

Software Engineering – Use case

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1 System description

System description is the first task that is performed during system analysis. Within the task the system description should be created with the following information:

- Basic information about the system,
- Description of the reality that is modelled – description of how system works. Description of the entities that are used in the system. Their elements, operations that are performed on them. For example in Library system the Book should be described. What information it contains (title, author, ...) how it interact (can be assigned to user, ...) where book is used (during borrowing, finding, ...).
- Describing the users of the system (Who can use system and for what)
- Describing of the functionality of the system – how the processes will be performed. For example how the book borrowing is handled
- Describing the non-functional assumptions – how the efficiency of the system matters. What user interface should look like etc.

2 Dictionary

In the dictionary the basic terms should be described. It is vital element because in different systems the same term can mean something else. For example book in the library is an object which can be borrowed, give back, have its state and returning date. On the other hand in internet shopping system book can be bought, have price etc.

- **Book** Basic object in the library. It can be borrowed, give back, check availability etc..
- **Reader** Important user of the system. Can borrow books...

3 User Stories

User stories are simple description of how functions will be performed in the system. It usually follows basic structure:

As a system user **I want to** perform some task **so that** to read its.

For example in library system:

As a regular reader **I want to** borrow a book **so that** I can read it.

The last part of User Story (**so that**) is optional and may contain non functional assumptions.

4 Use Case diagram

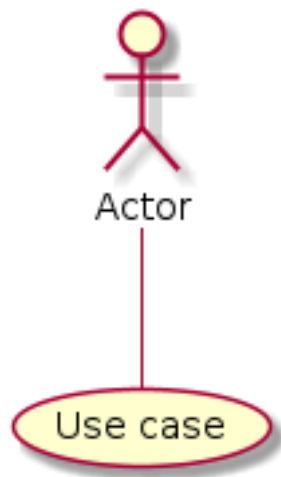
Use case diagram is UML diagram that allows to show system functionalities.

On Use case diagram actors are shown:



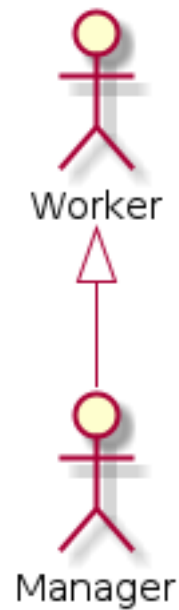
Actor is usually a system user. It can also be other system that interacts with our system. The most important fact is that actor is outside of the system. It can communicate with system but it is not part of the system.

Actor initiates the execution of use case in the system:



In that case we know that Actor can initiate "Use case" use case. For example in the Library management system we can have actor called "Reader" who executes for example use case "Borrow book".

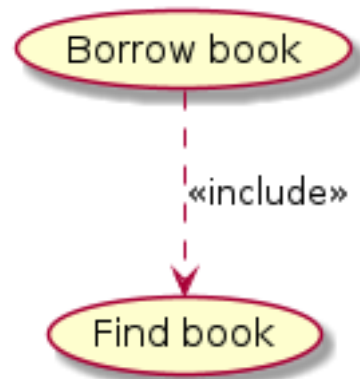
For better clarity of the diagram we can introduce relations between actors. We can use "generalization" to indicate that one actor "is like" other actor.



In that case "Manager" is a "Worker". This means that all use cases executed by Worker can also be executed by Manager. We do not need to draw additional arrows from him.

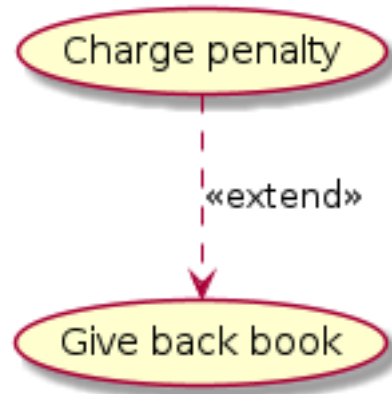
To indicate more complicated relations between use cases we can use two relations Include and Extend.

Include Relation means that during execution of one use case we will *always* execute additional use case:



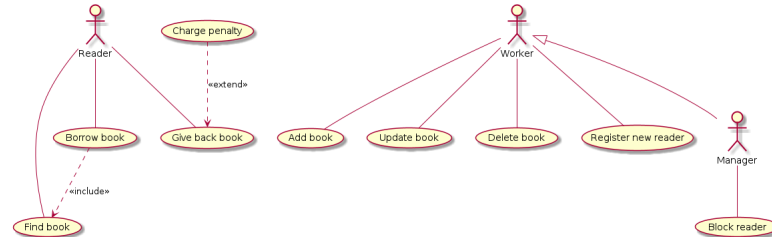
In that case we know that during execution of "Borrow Book" we always need to execute also "Find book".

Extend relation means that during execution of one use case we can *optionally* execute additional use case:



In that case we know that use case "Charge penalty" will be optionally executed during the execution of "Give back book". When the book is normally given back this use case will be executed without any additions. However, in some cases we will also need to execute charging penalty.

Below is a complete use case diagram for the library management system:



5 Tasks to complete

1. Create the system description (results put in the element <article id="description-english">)
2. Create the dictionary of terms (results put in the element <article id="dictionary-english">)
3. Create the User Stories for the system (results put in the element <article id="user-stories-english">)
4. Create the Use Case Diagram (results put in the element <article id="use-case-diagram">)