THE 'STEP WISE' PLANNING APPROACH TO SOFTWARE PROJECTS

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Introduction
There is a growing awareness of the importance of Software Project Management (SPM) to which recognition of 'software engineering' as a discipline has contributed. Evidence of this includes the publication of PRINCE, the government standards for the management of IT projects; the Certificate in Project Management that is administered by the Information Systems Examinations Board and the formation of PROMS-G, the BCS special interest group for project management.

The University of Brighton has responded to this interest. The original focus was on the development of a module for the inter-university Modular Masters in Software Engineering (MMSE) which allows industrial practitioners to obtain an MSc by completing modules of their choice from a range offered by a number of different universities in the UK. A module would require the attendance at an intensive course for a week, these courses being also open to others not participating in the overall scheme. The SPM material developed has subsequently been used in customised forms on a range of other courses, both undergraduate and post-graduate.

Development of SPM material
A continuing question has been what topics to include. The approach taken has been influenced by our perception of what constitutes the current 'state of the art', the current practices of industry, and the needs of students preparing for industrial placements and final year projects. It was hoped that PRINCE would provide a structured step by step approach and a set of useful, proven techniques. In fact PRINCE was found to lay down standards about the content of planning documents, but to be rather thin on the techniques: for instance, no specific estimating methods are prescribed. A further problem was that our degree and full time MSc students not unreasonably look towards the SPM component of their studies to provide guidance with the projects that are the culmination of their courses, while the PRINCE model was not easy to scale down into an approach which is helpful with these.

The 'Step Wise' framework
The response has been our own SPM framework which comprises a number of steps to be taken when planning a project (see Figure 1) and which is the basis for our teaching and for the recently published text. Individual techniques such as estimating, critical path network analysis and risk management can be applied at the appropriate step. The framework covers only project planning: it contains a step 'Execute plan' but does not include monitoring and control. This omission was deliberate as PRINCE seemed to be quite adequate with these aspects. In retrospect, this emphasis may have its dangers: however good a plan is, if it is not properly executed and controlled the risk of failure will be great.

The approach is designed to complement PRINCE, which emphasises the iterations of planning in outline first and then in more detail as the time approaches to tackle a part of the project. In a large project, Step 4, 'Identify the products and activities' would be reviewed and Steps 5 to 8 would be repeated at each lower, more detailed, level of planning. Step 4 itself also depends heavily on the PRINCE planning approach of identifying products first, then product flows and finally an 'ideal' activity network. The stakeholder analysis in Step 1 owes much to the ideas of 'Theory W Management' 4, while Step 3, 'Analyse project characteristics', originally owed much to Martyn Ould but has subsequently been much influenced by Euromethod.

An overview of the 'Step Wise' framework

Step 0 Select project

Step 1 Establish project scope and objectives

- Identify objectives and measures of effectiveness in meeting them.
  "What are we trying to achieve? How do we know if we have succeeded?"
- Establish of a project authority
  "Where is the overall authority for the project?"

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- Identify all stakeholders in the project and their interests
  *Who will be affected by the project and who will need to be involved?*
- Modify objectives in the light of stakeholder analysis
  *Do we need to do things to win the commitment of stakeholders?*
- Establish methods of communications with all parties
  *How do we keep in contact?*

![Diagram of project management steps]

**Figure 1 The Step Wise Framework**

**Step 2 Establish project infrastructure**

- Establish relationship between project and strategic planning
  *Why do they want the project?*
- Identify Installation standards and procedures
  *What standards do we have to follow?*
- Identify project team organisation
  *What is the organizational framework?*

**Step 3 Analysis of project characteristics**

- Distinguish the project as either objective or product based
  *Is there more than one way of achieving success?*
- Analyse other project characteristics (including quality based ones)
  *What is different about this project?*
- Identify high level project risks
  *What could go wrong?*
- Take into account user requirements concerning implementation
- Select general life cycle approach
• Review overall resource estimates
  'Does all this make us change our mind about probable costs?'

Step 4 Identify project products and activities

• Identify and describe project products (including quality criteria)
  'What sort of things do we have to create?'
• Document generic product flows
  'In what order do we produce them?'
• Recognise product instances
  'Can we identify particular individual cases of each type of product? e.g. what modules do we
  have to code?'
• Produce ideal Activity Network
• Modify ideal to take into account need for stages and checkpoints

Step 5 Estimate effort for each activity

• Estimate effort for activity
  'How long will this activity take?'
• Revise plan to create controllable activities
  'Do we need to combine activities or split them to get to a convenient size'

Step 6 Identify activity risks

• Identify and quantify activity-based risks
  'What could go wrong with this activity?'
• Plan risk reduction and contingency measures where appropriate
  'How can we stop it going wrong? What do we do if it goes wrong anyway?'
• Adjust plans and estimates to take into account risks

Step 7 Allocate resources

• Identify and allocate resources
  'What resources do we need for this activity?'
• Revise plans and estimates to take to account resource constraints
  'When will the resources be available?'

Step 8 Review/publicise plan

• Review quality aspects of project plan
• Complete/review documentation of plan
• Publicise plan and obtain agreement of parties to project

Step 9/10 Execute plan/ lower levels of planning

This may require the reiteration of the planning process at a lower level.

References
2. Hughes, R.T. 'Using practitioners' problems to shape a course on software project management' Proc of the 4th IFAC\IFIP Workshop on Experience with the Management of Software Projects, 1992