Project management

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 Organizing, planning and scheduling software projects

• DISCUSSION

- Project Managers?

Topics covered

- Management activities
- Project planning
- Project scheduling
- Risk management

Objectives

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- To introduce software project management and to describe its distinctive characteristics
- To discuss project planning and the planning process
- To show how graphical schedule representations are used by project management
- To discuss the notion of risks and the risk management process

Software project management

- Concerned with activities involved in ensuring that software is delivered on time and on schedule and in accordance with the requirements of the organizations developing and procuring the software
- Project management is needed because software development is always subject to budget and schedule constraints that are set by the organization developing the software

Software management distinctions

- The product is intangible
- The product is uniquely flexible
- Software engineering is not recognized as an engineering discipline with the same status as mechanical, electrical engineering, etc.
- The software development process is not standardized

Management activities

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- Proposal writing
- Project planning and scheduling
- Project costing
- Project monitoring and reviews
- Personnel selection and evaluation
- Report writing and presentations

Management commonalities

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- These activities are not peculiar to software management
- Many techniques of engineering project management are equally applicable to software project management
- Technically complex engineering systems tend to suffer from the same problems as software systems

Project staffing

- May not be possible to appoint the ideal people to work on a project
 - Project budget may not allow for the use of highly-paid staff
 - Staff with the appropriate experience may not be available
 - An organization may wish to develop employee skills on a software project
- Managers have to work within these constraints especially when (as is currently the case) there is an international shortage of skilled IT staff

Project planning

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- Probably the most time-consuming project management activity
- Continuous activity from initial concept through to system delivery. Plans must be regularly revised as new information becomes available
- Various different types of plans may be developed to support the main software project plan that is concerned with schedule and budget

Types of project plans

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Plan	Description	
Quality plan	Describes the quality procedures and standards that will be used in a project.	
Validation plan	Describes the approach, resources and schedule used for system validation.	
Configuration management plan	Describes the configuration management procedures and structures to be used.	
Maintenance plan	Predicts the maintenance requirements of the system, maintenance costs and effor required.	
Staff development plan	Describes how the skills and experience of the project team members will be developed.	

Project plan structure Introduction Project organization Risk analysis Hardware and software resource requirements Work breakdown Project schedule Monitoring and reporting mechanisms

Activity organization

- Activities in a project should be organized to produce tangible outputs for management to judge progress
- *Milestones* are the end-point of a process activity
- *Deliverables* are project results delivered to customers
- The waterfall process allows for the straightforward definition of progress milestones











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- Graphical notations used to illustrate the project schedule
- Show project breakdown into tasks. Tasks should not be too small. They should take about a week or two
- Activity charts show task dependencies and the the critical path
- Bar charts show schedule against calendar time

Task durations and dependencies

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Task	Duration (days)	Dependencies	
T1	8		
T2	15		
T3	15	T1 (M1)	
T4	10		
T5	10	T2, T4 (M2)	
T6	5	T1, T2 (M3)	
Τ7	20	T1 (M1)	
T8	25	T4 (M5)	
Т9	15	T3, T6 (M4)	
T10	15	T5, T7 (M7)	
T11	7	T9 (M6)	
T12	10	T11 (M8)	







Software risks

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Risk	Risk type	Description
Staff turnover	Project	Experienced staff will leave the project
	-	before it is finished.
Management	Project	There will be a change of organizational
change	-	management with different priorities.
Hardware	Project	Hardware that is essential for the project wi
unavailability		not be delivered on schedule.
Requirements	Project and	There will be a larger number of changes to
change	product	the requirements than anticipated.
Specification delays	Project and	Specifications of essential interfaces are not
	product	available on schedule
Size underestimate	Project and	The size of the system has been
	product	underestimated.
CASE tool under-	Product	CASE tools which support the project do not
performance		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.

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The risk management process

Risk identification

- Identify project, product and business risks
- Risk analysis
 - Assess the likelihood and consequences of these risks
- Risk planning
 - Draw up plans to avoid or minimize the effects of the risk
- Risk monitoring
 - Monitor the risks throughout the project





Risks and risk types

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Risk type	Possible risks
Technology	The database used in the system cannot process as many transactions
	per second as expected.
	Software components that should be reused contain defects limiting
	their functionality.
People	It is impossible to recruit staff with the skills required.
-	Key staff members are ill and unavailable at critical times.
	Required training for staff is not available.
Organizational	The organization is restructured so that different management is
-	responsible for the project.
	Organizational financial problems force reductions in the project
	budget.
Tools	The code generated by CASE tools is inefficient.
	CASE tools cannot be integrated.
Requirements	Changes to requirements requiring major design rework are proposed.
	Customers fail to understand the impact of requirements changes.
Estimation	The time required to develop the software is underestimated.
	The rate of defect repair is underestimated.
	The size of the software is underestimated.

Risk analysis	
 Assess probability and seriousness of each risk 	
 Probability may be very low, low, moderate, high or very high 	
 Risk effects might be catastrophic, serious, tolerable or insignificant 	

Risk planning

- Consider each risk and develop a strategy to manage that risk
- Avoidance strategies
 - The probability that the risk will arise is reduced
- Minimization strategies
 - The impact of the risk on the project or product will be reduced
- Contingency plans
 - If the risk arises, contingency plans deal with that risk