# Generic Programming - Assignment 2 Project Management

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**Abstract.** There are various Project Management systems available for different kind of purposes. Our main focus will be the systems that address software development which includes project planning tools, source control tools and bug tracking.

**Keywords.** Project Management, Project Planning, Source Control, Bug Tracking

# 1. Introduction

There are various Project Management systems available for different kind of purposes. Our main focus will be the systems that address software development which includes project planning tools, source control tools and bug tracking.

Our understanding of Project Management is a system that assists the development team as a tool to keep track of ressources and progress within a given project.

One of the dangers of not using project management on projects is that the project can escalate rapidly beyond the intended boundaries. An example of a project getting out of control would be the danish software project called Amanda. The project ended up being delayed for more than two years and exceeding the budget by roughly 200 million Danish kroner. This might have been avoided if the project managers had known the scope of the project from the beginning.

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## 2. Project Management

Our main focus on the topic of project management is project planning and tools used for actual management during the life time of the project.

#### 2.1 Project Planning

Planning the project process can be a rather complicated process. In order to avoid unecessary complications various measures must be taken. The main purpose of project planning is to predict problems early on in the planning phase of the project. Assuming that the required user inputs have already been aquired, it's possible to produce rough objectives for the end product.

By using analysis it is possible to design the objectives in detail and produce a final list of objectives for the project. Using these objectives it is possible to get an idea of the risks involved in the project as well as the resources required.

After the objectives have been defined, it is necessary to perform a risk analysis in order to map the possible risks involved in the project. Among the risks one could mention that the goals of the project can change midproject through external influences. While the analysis and design phase should have taken care of most discrepancies there is always a risk of the client changing the project specifications, e.g. adding extra functionality.

When estimating resources required for a given project it is necessary to look at the objectives and examine them carefully in order to get a realistic view of the time required. Often this is calculated in man-hours. As this is based on general objectives, it gives a rough image of the time and resources required. With the required number of man-hours available it is further possible to decide on the number of personel required and in the end, the timeframe for the project. For simplicity and structure this often involves milestones which links specific timeframes to the various project stages.

Once you have a rough image, it is necessary to partition the objectives into smaller tasks and assign these to the groups or individuals. Often it is needed to have various sub-project managers to direct activities in the smaller groups. This is, of course, only required in very large projects. These also help coordinating time estimates and making sure the various parts respects the time limits.

Often it is hard to properly manage time without some sort of graphical diagram or chart to help you. For this, one can use Gantt charts (figure 1) which gives a clear and accurate overview of the tasks and timelines involved in the project.

In order to keep track of the various tasks in the project, bug trackers are often used in the sense of adding the tasks as bugs, allowing developers to resolve them once completed. See section 2.4 for further information on Bug Tracking software. Another useful tool for managing development of the projects, is to use source control systems. By using these, for example

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integrated with a bug tracker, it is possible to keep track of the progress as well as the performance of the developers. This makes it possible to plan ahead to make sure the deadlines can be met. We have described the use of source control tools in section 2.3.

#### 2.2 Project Management Tools

To help the development team there are many tools available that organize the flow of a given project. One of the management tools used is the program "Microsoft Project" (Figure 2). In Microsoft Project it is possible to make Gantt charts, assign resources, risk managment and much more. Other alternatives to Microsofts propietary software includes tools such as KPlato and TaskJuggler. Rather then having a Desktop application there's also the possibility of using a web based application. The two most common known are Trac and Bugzilla.

# 2.3 Source Control Tools

A source control tool is used to manage a project's source code. One of the main features with any source control system is the revision control. Revision control allows the users to keep track of all changes and the ability to revert to any previous revision as well as to tell who commited any changes in the code. Since the code is available at a central point it is possible to write automated tools that work on the newest version of the code. This provides a powerful tool allowing automated scripts, such as nightly unit testing and any other tasks that doesn't require any user interaction.

Example of such tools are subversion<sup>1</sup>, CVS  $^2,$  GIT  $^3$  as well as the commercial TFS  $^4.$ 

## 2.4 Bug Tracking

Bug tracking is used to assign issues found in a project to individuals or groups on the development team.

Bug tracking includes features such as bug reports, task overview, ability to assign priority to a bug and much more.

Based on the bug reports made, it is possible to generate a productivity report which gives the project manager a rough image of the project's status within the development cycle. With a progress report the manager can assign more resources where needed such that the project can stay on time.

As mentioned earlier, systems such as Trac, Bugzilla and TFS already have this feature implemented as core functionality.

<sup>&</sup>lt;sup>1</sup> http://subversion.tigris.org/

<sup>&</sup>lt;sup>2</sup> http://www.nongnu.org/cvs/

<sup>&</sup>lt;sup>3</sup> http://www.kernel.org/pub/software/scm/git/docs/

<sup>&</sup>lt;sup>4</sup> http://msdn2.microsoft.com/en-us/teamsystem/aa718825.aspx

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## 3. Conclusion

With the use of Project Management it is possible to create and organize the development of a project with a larger degree of success. This a result of the easy organization and structuring that the Project Management provides to a team of developers. In conclusion, Project Management tools makes life easier for both project managers as well as developers. It also gives the client a clear benefit since the project is more likely to stay on track and not exceed the timeframe and/or budget.

# Appendix A. Figures

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Figure 1. Example Gantt Chart.



Figure 2. Screen dump of Microsoft Project

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