

# **PROJECT MANAGEMENT METHODOLOGY OF OBJECT-ORIENTED SOFTWARE DEVELOPMENT**

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## **ABSTRACT**

This paper introduces project management methodology that is focused on object-oriented software development. Students of FIT VUT Brno that attend course called “Project Management of Computer-Based Systems” may use this methodology for realization its project. Methodology detailed describes software development and project management activities and their inputs, outputs, tools and techniques, which roles carry out activities and lot of templates for documents.

## **1 INTRODUCTION**

Today’s development of software products use in most cases object oriented technology. Students at FIT VUT Brno have been familiarized with these technologies during their study. These students have opportunity attend course called “Project Management of Computer-Based Systems” that meet them with managing of projects. For this course we have created project management methodology of object oriented software development that is useful for students during realization of their projects. When we were developing methodology we firstly created simple software development life cycle for object oriented software development and then we integrated project management processes. Because students don’t have much time for realization of their project we have considered only main product and project management activities.

The structure of the text is the following. Firstly we are focused on the object-oriented software development and its life cycle. In the following chapter we introduce integration of project management to the software development life cycle. The next chapter introduces our project management methodology. The first part of chapter shows the structure of methodology and the second show user interface of methodology and briefly describes one of the activities. The last two chapters are deal with related work and conclusion.

## **2 OBJECT-ORIENTED SOFTWARE DEVELOPMENT**

Object-oriented software development uses an approach that modelling systems like a

set of collaborative objects. The language that we use for object-oriented analyses and design is Unified modelling language (UML). The important feature of UML is effort to be language no methodology. For object-oriented software development exist many methodologies that are represents by software development life cycle (SDLC). In the next two parts of the chapter we briefly introduce you with UML and SDLC.

**2.1 UNIFED MODELLING LANGUAGE (UML)**

UML is industry standardization’s graphic notation for specification, visualization, construction and documentation of item for software system. It is simplification of the complex process of software’s design by creation of visual’s models. Standard UML defines large set of resources, they use for development of products and we mainly use following. *Use case diagram* shows the functionality of system and relationship between actors and system. *Class diagram* and *package diagram* show the static structure of system and relationship between elements such as classes, interfaces, packages. *Sequential diagrams* or *collaboration diagrams* shows the dynamic structure of system. The detail description of UML and its notation and semantic you can find in [5].

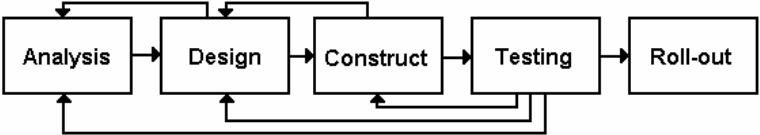
**2.2 SOFTWARE DEVEVELOPMENT LIFE CYCLE (SDLC)**

Software development lifecycle (SDLC) is a process that the software product goes through during its development. The creation of the product starts with an idea and finishes by creation of a product. SDLC defines the activities that are used to transform the required idea into a software product. In practice we can meet many different types of SDLC, which difference is mainly given by the demand on the software product or by the choice of the development approach. The well-known models of SDLC shows following table:

SDLC model	OO development
<i>Waterfall model</i>	poor
<i>Spiral model</i>	good
<i>Rapid application development model</i>	good
<i>Controlled iteration</i>	very good

**Tab. 1:** SDLC models and its usage in object oriented development

For object-oriented development in our project management methodology we use simple model of SDLC introduced on the following picture.



**Fig. 1:** Simple model of SDLC

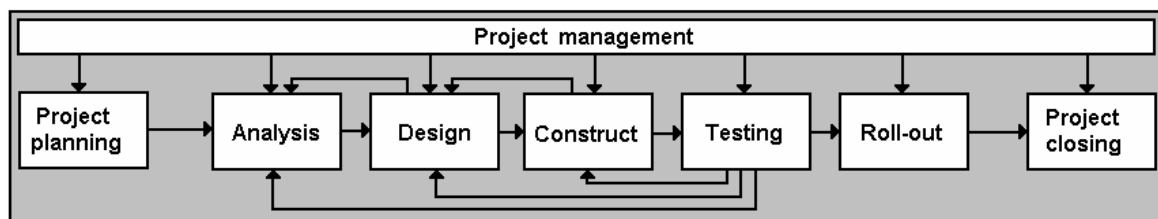
The choice for this simple SDLC model has following reasons. The projects that students solve are not difficult and they have short time for its realization. Students can more

concentrate its effort on project management processes than product development processes. The main goal of the course is to teach students how they can manage the project and that's the reason why we try don't task their minds with many software development activities. The following paragraph briefly introduces some phases of simple SDLC.

The phase of analysis formulates the system requirements and it establishes what the developing product will do. This activity identifies the requirements of the end user and the deliverable is a document of requirements. In this phase, the analyst takes its role. The phase of design defines how to create the required software product. Here the main activities are the design of end user's interface and technical design, the entry is a document of requirements and the deliverable is document of design. In the phase of design the designer take its roles. The phase of construction we create a software product and the main activity here is programming. The entry is the document of design and the deliverable is code. In this phase the role programmer take its role.

### 3 INTEGRATION OF PROJECT MANAGEMENT

In previous chapter we introduced simple SDLC, their phases and relationships. We were focused there only on the software development activity. Integration of project management into simple SDLC show following picture.



**Fig. 2:** Integration of project management into simple SDLC

As we see the project management integration to the SDLC add others phases and integrate project management activities to the phases of SDLC. Each project management activity is one of the following types.

- **Initiating** – authorizing the project or phase
- **Planning** – defining and refining objectives and creating plan
- **Executing** – coordinating people and resources to carry out the plan
- **Controlling** – monitoring and measuring progress, defining corrections
- **Closing** – formalizing acceptance of the project or phase

### 4 PROJECT MANAGEMENT METHODOLOGY

In this chapter we briefly introduce our project management methodology for object

oriented software development. Firstly we introduce structure and than user interface of methodology via IE. 5.50

### 4.1 STRUCTURE

Structure of our project management methodology is presented at following picture. For expression of the static structure we used class diagram.

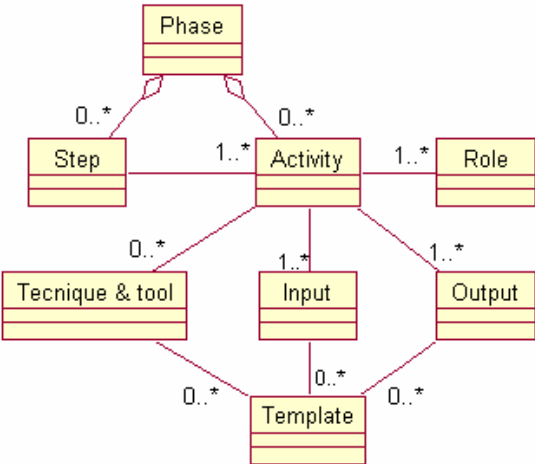


Fig. 3: Structure of project management methodology

### 4.2 USER INTERFACE OF PROJECT MANAGEMENT METHODOLOGY

The following picture represent screen of our methodology via IE 5.50.

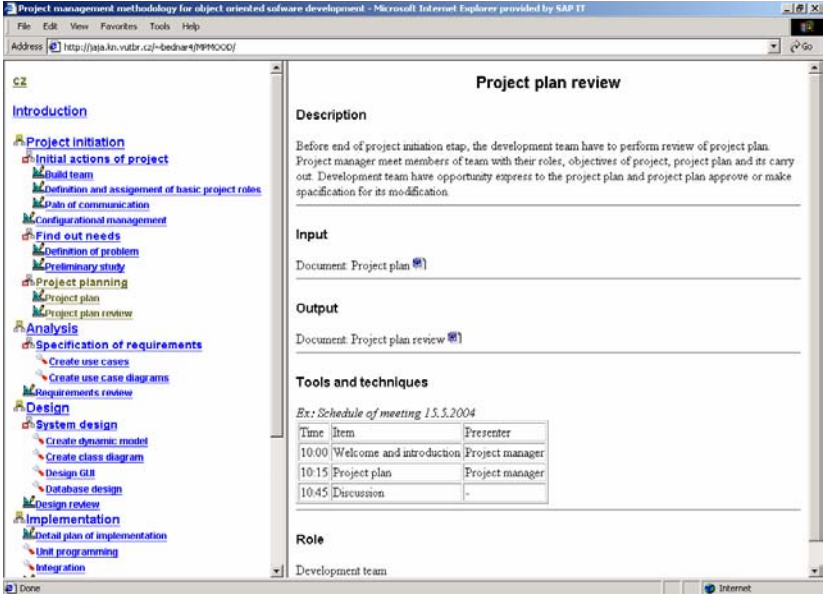


Fig. 4: Screen of project management methodology presented via IE.

The screen of project management methodology via IE consists of two frames. In the left frames are phases, steps, software development activities and project management

activities. In the right frames is detail of the selection from left frame. Current methodology is presented in Czech and English language and accessible through internet on the following http link [www.kn.vutbr.cz/~bednar4/MPMOOD/](http://www.kn.vutbr.cz/~bednar4/MPMOOD/) . In this paper isn't space for presentation particular activities of our methodology, that we briefly introduce activity *Project plan review* presented at the picture above.

*Description:* Before end of project initiation phase, the development team have to perform review of project plan. Project manager meet members of team with their roles, objectives of project, project plan and its carry out. Development team have opportunity express to the project plan and project plan approve or make specification for its modification.

*Input:* Project plan

*Output:* Project plan\_review

For input and output of this activity we created templates for documents.

*Tools and techniques:* Example of meeting schedule

*Roles:* Development team

## 5 RELATED WORK

Current students of course “Project Management of Computer-Based Systems” using our methodology. We monitor the use of methodology and when the course finishes we will evaluate and possibly improve our methodology for other course.

## 6 CONCLUSION

The project management methodology for object oriented software development was presented in this paper. We believe that our project management methodology help students not only in their project during the course “Project Management of Computer-Based Systems” but also in their future career like developers, developer managers, product managers or in another roles.

## ACKNOWLEDGEMENTS

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## REFERENCES

- [1] Murray R. Cantor : Object-Oriented Project Management with UML, Wiley, 1998
- [2] Stiller E., Leblanc C.: An Object-Oriented Approach, Addison Wesley, 2002
- [3] Jacobson I., Booch G., Rumbaugh J.: The Unified Software Development Process, Addison Wesley, 1999
- [4] Murch R.: Project Management Best Practices for Professionals, Prentice Hall, 2001
- [5] UML 1.5: [www.omg.org](http://www.omg.org) , 2003
- [6] A Guide to the Project Management Body of Knowledge (PMBOK Guide). 2000 Edition, Project Management Institute