Computers II Lesson 8

8.0 Project Management

Software development takes place within an organization and is subject to:

- Schedule
- Budget
- Organizational constraints

Management is therefore very important to software engineering

The objective of this lesson is to introduce software project management and two important management activities; risk management and people management.

The project manager's job is to ensure that the software project meets and overcomes these constraints as well as delivering high-quality software.

Good management cannot guarantee project success. However, bad management usually results in project failure.

Bad Management:

- Software may be delivered late
- Software cost more than originally estimated
- Software fails to meet the expectations of customers

For most projects, important goals for each project are:

- Deliver the software to the customer at the agreed time.
- Keep overall costs within budget.
- Deliver software that meets the customer's expectations.
- Maintain a happy and well-functioning development team.

The project manager job varies tremendously depending on the organization and the software product being developed.

However, most managers take responsibility at some stage for some or all of the following activities:

1) Project planning - Project managers are responsible for planning, estimating and scheduling project development, and assigning people to tasks. They supervise the work to ensure that it is carried out to the required standards and monitor progress to check that the development is on time and within budget.

2) Reporting - Project managers are usually responsible for reporting on the progress of a project to customers and to the managers of the company developing the software. They have to be able to communicate at a range of levels, from detailed technical information to management summaries. They have to write concise, coherent documents that abstract critical information from detailed project reports. They must be able to present this information during progress reviews.

3) Risk management - Project managers have to assess the risks that may affect a project, monitor these risks, and take action when problems arise.

4) People management - Project managers are responsible for managing a team of people. They have to choose people for their team and establish ways of working that lead to effective team performance.

5) Proposal writing - The first stage in a software project may involve writing a proposal to win a contract to carry out an item of work. The proposal describes the objectives of the project and how it will be carried out. It usually includes cost and schedule estimates and justifies why the project contract should be awarded to a particular organization or team. Proposal writing is a critical task as the survival of many software companies depends on having enough proposals accepted and contracts awarded. There can be no set guidelines for this task; proposal writing is a skill that you acquire through practice and experience.

8.1 Risk Management

Risk management is one of the most important jobs for a project manager.

Risk management involves anticipating risks that might affect the project schedule or the quality of the software being developed, and then taking action to avoid these risks

Risk management is particularly important for software projects because of the inherent uncertainties that most projects face.

Risk Comes from:

- Loosely defined requirements
- Requirements changes due to changes in customer needs
- Difficulties in estimating the time and resources required for software development
- Differences in individual skills.

You have to anticipate risks and take steps to avoid these risks. You may need to draw up contingency plans so that, if the risks do occur, you can take immediate recovery action.

There are three categories of risk that may overlap:

1. Project risks - Risks that affect the project schedule or resources. An example of a project risk is the loss of an experienced designer. Finding a replacement designer with appropriate skills and experience may take a long time and, consequently, the software design will take longer to complete.

2. Product risks - Risks that affect the quality or performance of the software being developed. An example of a product risk is the failure of a purchased component to perform as expected. This may affect the overall performance of the system so that it is slower than expected.

3. Business risks - Risks that affect the organization developing or procuring the software. For example, a competitor introducing a new product is a business risk. The introduction of a competitive product may mean that the

assumptions made about sales of existing software products may be unduly optimistic.

Risk	Affects	Description
Staff turnover	Project	Experienced staff will leave the project before it is finished.
Management change	Project	There will be a change of organizational management with different priorities.
Hardware unavailability	Project	Hardware that is essential for the project will not be delivered on schedule.
Requirements change	Project and product	There will be a larger number of changes to the requirements than anticipated.
Specification delays	Project and product	Specifications of essential interfaces are not available on schedule.
Size underestimate	Project and product	The size of the system has been underestimated.
CASE tool underperformance	Product	CASE tools, which support the project, do not perform as anticipated.
Technology change	Business	The underlying technology on which the system is built is superseded by new technology.
Product competition	Business	A competitive product is marketed before the system is completed.

The process of risk management involves several stages:

1. Risk identification - You should identify possible project, product, and business risks.
2. Risk analysis - You should assess the likelihood and consequences of these risks.
3. Risk planning - You should make plans to address the risk, either by avoiding it or minimizing its effects on the project.
4. Risk monitoring - You should regularly assess the risk and your plans for risk mitigation and revise these when you learn more about the risk.

There are at least six types of risk that may be included in a risk:

1) Technology risks - Risks that derive from the software or hardware technologies that are used to develop the system.

2) People risks - Risks that are associated with the people in the development team.

3) Organizational risks - Risks that derive from the organizational environment where the software is being developed.

4) Tools risks - Risks that derive from the software tools and other support software used to develop the system.

5) Requirements risks - Risks that derive from changes to the customer requirements and the process of managing the requirements change.

6) Estimation risks - Risks that derive from the management estimates of the resources required to build the system.

The probability of the risk might be assessed as:

- Very low (< 10%)
- Low (10–25%)
- Moderate (25–50%)
- High (50–75%)
- Very high (> 75%)

The effects of the risk might be assessed as:

- Catastrophic (threaten the survival of the project)
- Serious (would cause major delays)
- Tolerable (delays are within allowed contingency)
- Insignificant