

Upravljanje projektima

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Upravljanje projektima

Project management

Concerned with

- planning the conduct of the project
- controlling and checking project progress
- monitoring milestones and deliverables
- managing risk

Should account for not more than 10% of overall effort

~ not evenly distributed; spend most of it towards the start!

'Product' development

Concerned with

- achieving the aims and objectives of the project
- producing the deliverables in accordance with the project plan
- optimising scope and quality of the deliverables relative to the resources available

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Faze projekta

From a **project management** perspective, projects proceed in five stages:

- 1 **Definition**
Deciding on a project; making a project proposal
- 2 **Planning**
Detailed planning of the project
- 3 **Initiation**
Organising work (in particular, group work); literature survey
- 4 **Control**
Monitoring the progress of the project
- 5 **Closure**
Delivering/deploying result of the project; preparing final presentation; writing up reports

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Project definition: Aims and Objectives (1)

Clear specification of what the project is to achieve

→ definition of **aims** and **objectives**

Aims: Broad statement(s) of intent
Identify the project's purpose

Examples:

- Design a methodology for GUI development of technical courseware material
- Develop and evaluate an Artificial Neural Network to predict stock market indices

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Project definition: Aims and Objectives (2)

Clear specification of what the project is to achieve

→ definition of **aims** and **objectives**

Example aim:

- Develop and evaluate an Artificial Neural Network to predict stock market indices

Objectives: Identify specific, measurable achievements
Quantitative and qualitative measures by which completion of the project can be judged

Example:

- 1 Complete a literature search and literature review of existing stock market prediction techniques
- 2 Develop a suitable Artificial Neural Network model
- 3 Identify and collect suitable data for analyses and evaluation
- 4 Evaluate the model using appropriate statistical techniques
- 5 Complete final report

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Project definition: SMART objectives

Each **objective** should be

- Specific
- Measurable
- Appropriate
- Realistic
- Time-related

Example:

- 1 Complete a literature search and literature review of existing stock market prediction techniques
- Is it **specific**? Does it tell us what will be done?
 - Is it **measurable**? How will we know to what extent and to what quality the objective has been completed?
 - Is it **appropriate**? Does it relate to and in support of our aims?

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Project planning

Objectives of project planning

- Identifying the tasks that need to be done
- Clarifying the order in which tasks need to be done
- Determining how long each task will take
- (Redefining the project if there are problems)

Steps of project planning

- Work breakdown
- Time estimates
- Milestone identification
- Activity sequencing
- Scheduling
- Replanning

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Work breakdown (1)

- First step of project planning: Identifying the tasks that need to be done
- Starting point(s) should be the objectives of the project; Then break your objectives down into lower and lower levels of detail
- Work breakdown structures are used to visualise the process of breaking down the project

```
graph TD
    Root[ANN stock market project] --> LS[Literature survey]
    Root --> DAM[Develop ANN model]
    Root --> GSD[Get stock market data]
    Root --> Eval[Evaluation]
    Root --> CR[Complete report]
    LS --> LitSearch[Literature search]
    LS --> LitReview[Literature review]
    DAM --> IEAN[Investigate and evaluate ANNs]
    DAM --> DesignANN[Design ANN]
    GSD --> TrainANN[Train ANN]
    GSD --> USMD[Use stock market models]
    Eval --> RST[Review statistical tests]
    Eval --> AA[Analyze and evaluate]
    CR --> AA
```

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Time estimates

- Make reasonably accurate predictions of
 - the effort needed for completion and
 - the duration until completion
- of each leaf node of the work breakdown structure
- If the estimate exceeds the total time available for the project, then either modify the objectives and work breakdown or reduce and reallocate time between tasks

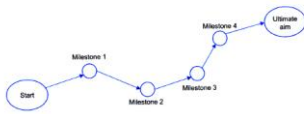
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    Eval --> RST[Review statistical tests]
    Eval --> AA[Analyze and evaluate]
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```

Activity	Effort	Duration
Literature search	2 weeks	5 weeks
Literature review	2 weeks	4 weeks
Investigate and evaluate ANNs	2 weeks	4 weeks
Design ANN	2 weeks	4 weeks
Develop and test ANN	2 weeks	2 weeks
Get stock market data	1 week	1 week
Train ANN	1 week	1 week
Use stock market models	1 week	2 weeks
Review statistical tests	1 week	2 weeks
Analyze and evaluate	4 weeks	4 weeks
Complete report	8 weeks	8 weeks
Total	20 weeks	40 weeks

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Milestone identification

- Milestones are significant steps towards the completion of the project
→ intermediate goals at which to aim



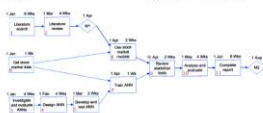
- M1 Completion of literature review
M2 Completion of ANN development
M3 Completion of evaluation
M4 Completion of project/report



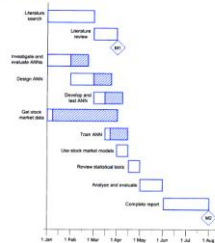
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Scheduling

Activity	Effort	Duration
Literature search	2 weeks	1 weeks
Literature review	2 weeks	4 weeks
Investigate and evaluate ANNs	2 weeks	4 weeks
Design ANN	2 weeks	4 weeks
Develop and test ANN	2 weeks	2 weeks
Get stock market data	1 week	1 week
Train ANN	1 week	1 week
Use stock market models	1 week	2 weeks
Review statistical tests	1 week	2 weeks
Analyse and evaluate	4 weeks	4 weeks
Complete report	0 weeks	0 weeks
Total	26 weeks	40 weeks



Gantt Chart



- Activities are represented by rectangles
- Milestones are represented by diamonds
- Size indicates duration relative to the timeline
- Shaded areas indicate slack

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MS Project Gantt Chart



- MS Project allows to represent the hierarchy of the **work breakdown structure**
- MS Project allows to represent activities and milestones (in the expected way)
- MS Project does not allow to represent slack
- MS Project does not allow to represent interdependencies across high-level tasks

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Replanning

- Needs to be done if you try to achieve too much in too little time
- Approach:
Iterate the following steps until you get a correct schedule
 - Rethink the interdependencies between activities
 - Redo estimates for effort and duration of each tasks
 - Reschedule tasks
 - Rethink the aims and objectives of your project
 - Redo work breakdown structure
- No plan is perfect; no plan is set in stone

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Rolling wave planning

- Phased iterative approach to project planning
~ fits well for incremental development
- Approach:
 - 1 Define **planning packages** for your project with
 - resource requirements
 - macro level deliverables
 - macro level dependencies
 - 2 Execute the following loop
 - 1 Determine which planning package has to be done next (first)
 - 2 Make a detailed plan for this planning package
 - 3 Execute the plan
 - 4 Re-adjust the remaining planning packages based on what happened

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Risk management: Introduction

Risk management

- involves the identification of risks at the project's outset
- control of those risks as the project progresses

~ risk management process

Four main stages of the **risk management process**

- 1 Identify risks
- 2 Assess impact of risks
- 3 Alleviate critical risks
- 4 Control risks

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Identifying risks: Types of risk

	Event-driven	Evolving
Technical	Project requirements change; Hard disk crashing	Project beyond your technical capability; Problem dependent on developing a complex algorithm
Non-Technical	Supervisor leaving; Illness	Underestimating effort required for a task; Literature not arriving on time

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Identifying risks

Risk triggers (risk symptoms)
Events happening during the course of a project that might indicate problems or that one of the identified risks is increasingly likely to occur

Examples:

- Missing preliminary milestones in your project
- Struggling with a straightforward implementation of a component
- Problems with arranging a meeting a client

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Assessing the impact of risks (2)

1 Assess each risk according to the following scales:

Risk Likelihood	Score
Low	1
Medium	2
High	3

Risk Consequence	Score
Very low	1
Low	2
Medium	3
High	4
Very high	5

2 Compute risk impact for each risk using the formula
 $\text{Risk impact} = \text{Likelihood} \times \text{Consequence}$

3 Rank all risks according to their risk impact

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Assessing the impact of risks (3)

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Determine critical risks

(a)

80/20 rule:

20% of your risks cause 80% of your problems

~ 20% top ranking risks are critical

(b)

RAG grading:

Red

Risks with impact greater than 10

~ critical risks

Amber

Risks with impact between 6 and 10

~ deserve some attention

Green

Risks with impact smaller than 6

~ can be ignored

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Alleviating critical risks (1)

Contingency

Accepting that the risk is going to occur and putting something in place to deal with it when it does

Examples:

- Hard disk crash → have a backup

- Time over-run → allow slack for each task

Deflection

Passing the risk on to someone or something else

Example:

- Required software → use of existing software instead of developing it yourself

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Alleviating critical risks (2)

Avoidance

Reducing the likelihood that the risk will occur at all

Examples:

- Use of programming languages

→ use one that you know instead of one that you don't

- Development of a complex algorithm

→ modify an existing algorithm

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Risk assessment report

Project: Introduction of IT-assisted teaching at a college

Risk	Likelihood	Consequence	Risk management approach	Risk symptoms
Infrastructure				
IT infrastructure cannot cope with requirements	Med(2)	High(4)	Equip sufficiently and involve IT Dept	Speed of equipment response
Data projector failing during teaching	Low(1)	Very High(5)	Have a stand-by data projector	None
Staff				
Lack of commitment by staff	Med(2)	High(4)	Clear communication plan; staff development events	Non- or variable attendance of events
Loss of key staff	Med(2)	Med(3)	Succession planning; critical procedures should be documented in a manual	Notice period / Request to attend interview
Delivery				
Staff not available at times training is delivered	High(3)	High(4)	Flexible delivery and session on different days and at different times	Timetables

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Controlling risks

Planning a risk strategy

- How will you go about managing/controlling the risks identified?
E.g. how and when would you notice a time over-run?
Checkpoints: Checking critical risks
 - at regular intervals (e.g. weekly)
 - at the end of particular project stages
 - at meetings with your supervisor
- How and when will you check the risk triggers identified?
- How and when will you invoke your contingency plans?
- How and when will you update your critical risk list?

Risk likelihood and risk consequences change over time

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Grupni zadatak

Consider our running example, that is, the project with the aim to
Develop and evaluate an Artificial Neural Network to predict stock market indices
which is conducted by undertaking the following tasks

Activity	Effort	Duration
Literature search	2 weeks	8 weeks
Literature review	2 weeks	4 weeks
Investigate and evaluate ANNs	2 weeks	4 weeks
Design ANN	2 weeks	4 weeks
Develop and test ANN	2 weeks	2 weeks
Get stock market data	1 week	1 week
Train ANN	1 week	1 week
Use stock market models	1 week	2 weeks
Review statistical tests	1 week	2 weeks
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Complete report	8 weeks	8 weeks
Total	26 weeks	40 weeks

What might a risk assessment report look like for this project?
(10 minutes group discussion)

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