Software Project Estimation

Trinity University – March 23rd, 2010

Dan Cornell
Overview

• Denim Group introduction

• What does an estimate provide?

• Denim Group’s approach for estimates

• Improving estimates
Denim Group and Project Estimation

- **Purpose:** Create a World Where Technology is Trusted
  - “Trust” requires security and predictability

- **Core Values:**
  - Get the Job Done
  - Improve Yourself and Those Around You
  - Understand and Focus on Customer Goals
  - Be a Good Leader; Be a Good Follower
  - Appreciate Quality
  - Communicate Openly and Clearly
What does an estimate provide?

• Forces a structure for how a project will be approached

• Outlines a plan for meeting client needs

• Provides insight into project’s viability

• Primary input for project schedule

• Defines tasks for developers
Why are good estimates important?

• Fixed price projects:
  – *The estimate defines the payment for the project*
  – *Your company is getting paid $Y but it takes $Y * 2 worth of time to deliver to deliver: Unemployment*

• Project milestones:
  – *Often milestones cannot slip*
    • Death march projects
      – i.e., Third week of 16 hour days, 7 days a week
  – *Being behind the 8-ball is demoralizing*
    • It’s difficult to enjoy your work when you are behind from the start
Denim Group Pre-project Workflow

NPIW Origination

Figure 1
Denim Group Pre-project Workflow (cont.)
Denim Group Estimate Generation

• Estimates provide:
  • Defined project structure
  • Quantified approach to project
  • Semi-chronological task list
  • Concrete tasks for developers

• Estimate generation/documentation:
  • Use a work breakdown structure (WBS) to record estimates
Inputs for WBS

- **Client Information**
  - *Client requirements: Business goals/requirements*
  - *Available documentation: process/business flow documentation*
  - *Access to client for inquiries: Interviews, clarification questions*

- **Technical Expert**
  - *Developer with domain experience preferred*
  - *Senior technical staff to assist with estimates*

- **General Project Approach**
  - *High-level plan for achieving project goals*
  - *Prior experience*
  - *Previous WBS for similar project*
  - *Detailed plan developed for new offerings*
Generate WBS

• Schedule time with business development staff to review client needs

• Review input documentation provided by business development and/or client
  – Read It Again!

• Follow up with client to resolve any open questions/issues
# WBS Example

<table>
<thead>
<tr>
<th>Client - Application Migration Project</th>
<th>Num People</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meetings and Documentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Documentation &amp; Updates</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meetings and Teleconferences</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Framework Review</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Application Component X</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convert to Web Service Architecture</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feature Set 1 to .NET</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feature Set 2 to .NET</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Utilities to .NET</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>...</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Application Component Y</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Framework</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feature Set 1 to .NET</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feature Set 2 to .NET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Development Total</strong></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Generate WBS (cont.)

• Begin with set of tasks that are repeated on all projects
  – Scoping
  – Development environment setup
  – Integration environment setup
  – Internal/External Kick-off
  – Project Management
  – Client review delays
  – QA
  – Post-project internal review
  – Etc.

• Content is driven by ‘type’ of project
  – Envisioning -> Project Vision Document (PVD)
  – Planning -> Functional Specification Document (FSD)
  – Development -> Technical deliverable(s)
Generate WBS (cont.)

• Envisioning:
  – *Gather client requirements*: “Helping stakeholders focus on what they want from the project.”
  – *Many interviews with stakeholders*
  – *Project Vision Document*
    • Documents the ‘big idea’ for the project
    • Combines all input from envisioning activities

• Planning:
  – *Use client requirements*: “Develop functional plan for development of project.”
  – *Categorize requirements: initial version vs. later version*
  – *Functional Specification Document*
    • Not a design document
    • Defines the system to be developed
Generate WBS (cont.)

• Development
  – *Decompose system into functional modules (top-down)*
  
  – *Bottom-up design of the functional modules*
  
  – *Identify tasks in terms of deliverables*
    • Document
    • Unit of functionality
  
  – *Continue decomposing tasks into manageable chunks*
    • Impossible to estimate large tasks with any accuracy
    • Some experts call for no work packages > 2 days
    • When have you gone far enough
Task Decomposition: Crucial

- Breaking down tasks forces you to conceptualize the underlying components
  - What are the steps necessary to finish a task?
  - How long do each of those take to complete?
  - Are there any outside dependencies or inherent lag time?
  - What unknowns are in these underlying tasks?

- When do you know when you’ve broken things down to small enough pieces?
  - You don’t
  - This takes practice and it is easy to be complacent when putting together estimates (or you’re on a 3 hour deadline)
Generate WBS (cont.)

- Development
  - *Assign duration for ‘typical’ developer per task*
    - Tasks that have well defined scope/functionality can have firm estimates
  - Poorly defined or ‘risky’ tasks need conservative estimates
    - Slippery slope
  - Use all information available to assign effort
    - Prior engagement with client required a larger than normal amount of coordination
    - Documentation requirements for a particular client may be more stringent than normal
    - Etc.
Review WBS

• Technical Review of WBS
  – *Requires time of senior technical resource*
  – *Crucial in pointing out oversights in task identification/level-of-effort*
  – *Useful for maintenance of standardized WBS (granularity/style) across the organization*
  – *Allows for enhanced accountability for an estimate*

• Business Review of WBS
  – *Business relationship manager will be able to assign dollar amount for project*
    • Terms the client understands
    • Can negotiate ‘must-have’ functionality/features
  – *Keeps continuity on projects for a client*
Improving Estimation Skills

• Estimating software development projects is DIFFICULT!

• Expertise is related to experience

• DO NOT provide ‘water cooler estimates’

• It’s the peripheral tasks that can really haunt you
  – *It is crucial to take note of project tasks that may not be at the center of the technical solution*
  – *Often overlooked, and add up to cause overruns*
Improving Estimation Skills (cont.)

• Historical data is key to making good estimates
  – True for organizations and individuals
  – Tracking personal performance against estimates is

• When is a task complete?
  – During a project unless you use tasks that result in a deliverable, it’s difficult to know when a task is complete
  – The use of deliverable-based tasks allows you to know if a task is complete or not
  – This allows for tracking actual progress vs. estimated
Improving Estimation Skills (cont.)

- **Estimation Tips:**
  - *Avoid over optimistic estimates*
    - You’re smart, but nothing works like it should in the real world
    - You will often be held up by outside factors (client delay, QA, missed requirements, etc.)
  - *Tasks WILL take longer than you think they will at first glance*
    - Back-to-front task analysis
  - *The smaller the chunk of work / the easier to estimate*
  - *Avoid write-only estimation*
    - Track your own progress against estimates
    - This is a professional growth opportunity (maybe on own time)
  - *Report unrealistic estimates*
    - The minute you realize an estimate is wrong, be sure to report it
    - May be difficult due to politics, but imperative for professional credibility
Wrap up & Q&A

Dan Cornell
Email: dan@denimgroup.com
Twitter: @danielcornell

Phone: (210) 572-4400
Web: www.denimgroup.com
Blog: blog.denimgroup.com