KSU STUDENT PORTAL

MSE Project Presentation 2.0

Javier Ramos Rodríguez

OUTLINE

- Introduction
- Architecture Design
  - Dynamic view
    - Use Case Specification
    - Model Representation
    - Sequence Diagram
    - Collaboration Diagram
  - Static View
    - Class Diagram
- Data Model
  - E-R Diagram
  - UML Data Model
  - Tables

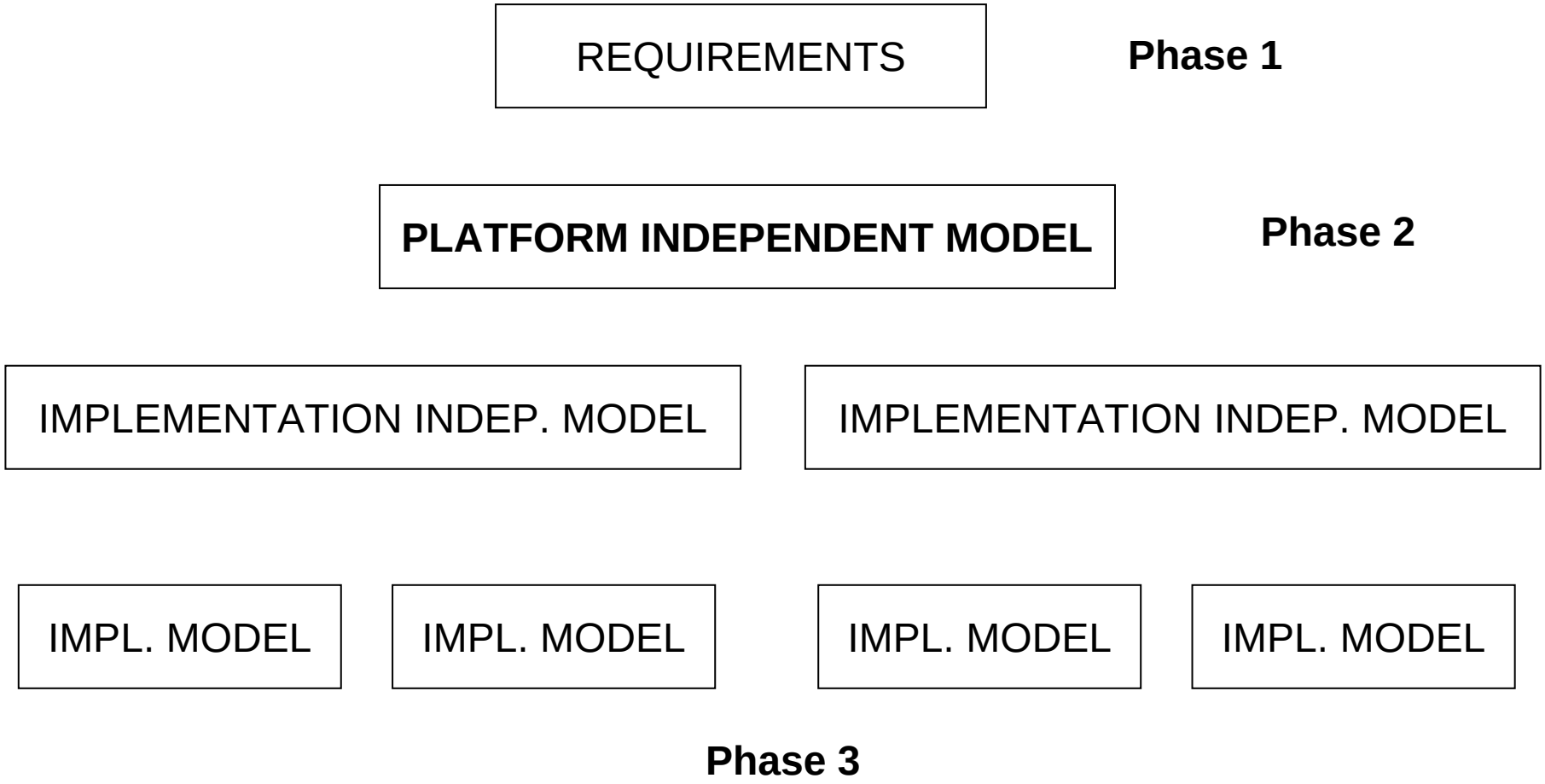
OUTLINE

- Formal Specification
  - Alloy Model
  - USE Model
- Inspection Checklist
- Project Plan
- Test Plan
- Conclusion
- References

Introduction

- Goals of this phase:
  - High Level description of the system.
  - Precise.
  - No Implementation details.
  - Portable.
- The Idea is to use an iterative process throughout the development to create a less expensive product. And at the same time increasing the quality, reusability and modularity.

Introduction

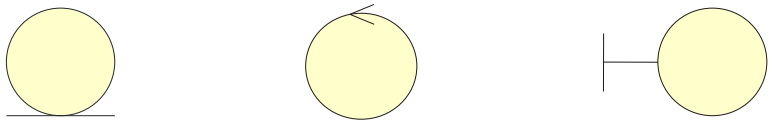


Architecture Design
Dynamic View

Name	Register
Objective	Register a new user in the application, so he/she can access to the main features.
Priority	High
Extends	
Includes	
Actors	User
Pre-conditions	
Post-conditions	User will get registered in the application.
Main Scenario	1. The user selects “Register” from the user interface. 2. The system receives the request. 3. The system shows the user the register form. 4. User fills the form. 5. System validates the form. 6. The system receives the information and saves it.
Secondary Scenario	
Exceptional Scenario	If there’s an error in the register form the system will tell the user to correct it.
Function	Register User

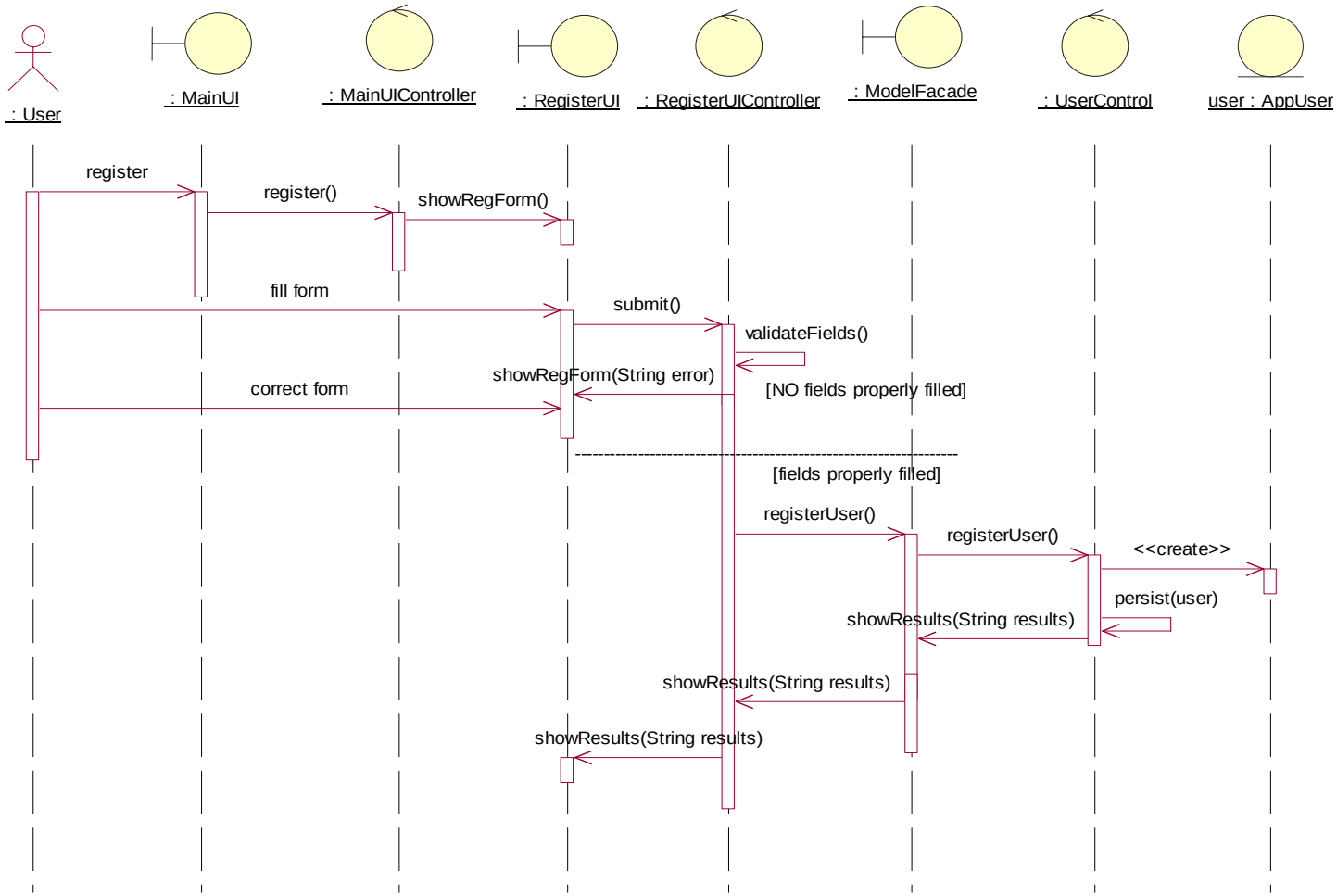
Model Representation

- **Entity Classes**: These types of classes are used to represent entities that contain data. Usually they will match to tables in the relational model or entity beans when using the J2EE platform.
- **Control Classes**: These types of classes are used to represent classes that perform some kind of logic: business logic or controllers. In the view layer these classes will represent the controllers in the MVC pattern; in the model these classes will represent the business logic. For example, in the J2EE platform these classes probably will be session beans.
- **Boundary Classes**: These classes in the view are used to represent the classes that the user interacts with. These classes will contain all the forms and all the other UI components. So, these classes are the boundary between users and the application. For example, in a J2EE web application these classes will be JSP pages. In the model, this stereotype is used to represent the boundary between the view and the model, so it will be used in the class that implements the facade design pattern.



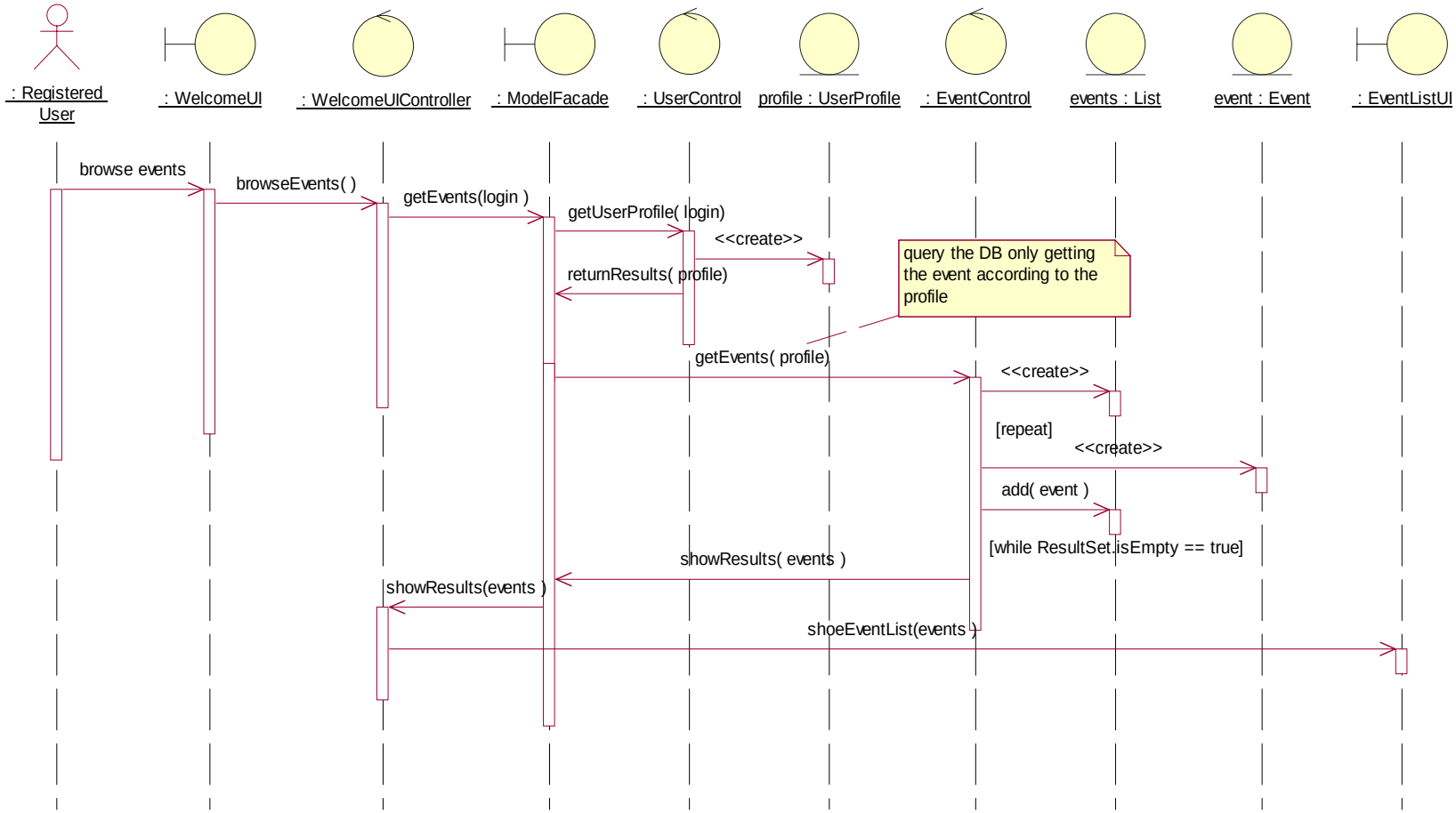
Sequence Diagram

Register

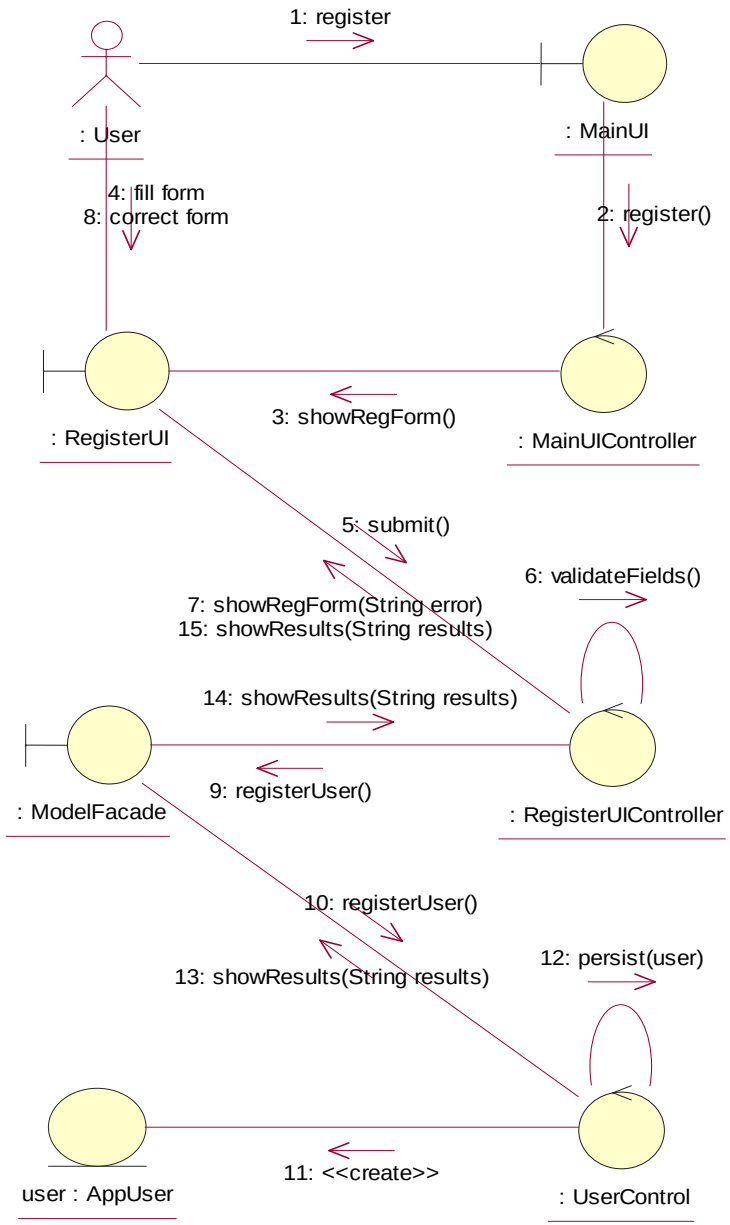


Sequence Diagram

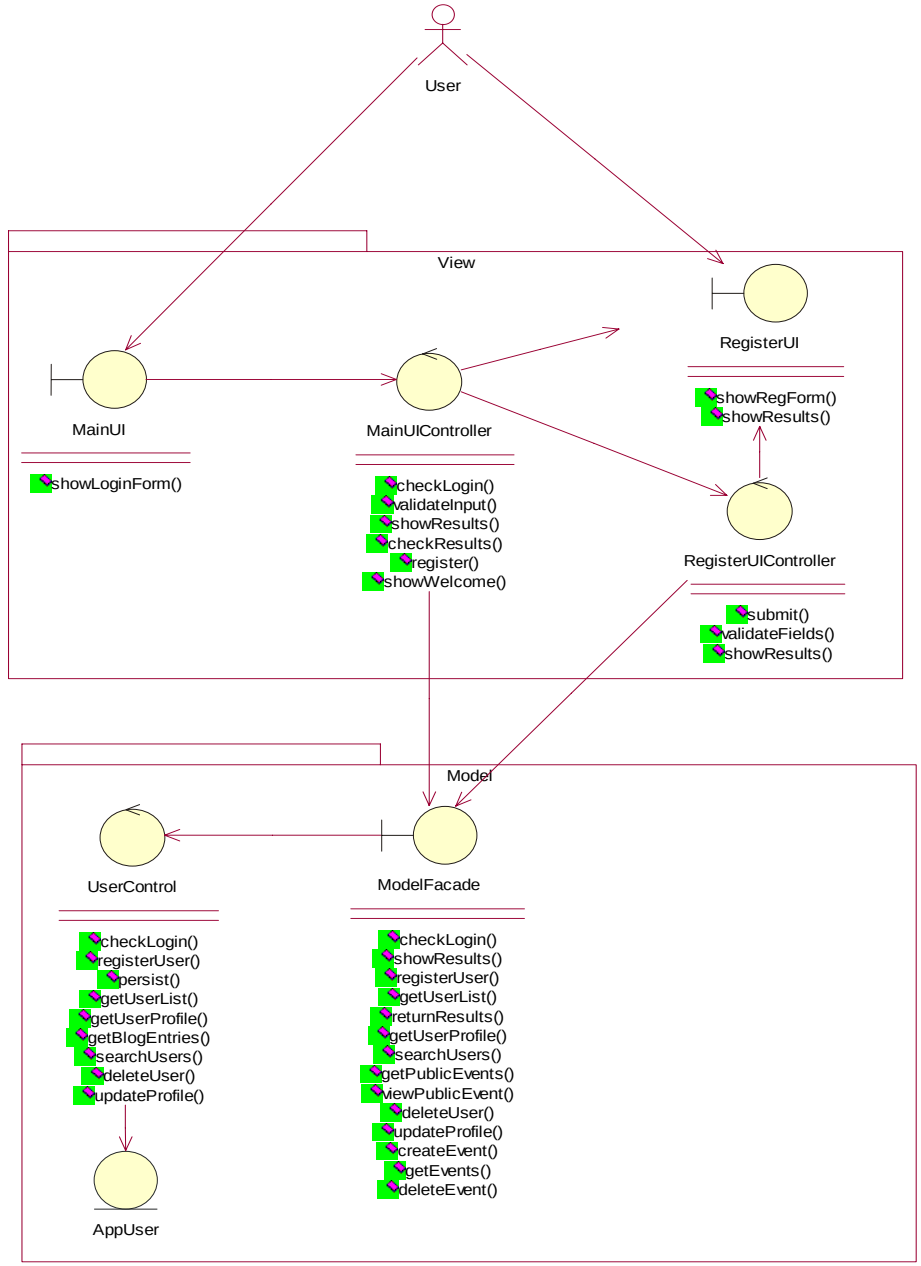
Browse Events



Collaboration Diagram

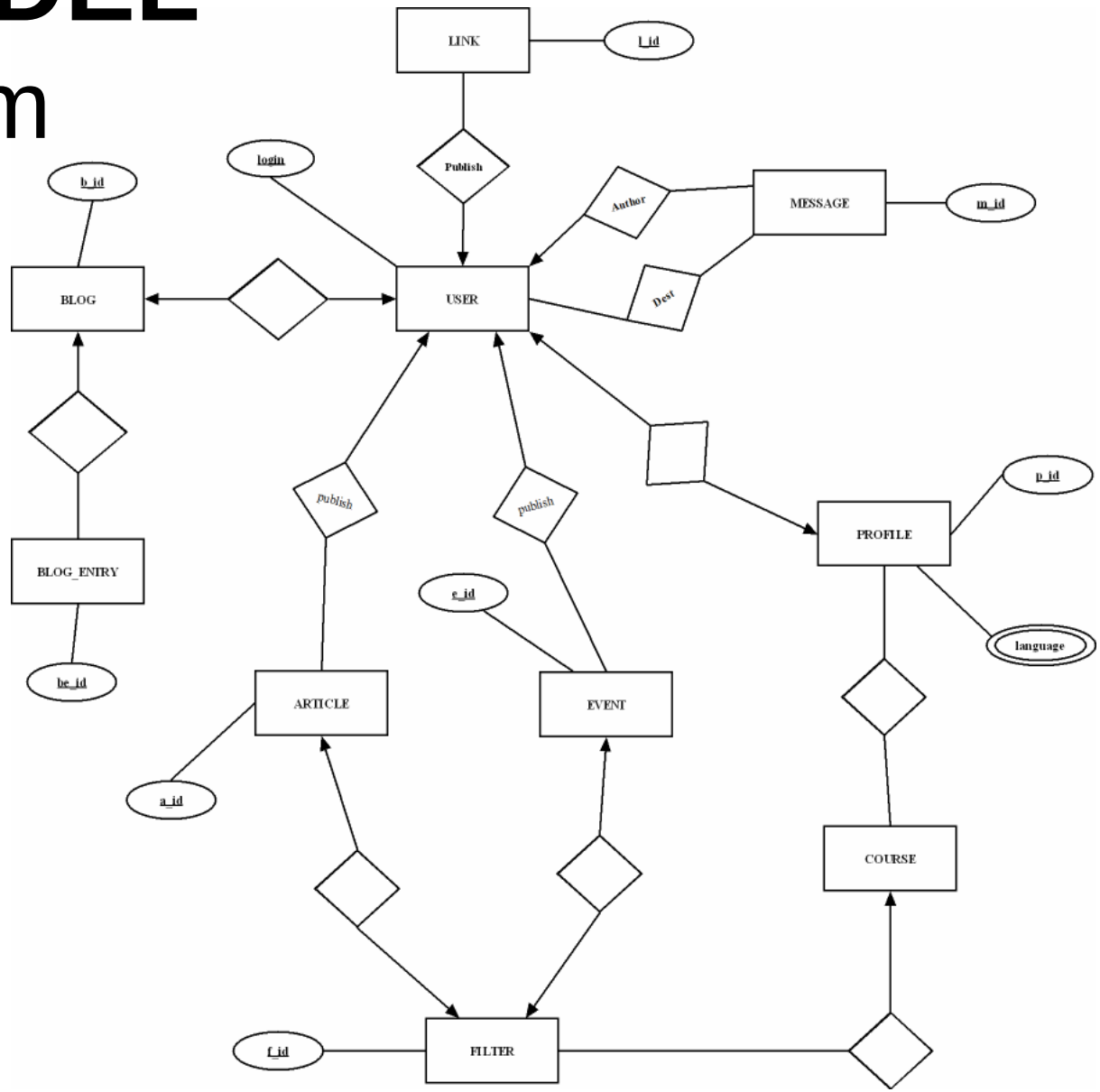


STATIC VIEW
Class Diagram

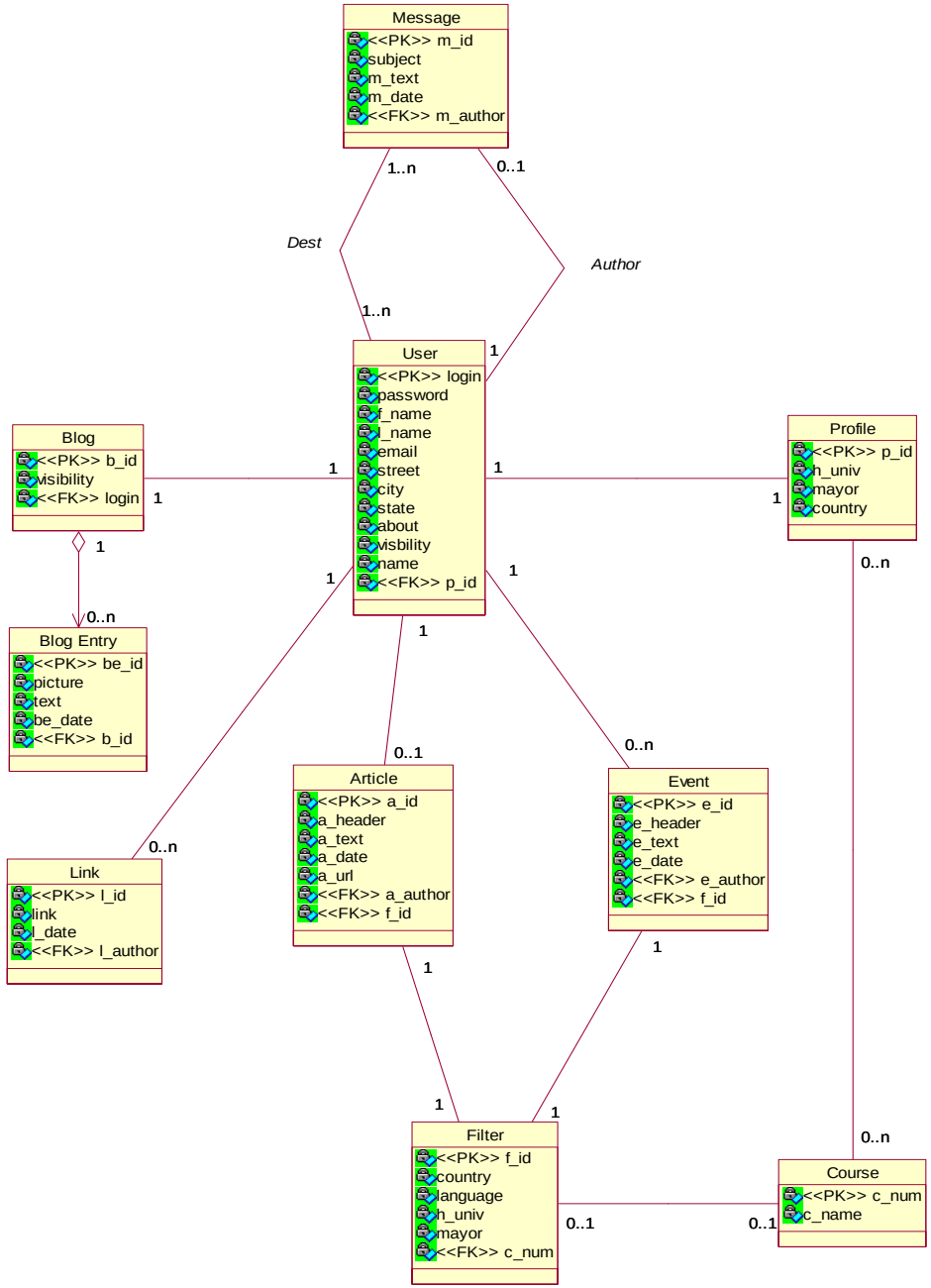


DATA MODEL

E-R Diagram



UML
Data Model



Data Tables

- **USER**: login, password, f_name, l_name, email, street, city, state, visibility, about, p_id
- **PROFILE**: p_id, h_univ, mayor, co_code
- **BLOG**: b_id, visibility, p_id, u_id
- **BLOG_ENTRY**: be_id, picture, text, be_date, b_id
- **MESSAGE**: m_id, subject. m_text, m_date, m_author
- **MESSAGE_DEST**: m_id, login
- **COURSE**: c_num, c_name
- **ARTICLE**: a_id, a_header, a_text, a_url, a_date, a_author, f_id
- **EVENT**: e_id, e_header, e_text, e_date, e_author, f_id
- **LINK**: l_id, link, l_date, l_author
- **FILTER**: f_id, h_univ, mayor, co_code, lan_code, c_num
- **PROFILE_COURSE**: p_id, c_num
- **PROFILE_LANGUAGE**: p_id, lan_code
- **COUNTRY**: co_code, country
- **LANGUAGE**: lan_code, language

Formal Specification

- **Alloy**: Non-Deterministic modeling language based on Sets and their relations.
- Items:
  - Domains: Here we define the possible values that the sets can take.
  - Sets: Unordered collections of objects that take values from the domains.
  - Relations: Relationships between sets
  - Multiplicities: Constrains on the number of objects that participate in a given relation.
  - Invariants: Constrains that the model should hold.
  - Assertions: Are useful to check if a specific invariant holds. If the Alloy Constraint Analyzer finds a counterexample this means that the invariant is incorrect.
  - Operations: Functions that the system can execute. We define pre, post and frame conditions.

Alloy Model

- We will model the User, Blog, Blog Entries, Messages, Events, Articles, Links, Profile and other attributes.
- **Associations**:

```
//1)Users can have only one Blog and a Blog correspons to exactly one user
user_blog(~blog_user): static User! -> static Blog!
//2) A blog can have several entries and one entry belongs to one blog
blog_entries(~entry_blog): static Blog! -> BlogEntry
```

- ***Operation:***

```
op createEvent(e:Event'!, author:User!, f:Filter'!){
e !in Event
f !in Filter
Filter'=Filter+f
Event'=Event+e
e.event_filter' = f
e.event_published'= author
Message'=Message
User'=User
Profile'=Profile
}
```

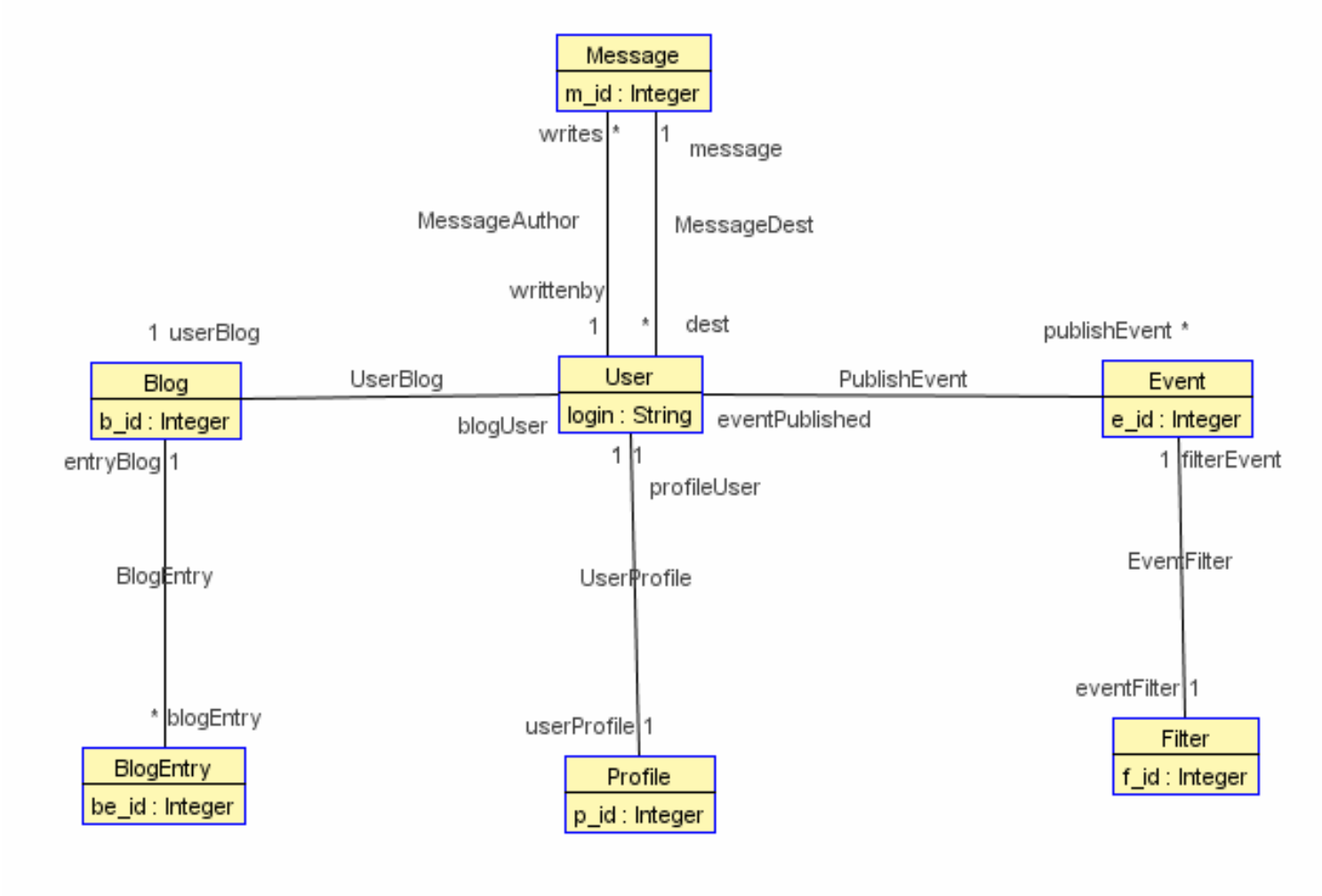
USE Model

- Formally checks the UML diagrams.
- Specifically class diagrams.
- Deterministic approach.
- OO Environment (not only Sets).
  - We will use the **OCL** language to specify constraints in the **UML** classes and its relations.

USE Model

```
model MSEProject
class User
 attributes
  login:String
end
association UserBlog between
  User[1] role blogUser
  Blog[1] role userBlog
End
association MessageDest between
  Message[1] role message
  User[*] role dest
end
association PublishEvent between
  User[1] role eventPublished
  Event[*] role publishEvent
end
```

USE Model


Message
m_id : Integer
writes
*
1
message
MessageAuthor
MessageDest
writtenby
1
*
dest
1 userBlog
publishEvent *
Blog
b_id : Integer
UserBlog
User
login : String
PublishEvent
Event
e_id : Integer
blogUser
eventPublished
entryBlog 1
1 1
profileUser
1 filterEvent
BlogEntry
UserProfile
EventFilter
eventFilter 1
* blogEntry
userProfile 1
BlogEntry
be_id : Integer
Profile
p_id : Integer
Filter
f_id : Integer

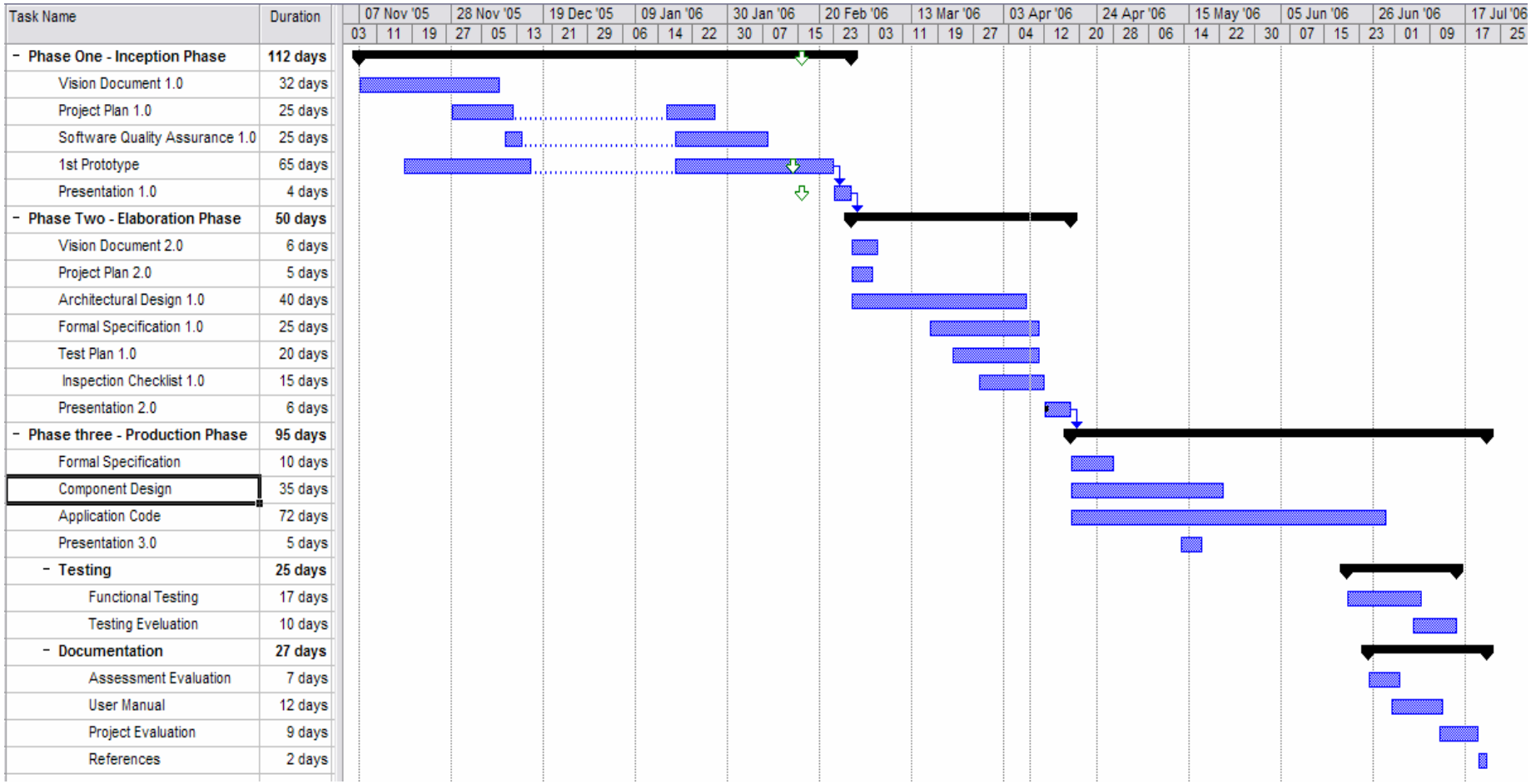
Inspection Checklist

- UML Diagrams
  - Class Diagrams
  - Sequence Diagrams
  - Collaboration Diagrams
  - Class descriptions
- Formal Specification
  - Alloy Model
  - Use Model
- Data Model
  - E-R Diagram
  - Tables

Inspection Checklist

- **Approach**:
  - UML diagrams conform to the UML standards .
  - UML diagrams correspond to the description in the Architecture Design document.
  - The different diagrams are consistent with each other.
  - The constraints in the Alloy model are well defined.
  - There a correspondence between the UML model and the Alloy model.
  - The USE model describes the behavior described in the other documents.

Project Plan



Task Name	Duration
− Phase One - Inception Phase	112 days
Vision Document 1.0	32 days
Project Plan 1.0	25 days
Software Quality Assurance 1.0	25 days
1st Prototype	65 days
Presentation 1.0	4 days
− Phase Two - Elaboration Phase	50 days
Vision Document 2.0	6 days
Project Plan 2.0	5 days
Architectural Design 1.0	40 days
Formal Specification 1.0	25 days
Test Plan 1.0	20 days
Inspection Checklist 1.0	15 days
Presentation 2.0	6 days
− Phase three - Production Phase	95 days
Formal Specification	10 days
Component Design	35 days
Application Code	72 days
Presentation 3.0	5 days
− Testing	25 days
Functional Testing	17 days
Testing Eveluation	10 days
− Documentation	27 days
Assessment Evaluation	7 days
User Manual	12 days
Project Evaluation	9 days
References	2 days

Test Plan

- **Test items:** Critical Use Cases
- **Approach:**
  - Black Box Testing
  - Unit Tests
  - Integration Tests
  - Environmental Test

Conclusions

- Build a model that provides a lot of detail but at the same time is platform independent.
- This allows to reuse the model reducing cost and improving quality.
- We create:
  - Data Model
  - Business Logic Model
- Formal Specification check the correctness of both specifications.

References

- www.uml.org
- http://en.wikipedia.org/wiki/Rational_Unified_Process
- www.rational.com
- Applying UML and Patterns - An Introduction to Object-Oriented Analysis and Design and the Unified Process, *Craig Larman*
- The Rational Unified Process: An Introduction (2nd Edition), *Philippe Kruchten*