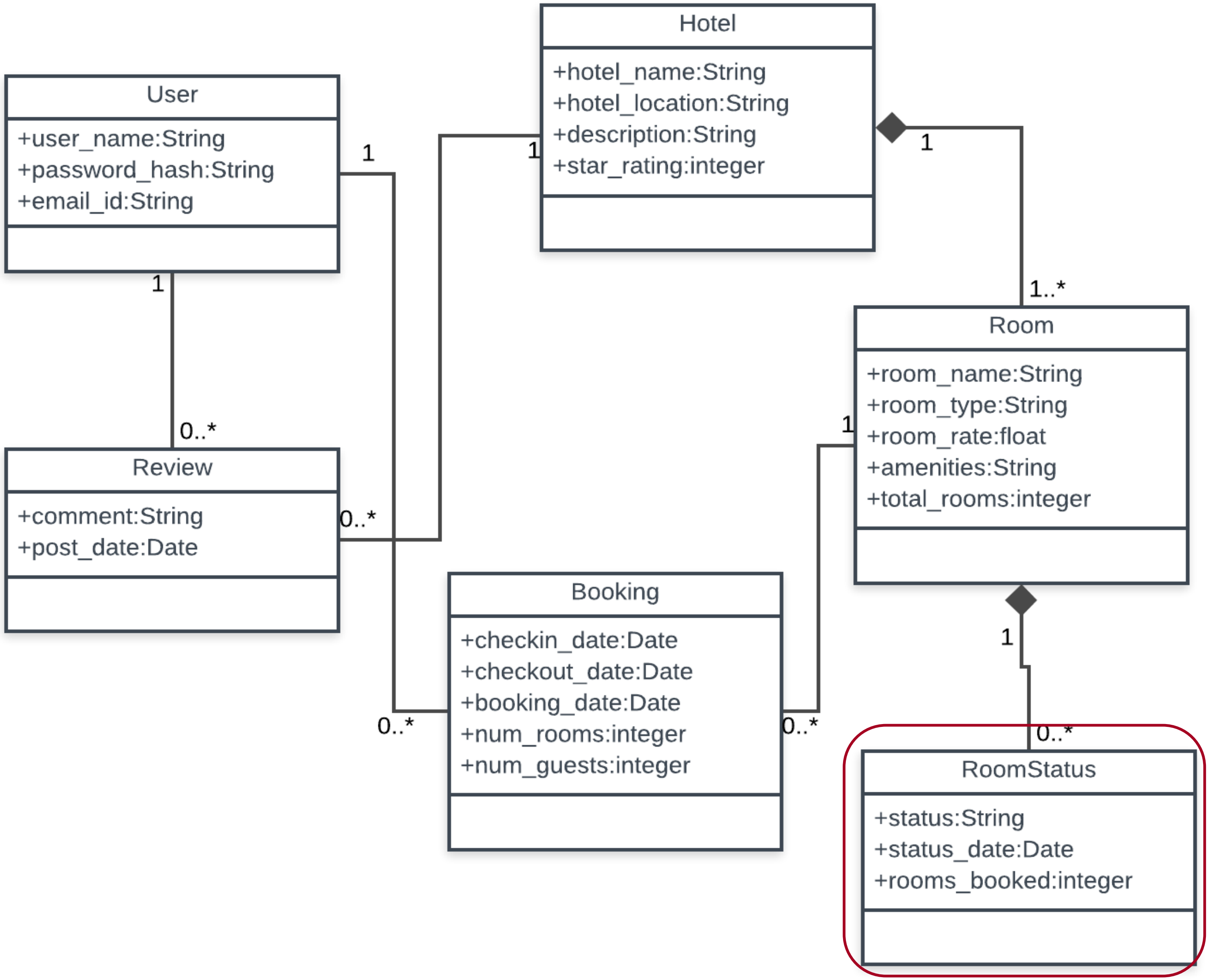
- Advanced requirement of providing discounts to loyalty-card holders
- Administrators can update hotel information



Decide multiplicity of the relationships

- How many objects of one class is related to the objects of another class (minimum and maximum)
  - 1-to -1: Each object of a class is related to one object of another class)
    - Hotel and Address
  - 1-to-1..* (1 to at least 1 or more)
    - Hotel and Room
  - 1-to-0..* (1 to 0 or more)
    - Room and Room Status
  - 0..* to 0..* (many to many)

Conceptual Model



Responsibilities of the Classes

- Identify the Verbs in the use stories and associate them to the relevant class

As a user I want to view all the hotels of the hotel chain and their locations..

As a user I want to see the different types of rooms and their rates for any chosen hotel …

As a user I want to check availability of a hotel room for certain check-in and check-out date.

As a user who has logged in, I want to choose a room and book a room. I want to book from a check-in date to a check-out date and receive a confirmation

As a user who has logged in, I want to post a review of the hotel or the room.

As a user I want to register and provide my name, mail id and set my account password, so I can book a room or post reviews

Class Responsibilities

- Where do the different responsibilities it belongs

- Common principle – **Class (or Object) should be responsible for itself**

- **Avoid 'GOD' class**

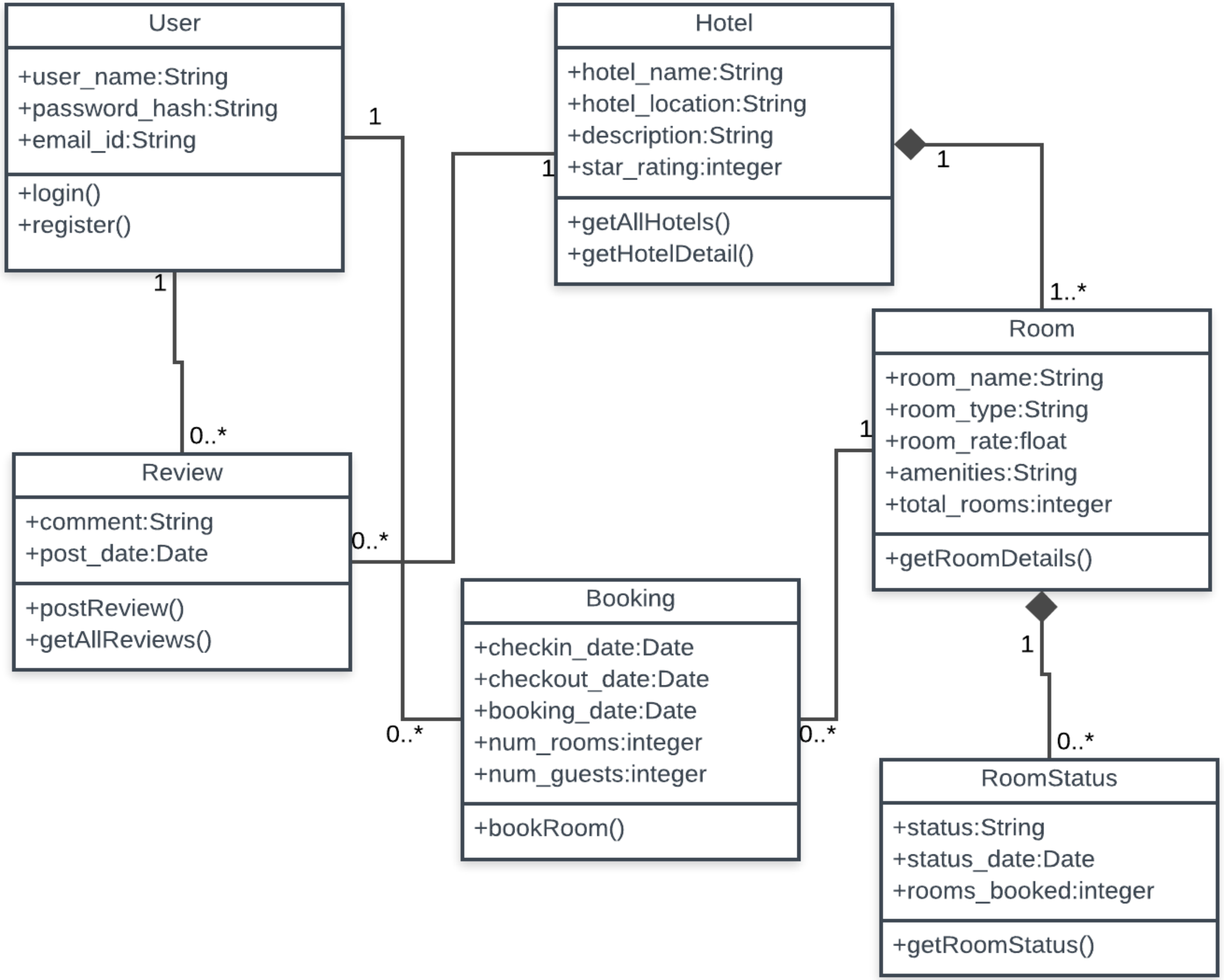
Class Responsibilities

- view hotels → Hotel: get all hotels
- View room details of a hotel → Hotel: view hotel detail
- Check and select a room→ Room: view room detail
- User logged in → User: login

Class Responsibilities

- Register user → User: register
- Post a review → Review: post review
- Check availability → Room Status : get status
- Book a room → Booking : Book room
- View reviews of hotel → Review : view reviews

Class Responsibilities



Data Modelling

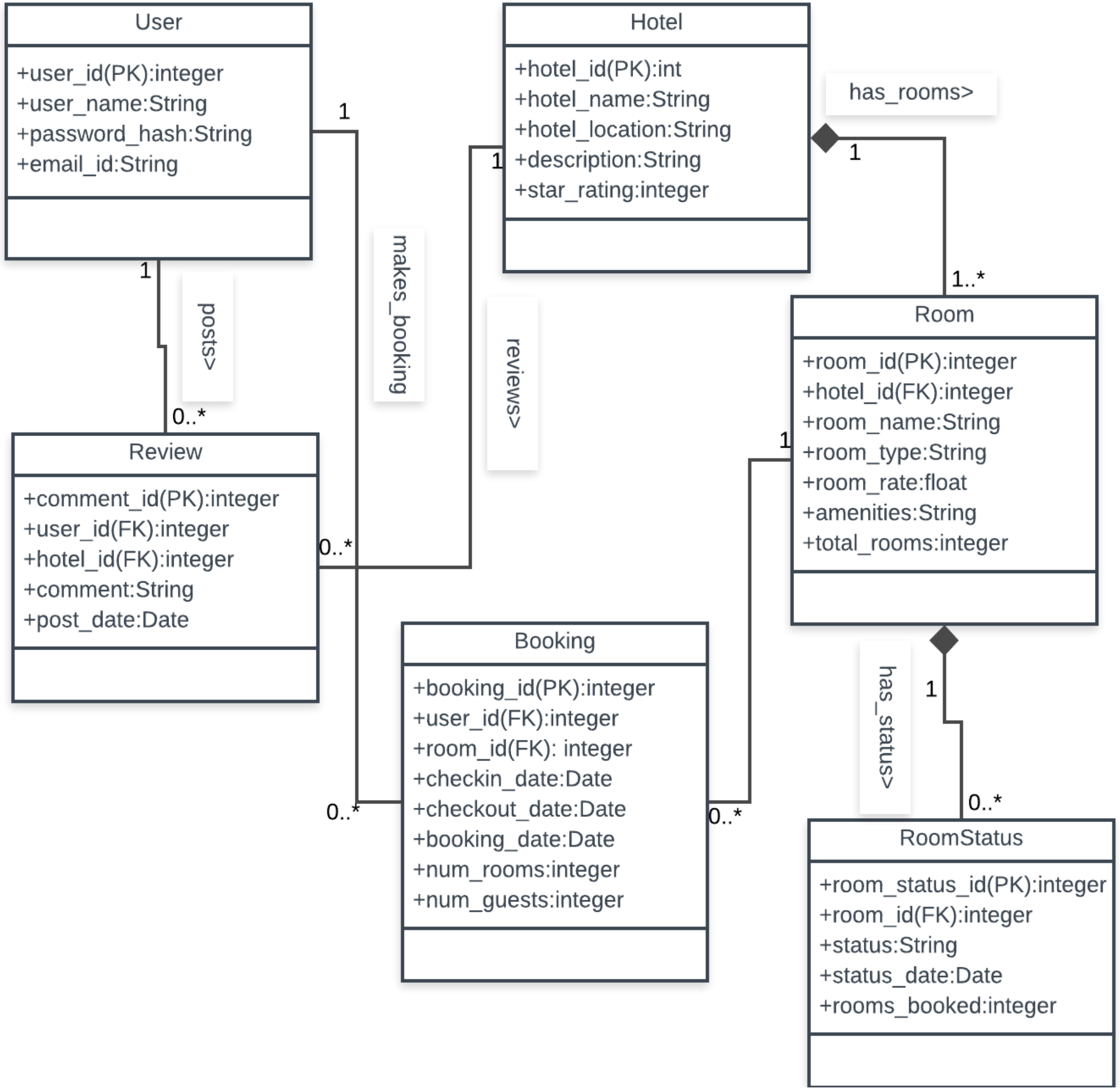
- Representing data of your application.
- Represent it using a higher level model
  - Entity relationship model
  - Unified modelling language
- Translated into relations of a relational model
  - Relational Model - Relational Database with a set of relations

Data Modelling

- Classes for Data modelling
  - Specify Primary key (uniquely identify the object)
  - Drop the methods
  - Specify Foreign key (referring to other objects)

- Association for Data modelling
  - Cardinality or Multiplicity
  - Name the association

Data Modelling



User

+user_id(PK):integer
+user_name:String
+password_hash:String
+email_id:String

Hotel

+hotel_id(PK):int
+hotel_name:String
+hotel_location:String
+description:String
+star_rating:integer

Room

+room_id(PK):integer
+hotel_id(FK):integer
+room_name:String
+room_type:String
+room_rate:float
+amenities:String
+total_rooms:integer

Review

+comment_id(PK):integer
+user_id(FK):integer
+hotel_id(FK):integer
+comment:String
+post_date:Date

Booking

+booking_id(PK):integer
+user_id(FK):integer
+room_id(FK): integer
+checkin_date:Date
+checkout_date:Date
+booking_date:Date
+num_rooms:integer
+num_guests:integer

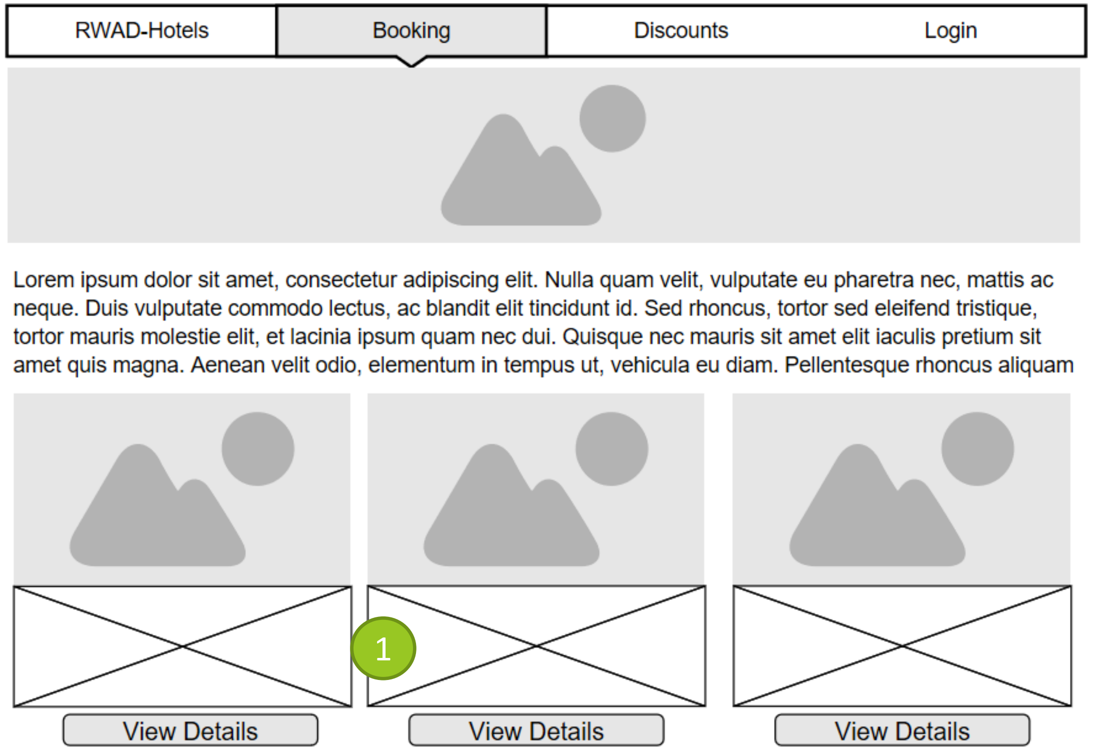
RoomStatus

+room_status_id(PK):integer
+room_id(FK):integer
+status:String
+status_date:Date
+rooms_booked:integer

View

As a user I want to view all the hotels of the hotel chain and their locations because I want be informed of various hotels and locations.

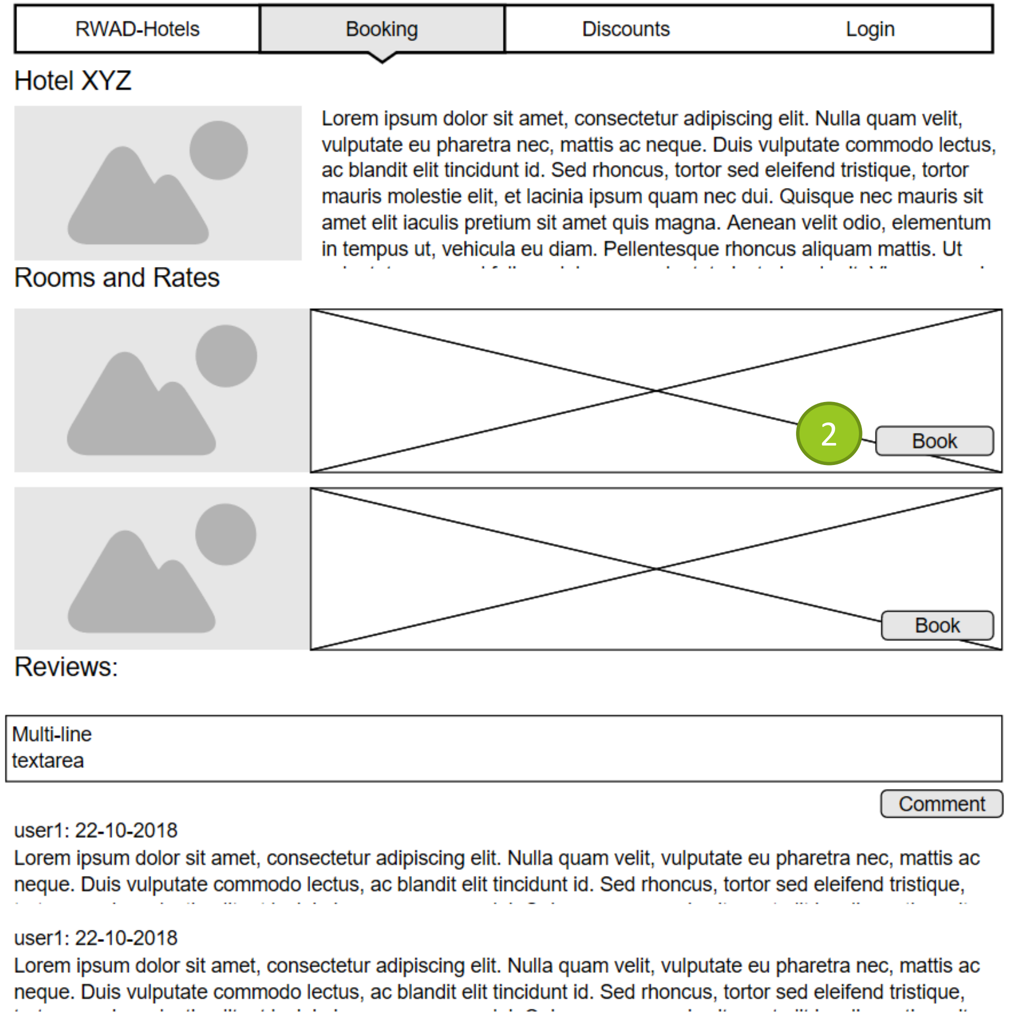
Will need to store additional information about Hotel images



Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla quam velit, vulputate eu pharetra nec, mattis ac neque. Duis vulputate commodo lectus, ac blandit elit tincidunt id. Sed rhoncus, tortor sed eleifend tristique, tortor mauris molestie elit, et lacinia ipsum quam nec dui. Quisque nec mauris sit amet elit iaculis pretium sit amet quis magna. Aenean velit odio, elementum in tempus ut, vehicula eu diam. Pellentesque rhoncus aliquam

View

As a user I want to see the different types of rooms and their rates for any chosen hotel because I need to get more inputs into the amenities and rates.



Hotel XYZ

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla quam velit, vulputate eu pharetra nec, mattis ac neque. Duis vulputate commodo lectus, ac blandit elit tincidunt id. Sed rhoncus, tortor sed eleifend tristique, tortor mauris molestie elit, et lacinia ipsum quam nec dui. Quisque nec mauris sit amet elit iaculis pretium sit amet quis magna. Aenean velit odio, elementum in tempus ut, vehicula eu diam. Pellentesque rhoncus aliquam mattis. Ut

Rooms and Rates

Reviews:

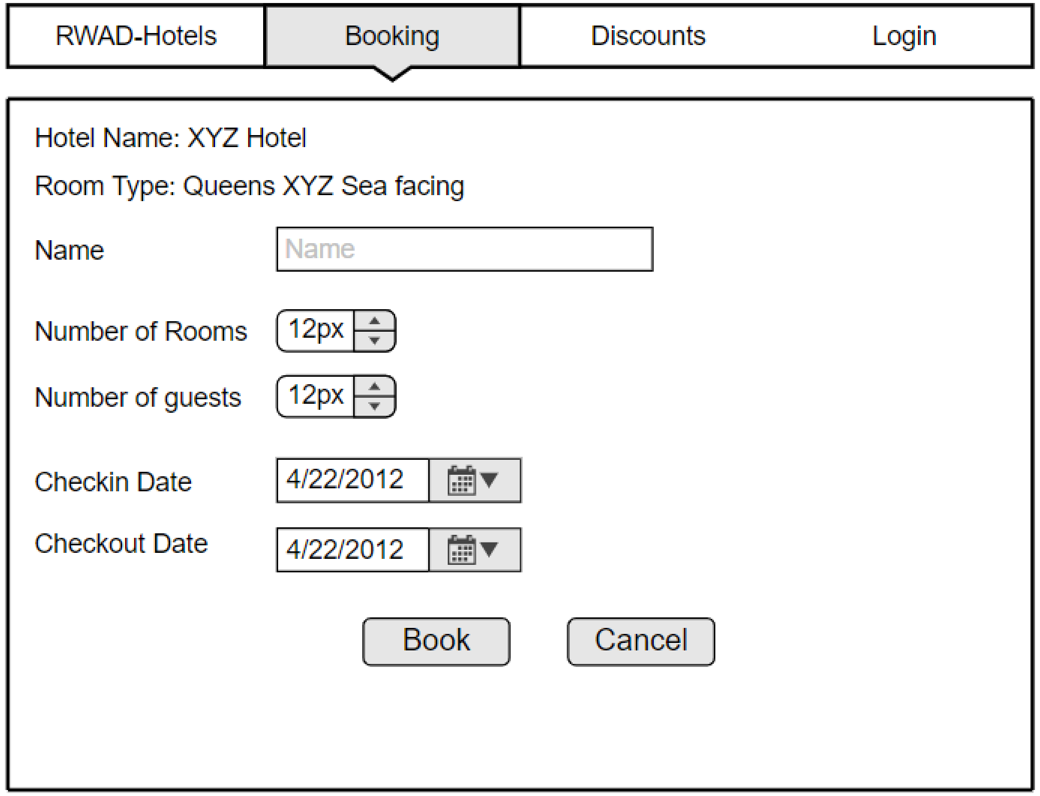
Multi-line
textarea

user1: 22-10-2018
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla quam velit, vulputate eu pharetra nec, mattis ac neque. Duis vulputate commodo lectus, ac blandit elit tincidunt id. Sed rhoncus, tortor sed eleifend tristique,

user1: 22-10-2018
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla quam velit, vulputate eu pharetra nec, mattis ac neque. Duis vulputate commodo lectus, ac blandit elit tincidunt id. Sed rhoncus, tortor sed eleifend tristique,

View

As a user who has logged in, I want to choose a room and book a room. I want to book from a check-in date to a check-out date and receive a confirmation, so I can be sure that the room has been booked.



Hotel Name: XYZ Hotel

Room Type: Queens XYZ Sea facing

Name: Name

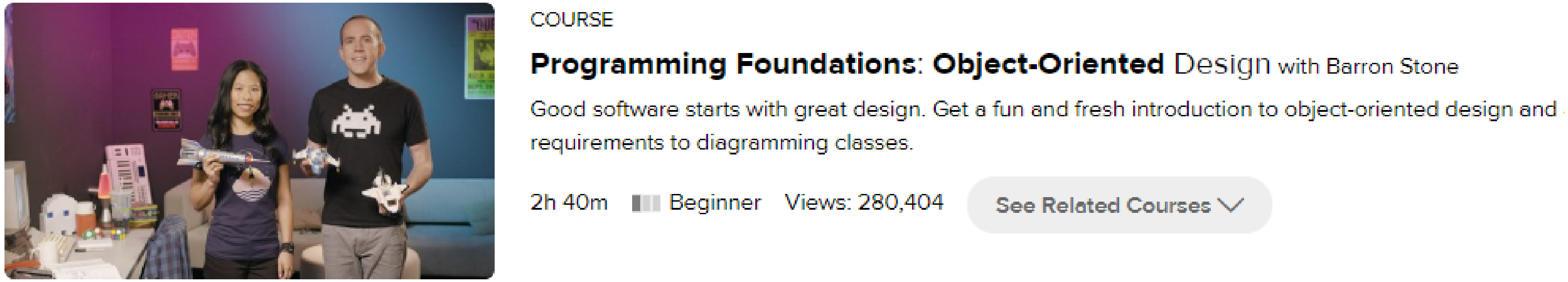
Number of Rooms: 12px

Number of guests: 12px

Checkin Date: 4/22/2012

Checkout Date: 4/22/2012

Lynda Resources


COURSE

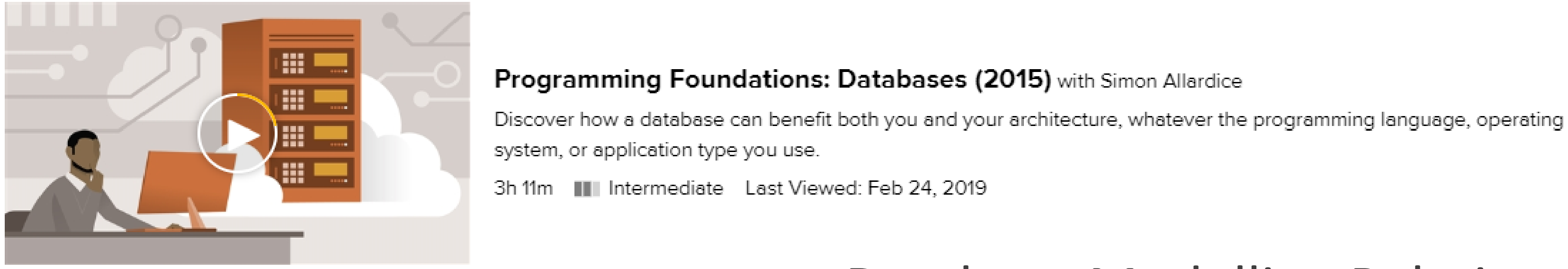
Programming Foundations: Object-Oriented Design with Barron Stone

Good software starts with great design. Get a fun and fresh introduction to object-oriented design and requirements to diagramming classes.

2h 40m Beginner Views: 280,404

- Identifying objects
- Identifying relationships
- Identify class responsibilities

~10 minutes


Programming Foundations: Databases (2015) with Simon Allardice

Discover how a database can benefit both you and your architecture, whatever the programming language, operating system, or application type you use.

3h 11m Intermediate Last Viewed: Feb 24, 2019

- Database Modelling Relationships
  - One to Many
  - Many to Many
  - One to One

Summary

- Model View Controller Pattern

- Web application
  - User Stories
  - Conceptual Model
  - Controller functions
  - Data Model
  - Views