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Introduction to Project Management: Principles, Techniques and Tools

2013

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Agenda

	Topic	Time
1	Opening and Introduction	30 mins
2	Project Management - Introduction to Project Management	20 mins
	10 Minute Break	
3	Project Management Methodology - Project Scope and Activity-Planning - Planning, Estimation and Scheduling - Team Management	60 mins
	10 Minute Break	
4	Project Management Methodology - Project Monitoring & Control	10 mins
5	Team Exercise	30 mins
	10 Minute Break	
6	Recap and Closing Remarks	10 mins

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OPENING AND INTRODUCTIONS

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Opening and Introduction

- Name
- Department and/or Unit
- Role
- How many years with UC Davis?
- Something interesting about yourself
- Experience with Project Management
- What do you want to learn from this course?

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INTRODUCTION TO PROJECT MANAGEMENT

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Program versus Project

- Often program and project are used interchangeably, but nominally, a program is a larger concept than a project
  - A program is a set of related projects
    - The Space Shuttle program consists of many flights which are each separately managed projects
  - This training is focused on projects

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Defining a Project As Interrelated Tasks

- A project is a series of complex, connected activities with a common purpose
  - Our most common context is a project to develop or refine a program, but principles of project management apply to most projects.
- A key factor of successful project management is to see a project as a series of interrelated tasks
  - Most other courses focus on how to *perform* a single complex task, such as developing a use-case or designing a good human-computer interface
  - But there are 5 variants on how we plan the tasks over the timeline of the project.

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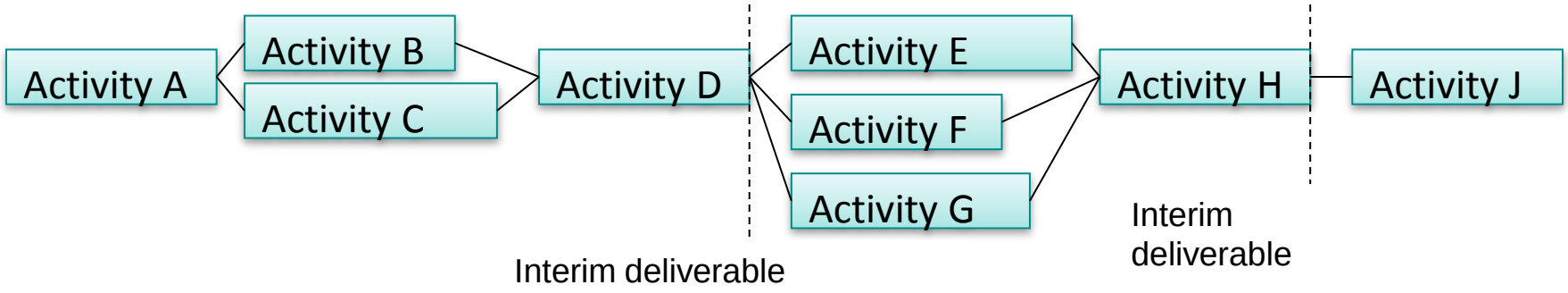
What is a Project?

A project is a sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification.



If the length of the activity bars indicates relative task duration, this chart tells us quite a lot about the project:

- There are two important deadlines when sub-components of the system (interim deliverables) must be delivered for the project to be considered on track
- The Critical Path (the sequence of activities that cannot slip without the whole project slipping) is A → C → D → E → H
- If we could perform the activities to develop sub-component 1 and sub-component 2 in parallel, we could reduce the project time slip risk considerably.

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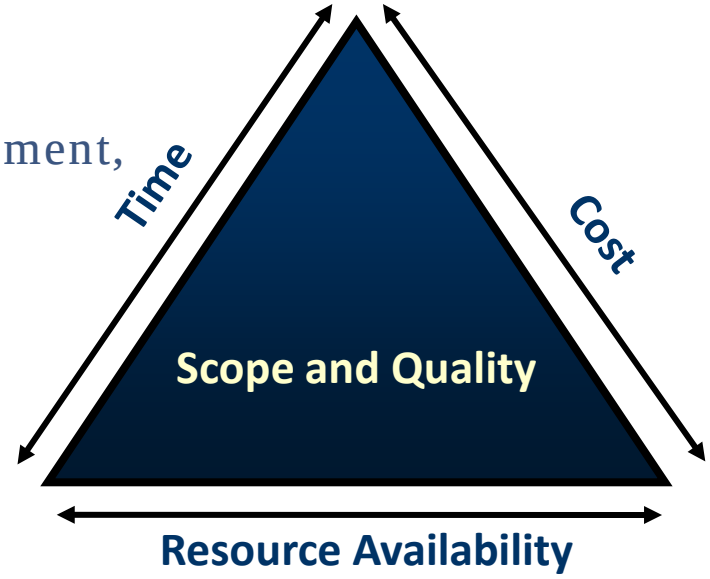
Project Constraints

- Projects are limited by their product quality and process quality requirements
  - Cost – mostly labor cost, but also hardware, software, training, etc.
  - Calendar time (schedule)
  - Requirements/objectives and/or quality
  - Resources – people (skills), facilities, equipment, etc.
- In reality we can only control and manage – at most - two of these constraints
  - *Client decision: Which constraints can you tolerate flexibility in?*



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Concept of Project Planning

- Project Planning involves understanding the fundamentals of a project:
  - What business situation is being addressed?
  - What do you need to do?
  - What will you do?
  - How will you do it?
  - How will you know you did it?
  - How well did you do?

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The Creeps

- Scope Creep
  - Changes to the project spec. and plan occur all the time, for many reasons. Scope creep occurs when the project becomes more complicated (wider in scope) over time because of these changes.
- Hope Creep
  - Project team members tend to hide when they are falling behind. This is where a good strategy pays off: you need to understand what each team member is doing and monitor what progress they make.
- Effort Creep
  - Sometimes people are just not effective and sometimes the job is more complicated than anticipated. Effort creep occurs when a team member is putting in the hours, but not writing off the tasks by the expected deadline.

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Classification By Project Management Life Cycle

- Traditional PM
  - Follows the linear, waterfall model
- Incremental planning PM
  - Delivers the project in incremental stages
  - Reduces risk of delivering everything at once
- Iterative planning PM
  - Allows project to evolve as understanding increases
  - Allows management and stakeholder expectations / operational challenges to be clarified
- Adaptive planning PM
  - Allows project purpose & goals to evolve as project proceeds
  - Project planned in cycles: goals & requirements reviewed each cycle
- Extreme planning PM
  - Involves users and/or client in constant input / review of requirements
  - Needs small group of project team working closely

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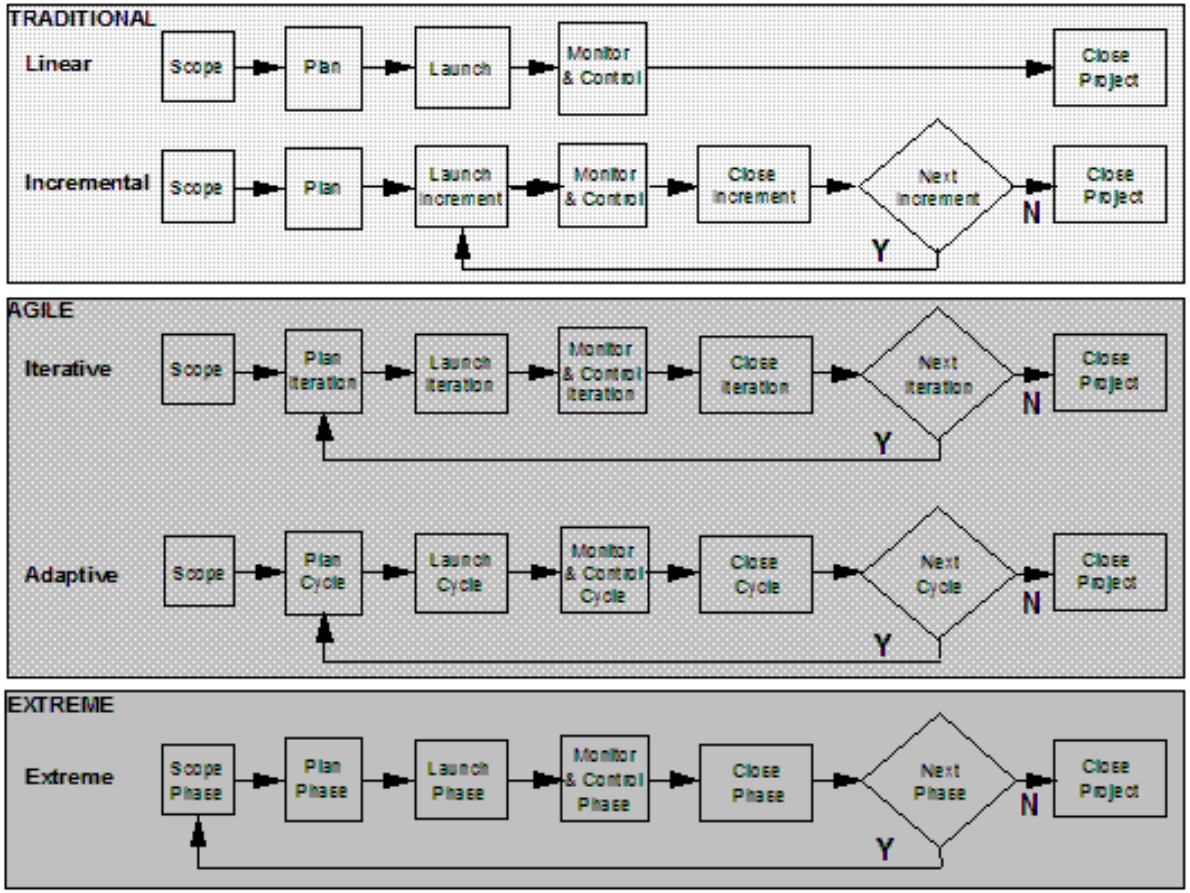
The Five PM Lifecycle



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Defining Interim Deliverables

- Breaks a project down into sub-projects
  - Define interim deliverables around objectives or goals
  - Interim deliverables are simply project milestones
    - Deliverables can be internal to the project, demonstrating progress
    - Some deliverables may be external (delivered to the client)
  - This makes the project more visible to your everyone (management, team, peers) – even if you don't deliver tangible results, you have achieved interim milestones, that demonstrate progress
- Think in terms of project outcomes and management priorities
  - Breaks a project down into sub-projects
    - High priority objectives/goals are developed first
  - Identifies dependencies between objectives/goals early
    - Makes sense of scheduling order: what needs to be done first
    - Activities within a sub-project may be scheduled in parallel

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Scope The Project

- Develop and gain approval of a general statement of the goal and business value of the project.
  - Eliciting the true needs of the project
  - Documenting the project's needs
  - Negotiating with the sponsor/senior management how these needs will be met
  - Writing a one-page description of the project
  - Gaining senior management approval to plan the project

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Plan The Project

- Identify work to be done and estimate time, cost and resource requirements and gain approval to do the project.
  - Defining all of the work of the project
  - Estimating how long it will take to complete this work
  - Estimating the resources required to complete the work
  - Estimating the total cost of the work
  - Sequencing the work
  - Building the initial project schedule
  - Analyzing & adjusting the project schedule
  - Writing a risk management plan
  - Documenting the project plan
  - Gaining senior management approval to launch the project

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Launch The Project

- Recruit the team and establish team operating rules
  - Recruiting the project team
  - Writing the Project Description Document
  - Establishing team operating rules
  - Establishing the scope change management process
  - Managing team communications
  - Finalizing the project schedule
  - Writing work packages

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Monitor & Control The Project

- Respond to change requests and resolve problem situations to maintain project progress.
  - Monitoring project performance
  - Establishing the project performance and reporting system
  - Monitoring risk
  - Reporting project status
  - Processing scope change requests
  - Discovering and solving problems

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Close Out The Project

- Assure attainment of management requirements and issue deliverables.
  - Gaining senior management approval of having met project requirements
  - Planning and issuing deliverables
  - Writing the final project report
  - Conducting the post-implementation audit

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10 MINUTE BREAK

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PROJECT MANAGEMENT METHODOLOGY

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PROJECT SCOPE AND ACTIVITY PLANNING

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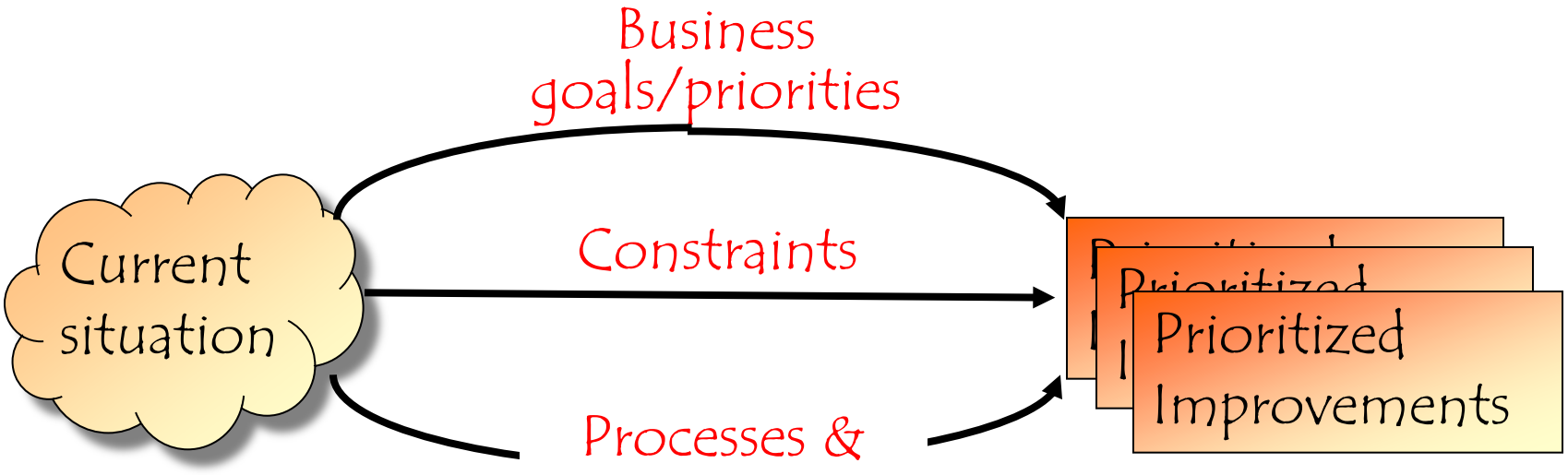
Gap Analysis: Defining Scope



Potential business scope and impact

Goals for change

The project scope

WHAT → HOW → WHAT

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The Project Overview Statement

- We start project scoping by defining a Project Overview Statement (POS).
  - The POS defines the scope and the business rationale of the project. It is intended to communicate to all project personnel and stakeholders exactly what will be implemented and *why*. Not just why it is needed, but why it needs to be implemented in this way.

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Example POS

PROJECT OVERVIEW STATEMENT	Project Name	Project No.	Project Manager
	Office Supply Cost Reduction		PAUL BEARER

Problem/Opportunity

Our cost reduction task force reports that office supply expenses have exceeded budget by an average of 4% for each of the last three fiscal years. In addition an across the board budget cut of 2% has been announced and there is an inflation rate of 3% estimated for the year.

Goal

To implement a cost containment program that will result in office supply expenses being within budget by the end of the next fiscal year.

Objectives

1. Establish a departmental office supply budgeting and control system.
2. Implement a central stores for office and copying supplies.
3. Standardize the types and brands of office supplies used by the company.
4. Increase employee awareness of copying practices that can reduce the cost of meeting their copying needs.

Success Criteria

1. The total project cost is less than 4% of the current year office supply budget.
2. At least 98% of office supply requests are filled on demand.
3. At least 90% of the departments have office supply expenses within budget.
4. No department office supply expense exceeds budget by more than 4%.

Assumptions, Risks, Obstacles

1. Central stores can be operated at or below the breakeven point.
2. Users will be sensitive to and supportive of the cost containment initiatives.
3. Equitable office supply budgets can be established.
4. Management will be supportive and consistent.
5. The existing inventory control system can support the central stores operation.

Prepared By	Date	Approved By	Date
Olive Branch	9/2/04	Del E. Lama	9/3/04

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Tools, Templates & Processes used to Scope Project

- Establish the Conditions of Satisfaction (CoS)
- Project Scoping Meeting
- Requirements Gathering
- Diagramming Business Processes
- Validating Business Cases
- Procurement Management
- Outsourcing
- Project Overview Statement
- Approval to Plan the Project

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The Project Scoping Meeting

- Purpose
  - Draft Project Overview Statement
  - Draft resource requirements
- Attendees
  - Senior Management and project stakeholders
  - Core Members of Project Team
- Agenda
- Deliverables
  - Conditions of Satisfaction
  - Final Project Overview Statement

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ESTIMATION AND SCHEDULING

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Project Estimation & Planning

The steps in project estimation and planning are:

- Define project requirements:
  1. Define the project goals/priorities and requirements
  2. Define the communication, training, and change management requirements
- Decompose the above requirements into a work-breakdown structure (WBS), that defines each activity required to complete the project
- Schedule the activities in the WBS into a time-related plan
- Estimate the time, cost and resources required for the plan

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Work Breakdown Structure (WBS)

The Work Breakdown Structure (WBS) is a hierarchical description of all of the work that must be done to meet the needs of the client.

Uses for the WBS:

- Thought Process Tool
- Planning Tool
- Project Status Reporting Tool

The key to writing a good WBS is to decompose the project goal into major activities

- Then keep breaking those activities down until you get to the smallest level of tasks mentioned earlier
- A WBS with too much detail is time consuming to generate and follow
    - ...not enough detail, and you miss important tasks

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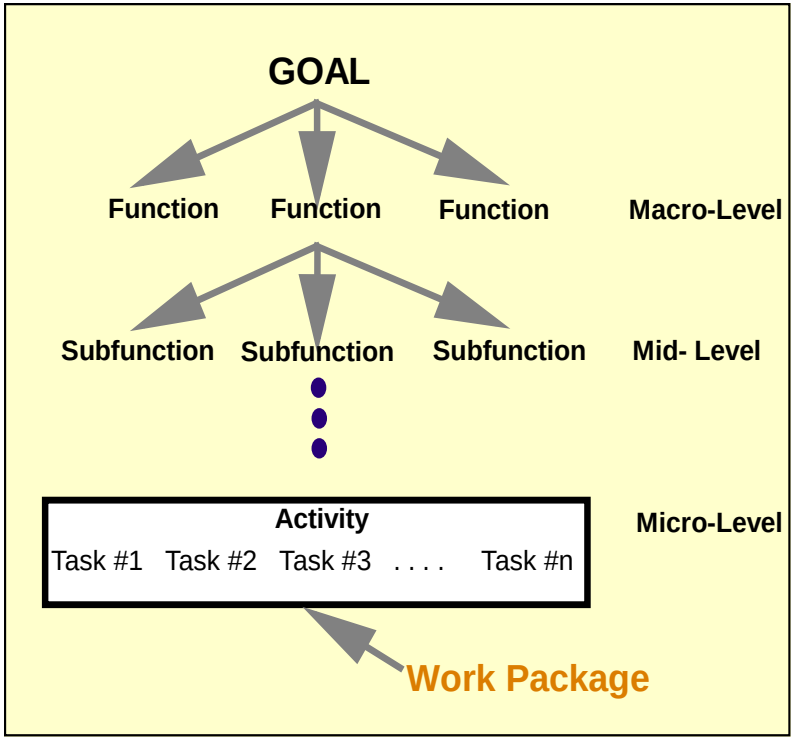
Work Breakdown Structure (WBS)



The WBS gives structure to the set of activities in a project

- It expands on the POS by describing activities in more and more detail, until you get down to the smallest level of task you need to define for a project

The WBS is a *really big* 'to-do' list. Its uses are to:

- Estimate Duration
- Determine Resources
- Schedule Work

Inputs to the WBS are:

- POS

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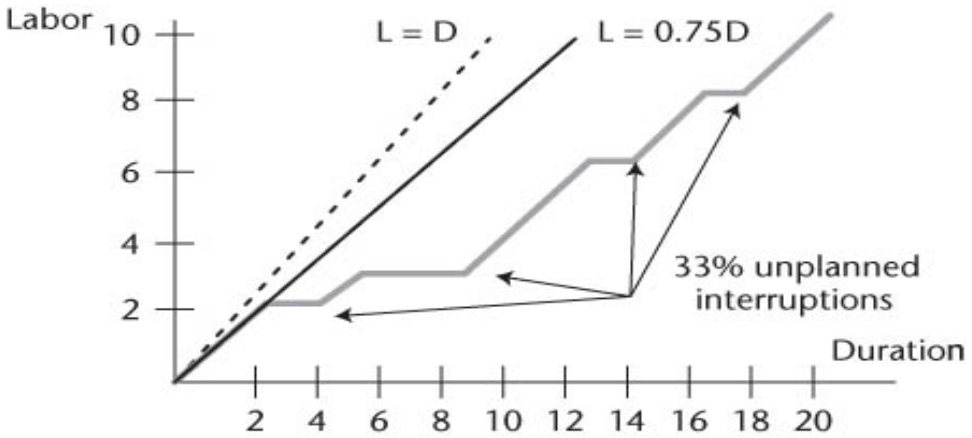
Duration versus Effort

- Duration, or time for a task, is the amount of calendar time needed to accomplish it
- Effort is the number of working hours (or months or years) needed for a task or project

  One week of effort is 40 hours, one month of effort is about 168 hours

  May use units of staff-months, people-months, labor-months or man-months
- *The difference between Duration and Work Effort:*



Average Staffing

- An easy measure of a project is the average number of people working on it – equal to the effort divided by time
  - Ave staffing = effort / time
  - A project might take 9 months (duration) and 12,000 hours (effort)
    - Ave staffing=(12,000 hrs / (168 hrs/mo))/ 9 months = 7.9 people

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Six Simple Ways to Estimate Task Duration

1. Similarity to other activities
2. Historical Data
3. Expert Advice
4. Delphi Technique
   - Group of experts individually estimate duration
   - Then, average of the estimates is calculated
   - Repeat these steps twice more
5. Three-Point Technique
   - Derive most optimistic estimate, most pessimistic estimate, and most likely estimate, which are then averaged
6. Wide-band Delphi Technique
   - Combination of Delphi and Three-Point techniques

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Estimating Resource Requirements

- Types of resource:
  - People
  - Facilities
  - Equipment
  - Money
  - Materials

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Timelines

- Timelines for a schedule may follow either a calendar schedule, or a relative schedule
  - *Calendar schedule* is broken into absolute time intervals based on actual time (e.g. Jul. 2013)
    - May use a second or third calendar scale of larger intervals (quarters, years)
    - Calendar (CY) or fiscal (FY) years may be used
  - *Relative schedule* is measured from the start of the project - or some other key event - then uses time intervals counted from that event (e.g. Month 2 after budget received)

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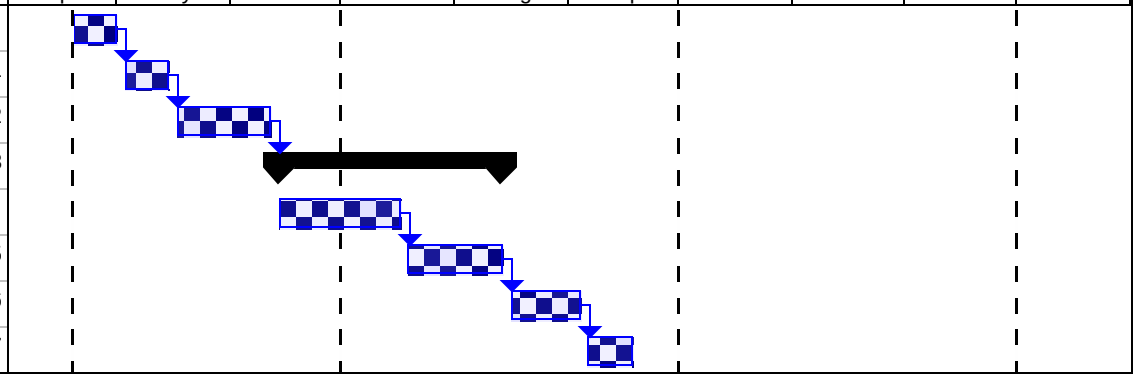
Gantt Chart

- Label each activity with its WBS and task name, followed by a bar to represent its duration on the timeline
- Milestones are generally a diamond symbol ◇
  - Used for key decisions
- Symbol format not critical, as long as it's clear and consistent

ID	Task Name	Duration	Predecessors
1	1.0 Requirements Definition	10 days	
2	2.0 Architectural Design	10 days	1
3	3.0 Detailed Design	20 days	2
4	**4.0 Coding and Unit Testing**	**45 days**	**3**
5	4.1 Coding	25 days	
6	4.2 Unit Testing	20 days	5
7	5.0 Integration Testing	15 days	6
8	6.0 System Testing	10 days	7



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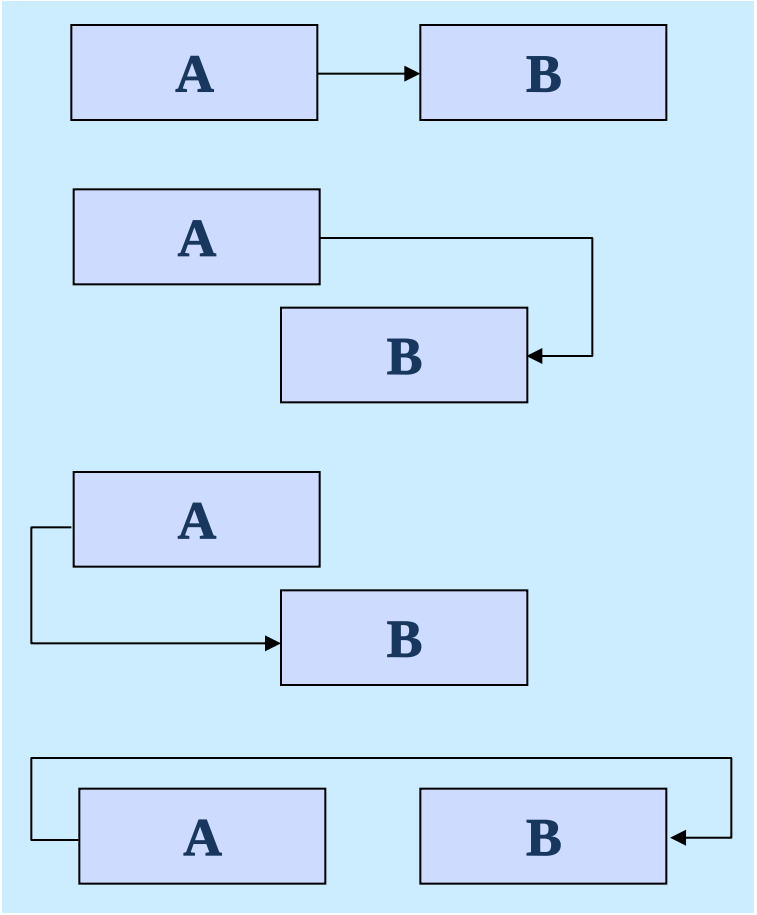
4 Types of Task Dependency



FS: When A finishes, B may start

FF: When A finishes, B may finish

SS: When A starts, B may start

SF: When A starts, B may finish

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TEAM MANAGEMENT

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What is a Project Team?

- A project team is a group of professionals committed to achieving common objectives, who work well together and who relate directly and openly with one another to get things done.
- Project team membership
  - Project manager –(chosen before Scoping)
  - Core team (chosen before Planning)
  - Supporting team (chosen before Launching)

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What Makes A Project Team Effective?

- "People like us"
  - Select team members who will get on with each other.
- Possesses needed skills and competencies
  - Goes with member development. Pair less experienced people with more experienced, to develop their skills and understanding.
- Member satisfaction & Member development
  - People need to think that they are (a) appreciated and (b) developing marketable skills. Make sure they get great feedback and access to training opportunities.
- Flexibility, Coordination & Cooperation
  - Are the team *acting as a team* in monitoring progress? Do they identify and share critical tasks, to get things done?
- Quality of output
  - Do your team understand what makes a high-quality piece of work? If not, it is your job to educate them!
- Productivity
  - Set clear goals and reward structures. Make sure people feel appreciated when they meet their goals.

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The Project Kick-Off Meeting

- Introductions
- Sponsor Comments
- Write the Project Definition Statement*
  - Expands on the (business) objectives of the PoS, to produce a set of high-level process requirements for the project
  - Expands on assumptions, risks, and obstacles from PoS, to agree a high-level risk management plan, *across the team*
- Establish team operating rules*
- Integrate team member availabilities into schedule*
- Identify and write work packages*

** This working part of the meeting is for the members of project team*

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10 MINUTE BREAK

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PROJECT MONITORING & CONTROL

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Control versus Risk

- Management Controls:
  "Actions taken as a result of reports."
- Purpose of Management Controls
  - To track progress
  - To detect variance from plan
  - To take corrective action
- Without good controls, a project will wander like a 6-year-old on summer vacation
- Controls allow us to
  - Track progress – what has been accomplished?
  - Detect variance – have we departed from the plan?
  - Take corrective action – fix it!

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Control and Risk

- Controlling a project is closely linked to risk management
  - High Control – Low Risk
  - Low Control – High Risk
- Need to minimize the risk that the project won't finish successfully
  - Successfully generally means "on time and within budget"
- To do so, you need measurements to help decide if the project is on track
- If something's wrong, you need to address what corrective action will be taken

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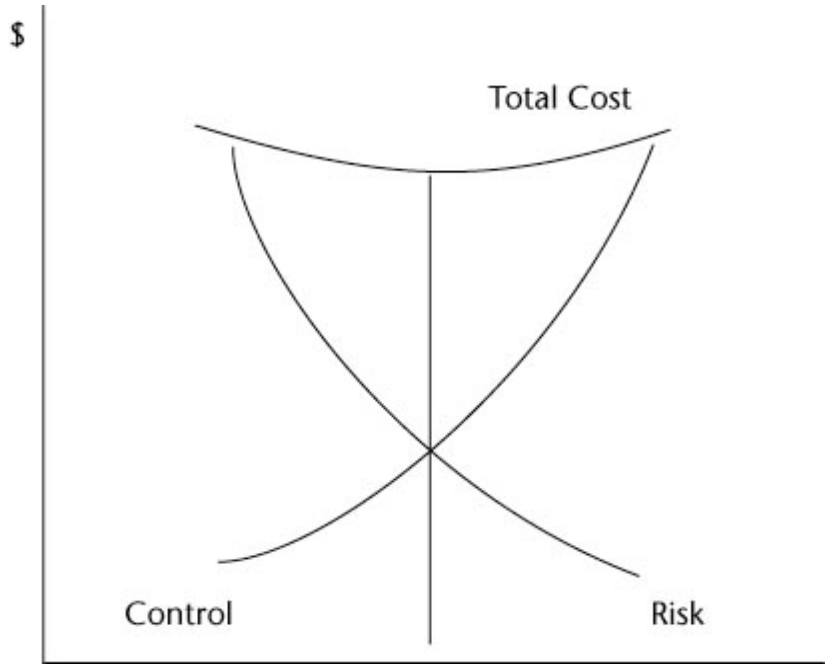
Balancing the Control System

In theory there's an ideal balance possible between control and risk.

- Too little control will increase project cost, because effort will be wasted.
- Excessive Control Can Limit Creativity
- Excessive Control Can Increase Reporting Overhead
- Product quality will also be affected by amount of control over its development process



There is a positive correlation between Control and Quality

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Progress Reporting System

- Some form of progress reporting system needs to be established
  - Want timely, complete, clear, and accurate status reported
  - Need something that isn't burdensome and counterproductive
    - Avoid adding too much to overhead to create the status reports
  - Results are readily available and easy to understand
    - Readily acceptable to senior management
    - Readily acceptable to the project team
  - Provides an effective early warning system
    - Warns of problems with time to fix them

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How and What Information to Update

- Determine a set period of time and day of week
- Report actual work accomplished during this period
- Record historical and re-estimate remaining
- Report start and finish dates
- Record days of duration accomplished and remaining
- Report resource effort spent and remaining
- Report percent complete

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Five Types of Status Reports

1. Current period reports – report status during the current reporting period, e.g. this week's status
2. Cumulative reports – report history of project from start to the present, or at least a significant amount of time. These are good for identifying trends
3. Exception reports – are generated only when something is amiss. This summarizes what's wrong, and indicates what action is needed to fix it.
4. Stoplight reports – aren't really a separate type of report. They add a simple red/yellow/green indicator of status – green is OK, yellow is a problem that needs fixing, and red means project is out of control
5. Variance reports – tell how far the project is ahead of, or behind the plan
    1. Variances generally pertain to the schedule and/or costs, showing planned and actual values, and the difference between them
    2. Present results from the current reporting period, and maybe one previous period
    3. May be tabular data, or graphic

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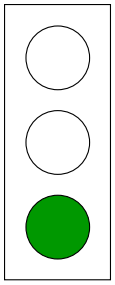
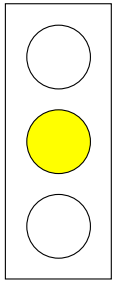
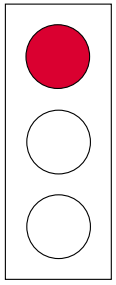
Exception Report – Stoplight Report



The project is progressing according to plan.



The project has a problem.
A Get Well plan is in place.
The situation will correct.



The project is failing.
Intervention is required.

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Variances

- Variances are the difference between actual events and the project plan
- Positive variances are often good
  - They mean you are ahead of schedule or under budget
  - But could mean the schedule has slipped, and little has been accomplished
- Conversely, negative variances are generally bad
  - Behind schedule and/or over planned cost
  - Rarely, can mean more work has been done than planned (not always bad)
- Variance Report has three columns
  - The planned number
  - The actual number
  - The difference between the two numbers
- Report can be numeric or graphical
- Five Reasons to report on duration and cost variances
  - Catch deviations from the curve early
  - Dampen oscillation
  - Allow early corrective action
  - Determine weekly schedule variance
  - Determine weekly effort (person hours/days) variance

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How & When To Collect Data?

- Status reports are critical to understanding a project, yet can also be a waste of time and/or interfere with getting the project done
- Need to decide how often reporting is done
  - Academia tends to be monthly, most of industry is weekly or biweekly
- Need to determine reporting period (what day is the start of the week?)
  - This often feeds a repeating process, e.g.
    - Reports are due Friday to your manager
    - They report to their boss by Monday noon
    - A collected report is issued on Tuesdays
- Reports contain actual status to date, start and finish dates for tasks
- Reports might also include
  - Projections of work remaining
  - Percent completion of tasks, and
  - The amount of resources spent on each task (e.g. 12 hours on WBS task 1.3.2)

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How and What Information to Update

- Determine a set period of time and day of week
- Report actual work accomplished during this period
- Report start and finish dates
- Record days of duration accomplished and remaining
- Report resource effort (hours/day) spent and remaining (in-progress work only)
- Report percent complete
- Frequency of gathering and reporting project progress
  - Typically weekly but can be more or less frequent depending on the project

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Displaying Status

- There are three major ways to display the status of a project graphically
  - Gantt chart
  - Milestone trend chart
  - Cost schedule control chart

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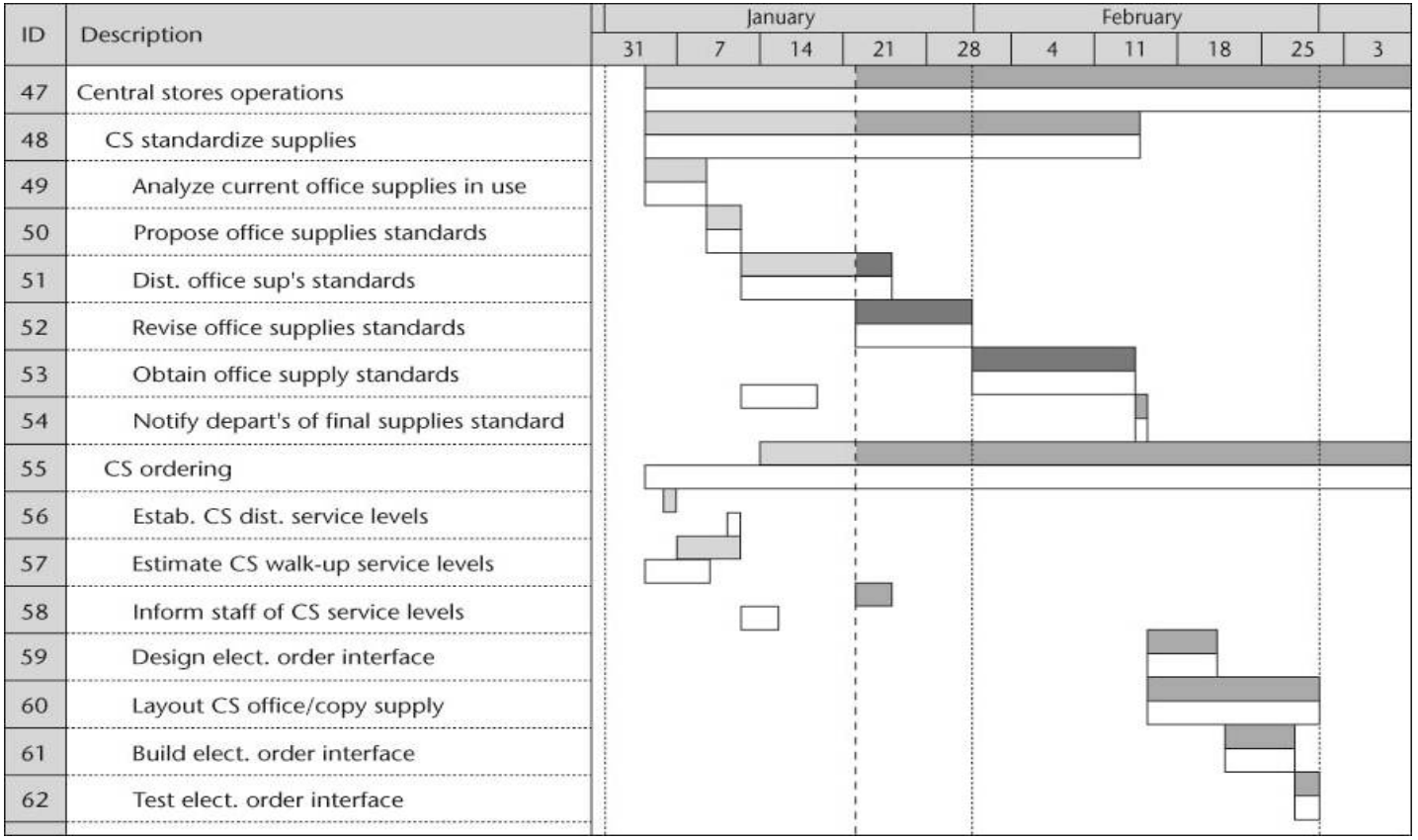
Charting the WBS to Report Project Status



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TEAM EXERCISE

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10 MINUTE BREAK

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Team Exercise

- **Assignment 1**: *Project scoping.*
  Define the business "problem" and what your project goals are. Use a real life example. Prepare a work breakdown structure for the expected project activities and produce a project overview statement. To do this, you need to understand the interim deliverables – the sub-components that constitute your system and the sets of activities needed to deliver these. Don't assume that all of the business requirements have been clarified at this point – and don't forget the *change-management activities*, such as business process change, training, communication and initial support.
- **Assignment 2**: *Project estimation.*
  Refine the work breakdown structure and define what type of skills you will need, what types of tasks are to be done, what are the major risks of the project, and what dependencies you might have between project elements. From the WBS and analysis, you should be able to produce effort and costs estimate easily, covering tasks, resources, time and task dependencies. Produce an initial project timeline.
- **Assignment 3**: *Project organization and reporting.*
  First, you are asked to think about the specifics of reporting status for your project. Think about the sort of organization you are working for, the way in which you are intending to organize the "sub-projects" for your system, and the types of interim deliverable that you want senior management and other project stakeholders to be aware of.

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RECAP AND CLOSING REMARKS

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Summary of Key Points

- Manage the Creeps
- Project Overview Statement
- Work breakdown structure
- Task and Duration Estimates
- Manage Resources (people, time, and so on)
- Communicate status