Project Management : Techniques and Tools
(COMP 4990)

Who are the stakeholders?

- Clients/Customers
- Upper Management
- Project Manager
- Developers/Workers

A project manager's role

- A major role of a project manager (PM) is to ensure that the project succeeds
  - To a lesser degree, this is also a role for other stakeholders
- Therefore, the PM is responsible (if not to blame) when these problems occur

- A project manager must remain unbiased
  - Customers or upper management may ask for unrealistic features and/or schedules
  - It is not a project manager's role to make such schedules work, by pushing developers harder

What would you look for in a PM?

- sufficient experience
  - has experienced successful projects
  - has experienced failed projects
- has excellent organizational skills
- has excellent communication skills
- is a strong leader
- project management certifications:
  - Project+: Entry-level certification, for aspiring project managers
  - PMP: Professional cert., for experienced project managers
    - Project management body of knowledge (PMBOK)

Project Management Phases

1. Defining
2. Risk Management
3. Planning & Scheduling
4. Launching
5. Monitoring & Controlling
6. Closing

Defining

- Determine what the customer wants
- Identify Requirements
  - Goals
  - Deliverables
  - Success criteria
- Scope

Goals

- A goal is normally a solution to a problem
- When defining goals, answer the following questions:
  - What problem will we solve?
    - e.g. Accounting department has 2 month turnaround for budget requests, which is too long.
  - In what sense will we solve the problem?
    - e.g. Our accounting software will streamline the process of budget re-work.
- May be made of smaller sub-goals

Deliverables

- Deliverables are the actual artifacts created by the project team for the customer
- These typically include:
  - Binary packages
  - Source packages (in open source projects)
  - Documentation & tutorials
  - Version history
  - Utilities
  - Installation software

Success Criteria

- Success criteria define what must be true in order for the project to be considered a success
  - related to the goals
  - attributes that can be measured
    - e.g. The accounting department's time to approve a budget is reduced by at least 50%.

Scope

- The project's scope defines its boundaries
  - Closely related to the *Requirements*
  - PM may work with customers to decide which requirements are necessary, and which are not
  - Determine whether or not a feature request (change) is appropriate later
- Thus, scope deals with both requirements and changes

Risks

- Risks are things that could cause the project to:
  - Fail
  - Be delayed
  - Require additional budget
  - Require additional personnel

- A project manager should identify:
  - Impact: What is the expected negative impact should it occur?
  - Probability: How likely is it to occur?

Risk Document

- The risk document:
  - Identifies and describes risks
  - Describes what conditions make it happen
  - Describes the probability of it happening
  - Describes the impact of it happening
  - Describes a plan for how to (try to) avoid it happening
  - Describes a plan for what to do if it happens
    - This is only done if the probability and/or impact necessitate such a plan

Planning

- We know what we want and the associated risks
- Now, we figure out how to do the work required
- We do this by:
  - Performing architecture & design
  - Identifying activities: work breakdown structure (WBS)
  - Identifying dependencies between activities
  - Estimating activity duration
  - Estimating activity resource requirements
  - Scheduling activities (start date, duration)

Architecture & Design

- Architecture: Refers to the *overall structure* of the application - defines the modules
  - Each module has a set of common responsibilities

- Design: Refers to the structure of the module itself
  - Can involve creating classes (in OOD) and assigning responsibilities (functions or data) to them

Activities

- An activity is something a participant may undertake
  - This could be:
    - Designing a module
    - Updating documentation
    - Optimizing the search code
    - Installing the binaries in a web server
    - Writing a lookup method
- Activities can be:
  - Estimated for time & resource requirements
  - Assigned to team member(s)

Schedule

- A schedule is a time-plan for activities
- The schedule must:
  - Include all activities
  - Show dependencies between activities
    - e.g. What must occur before this activity can start?
  - Show estimated durations for activities
  - Show starting points for activities
  - Show combined activity duration as project duration
  - Show estimated resources for activities
  - Show combined activity resource requirements as project resource requirements

Work Breakdown Structure

- The WBS:
  - Defines all activities
    - Each system function is defined as a high-level activity
    - Each activity is broken down into smaller activities
    - This process repeats until activities are small and manageable
  - Shows hierarchical relationships between activities
    - A WBS can be represented with a tree diagram

Project Plan

- The project plan defines:
  - Dependencies between activities
    - e.g. Architecture must be determined before development can begin
  - Schedule
    - Including an estimate of each activity's duration
  - Initial activity assignment
    - Activities are assigned to fictitious team members

Launching

- We have a detailed work plan
- Now, we get the work underway
- We do this by:
  - Choosing participants
  - Making participants available for the project
  - Assigning work to participants
  - Organizing participants into team(s)
  - Providing resources to the team(s)
  - Establish constraints and freedoms for the team(s)

Monitoring & Controlling

- We have people working on activities
- Now, we must ensure we are making adequate progress
- We do this by:
  - Interviewing and observing progress reports
  - Implementing version control software
  - Providing mechanisms for requesting changes
  - Continually updating plans (e.g. schedules)

Closing

- We have completed all activities
  - The result should be that
    - All overall goals are satisfied
    - All success criteria are met
    - All deliverables are ready for roll-out
- Now, we need to complete hand-over
- We do this by:
  - Obtaining client acceptance
  - Deploying deliverables
    - e.g. media disks, printed manuals, online deployment/downloads
  - Performing a post-mortem analysis
    - How did we do?

Post-Mortem Analysis

- A post-mortem involves analyzing the project upon completion
  - This is not to be confused with QA, which analyzes the deliverables
- A post-mortem is a critical step, that many project managers miss
  - May allow the manager to
    - More accurately estimate activities after the experience
    - Identify mistakes made, to avoid making them again
    - Recognize personal achievements

Summary

- Project management's job is to ensure that projects do not fail
  - We must identify what the customer wants
  - We must identify potential pitfalls
  - We must list what needs to be done
  - We must make detailed plans
  - We must prepare for changes
  - We must ensure that our plans are being followed
  - We must ensure that our plans are working
    - If not, we must update them or take another corrective action