**DIT045/DAT355
Requirements and User Experience**

# Lecture 3: Requirements Modeling (2)

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# Student Reps

GU

- Navya Pulikandla Satyanarayanachetty

- Himank Meattle

- Leila Bencheikh

Chalmers

- Student office will pick randomly

NOV 18

ACT! SUSTAINABLE DESIGN JAM 2020

ONLINE @ IT FAC

CHALMERS | UNIVERSITY OF GOTHENBURG

November 18th, 2020  9:30 – 17:30

Online event (Zoom, Discord)

Register before Nov 11th, spaces limited

Registration URL:  **https://tinyurl.com/designjam2020**

Open to all of GU, Chalmers, some partner universities

**The theme is sustainable mobility for students**

No programming!    Free!

Produce a short video of your final designs

Judging session with prizes!

# Agenda
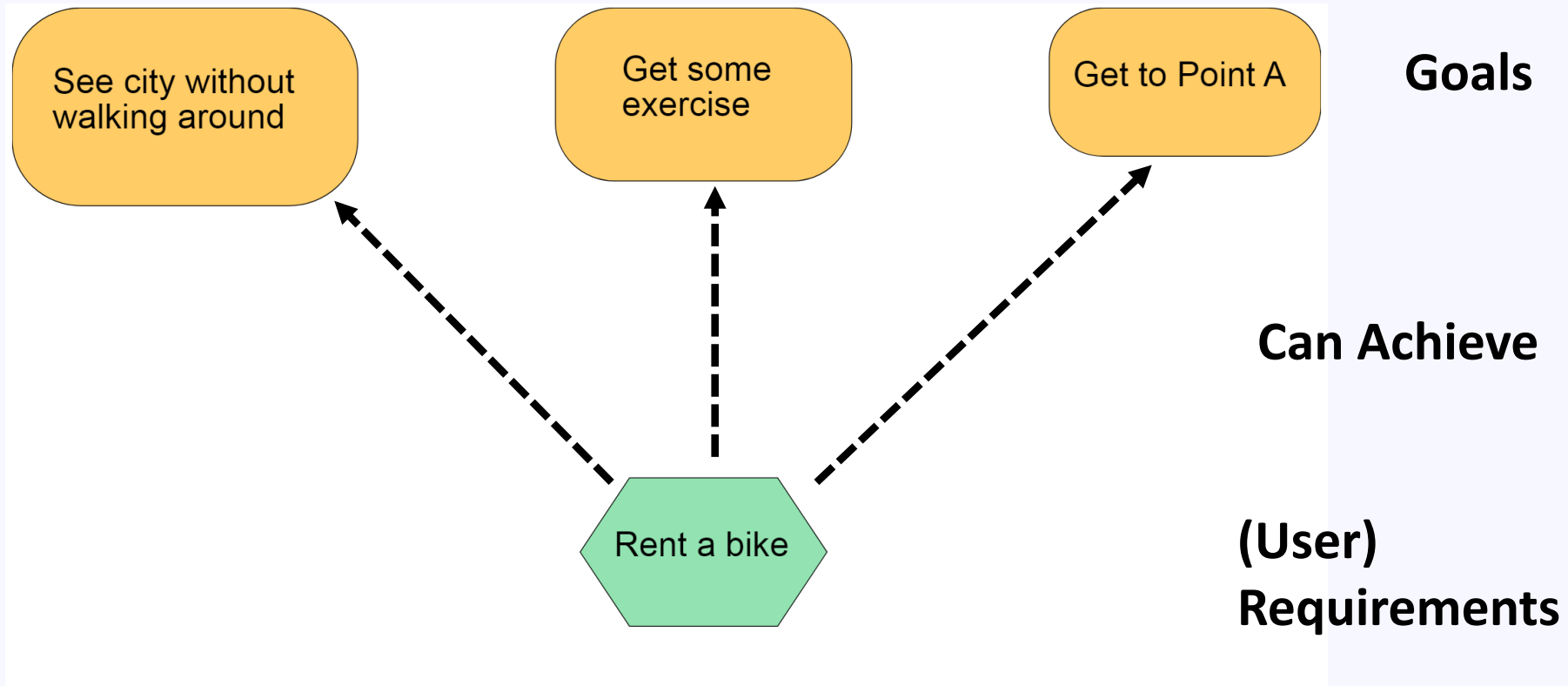
Goal Models part 2

Use Case Diagrams

Customer Journey Maps
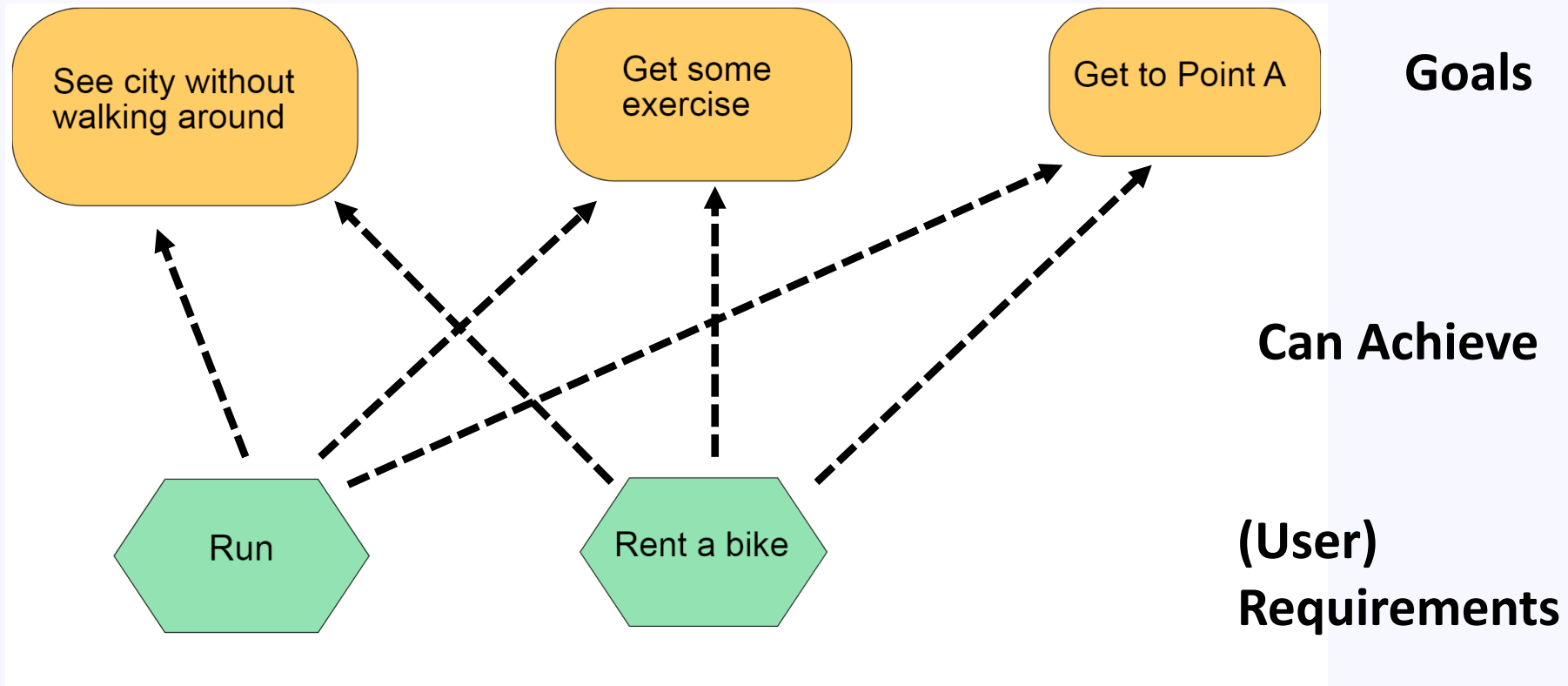
# Goal Models

# Requirements vs. Goals

- Goals:
  - What users would (really) like to achieve
  - Usually at a high level of abstraction
  - Usually does not directly reference the system
  - Captures users overall motivations and intentions

- Goal: I want to rent a bike
  - Is this a user goal?

  - WHY do you want to rent a bike?
    - I want to see the city without walking around
    - I want to get some exercise
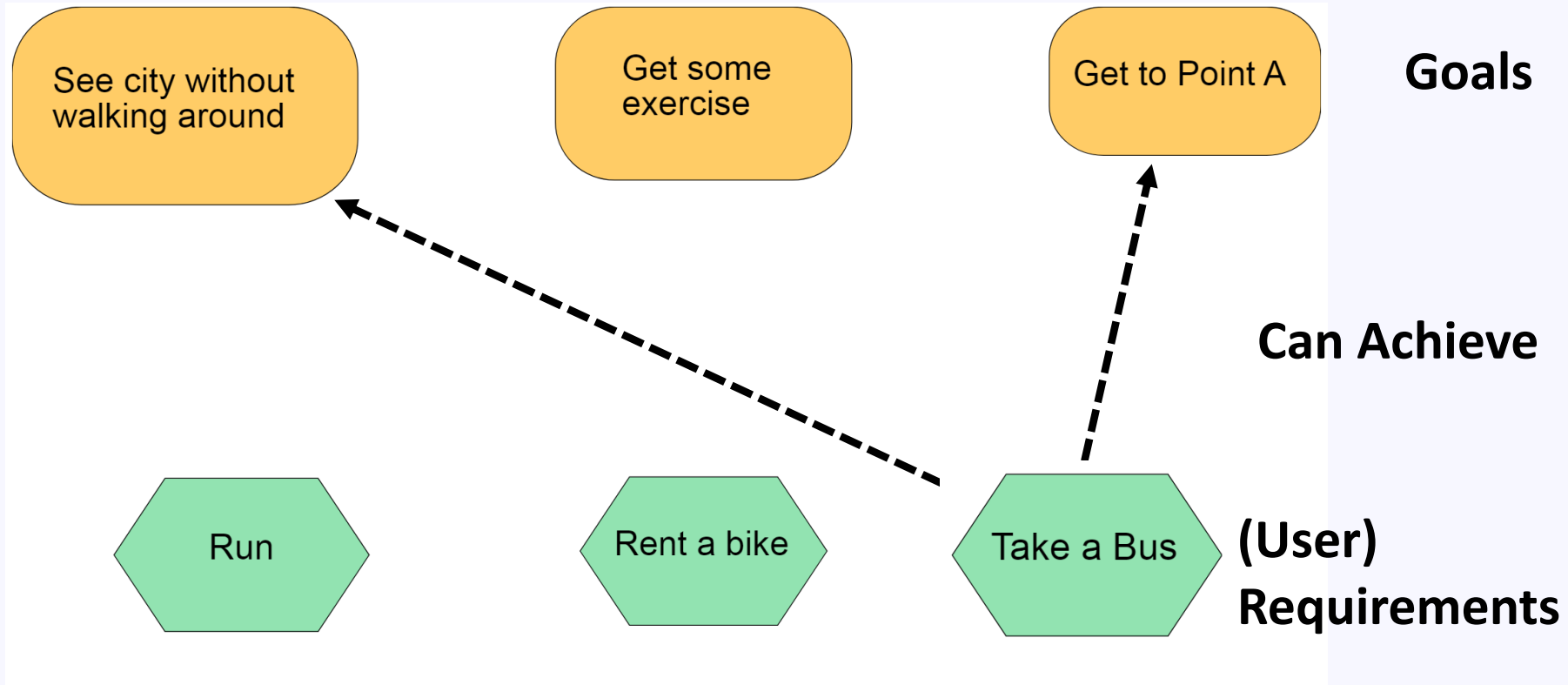    - I want to get to point A

# Requirements vs. Goals



**Goals**

See city without walking around

Get some exercise

Get to Point A

**Can Achieve**

Rent a bike

**(User) Requirements**

- But is renting a bike the best solution?

# Requirements vs. Goals



Goals

Can Achieve

(User) Requirements

See city without walking around

Get some exercise

Get to Point A

Run

Rent a bike

- But is renting a bike the best solution?

# Requirements vs. Goals



| See city without walking around | Get some exercise | Get to Point A | **Goals** |
| --- | --- | --- | --- |
| | | | **Can Achieve** |
| Run | Rent a bike | Take a Bus | **(User) Requirements** |

- But is renting a bike the best solution?

# Requirements vs. Goals



**Quality Goals**

Get to destination quickly

Get to Point A

**Goals**

**Can Achieve**

Run

Rent a bike

Take a Bus ✓
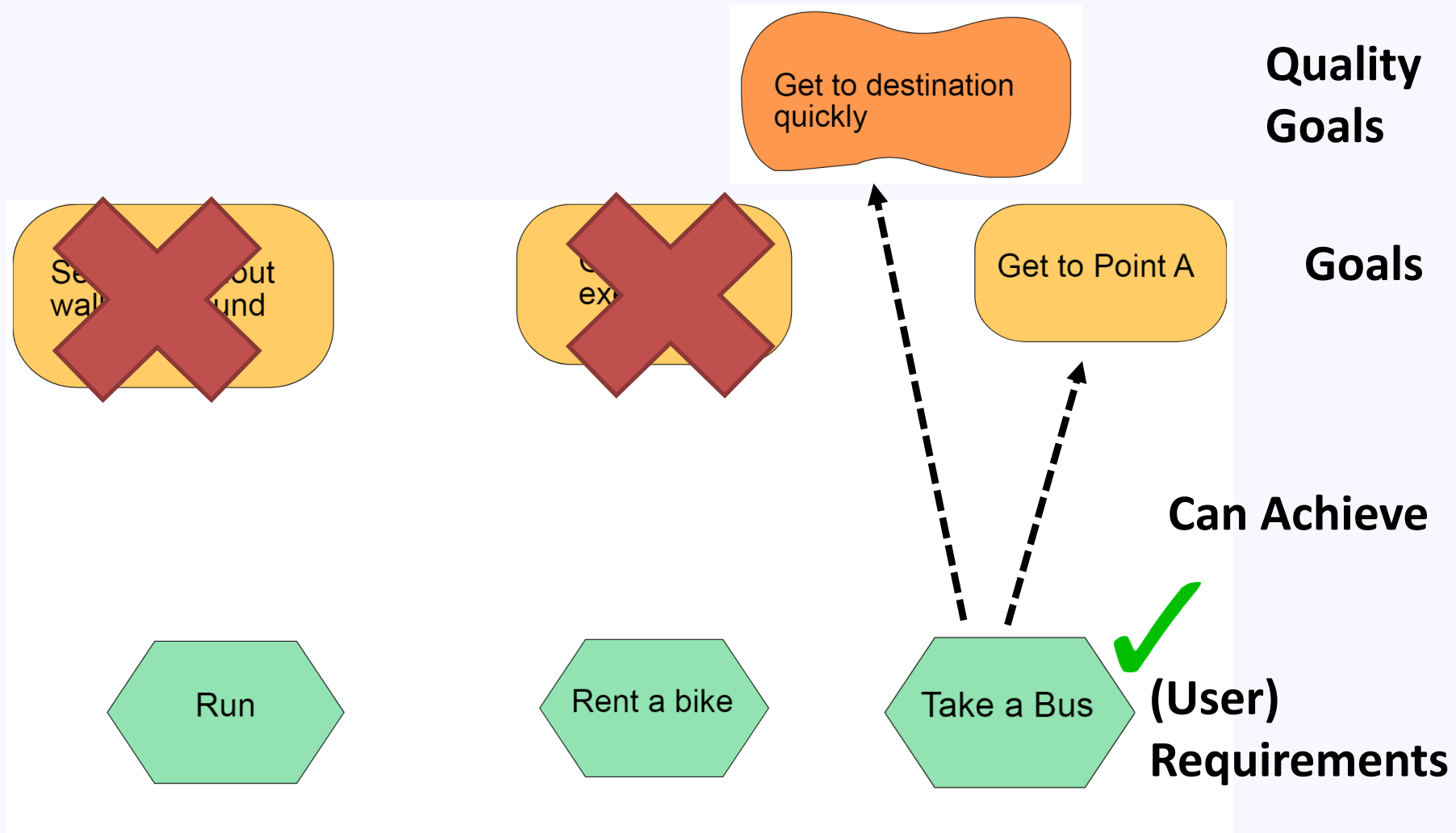
**(User) Requirements**

- Qualities?

# Requirements vs. Goals



- Qualities?

# Requirements vs. Goals



Quality Goals

Goals

Can Achieve

(User) Requirements

- Avoid strenous activity
- Get to ~~~~tion quick~~
- See city without walking around
- Get some exercise
- G~~~~nt A
- Run ✔
- Rent a bike ✔
- Take a Bus ✖
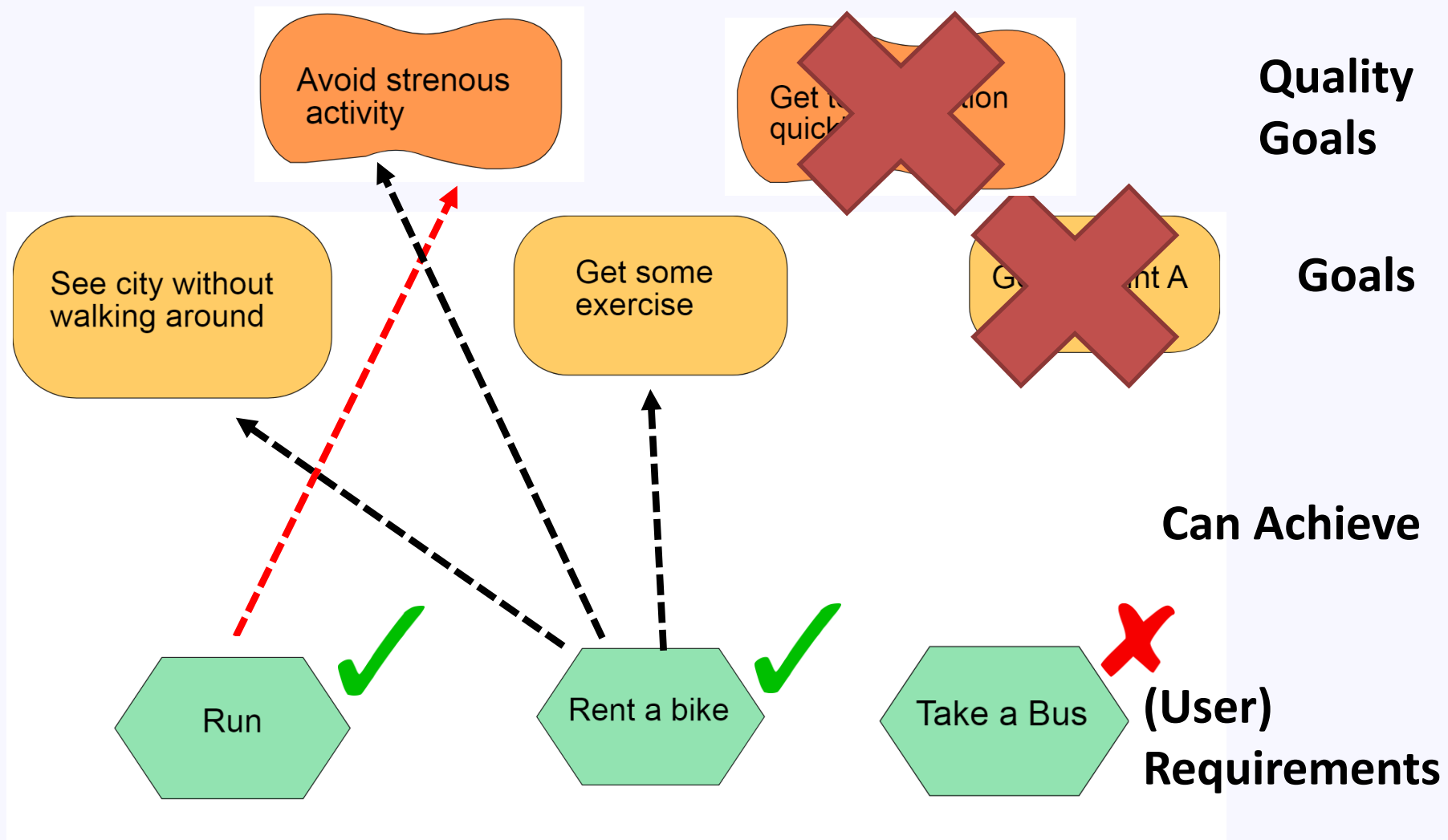
- Qualities?

# Requirements vs. Goals

- Requirements achieve goals, they are a means to an end

- A requirements can achieve more than one goal

- A goal can also be achieved by more than one requirement

- ->  Choice,  Alternatives

- There isn't necessary one set of correct requirements, but a number of possible requirements, which may achieve user goals to different degrees

- Eliciting goals help us to make decisions in the requirements space

# Why Goal-Orientation?

- Most systems today are socio-technical

  - E.g., online commerce, healthcare, government

- Complex web of relationships among systems and stakeholders

  - Help each other achieve what they want

- Help stakeholders understand their needs:

  - E.g., security, privacy, trust, profitability, market positioning, strategic alliances, intellectual property, …

- Understanding "why?", not just "what?" or "how?"

# Example Application: Strategic Requirements Analysis for Kids Help Phone

- Kids Help Phone (KHP) is a not-for-profit organization which provides counseling for Canadian children and youth.

- Traditionally, KHP has provided counseling via phone

- As new technology is introduced, KHP wanted to go where the kids are: the web

- How can counseling services be effectively provided on-line?

- How can the organization continue to ensure:

- Anonymity?     Confidentiality?     Quality of Service?

- A new design is needed for the Controlled Airspace Infringement Tool (CAIT)

  - provides air traffic controllers with timely warnings of airspace infringements

- How do we know the new requirements are safe?

- How do we know how the new requirements effect the wider socio-technical system?

# i* Strategic Dependencies

- Goal Dependency: I want you to achieve my goal, I don't care how

GA Pilot (non-controlled) —▷ Be educated ▷— Flying club/airfield
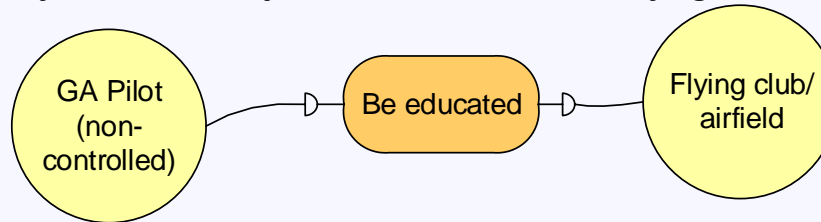
- Task Dependency: I want you to achieve this task, in an agreed upon way

KHP —D— Provide counseling via text message —D— Counsellors
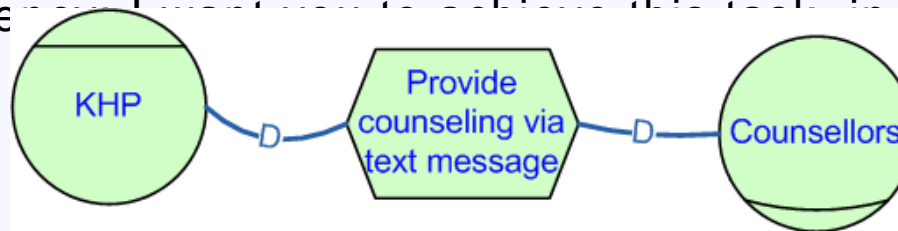
- Resource Dependency: ...ing (entity)

Client —D— WiFi signal information —D— WiFi Access Point

- Quality Dependency: I want you...

KHP —D— High Quality Counselling —D— Counsellors

# i* Strategic Rationale (SR) Diagrams

- Actor boundaries

- Goals, Qualities, Tasks, Resources

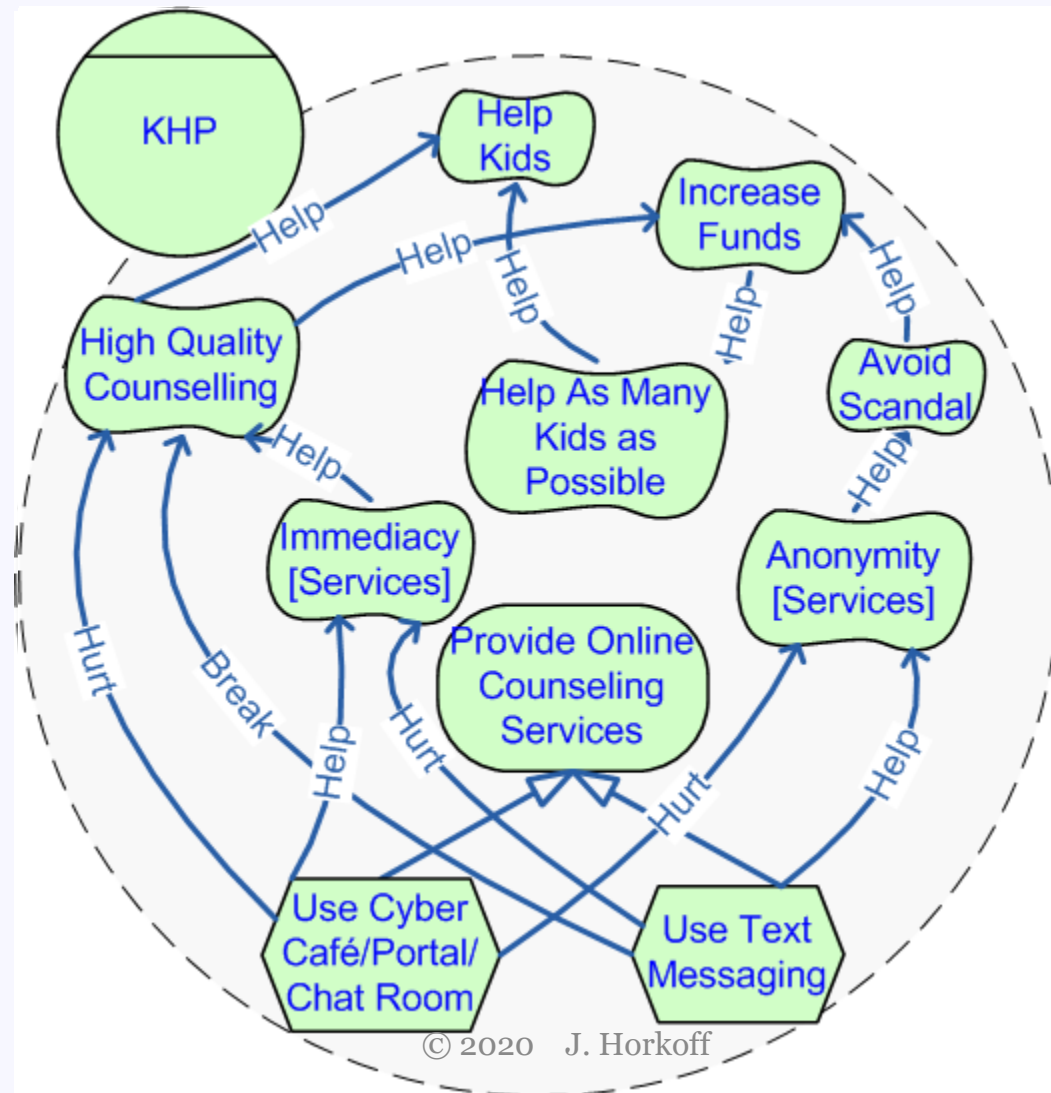- Dependencies (as before)

- Refinement (AND), (OR)
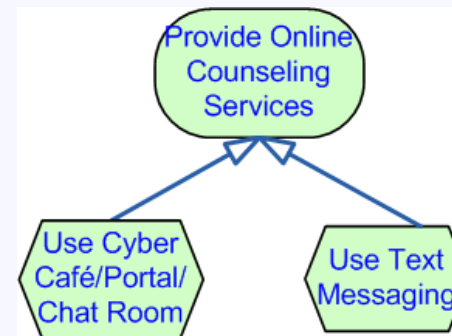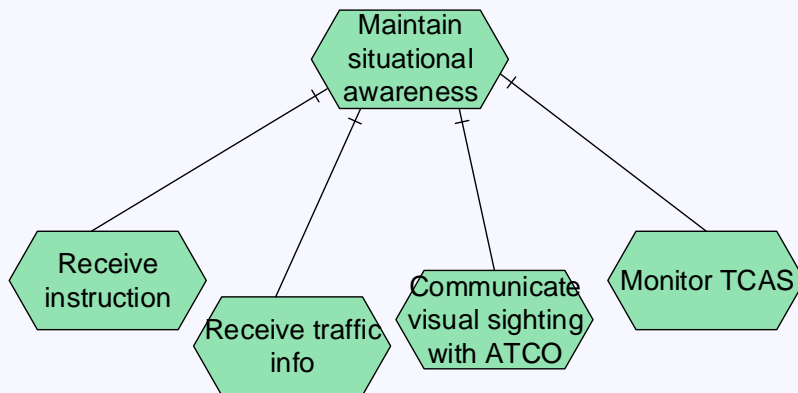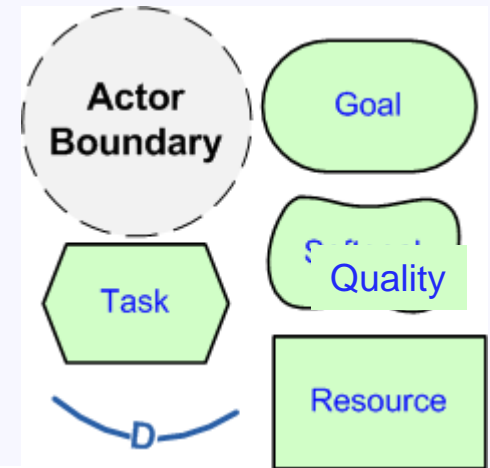
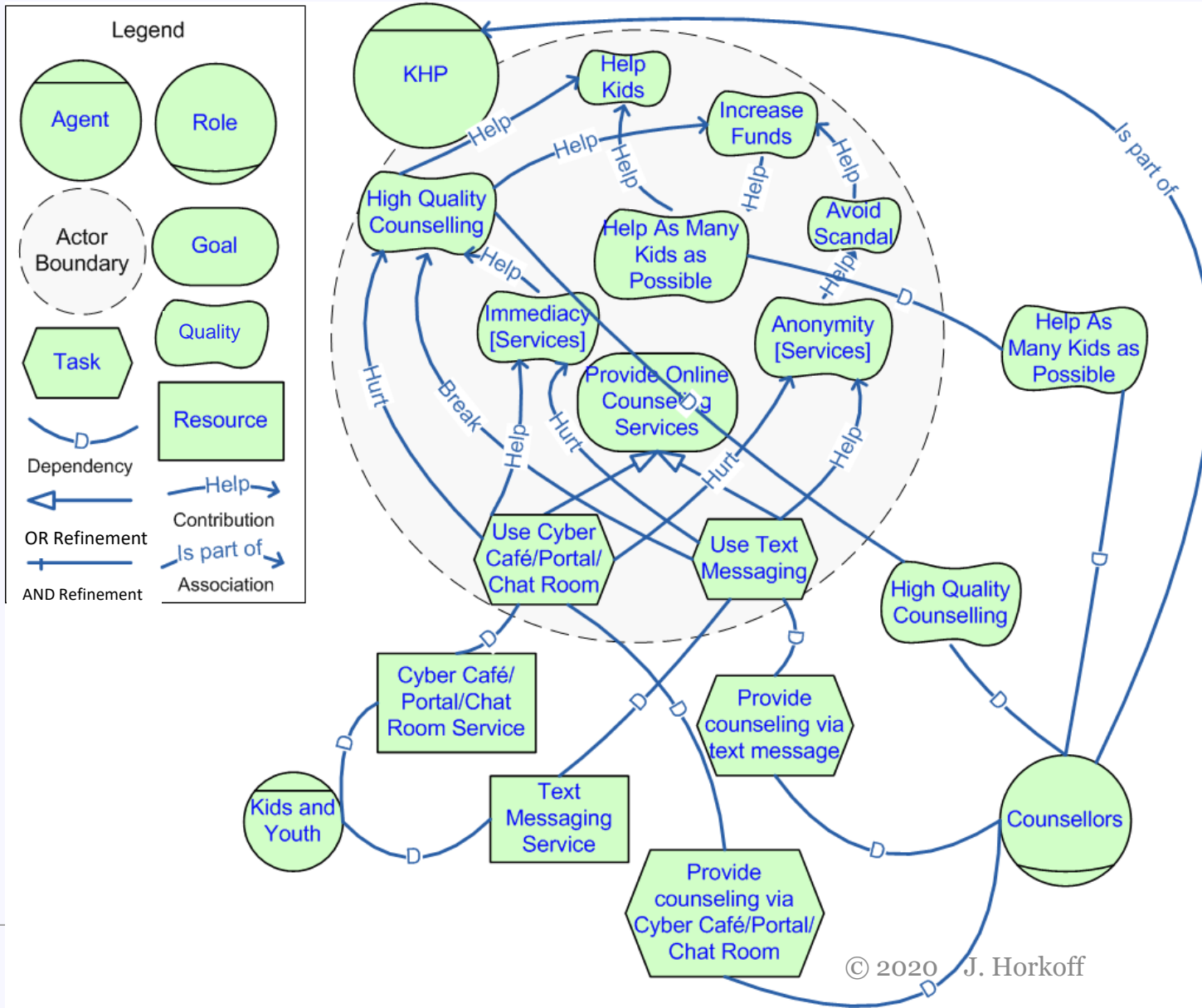- Contribution: Make, Help (+), Hurt (-), Break
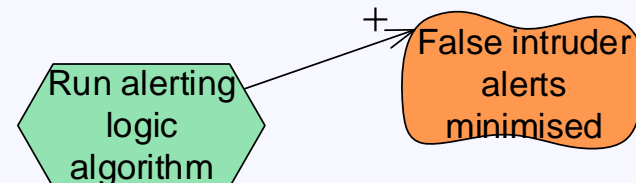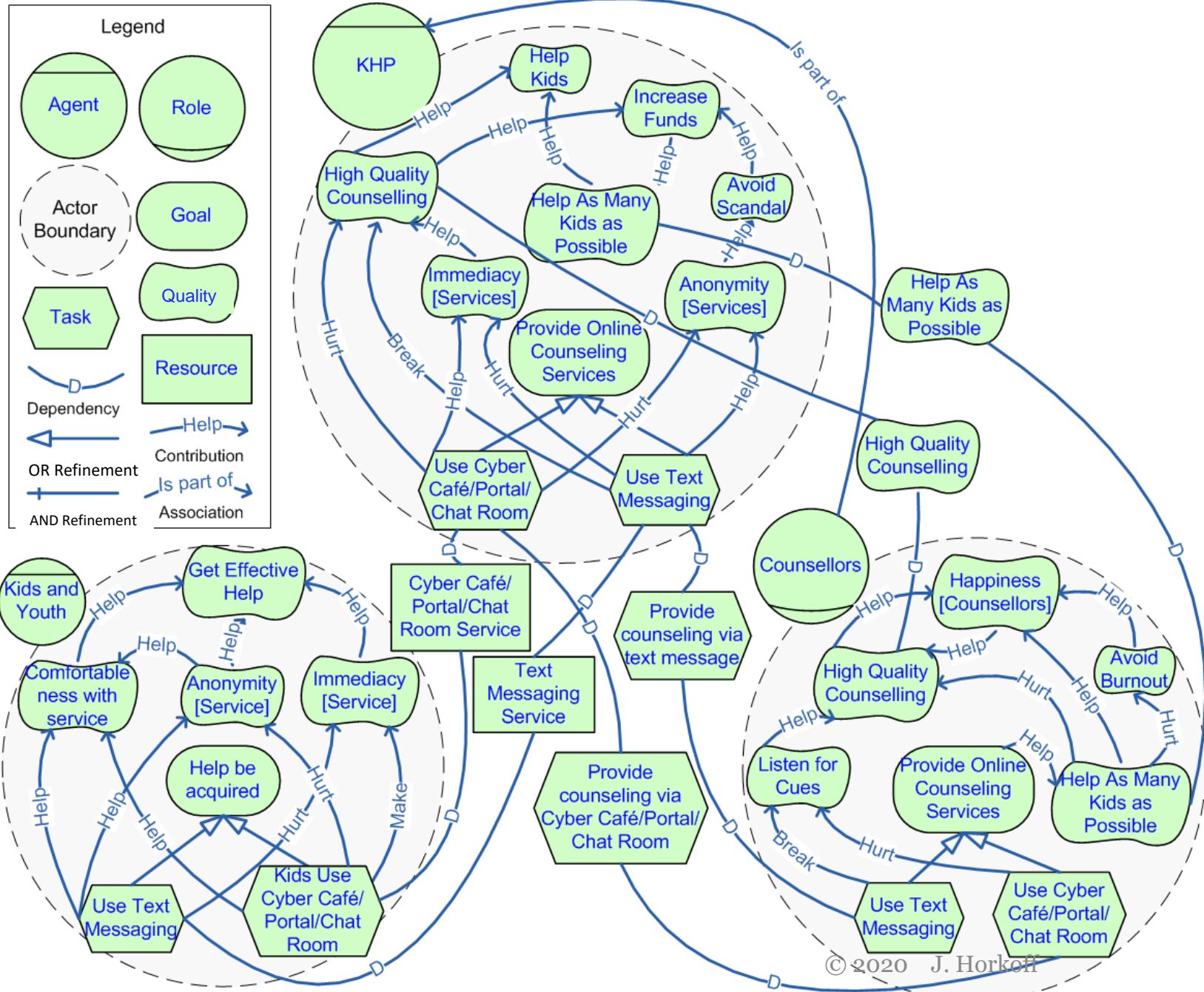
# SR Example: Kids Help Phone

- What are the goals of KHP?

- What are the relationships between the goals?

- What are the alternatives?

- How can these goals be satisfied?

- What are the negative consequences?
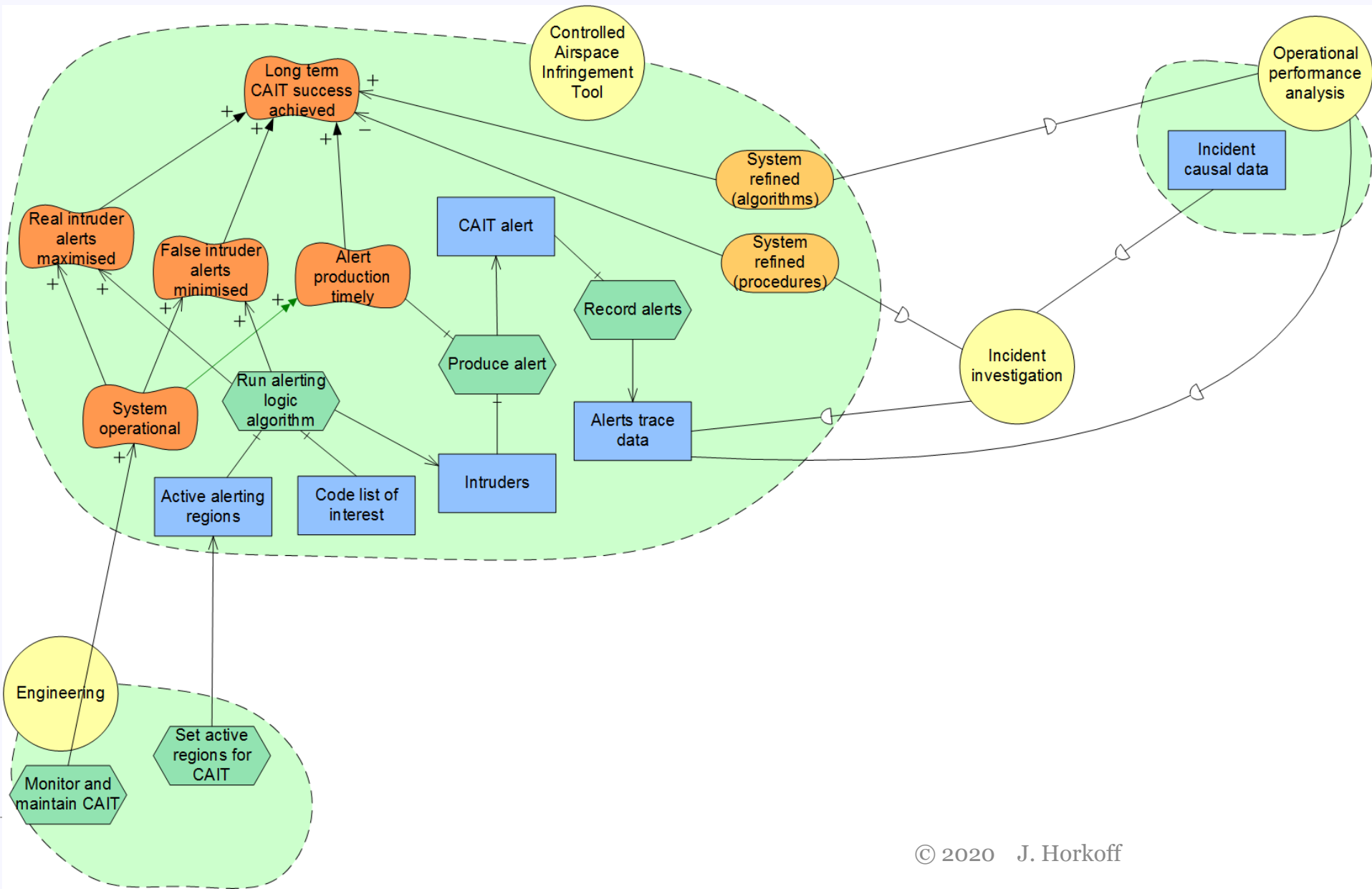
- Who do we depend on?

- For what?

- How?



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# SR Example: Kids Help Phone

© 2020  J. Horkoff

# SR Example: Kids Help Phone

# SR Example: NATS (partial)

# iStar (i*)

- There's more than one goal modeling language

- We'll use iStar 2.0

- Evolution of i* (examples you've seen so far)

- More info can be found (Document also on Canvas)

  - https://arxiv.org/abs/1605.07767

  - Additional slides on Canvas for university travel example

# Creative Leaf

- Web-based goal modeling tool

- Use in Chrome (!)

- [http://creativeleaf.portal.chalmers.se/](http://creativeleaf.portal.chalmers.se/)

- (backup site:  [http://creativeleaf.city.ac.uk/](http://creativeleaf.city.ac.uk/))

- Former has syntax restrictions, latter does not, i.e., you can do more wrong things in the UK version, but have more freedom.

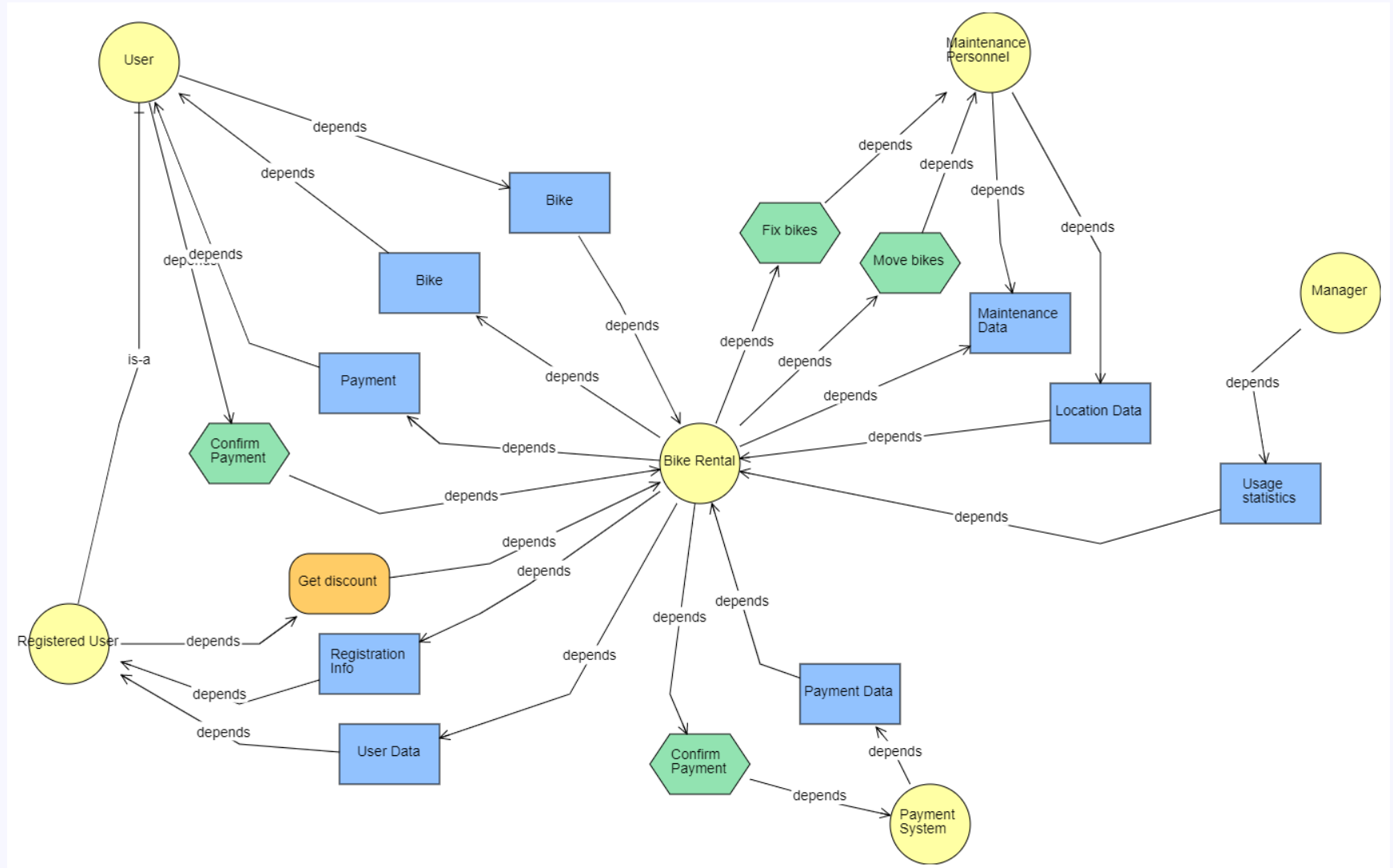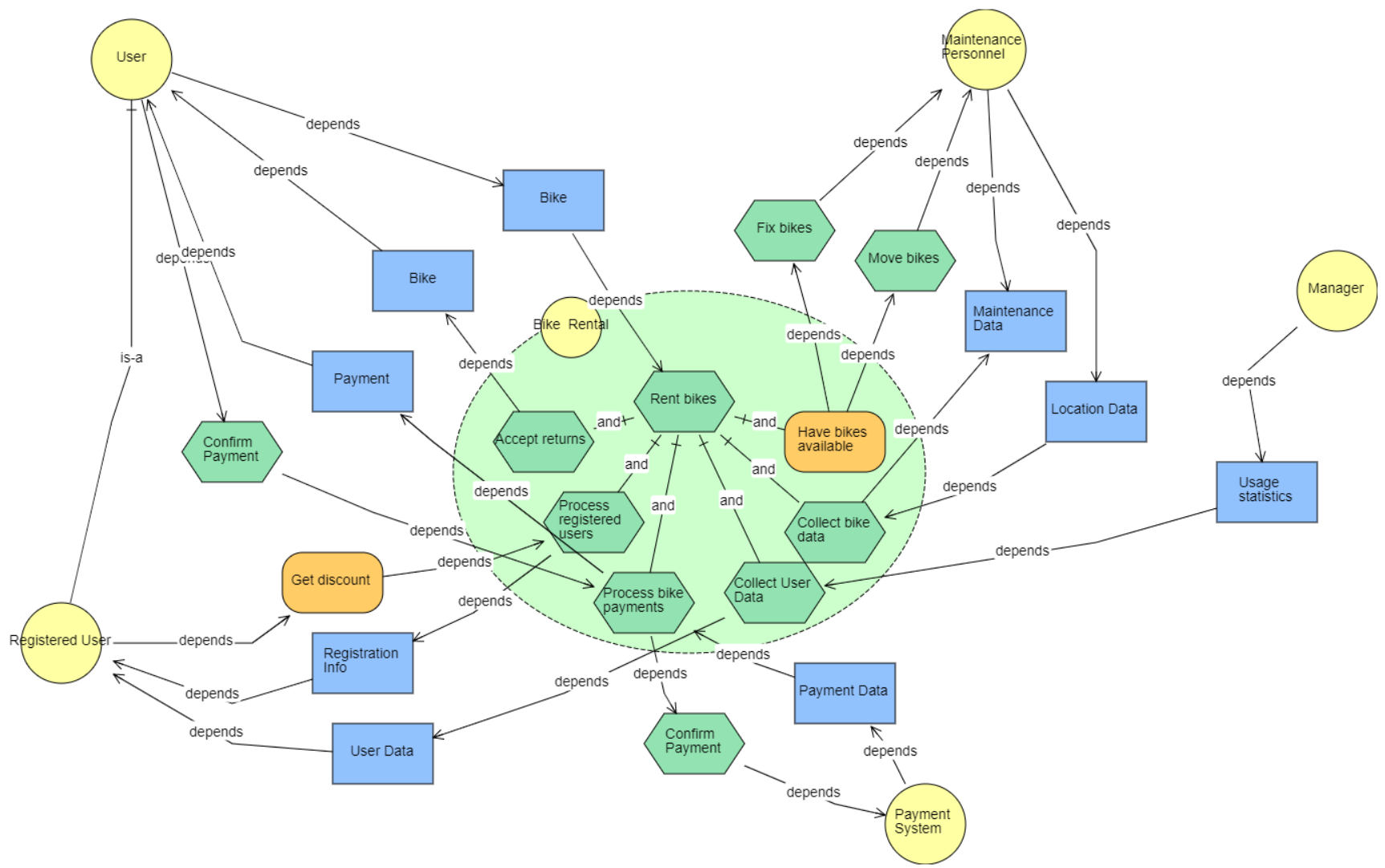- Bugs?   Email me:  jenho@chalmers.se

# Creative Leaf

- http://creativeleaf.portal.chalmers.se/
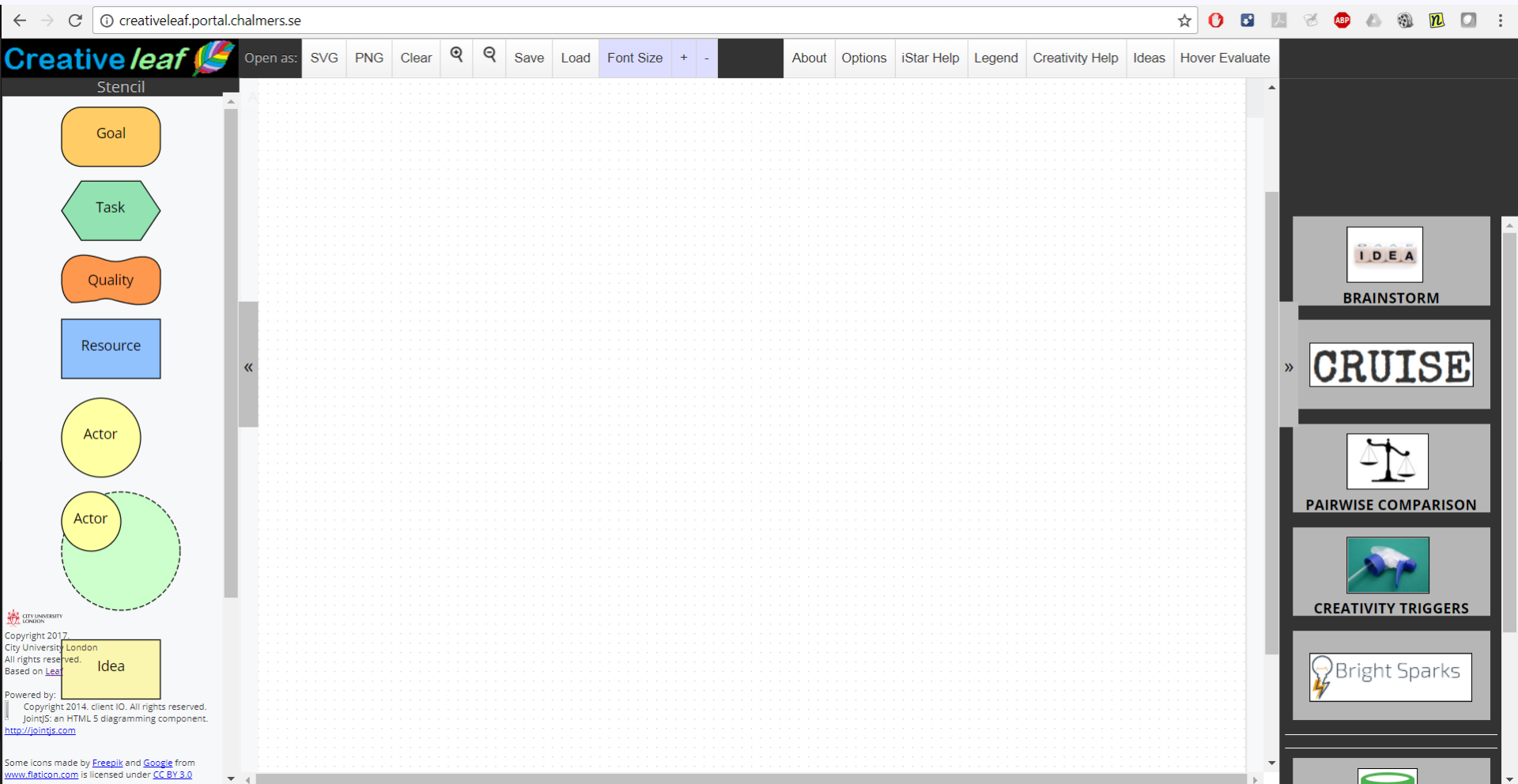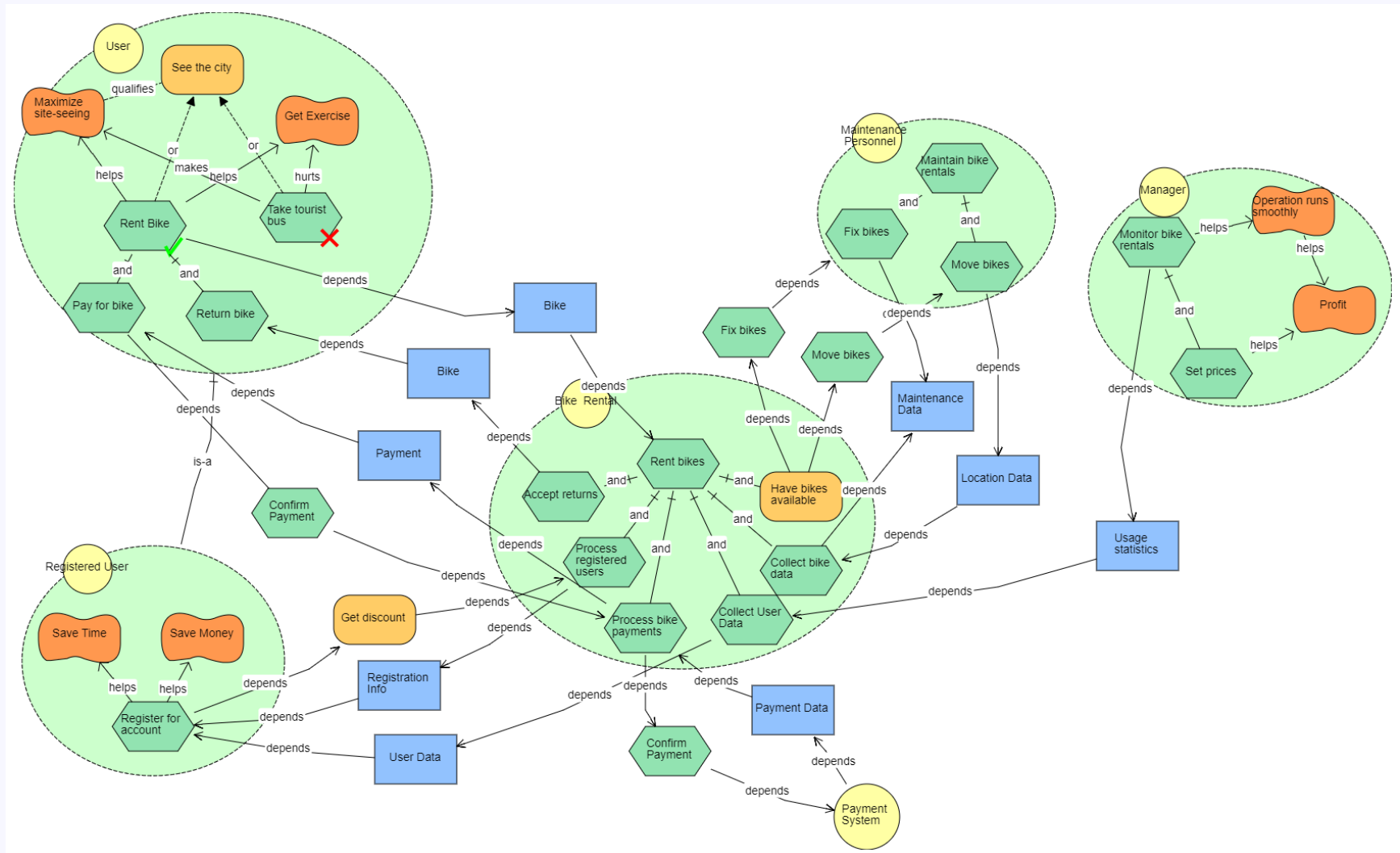
# Bike Rental: Actors
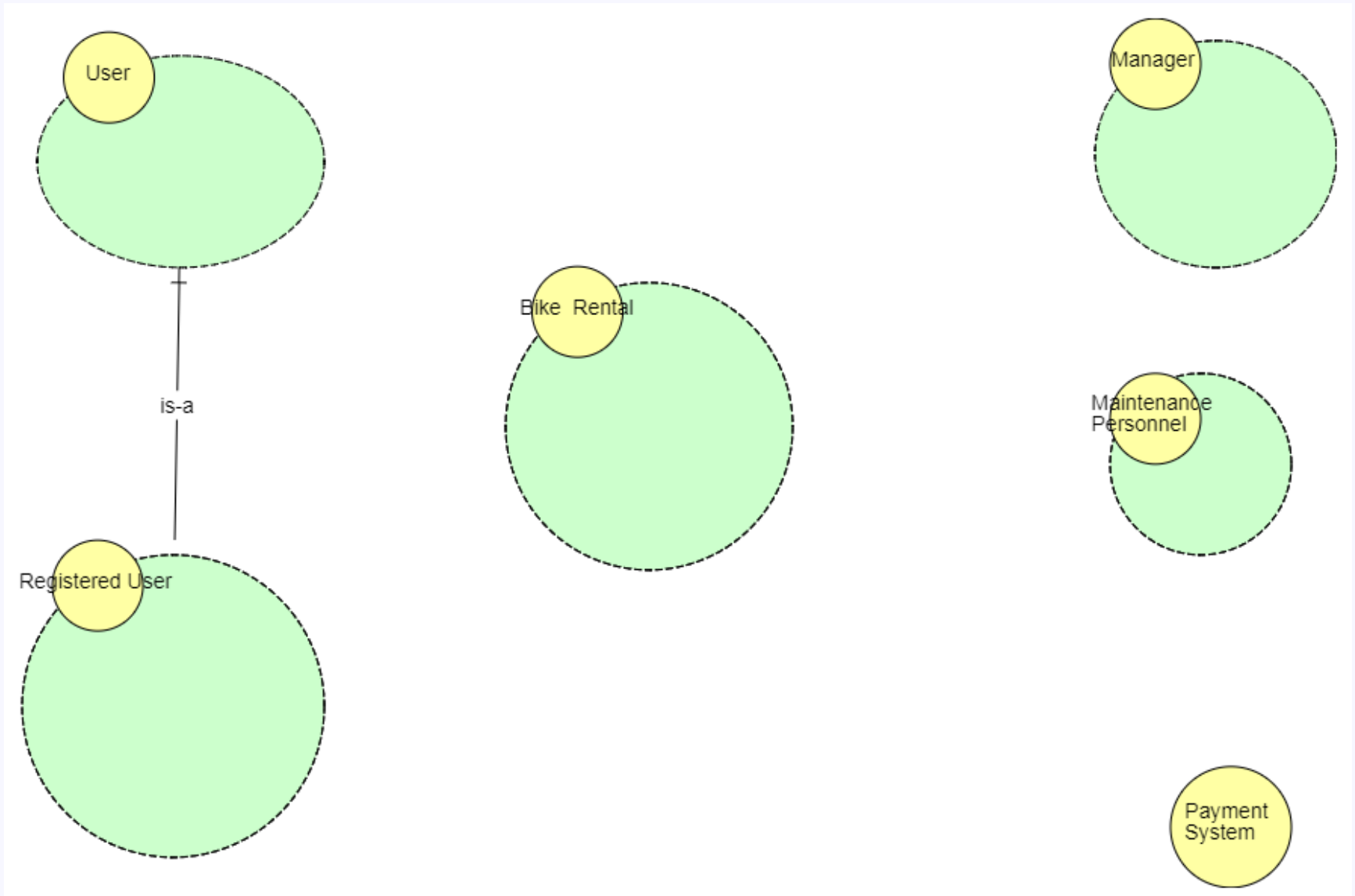
# Bike Rental: SD

# Bike Rental: SR (partial)

# Bike Rental: SR (full)

# Virtual Museum/Gallery SR?

- Start if time

- Finish in video

  - Uploaded in 1-2 days

# Use Case Diagrams

# Use Case Diagrams

- Part of UML (Unified Modeling Framework)

  – Well-known modeling standard

- A visual (model) part and a longer text part

- Actors (again)

  – Stakeholders, anyone who uses the system to do anything

- Use cases

  – "**Use cases**. A use case describes a sequence of actions that provide something of measurable value to an actor and is drawn as a horizontal ellipse."

  – "Use Case: A use case is all the ways of using a system to achieve a particular goal for a particular user. Taken together the set of all the use cases gives you all of the useful ways to use the system, and illustrates the value that it will provide." Jacobson, 2011
  http://www.agilemodeling.com/artifacts/useCaseDiagram.htm

# Use Case Diagrams

- Use Cases

  - Capture requirements

  - Usually at a higher level than text requirements – shorter and more abstract

  - Are usually broken down into a sequence of actions

  - Have a long form template version – a scenario

  - Will cover scenarios and the longer form of use cases in a later lecture

- Associations

  - Which actors are involved in which use cases

- System boundary

  - Use cases are shown as part of a system
    http://www.agilemodeling.com/artifacts/useCaseDiagram.htm

# Bike Rental Again

- Actors (can be same as in context diagram)
  - Users (registered user, non-registered user)
  - Maintenance personnel
  - Managers
  - Payment system
  - … anyone else who interacts with system
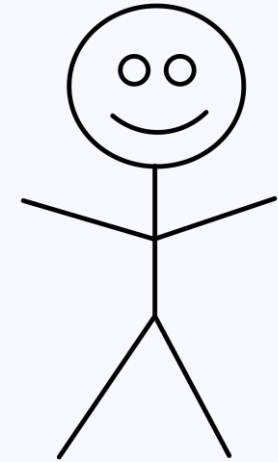
- Use cases (should cover main functionality)

  Rent bike                      Get maintenance info
  Pay for bike                   Get bike location info
  Return bike                    Move bikes
  Enter registration info        Get bike usage data
  Get discount

- Who is involved in these use cases?

# Bike Rental

Bike Rental

Actors

System Boundary

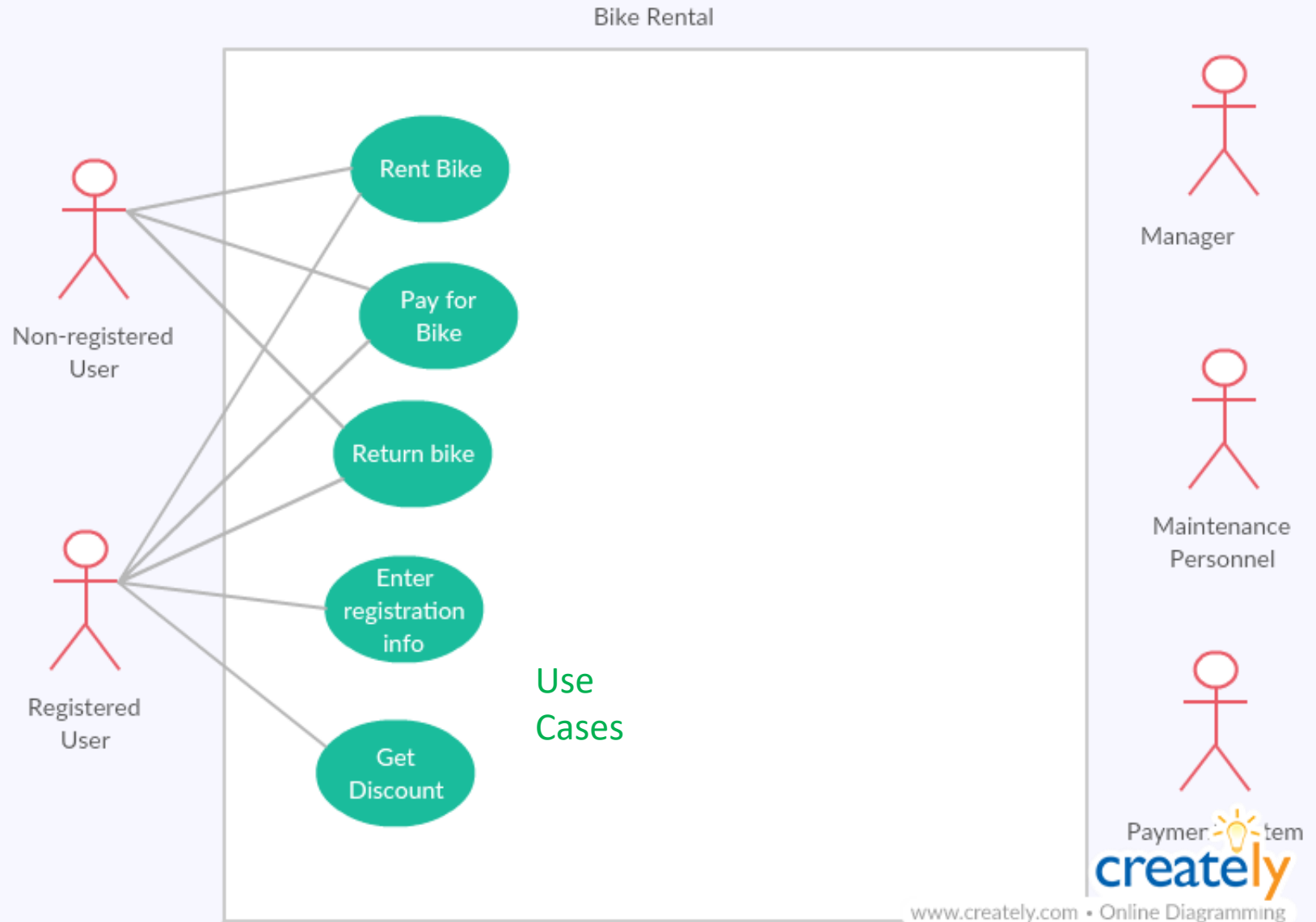Non-registered
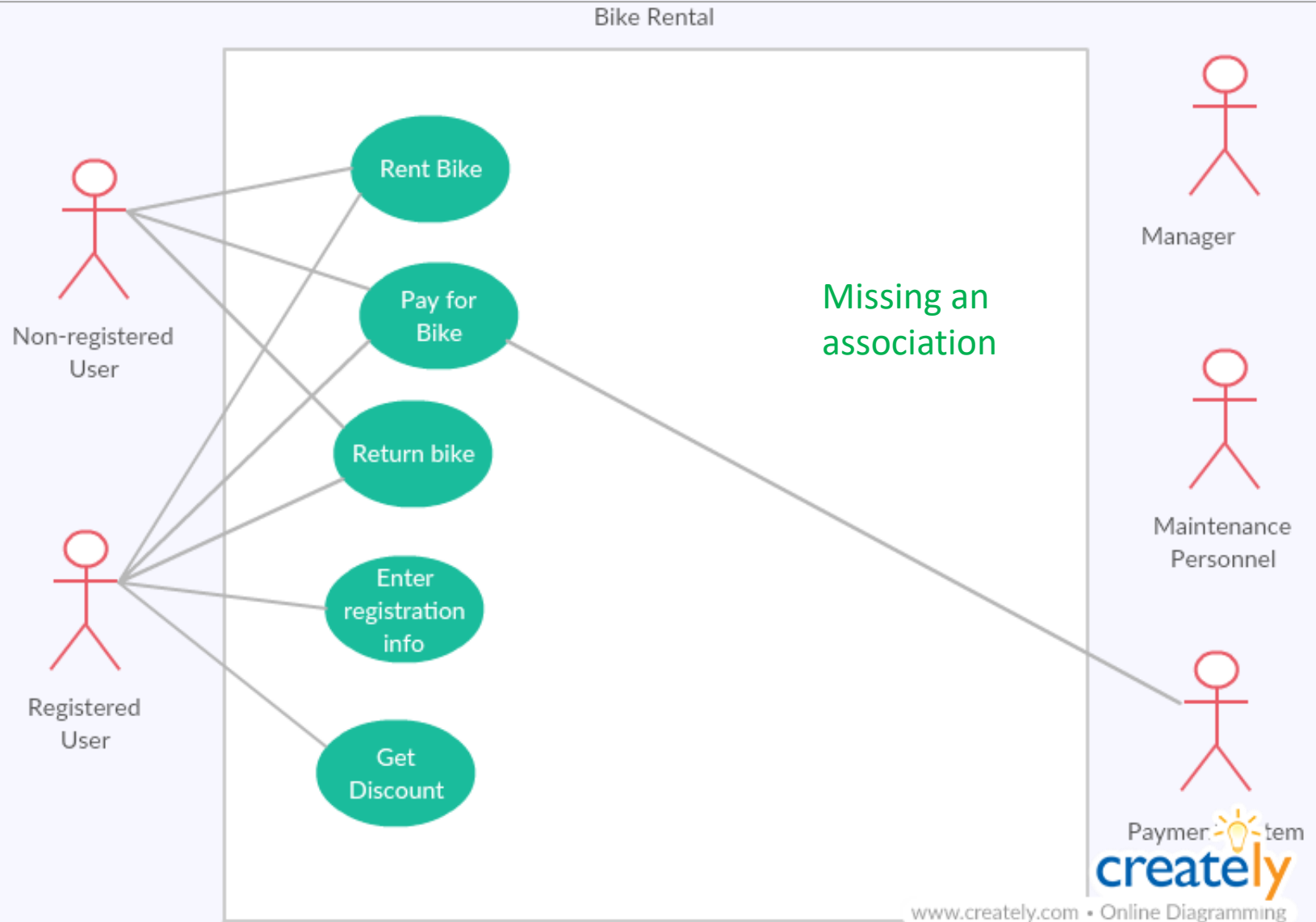User

Registered
User

Manager
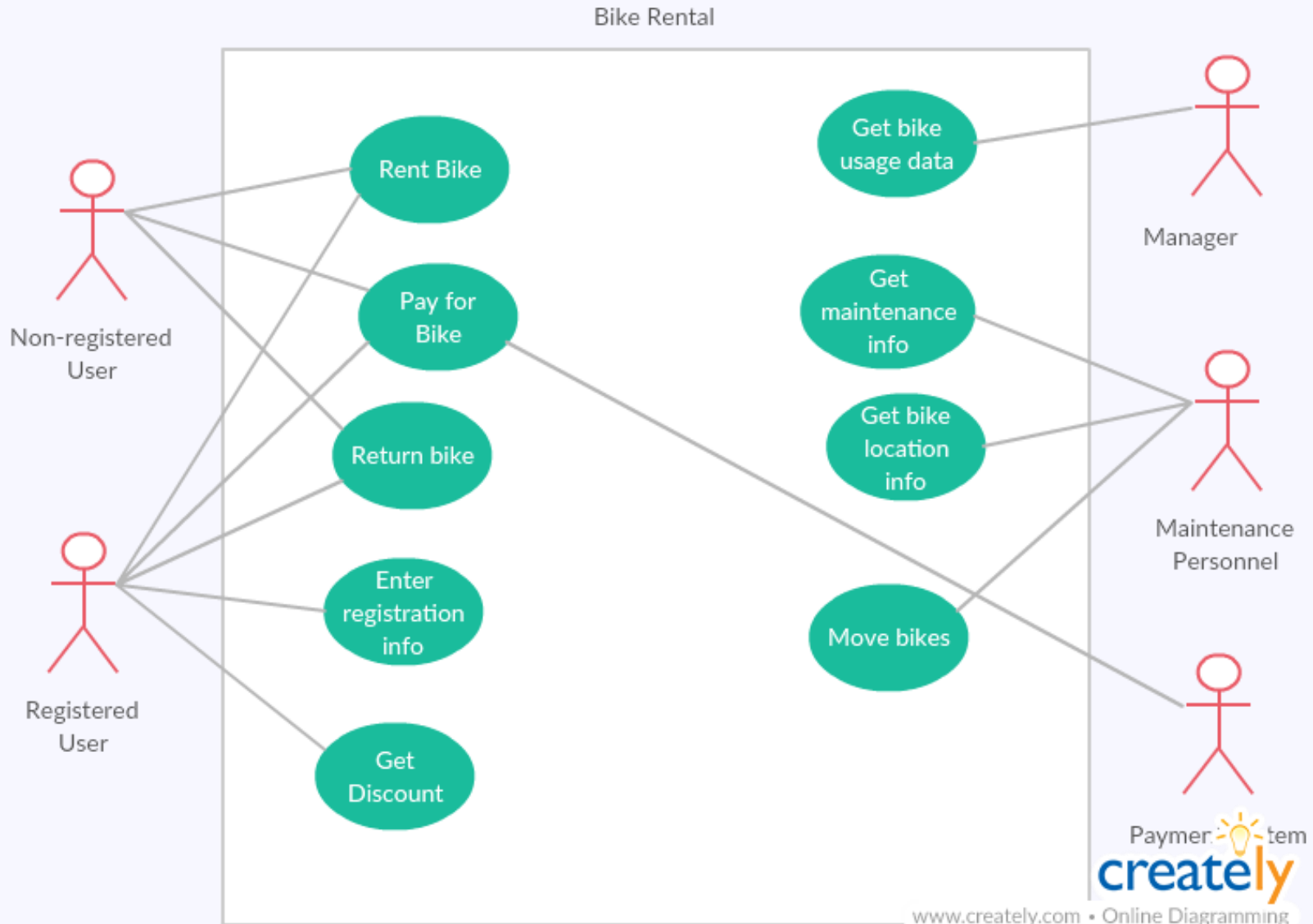
Maintenance
Personnel
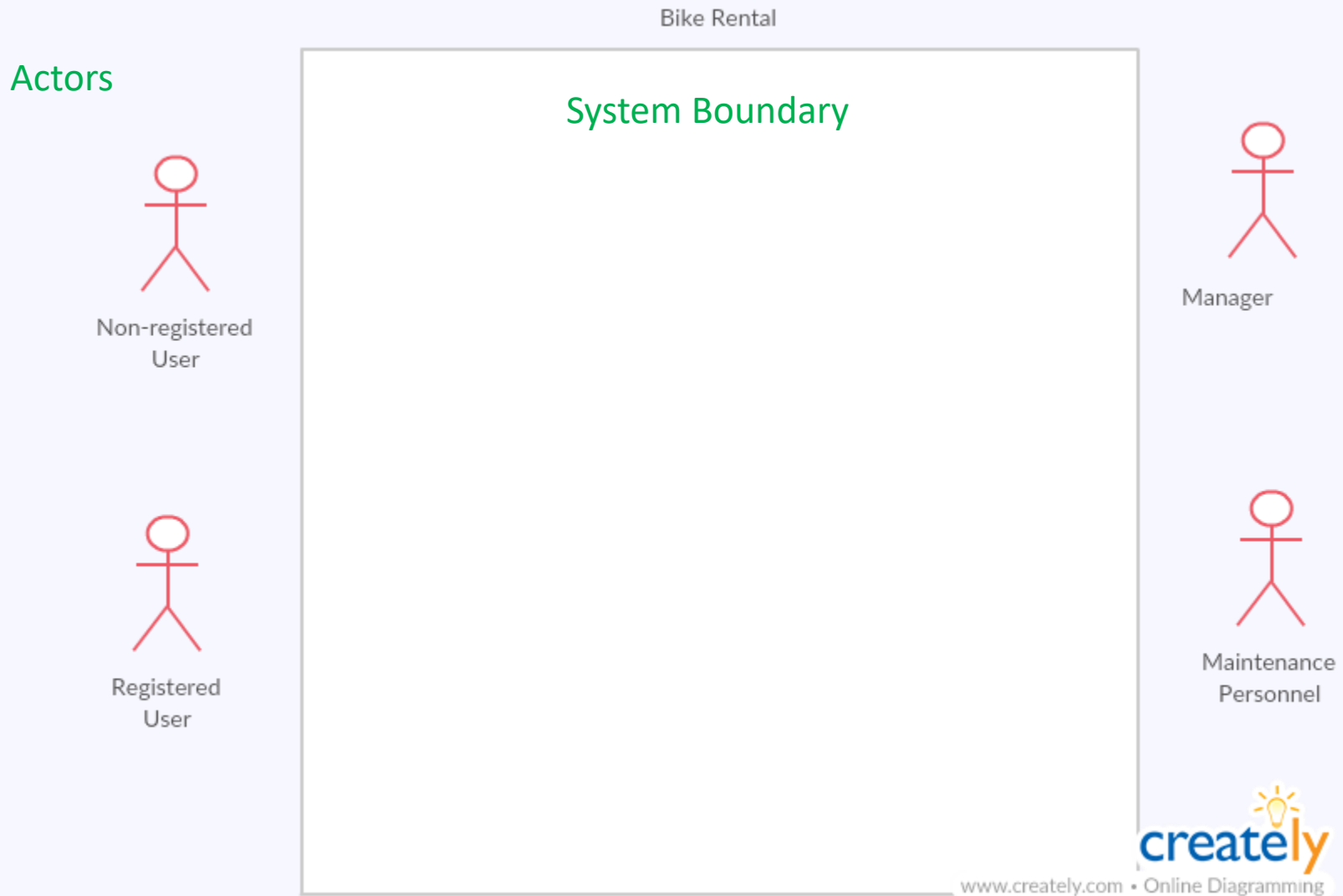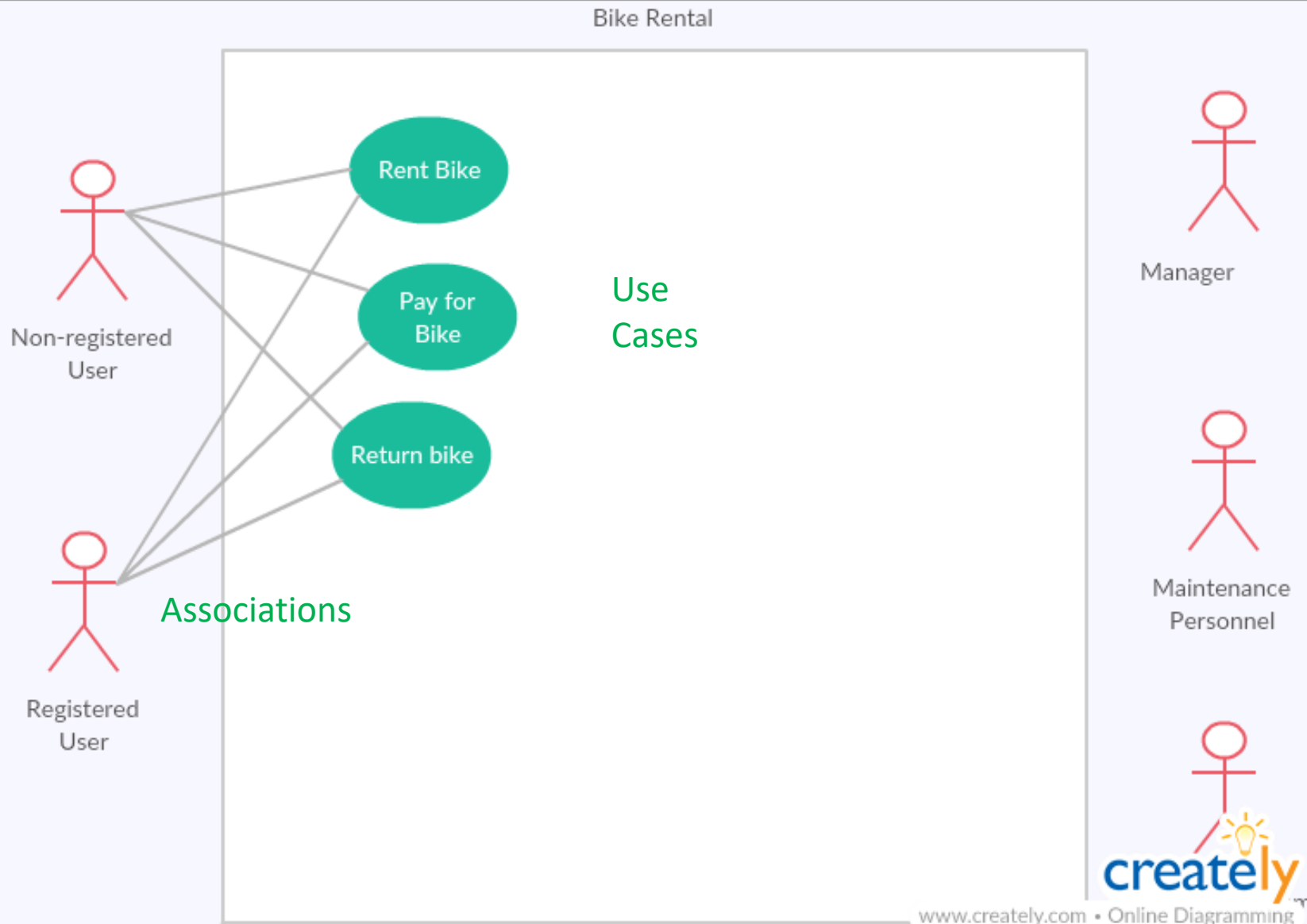
# Bike Rental

# Bike Rental

# Bike Rental

# Bike Rental

# Use Cases: Advanced Concepts

- ## Use cases can extend other use cases

  - "An extending use case is, effectively, an alternate course of the base use case."

- ## Use cases can include other use cases

  - "the invocation of a use case by another one."

- ## Actors can have an "is-a" relationship

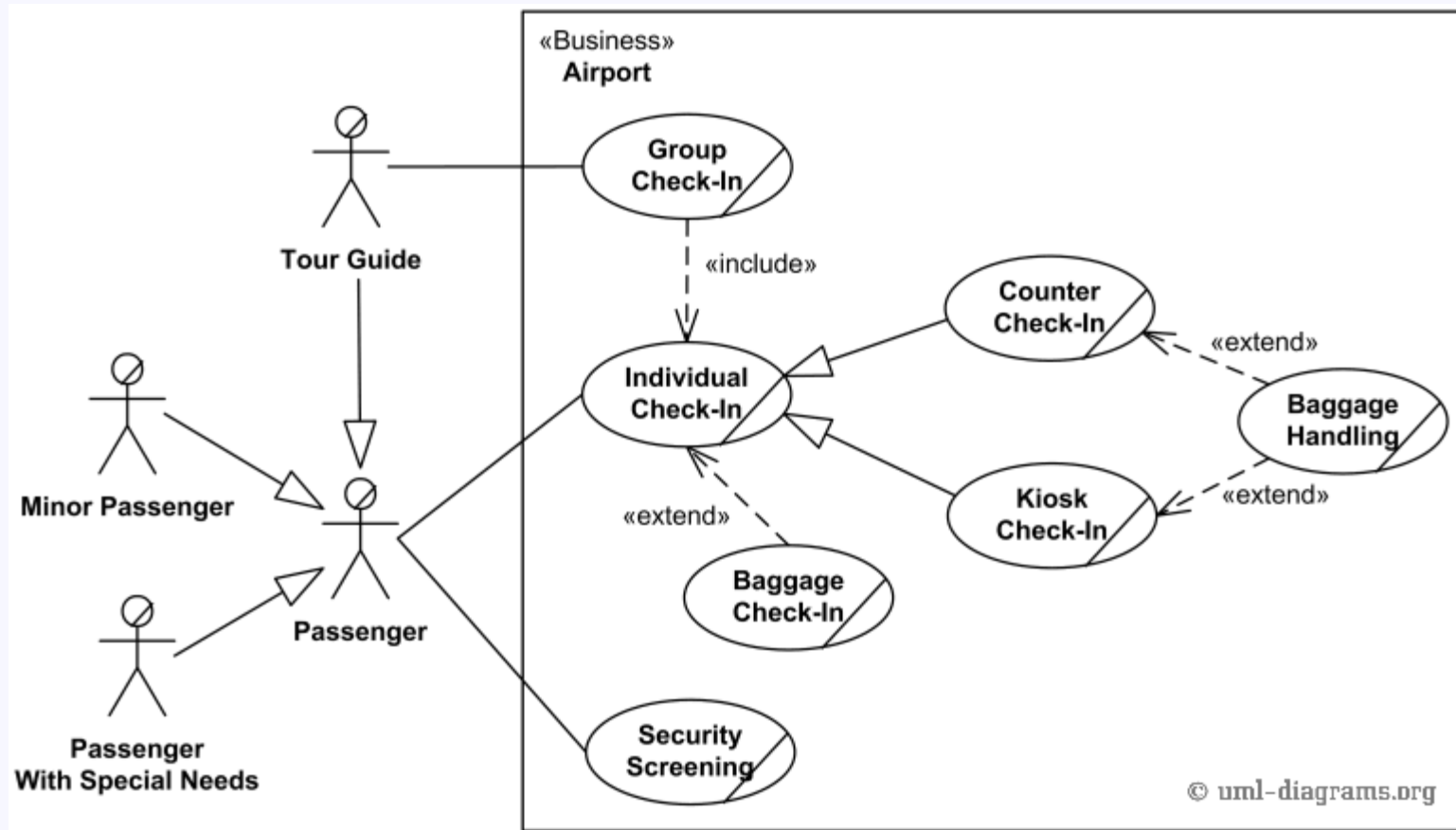http://agilemodeling.com/essays/useCaseReuse.htm

# Bike Rental

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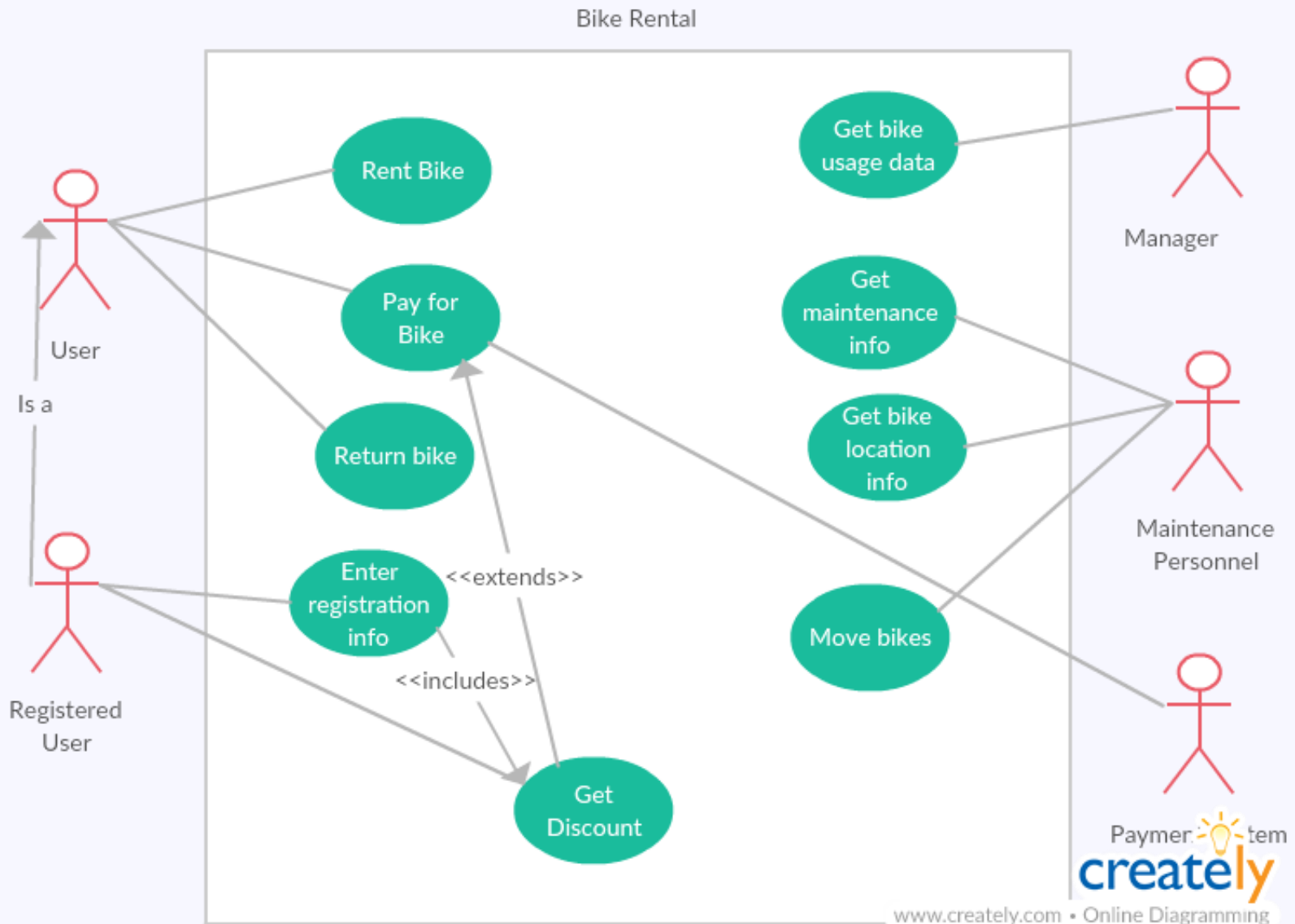
# Online Shopping Example
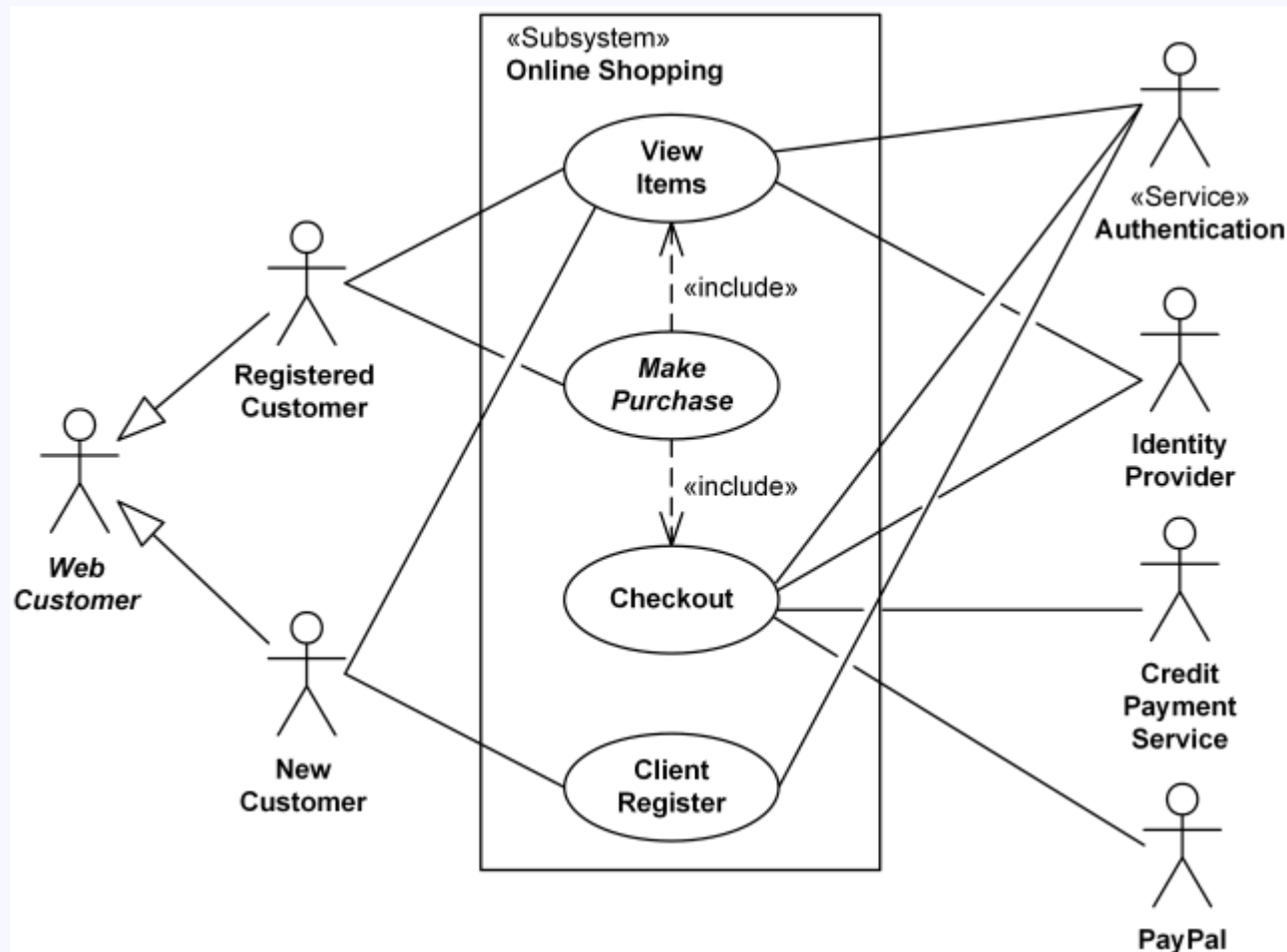
# Airport Example

# Virtual Museum/Gallery Use Case?

- Start if time

- Finish in video

  - Uploaded in 1-2 days

# Approximate Model Mappings

| Context Diagram | Use Cases | Goal Models |
|---|---|---|
| System actor | System boundary | System actor |
| Other actors | Actors | Actors |
| Inputs/Outputs | Roughly map to use cases | Dependencies |
| | Use Case | (Usually) Task |
| | | Qualities |
| | | And/Or Refinement |
| | | Contribution |

# Customer Journey Maps

# Customer Journey Maps

- Similar to:

  - Activity Diagrams (UML)

  - Sequence Diagrams (UML)

  - Business Process Diagrams (BPMN)

- But simpler…

- And used more commonly in UX

- Also used a lot in marketing

  - Which in practice means the example look nice but are difficult to draw, i.e. no strict syntax
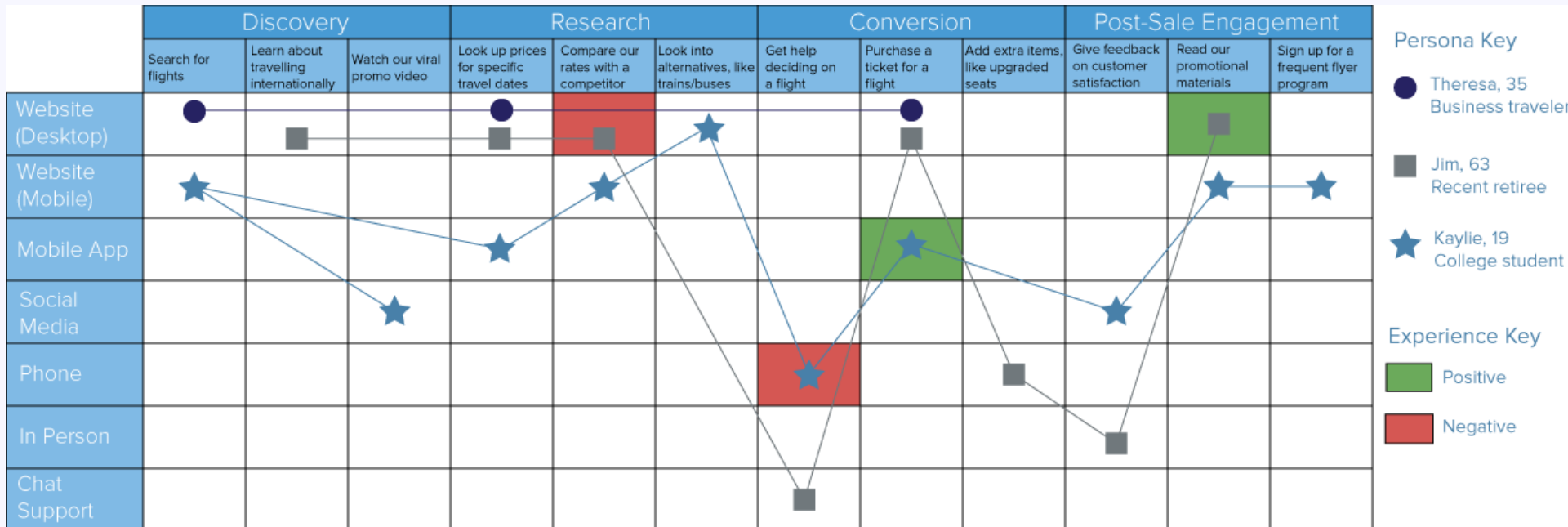
# What's in a Journey Map

- **Personas**: the main characters that illustrate the needs, goals, thoughts, feelings, opinions, expectations, and pain points of the user;

- **Timeline**: a finite amount of time (e.g. 1 week or 1 year) or variable phases (e.g. awareness, decision-making, purchase, renewal);

- **Emotion:** peaks and valleys illustrating frustration, anxiety, happiness etc.;

- **Touchpoints**: customer actions and interactions with the organization. This is the WHAT the customer is doing; and

- **Channels**: where interaction takes place and the context of use (e.g. website, native app, call center, in-store). This is the WHERE they are interacting.

- From: https://uxmastery.com/how-to-create-a-customer-journey-map/
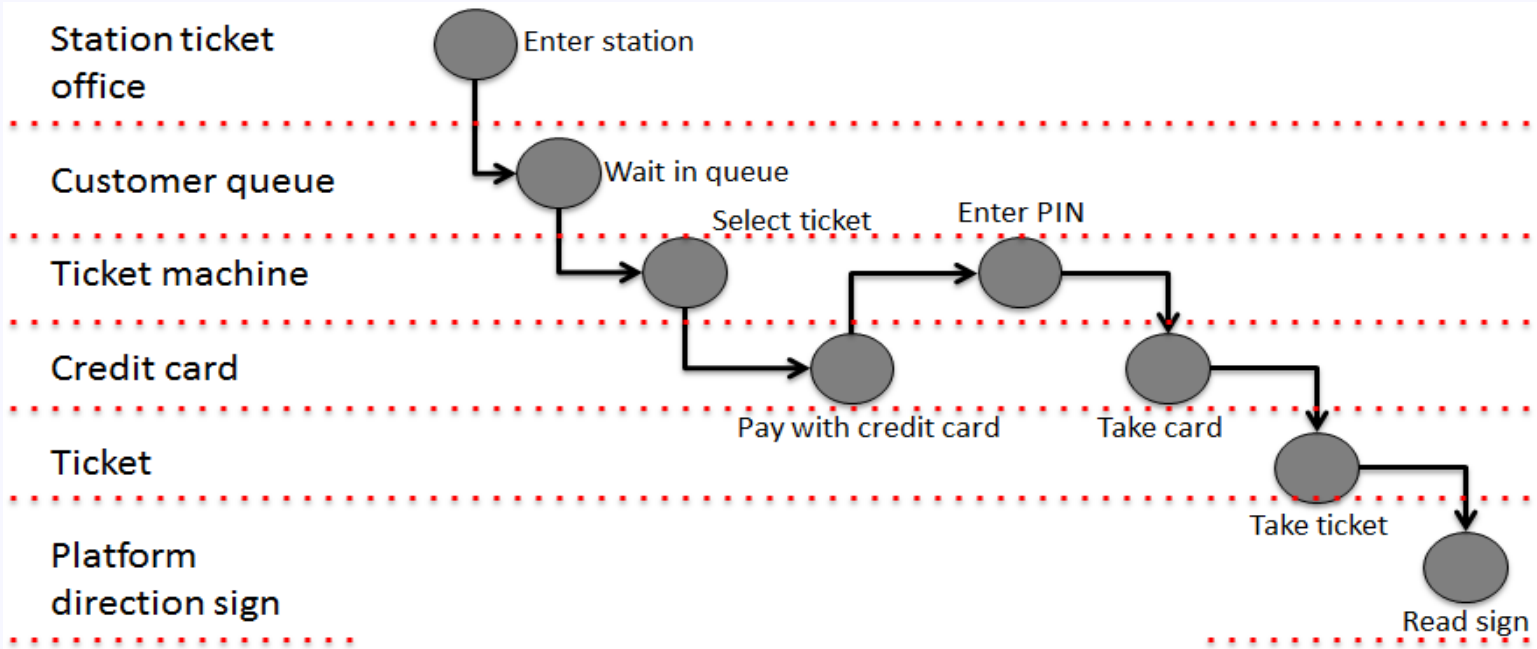
# Example: Online Shopping



https://www.mycustomer.com/experience/engagement/why-customer-journey-mapping-must-evolve-into-experience-design
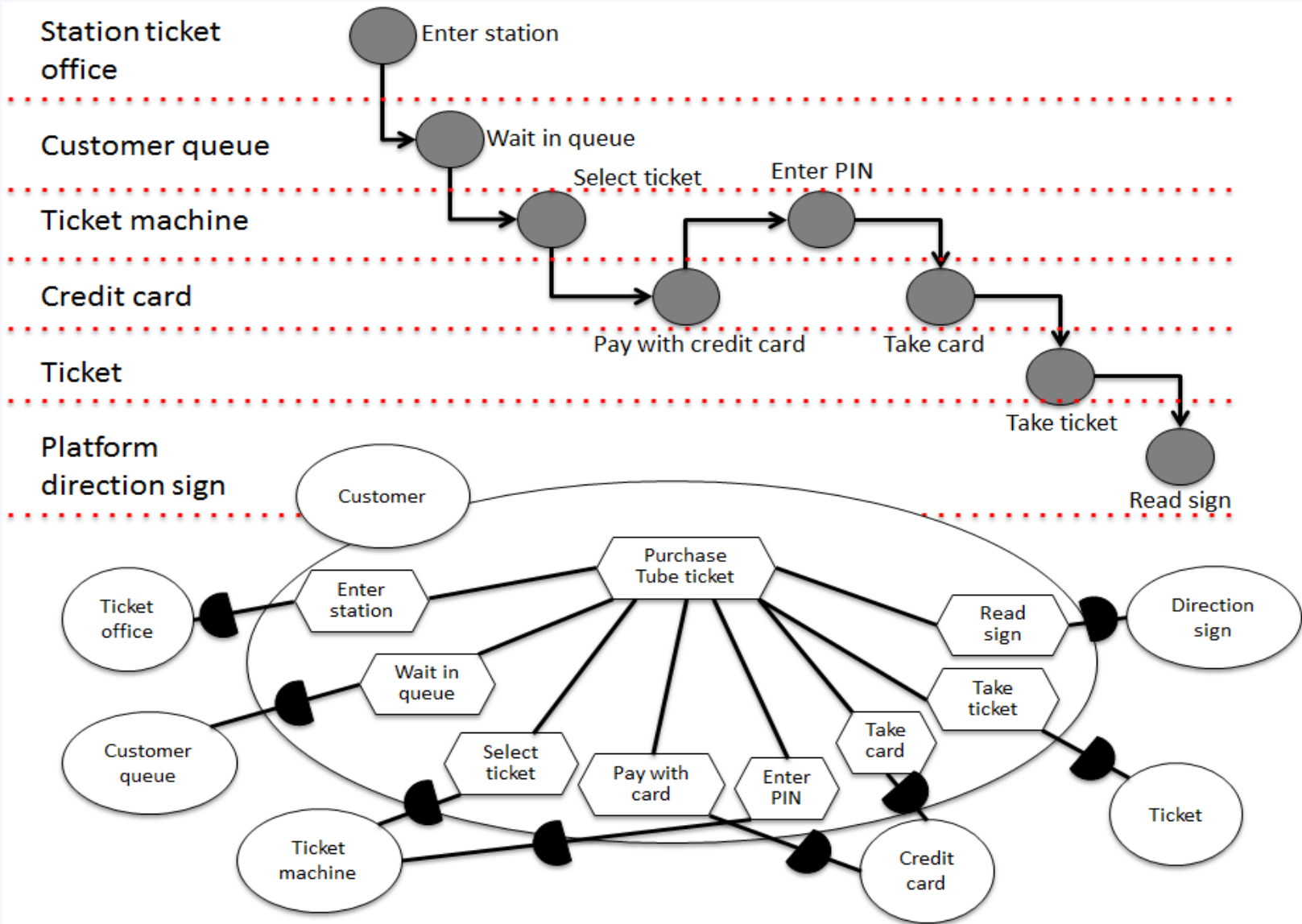
# Example with Many Personas



https://www.mycustomer.com/experience/engagement/nine-sample-customer-journey-maps-and-what-we-can-learn-from-them

# Journey Map with Goal Model

# Journey Map with Goal Model

# Bike Rental

| | Acquisition | | | | Riding | | Return | | Feedback |
|---|---|---|---|---|---|---|---|---|---|
| | Bike Selection | Select Options | Payment | Confirmation & Info | Bike Riding | Reminders | Return Bike | Confirmation | Feedback |
| Bike Rack | ★ | | | | | | | | |
| Rental Display | | ★ | | | | | | | |
| Payment Panel | | | ★ | | | | ★ | | |
| User Device | | | | ★ | | ★ | | ★ | |
| Bike | | | | | ★ | | | | |
| Email | | | | | | | | | ★ |

# Virtual Museum/Gallery Journey Map?

- **Start if time**

- **Finish in video**

  - Uploaded in 1-2 days

# Optional Readings

- Extra iStar help:

  - iStar cheatsheet

  - iStar2

  - 2016-12-istar_Supplimentary

- Optional for next lecture:

  - Writing Good Requirements RE17

  - MarkingToolRequirementsDesign  (old example)

# Questions?