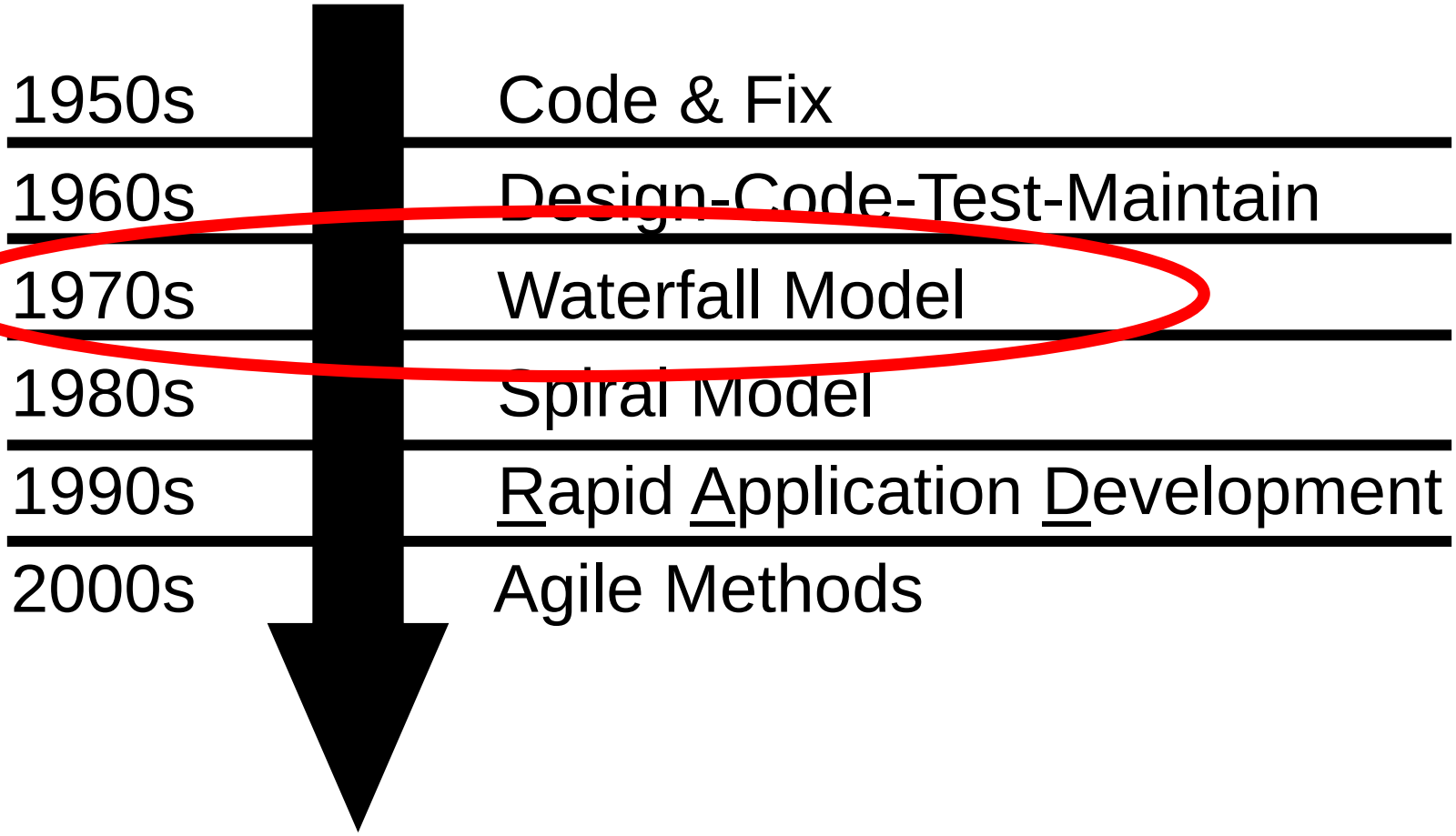
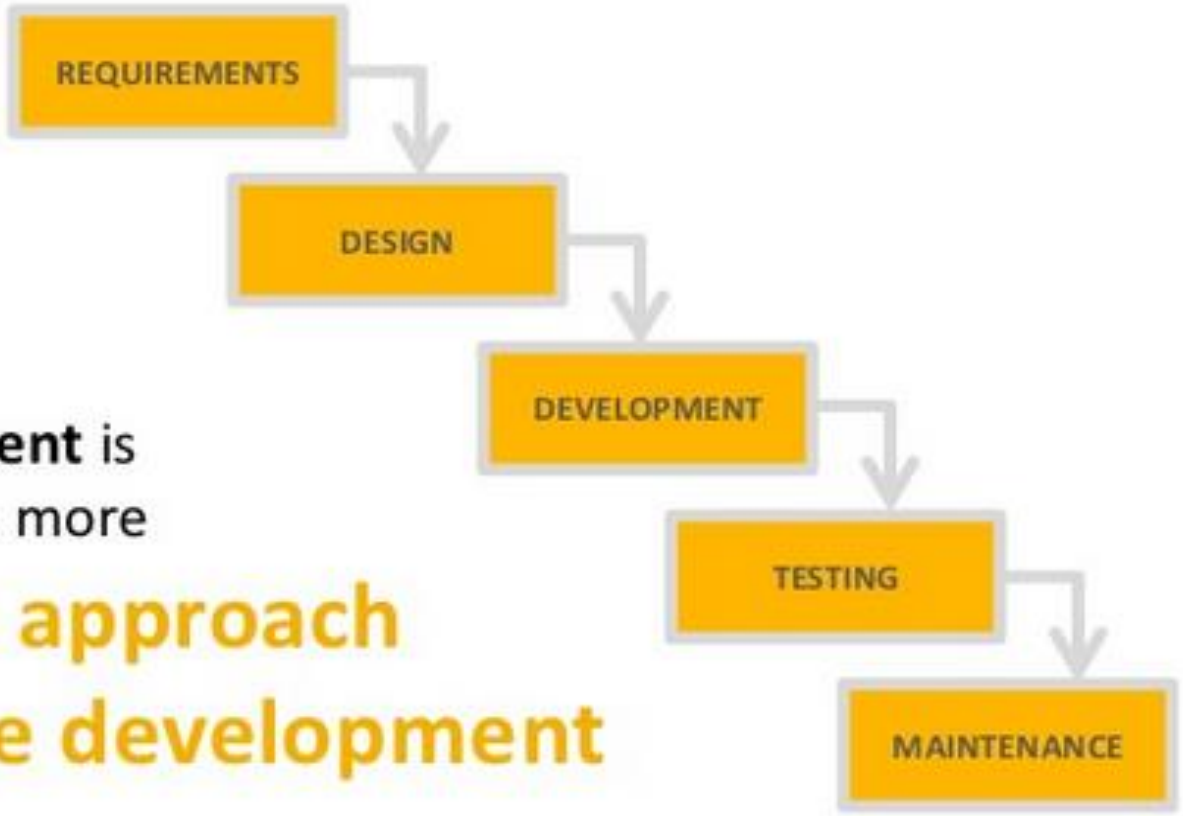
14. SOFTWARE DEVELOPMENT METHODOLOGIES 2

What did we do last time?

Timeline of Methodologies



Waterfall Development



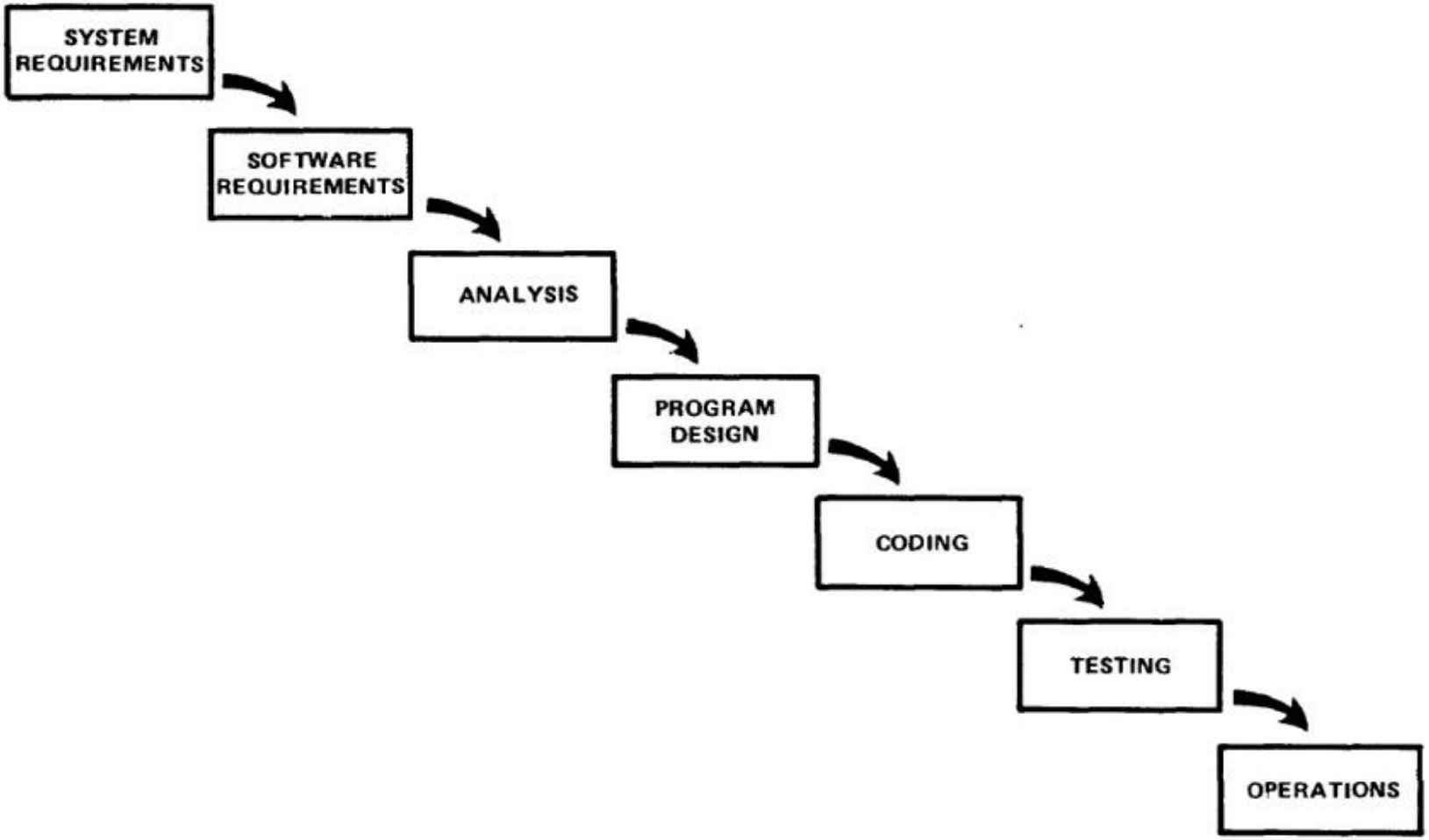
Waterfall Development is another name for the more

traditional approach to software development

Waterfall Development (contd..)

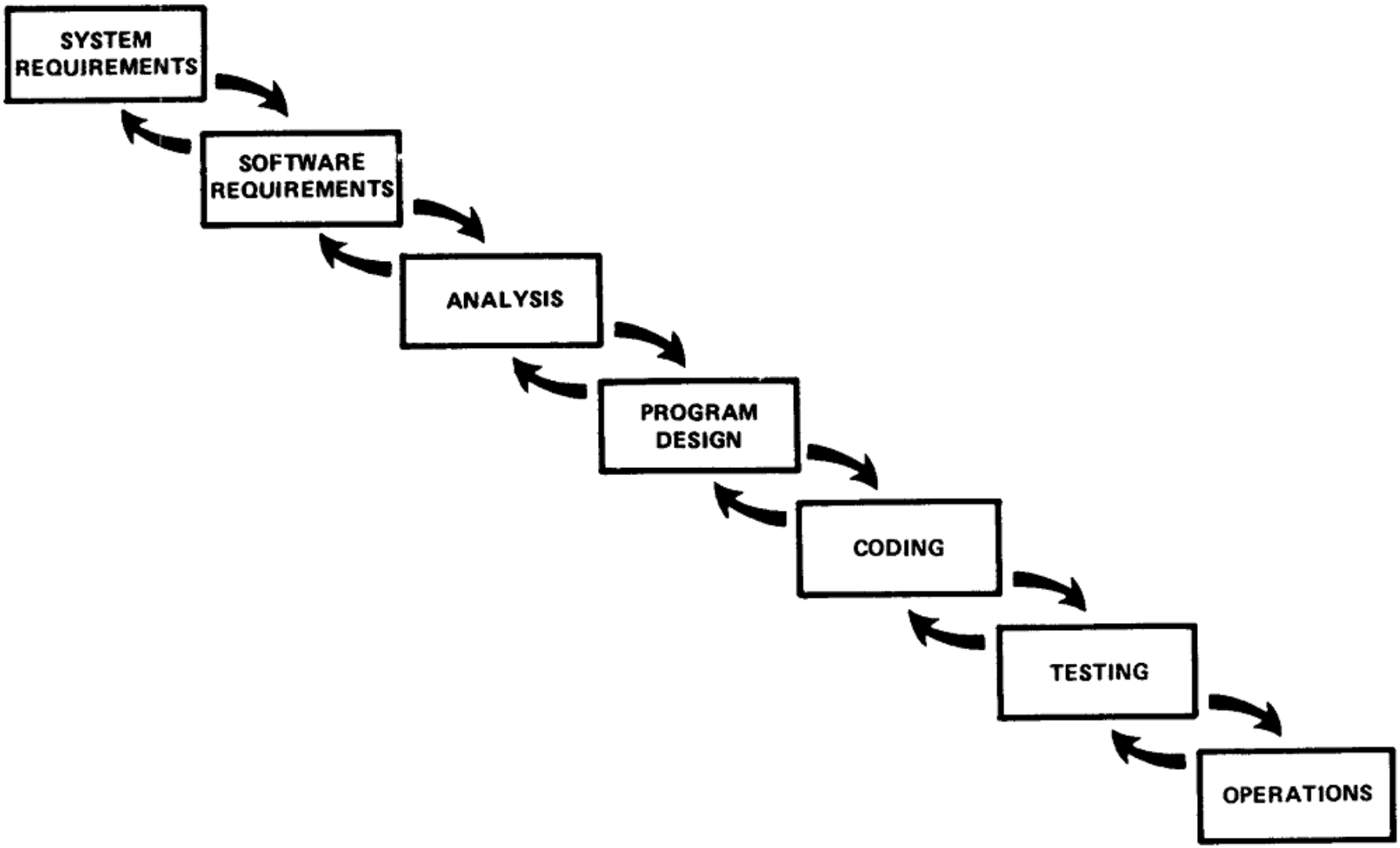
You **complete one phase** (e.g. design) **before** moving on to the **next phase** (e.g. development)

You **rarely aim to re-visit a 'phase' once it's completed**. That means, you **better get whatever you're doing right the first time!**

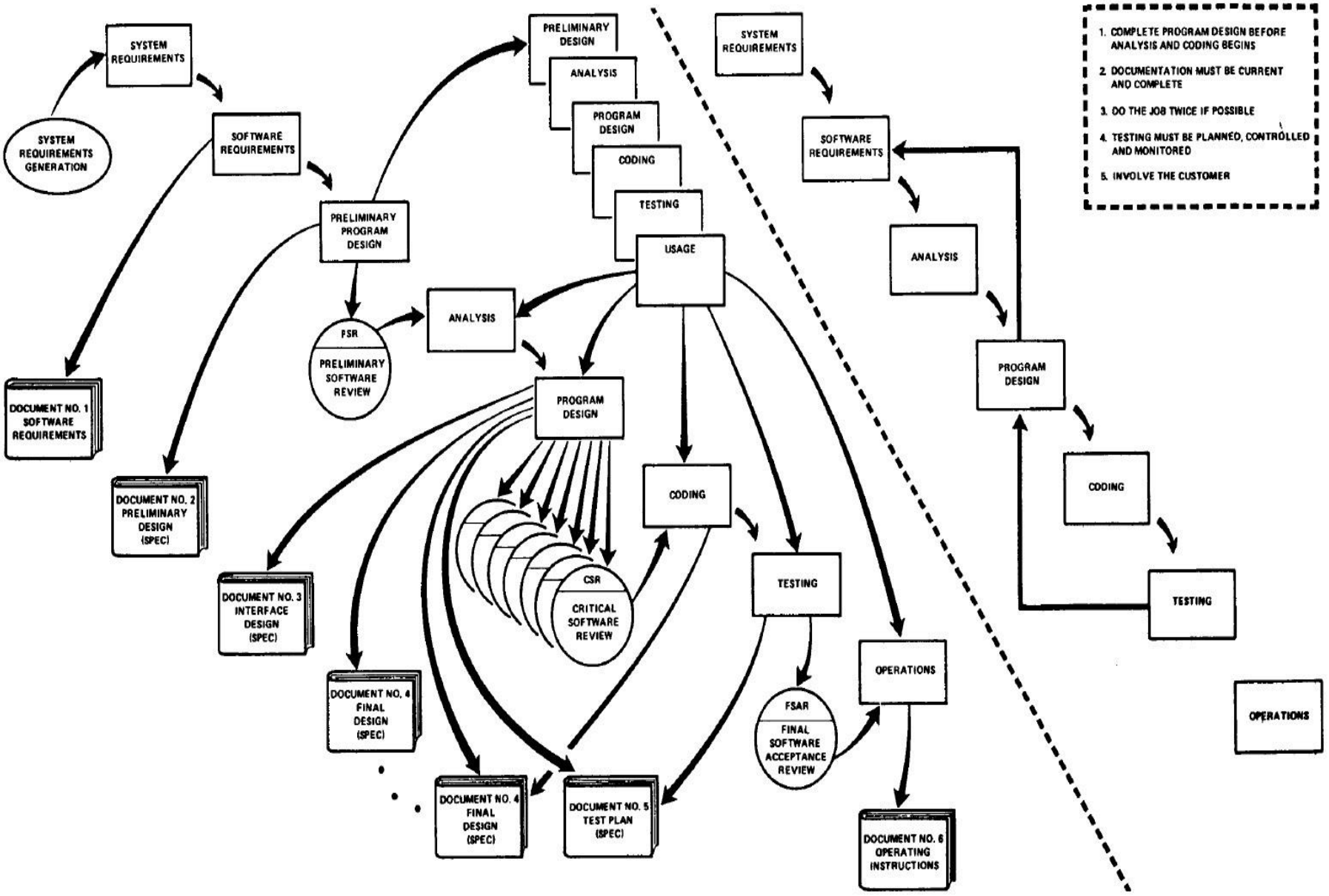


- Royce, W.W., 1970, "*Managing the Development of Large Software Systems*", Proceedings of IEEE WESCON 26 (August), pp.1–9.

Iterative Relationship between Successive Development Phases



Summary


SYSTEM REQUIREMENTS GENERATION
SYSTEM REQUIREMENTS
SOFTWARE REQUIREMENTS
DOCUMENT NO. 1 SOFTWARE REQUIREMENTS
PRELIMINARY PROGRAM DESIGN
DOCUMENT NO. 2 PRELIMINARY DESIGN (SPEC)
FSR
PRELIMINARY SOFTWARE REVIEW
PRELIMINARY DESIGN
ANALYSIS
PROGRAM DESIGN
CODING
TESTING
USAGE
ANALYSIS
PROGRAM DESIGN
CODING
TESTING
CSR
CRITICAL SOFTWARE REVIEW
DOCUMENT NO. 3 INTERFACE DESIGN (SPEC)
DOCUMENT NO. 4 FINAL DESIGN (SPEC)
DOCUMENT NO. 4 FINAL DESIGN (SPEC)
DOCUMENT NO. 5 TEST PLAN (SPEC)
FSAR
FINAL SOFTWARE ACCEPTANCE REVIEW
OPERATIONS
DOCUMENT NO. 6 OPERATING INSTRUCTIONS
SYSTEM REQUIREMENTS
SOFTWARE REQUIREMENTS
ANALYSIS
PROGRAM DESIGN
CODING
TESTING
OPERATIONS
1. COMPLETE PROGRAM DESIGN BEFORE ANALYSIS AND CODING BEGINS
2. DOCUMENTATION MUST BE CURRENT AND COMPLETE
3. DO THE JOB TWICE IF POSSIBLE
4. TESTING MUST BE PLANNED, CONTROLLED AND MONITORED
5. INVOLVE THE CUSTOMER

TODAY, WE ARE GOING TO TALK ABOUT:

PEOPLE IN DESIGN

People in Design

- Why do we care about people in design?

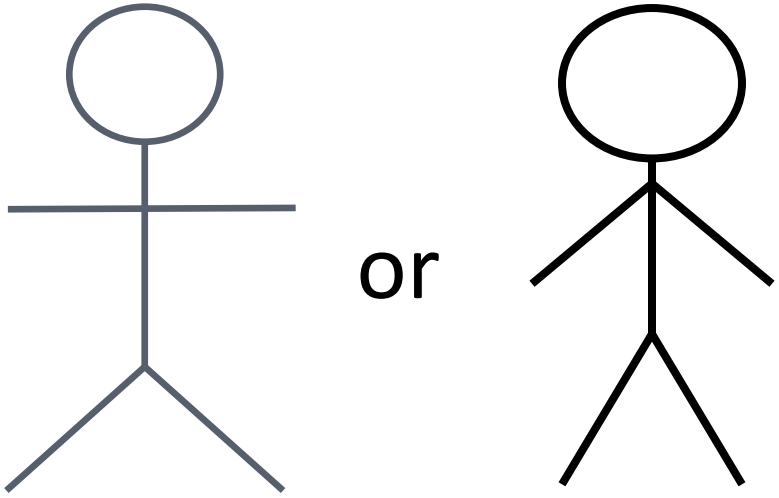
Because we build software systems for other people, so we have to give as much thought about how these people (the users) will experience the system, as we do in the building on the internal logic of the system.

People in Design

- How do we represent people in design?

People in Design

- How do we represent people in design?
  - It's worse than you think.

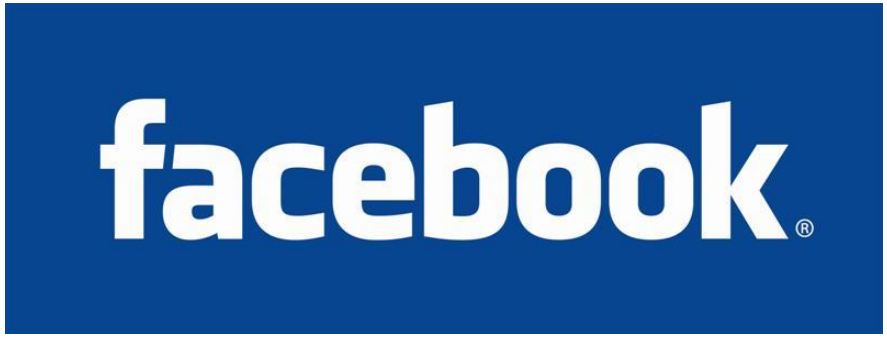


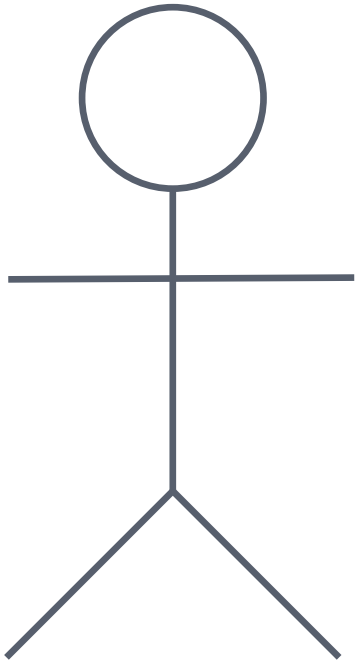
or

In software engineering we refer them as actors!

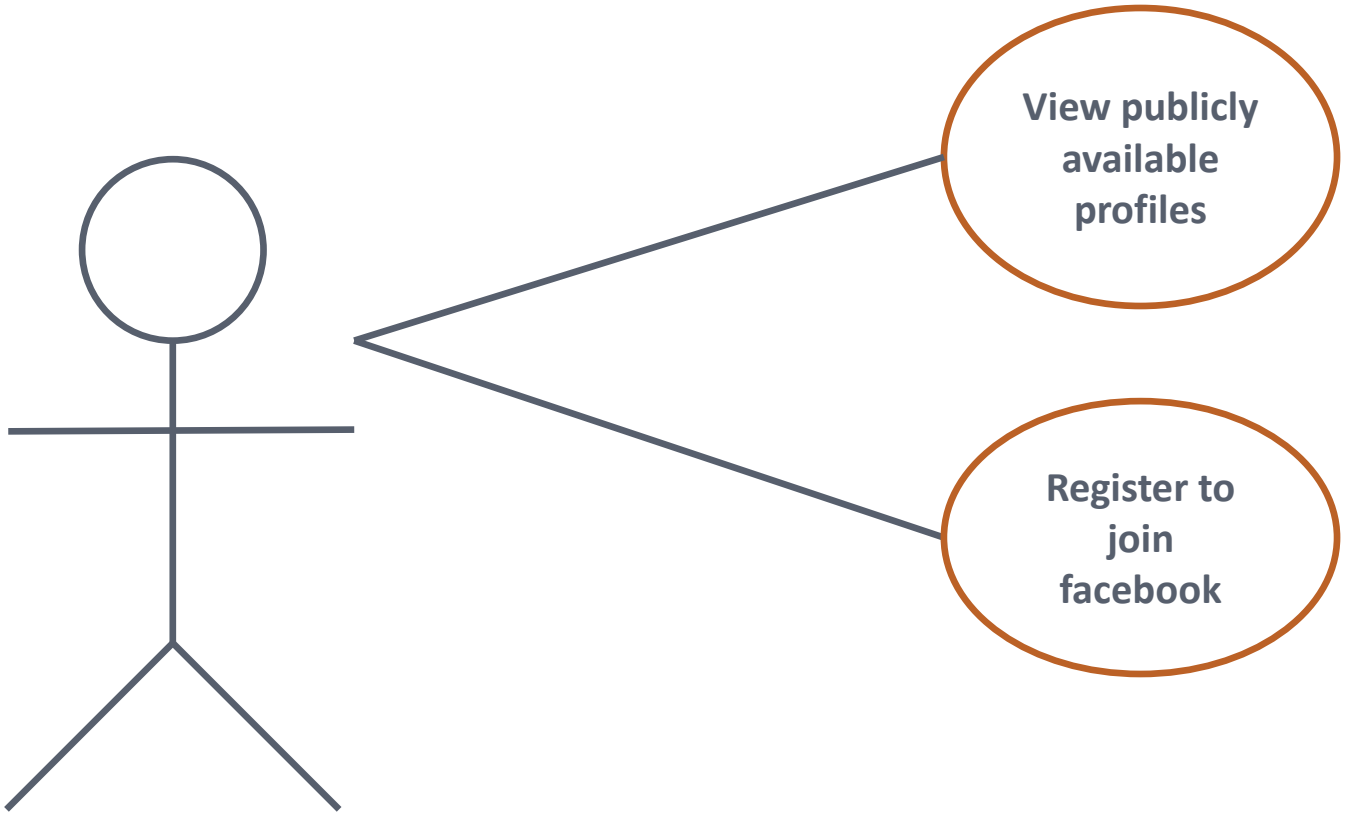
People in Design – an exercise

What functionalities would an unregistered facebook user have?


facebook

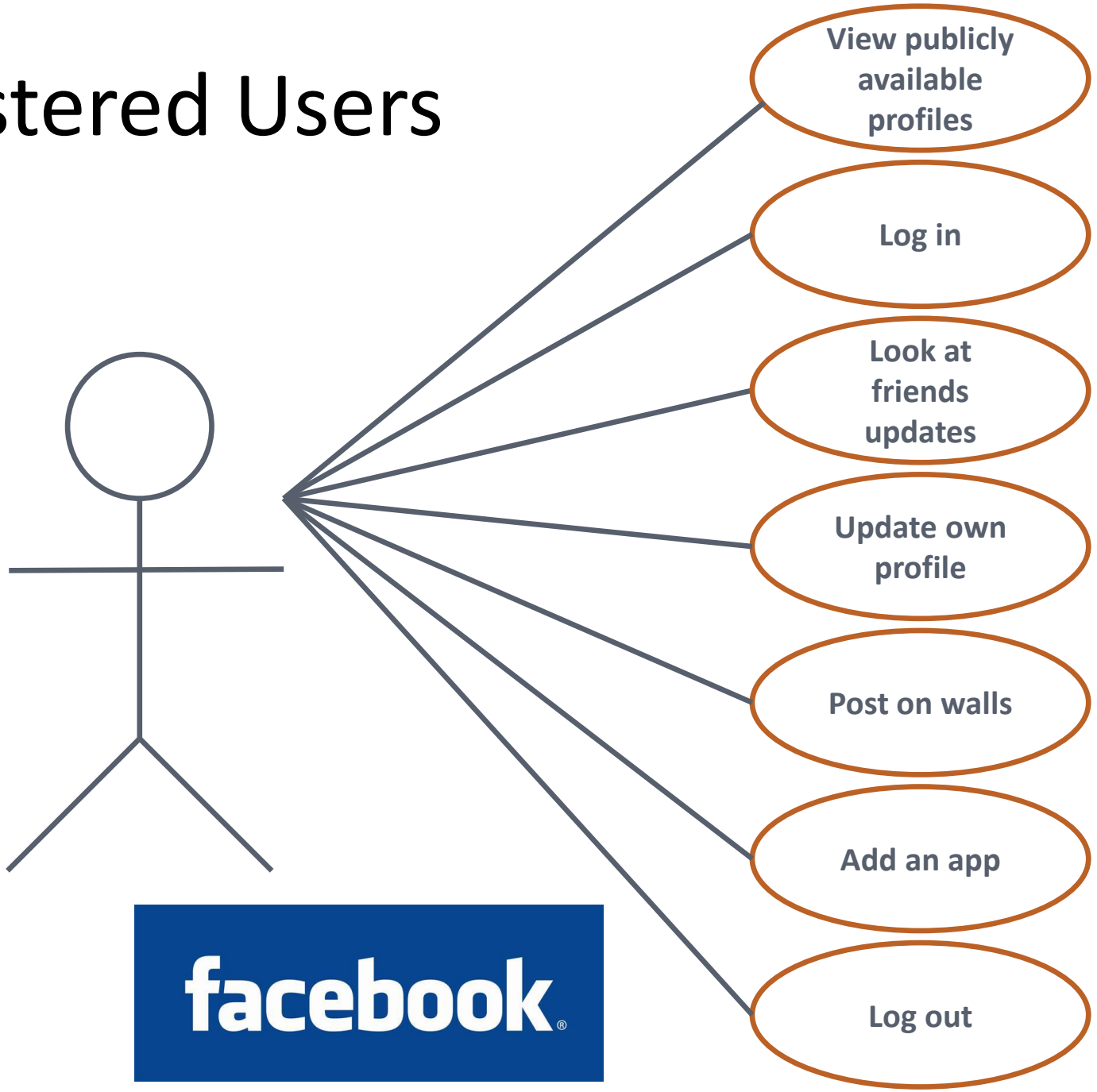


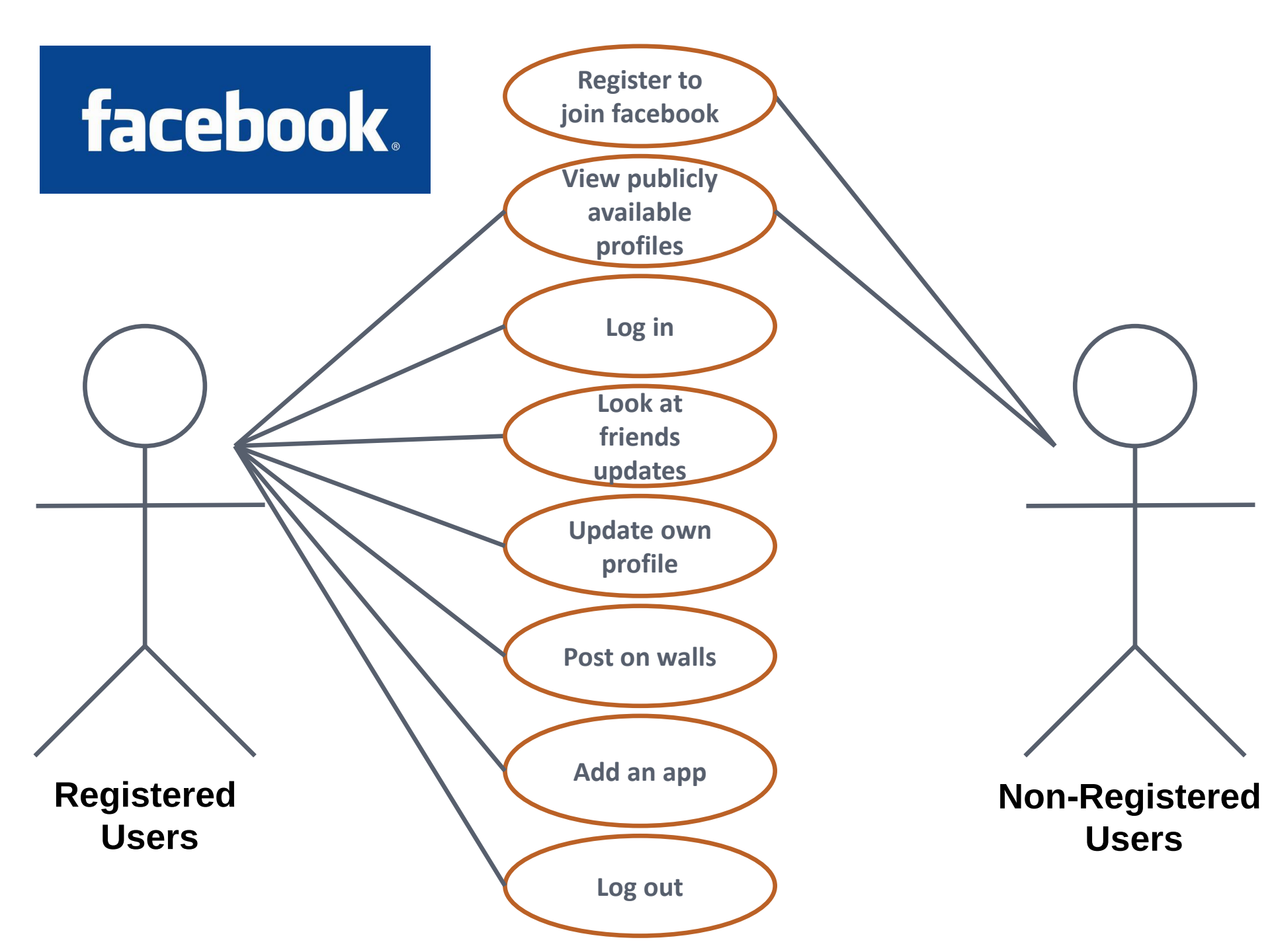
Non-Registered Users



What functionalities would an registered facebook user have?

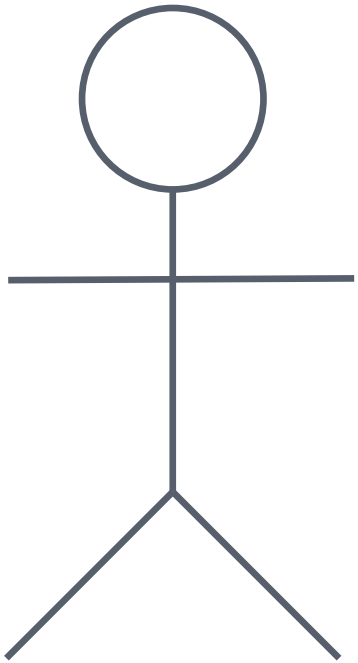
Registered Users




facebook
Register to join facebook
View publicly available profiles
Log in
Look at friends updates
Update own profile
Post on walls
Add an app
Log out
Registered Users
Non-Registered Users

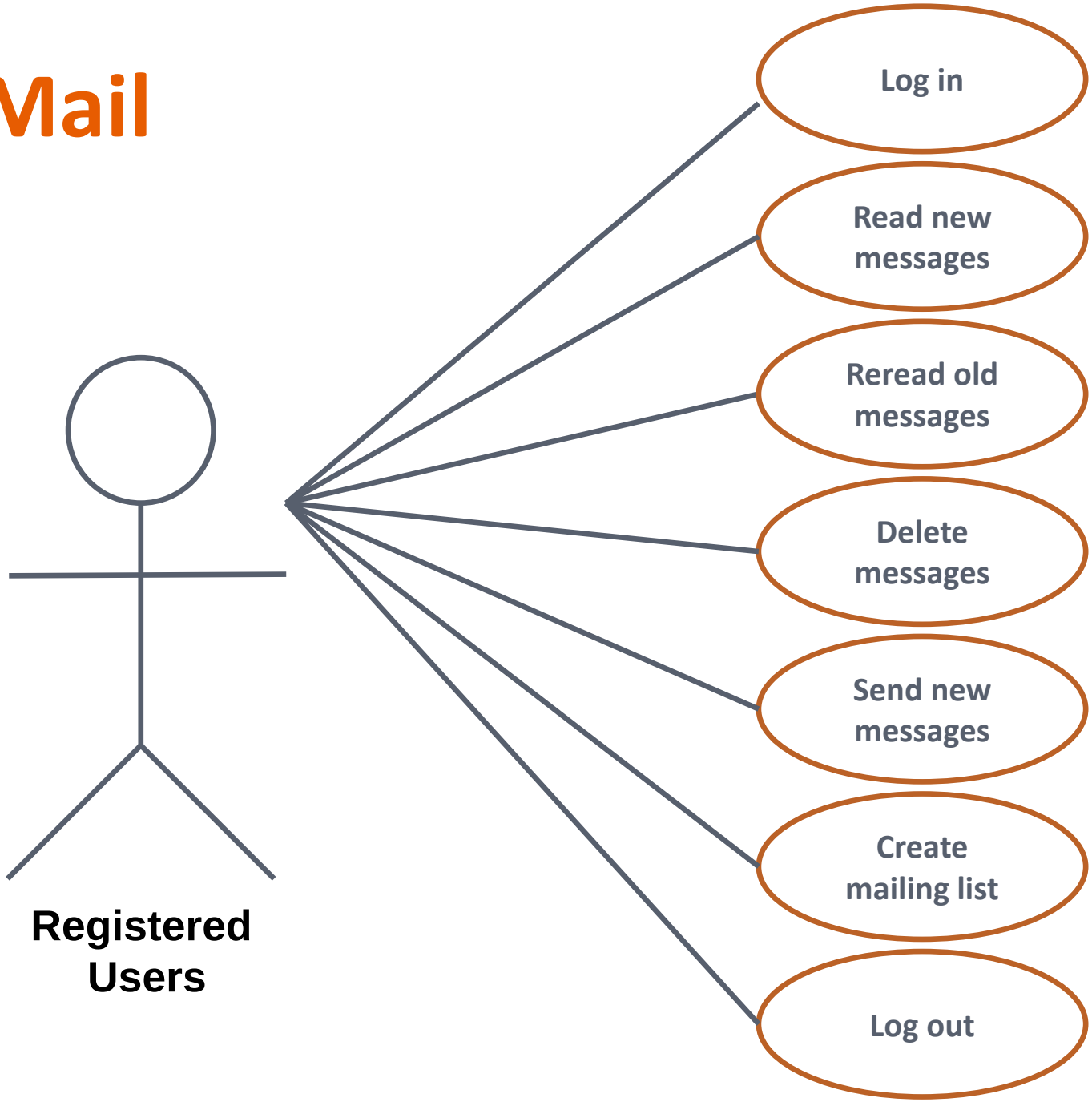
People in Design

Let’s take another example: **e-mail**

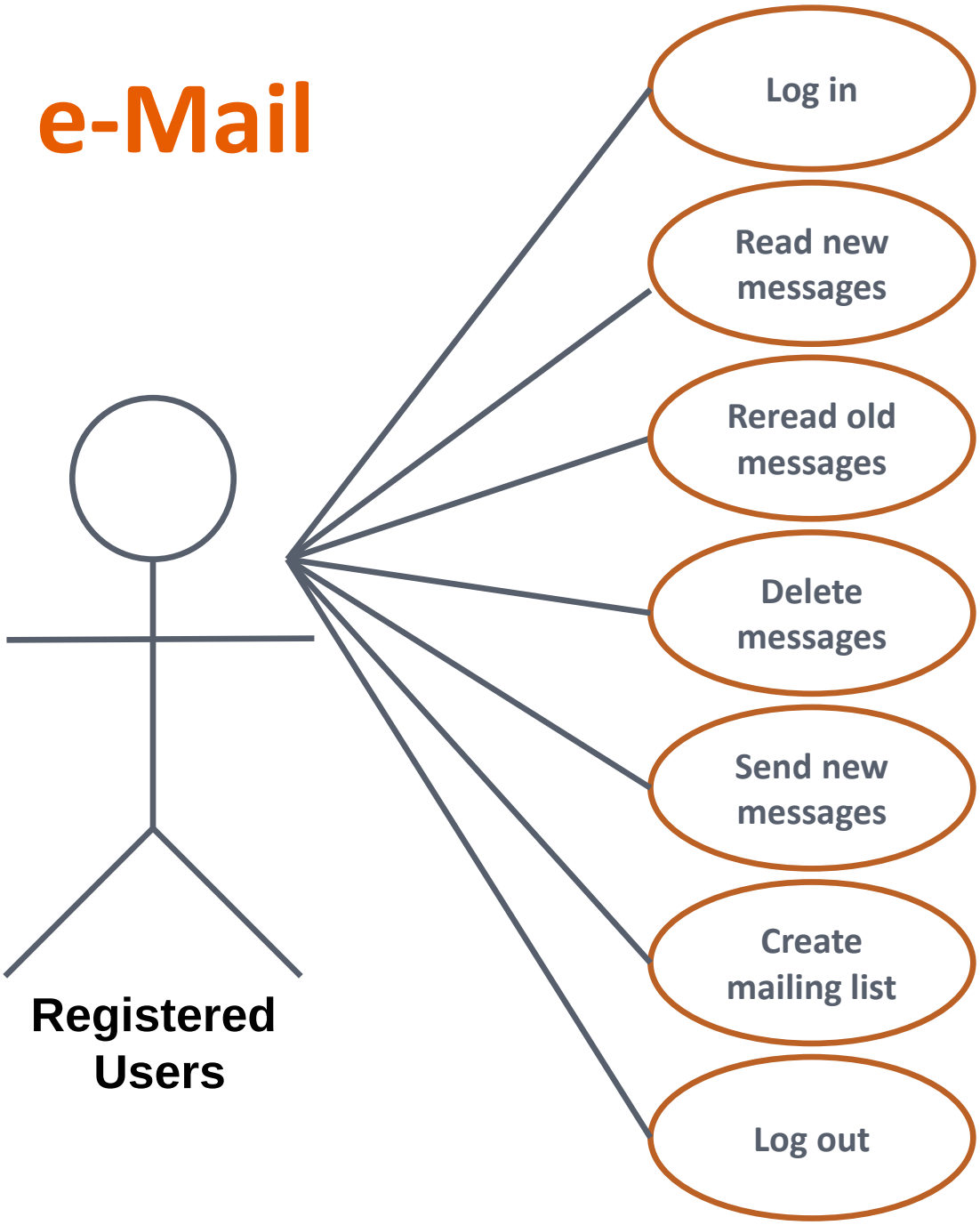


Registered Users

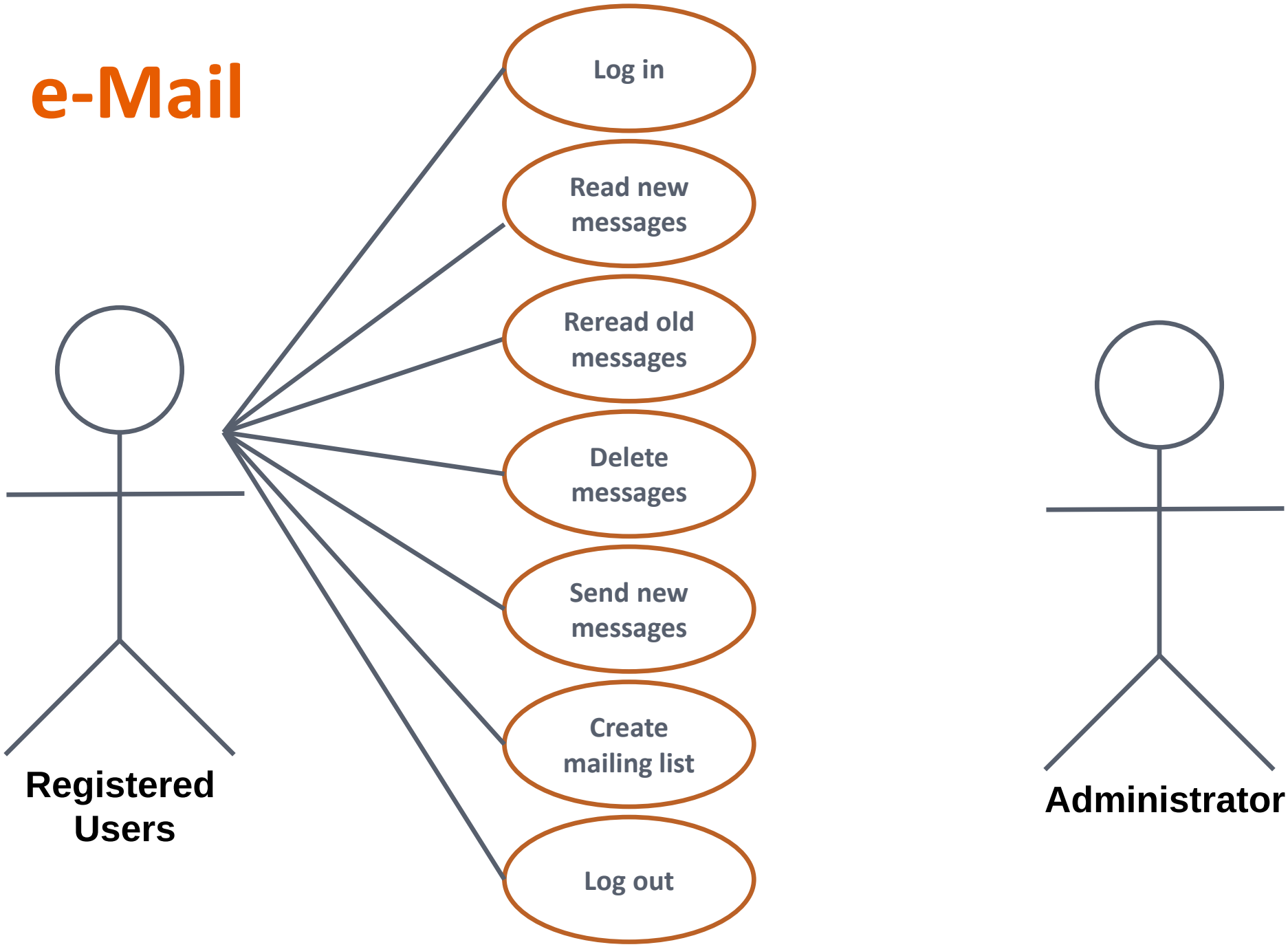
e-Mail


Log in
Read new messages
Reread old messages
Delete messages
Send new messages
Create mailing list
Log out
Registered Users

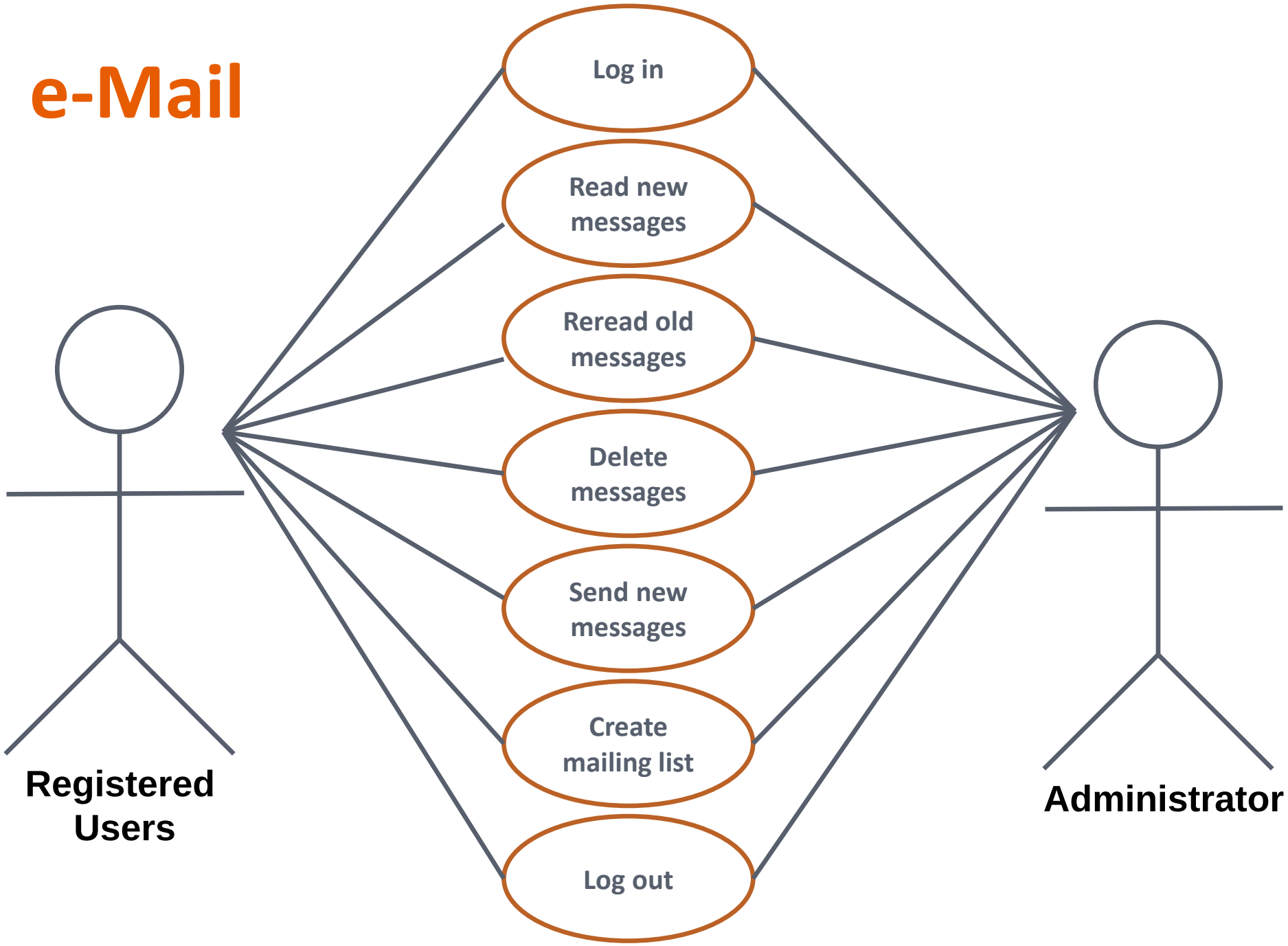
e-Mail


Log in
Read new messages
Reread old messages
Delete messages
Send new messages
Create mailing list
Log out
Registered Users

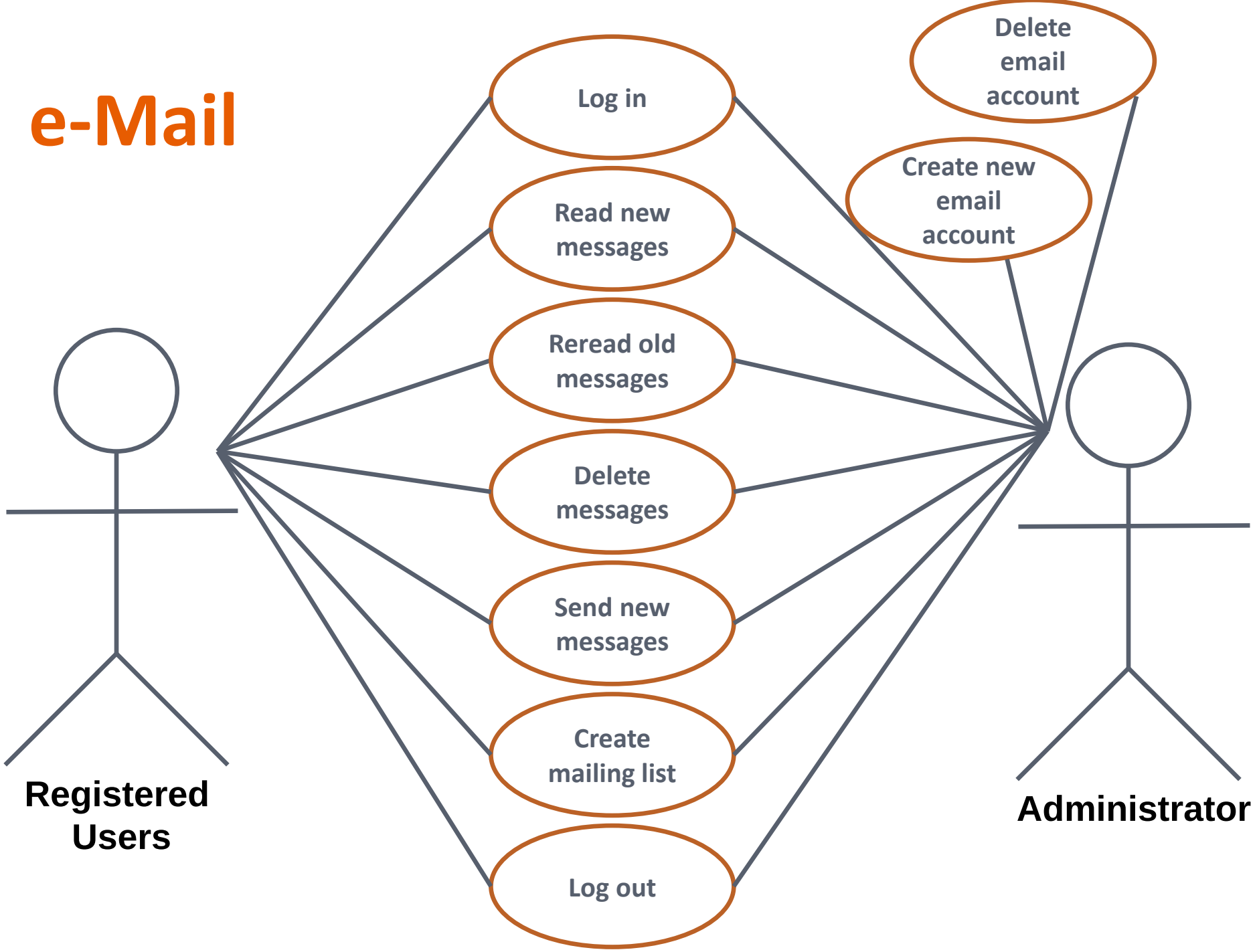
e-Mail


Log in
Read new messages
Reread old messages
Delete messages
Send new messages
Create mailing list
Log out
Registered Users
Administrator

e-Mail

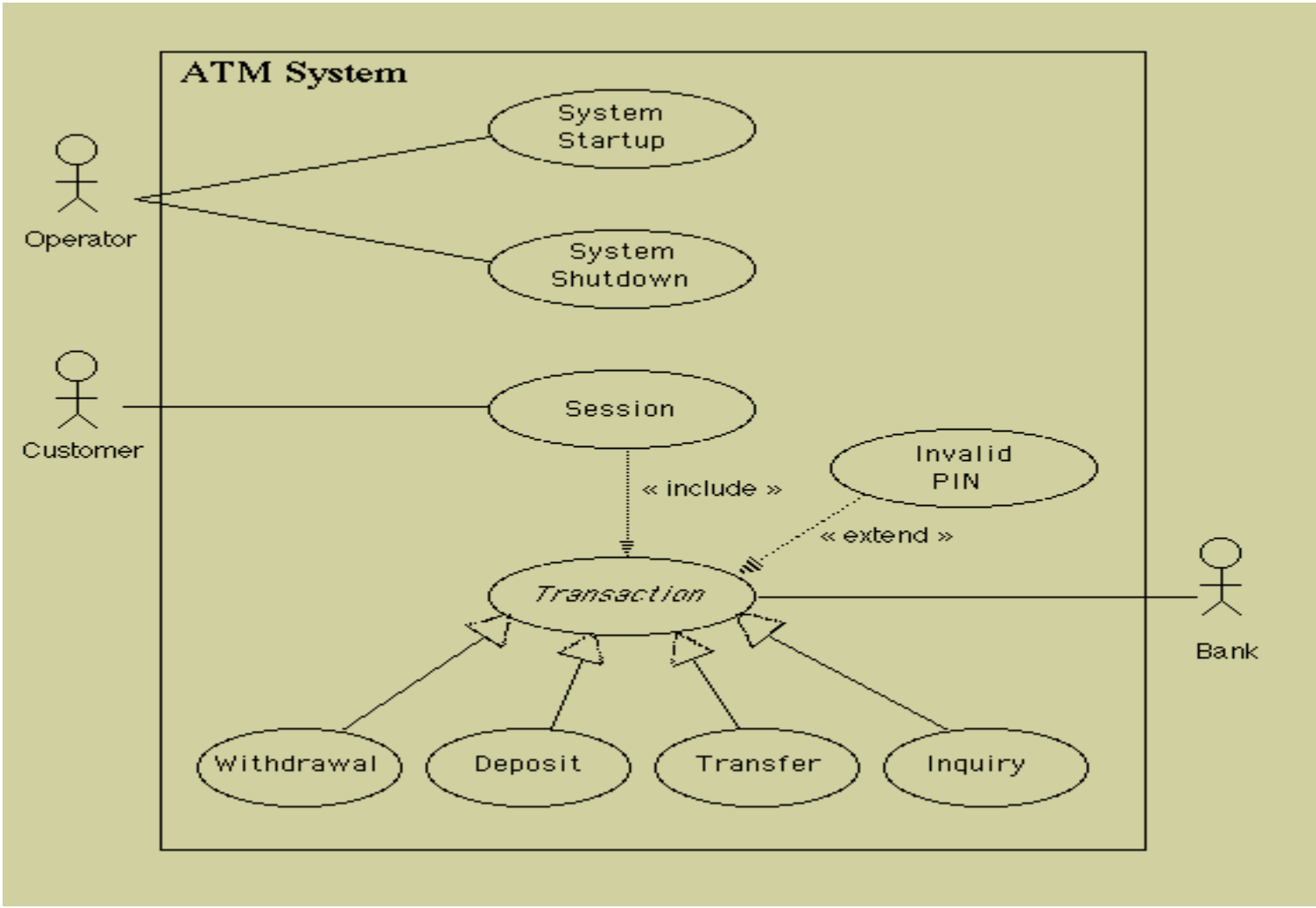

Log in
Read new messages
Reread old messages
Delete messages
Send new messages
Create mailing list
Log out
Registered Users
Administrator

e-Mail


Log in
Read new messages
Reread old messages
Delete messages
Send new messages
Create mailing list
Log out
Delete email account
Create new email account
Registered Users
Administrator

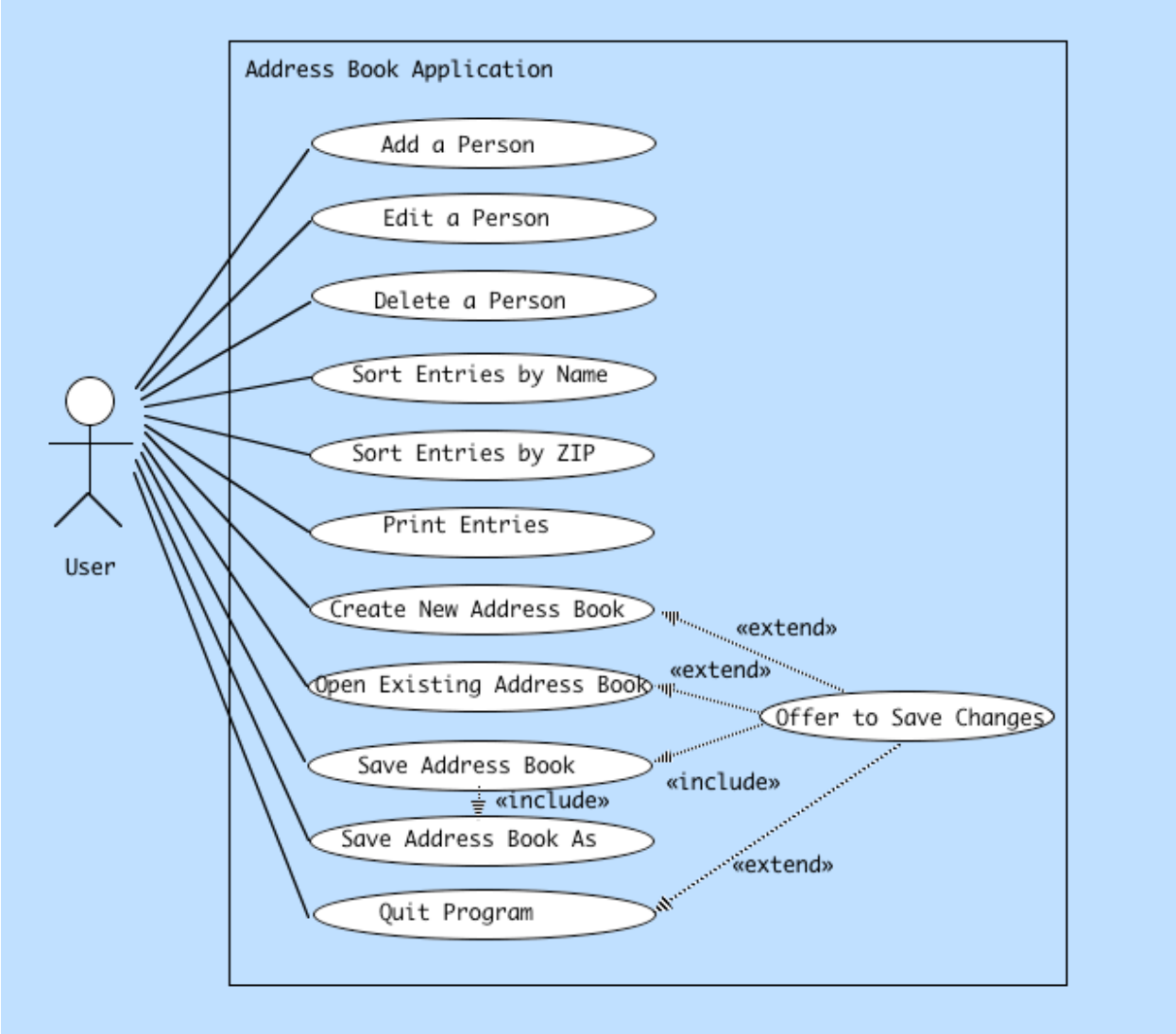
Use case diagram

Use Case for an ATM System



http://www.math-cs.gordon.edu/courses/cs211/ATMExample/

Use Cases for a Simple Address Book



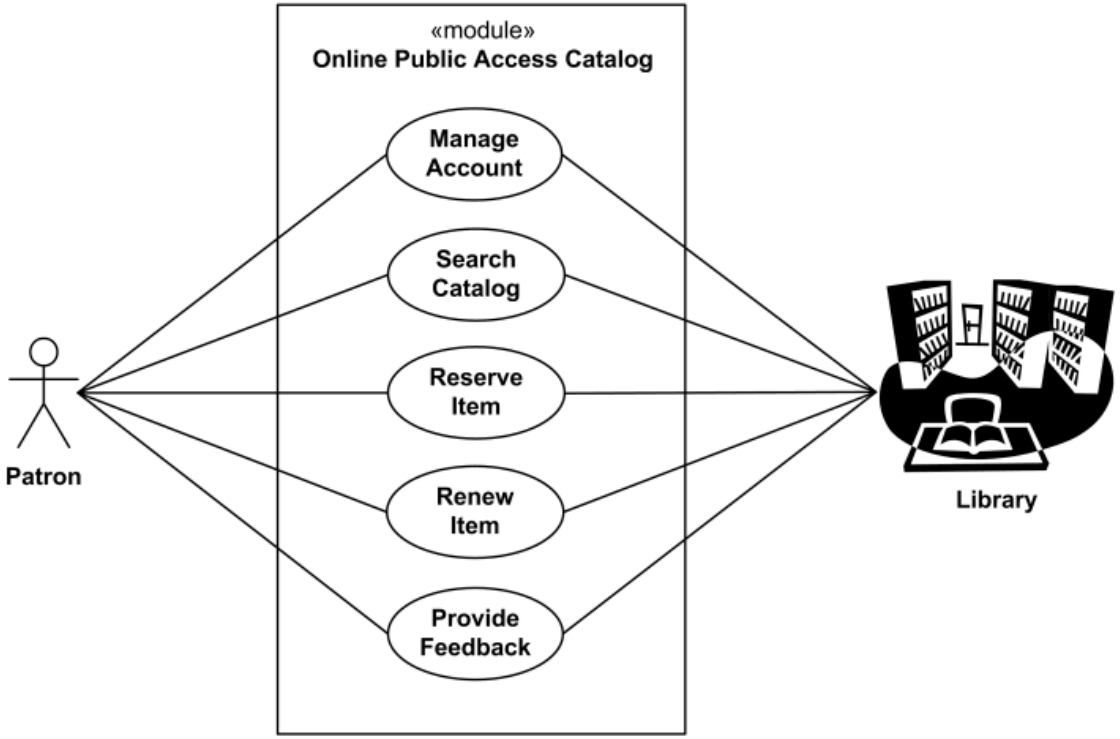
http://www.cs.gordon.edu/courses/cs211/AddressBookExample/index.html

Use Cases for e-library OPAC

e-Library OPAC

An **Online Public Access Catalog** (**OPAC**) is e-Library website which is part of **Integrated Library System** (ILS), also known as a **Library Management System** (LMS), and managed by a library or group of libraries.

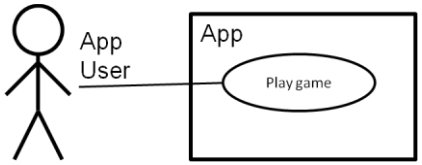
Patrons of the library can search library catalog online to locate various resources - books, periodicals, audio and visual materials, or other items under control of the library. Patrons may reserve or renew item, provide feedback, and manage their account.



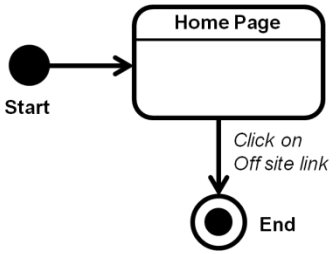
http://www.uml-diagrams.org/use-case-diagrams-examples.html

UML

- Unified Modelling Language (v2.0)
- A visual language for designing systems by creating a visual model of the system before writing code
- 13 types of diagrams in 3 categories
- **Structure Diagrams** *(represent the structure of code in a program)*
  - Class Diagram, Object Diagram, Component Diagram, Composite Structure Diagram, Package Diagram, and Deployment Diagram.
- **Behaviour Diagrams** *(represent types of behaviour)*
  - Use Case Diagram, Activity Diagram, and State Machine Diagram.
- **Interaction Diagrams** *(represent aspects of interaction)*
  - Sequence Diagram, Communication Diagram, Timing Diagram, and Interaction Overview Diagram.



Use cases diagrams



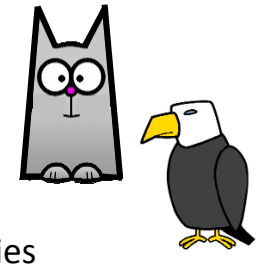
State diagrams

http://www.omg.org/gettingstarted/what_is_uml.htm
http://www.omg.org/spec/UML/2.4.1/

UNDERSTANDING THE USER

User Characteristics

- User Characteristics
  - Abilities and skill
  - Nationality
  - Educational background
  - Preferences
  - Personal circumstances
  - Physical or mental disabilities
  - Age
  - Etc.



- Domain ability and knowledge
  - Novice
  - Expert
  - Casual user
  - Frequent user

User Profile

- The **attributes** of a particular type of user
- A system will have **several types** of users or **actors**, with their own distinct profiles
- **Functionality** can be **grouped** according to user profiles

Persona - Bringing users to life

Personas (Cooper, 1999)

- **Rich descriptions** of **typical users** of the system, artefact, product or service under design
- **Realistic** not idealized
- Represent a **synthesis of characteristics** and **behaviours** from real potential users encountered during data gathering
- Each persona characterised by a **unique set of goals** relating to the system, artefact, product or service under design
- As people with the **same job role** may have very **different goals**
- And people with **very different job** roles may have the **same goal**
- A persona also includes a description of their **skills, attitudes, tasks and environment**
- Each persona has a name, a photograph, some personal details
  - Usually there will be a set of personas, not one
    - one **primary persona** may represent a large section of the intender users or a primary interface
    - A few **secondary personas** to additional users of the each major interface, with differing needs, skills and goals of the primary persona.
    - **Negative personas** – system not for them
    - One or two **buyer personas** who represent the buyer's needs, biases and goals. A buyer may or may not be a user of the product
  - The persona's pain-points

[1] http://www.frontend.com/products-digital-devices/real-or-imaginary-the-effectiveness-of-using-personas-in-product-design.html
[2] Cooper (1999) *The Inmates are Running the Asylum*'
[3] Cooper and Reimann (2003) *About Face 2.0; The Essentials of Interaction Design* - Goal-Directed Design™

Name:	**Marty**
Occupation:	**Food finder**
Age:	**5 cat years**
Education:	**informal**

Personal Details

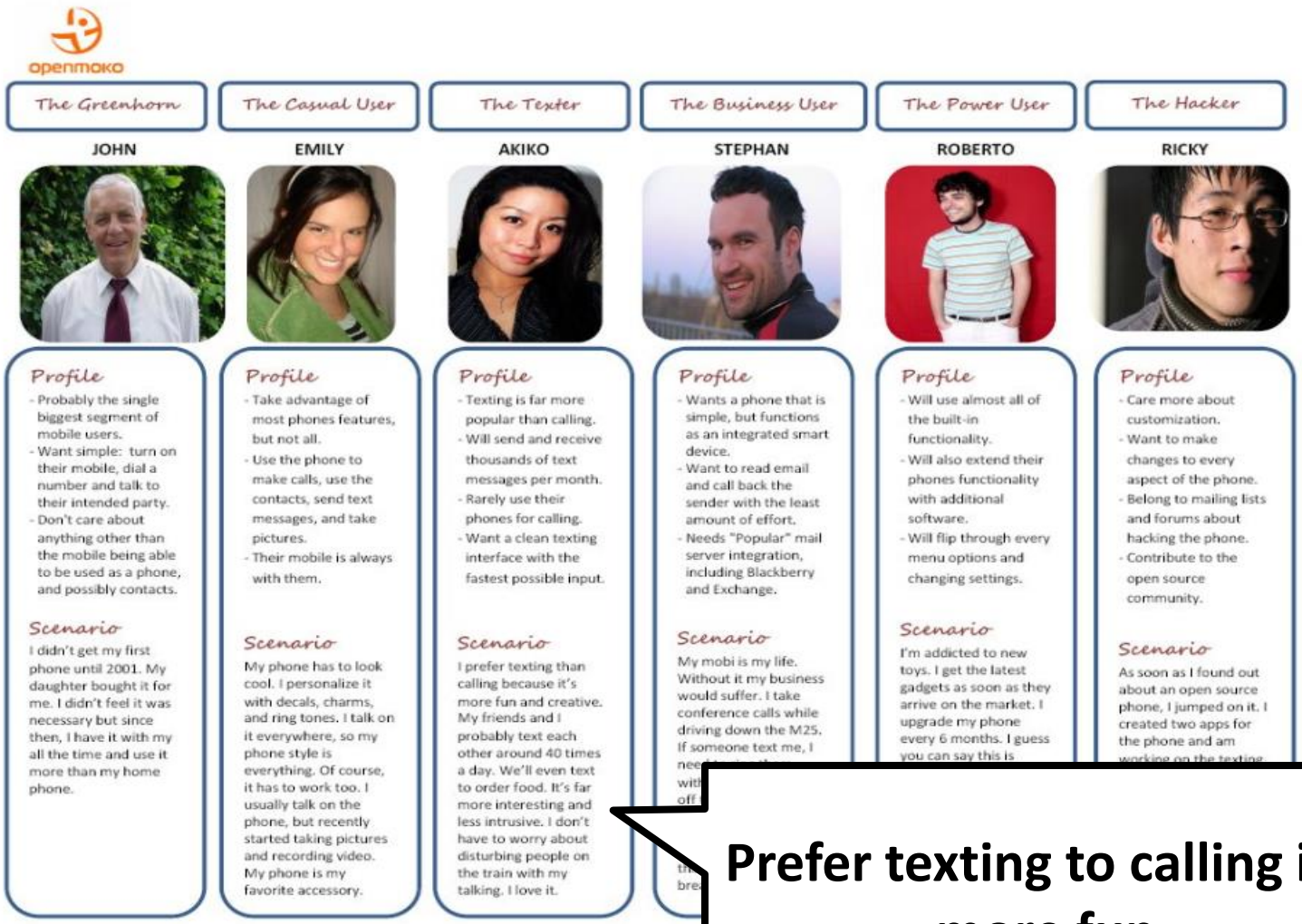
- Likes to have his food moist with a mouse on the side
- Likes to be fed at least 3 times a day

Goal(s)	• Get as much food as possible whilst doing as little as possible • Sit in the sun all day, move only for feeding purposes • Sick of waiting on the birds wants to fly up there and kill something

Attitude \ Skills

- Minimum effort approach to work
- Zero attention to detail, jump and forget

With Scenarios



Prefer texting to calling it's more fun

[1] http://dylan440.blogspot.com/

Include accessibility in persona

Persona: Kim, User Group: College Students

Date: September 2003

Background

CellCall, Inc. is revising the design of its most popular phone, model CC00310, to give it an updated look and increased functio
for model CC90310 are high school students,
between the ages of 18 and 25.

Persona

Kim Callahan is a freshman at Midwestern College, a smal
an undergraduate population of 3,000 students. Kim is pl
journalism, and will carry 14 credits during her first semes
was the co-editor of the student newspaper at her high sch
work on The Chronicle, the student newspaper at Midwest

Kim has been deaf since age 5. She has Alport Syndrome,
often results in deafness. Because Kim was already speaki
she is able to communicate verbally with friends and famil
accustomed to her speech patterns have some initial diffic
Kim's speech. Kim will be living in a residence hall on cam
anxious about her first conversation with her roommate.

Deaf since age 5

Background

HRWeb is a Hum by
Acme Insurance.
compensation, an
managers, HR sp n-
nistrative assista es, retired employees.

a

Roger Thompson retir o at age 62, after working for 35 years in the
Underwriting d Insurance. At 65 years old, Roger is extremely
swims laps three times a week in
s an hour or two each day
also an avid fisherman.

hich, in Roger's case, causes blurred
n progressively worse over the past
zzles, he needs brighter light and

is happy to report that this does not
that some activities, such as
cted by the tremor. When he uses
using the mouse, especially if the
button or link he's trying to hit is fairly small.

Hand tremor hard to click on small icons

Poor vision – can't do this

[1] http://www.uiaccess.com/accessucd/personas_eg.html
[2] http://www.captcha.net/

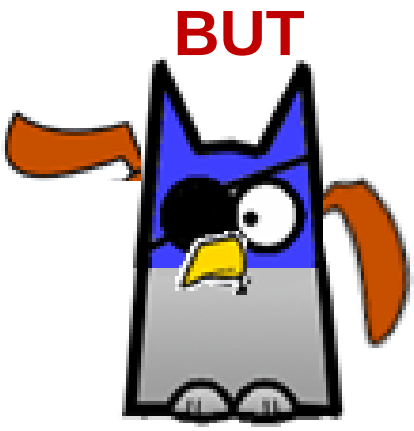
Benefits of Personas

- The Personas method advocates a **psychologically compelling approach** to communicate information about users to development teams
- **Engage teams** in the consideration of user needs, behaviours and preferences, as personas are **memorable constructs**
- Designers can extrapolate from the personas to make design decisions - **turn users into identifiable human beings**
- User profiles can become inappropriately generalised. Personas maintain a **connection with a 'real / character' user**
- Facilitate **communication** with users and within the project \ product team
- Provide **another perspective** on functionality, usability and accessibility testing for testing the effectiveness of the design

[1] Pruitt, J and Adlin, T (2006) *The Persona Lifecycle, keeping people in mind throughout product design'*, San Francisco: Morgan Kaufman.
[2] Pruitt, J and Grudin, J (2003) *Personas Practice and Theory,* Proceedings of the conference on Designing for user experiences, June 06-07, San Francisco, ACM pp 1-15.
[3] Mulder'(2007) *The User is Always Right: a Practical Guide for Creating and Using Personas on the Web,* California: New Riders

Problems with Personas

- It is difficult to determine how **many, if any**, users are represented by a persona
- So it is difficult to know whether a persona is **relevant** for intended users.
- Personas cannot be adequately verified or falsified and therefore have **no demonstrable validity**.
- **political problem** - assertion of authority by the persona creators
- So maybe **used irresponsibly** to justify a design



Another tool

Another perspective

Another model to think with

Can be inspiring and useful

[1] Chapman, C.N, and Milham, R. P (2006) *'The persona's new clothes: methodological and practical arguments against a popular method'* Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting, pp. 634 –636. (Available online at: http://cnchapman.files.wordpress.com/2007/03/chapman-milham-personas-hfes2006-0139-0330.pdf).

[2] Chapman, Love et la., (2008) Quantitative Evaluation of Personas as Information http://www.userphilosophy.com/wp-content/uploads/2009/02/reprint-hfes08-chapman-love-milham-elrif-alford.pdf

NCAD Persona Study

NCAD study investigated the effects of using different presentation methods to present personas.

Concluded

- **Photographs worked better than illustrations**

[1] Cooper (1999) *The Inmates are Running the Asylum*'
[2] Cooper and Reimann (2003) *About Face 2.0; The Essentials of Interaction Design* - Goal-Directed Design™
[3] Pruitt, J and Adlin, T (2006) *The Persona Lifecycle, keeping people in mind throughout product design'*, San Francisco: Morgan Kaufman.
[4] Pruitt, J and Grudin, J (2003) *Personas Practice and Theory,* Proceedings of the conference on Designing for user experiences, June 06-07, San Francisco, ACM pp 1-15.
[5] Mulder'(2007) *The User is Always Right: a Practical Guide for Creating and Using Personas on the Web,* California: New Riders

NCAD Persona Study

- **Visual storyboards were more effective in presenting task scenarios than text only versions.**