



Project Management

Ejvin Berry,
Chris Imondi,
Tim Christensen

FIRSTFare – October 31st, 2009

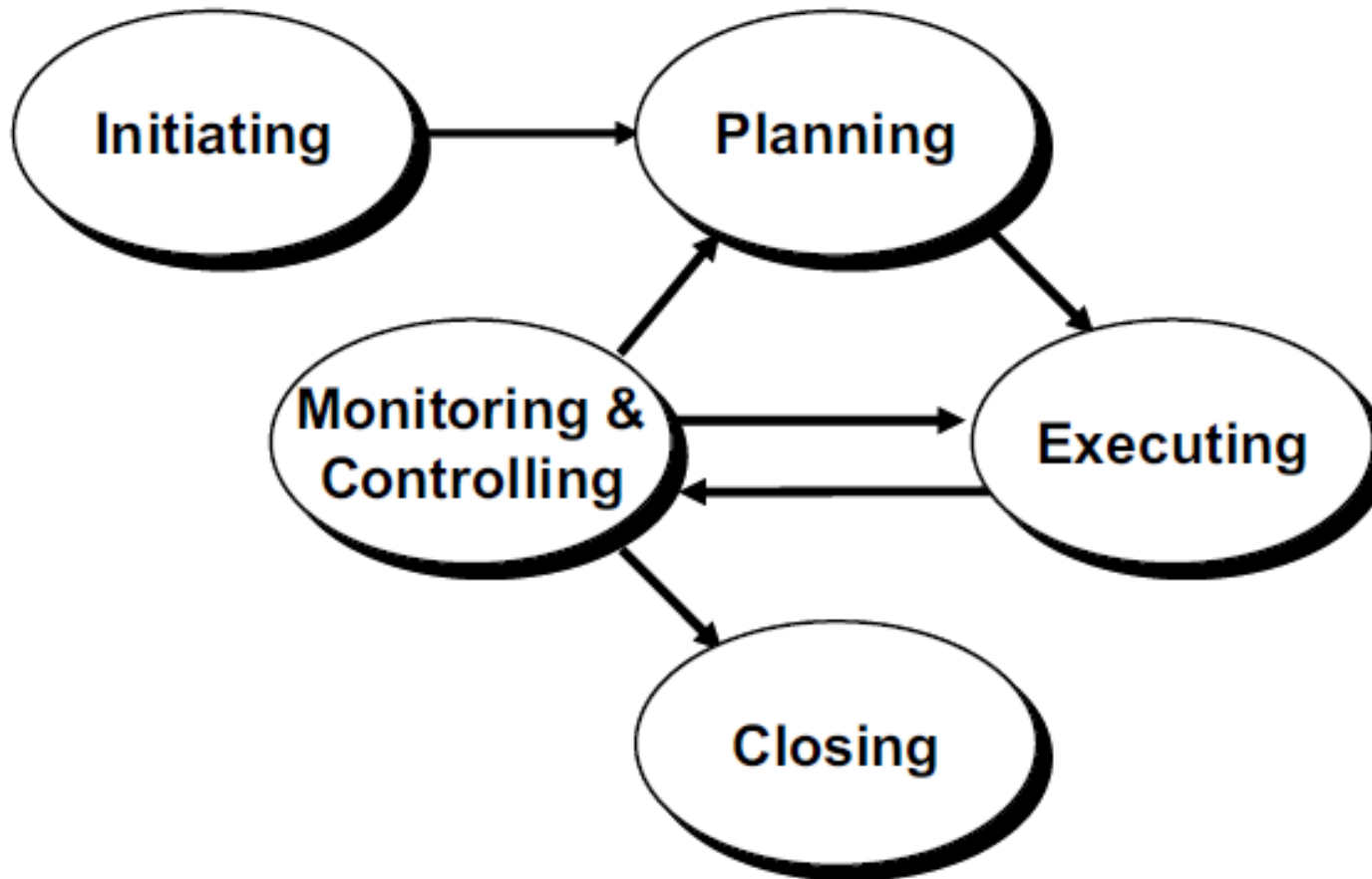
[What is a Project?]

- Scope
- Time
- Cost
- Quality
- Risk

[Project Success]

- Happy customers
- On time deliverables
- On budget
- Return investors
- Team cohesion (at end of project)

Project Management Processes



[Project Manager]

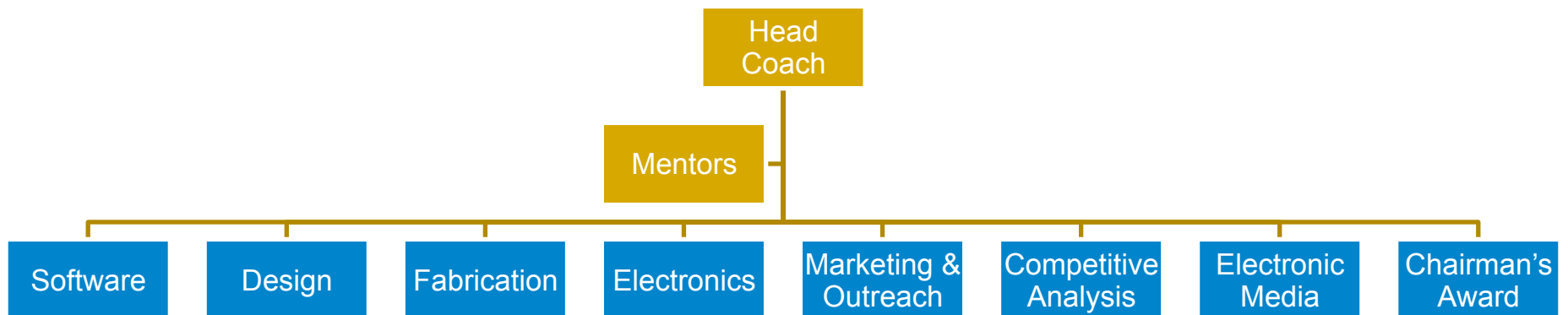
- Primary Roles:
 - Build a team (organize existing resources)
 - Maintain/ Analyze data and schedule
 - Manage conflict (interference)
 - Review work
 - Schedule resources

[Team Structures]

- Who's on first??
 - Many teams will develop an organization chart, matching system team leads to their responsibilities, and who is on each system team
- Matching people with their strengths
 - It may be helpful, particularly for rookie teams, to develop a skills matrix.
 - This will help identify training needs, or where you need to get more help (a trainer, or a hired gun?)

[Team Management]

Team 1540 Organization Chart



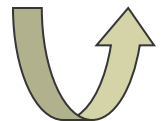
Dale Yokum, "New Coach Workshop"



Skills Matrix

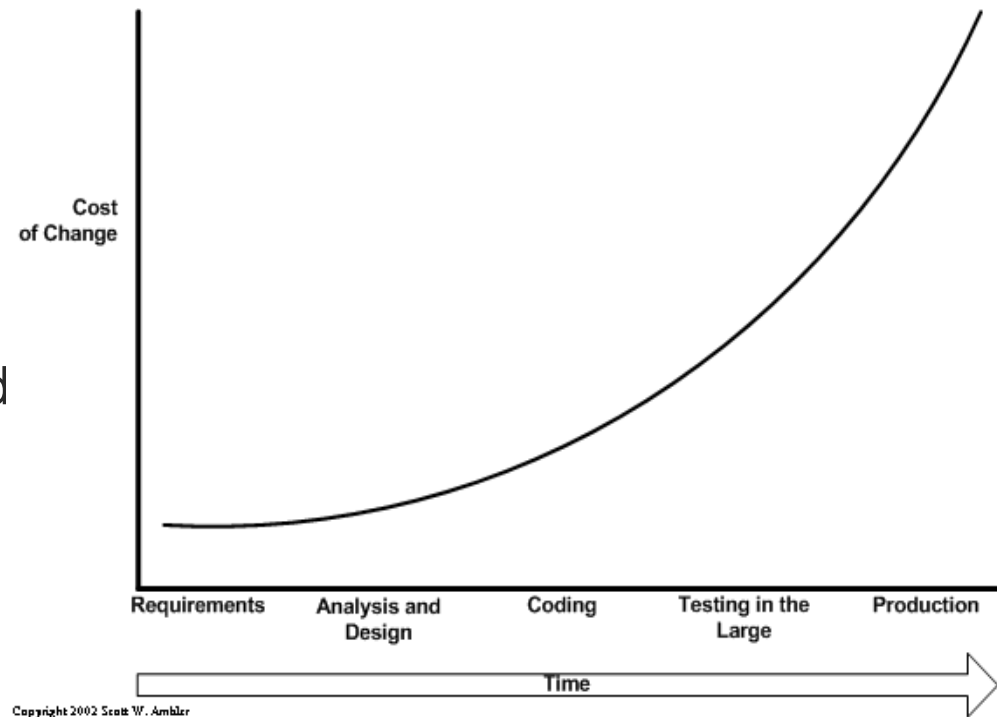
Role \ Skill	Testing Methods	Programming	Business Knowledge	Application	Hardware Connectivity	Hardware Capacity	Training	Technical Writing	Project Management
Process Engineer			H	H					M
Project Manager		M	M						H
Business Analyst		M	M	M					L
Quality Analyst	M		M	M					
Technical Writer	L		M					H	M
Trainer			M				H		M

Legend
 H = High skills
 M = Medium skills
 L = Low skills



Project planning: - the critical first step.

- Unexpected problems can kill your project – no time left to fix, or no money
- Time spent up front to carefully understand the requirements, analyze and correctly design a solution saves big in the end



[Design Reviews]

- Plan and schedule design reviews – possibly every day, until you enter production
- Document (as specifically as possible) how subsystems will work together and connect (interfaces)
- Check your interfaces in the reviews – if there is change, it must be fully investigated, understood and agreed to

[Plan the work...]

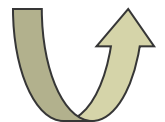
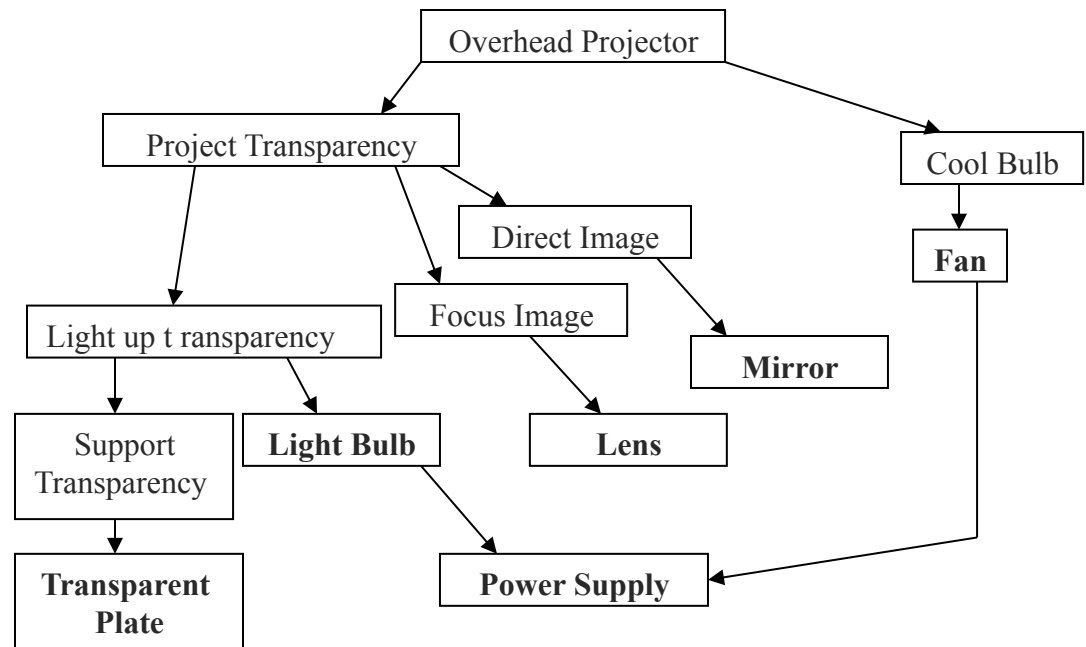
- Work Breakdown Structure (or WBS) = Everything you want to do on the project
 - The form and function of every part, and what they all do for you (Functional Efficiency Technique)
 - Also any related work – fundraising, major events, support equipment
 - This ultimately becomes your project plan, as detailed as you choose to plan and schedule it.
- Match with your team structure.

[Plan the work (cont.) . . .]

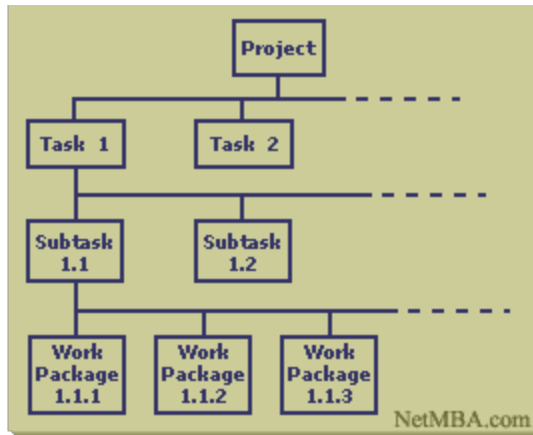
- Estimate each item or system using a Resource Loading Diagram:
 - How much time (work hours) do you think it will take?
 - Rookie team? Run your WBS and Resource Loading by an experienced team before committing yourselves.
 - How many people do you have? How much time do they have?
 - How many days/ hours will each item take?
 - Where are you short handed? Make sure you aren't double booking people.

[Functional Efficiency Technique]

- Break down the device by tasks it performs.
- Include what each sub-system does (a verb), and what it does it to (a noun)
- Continue until you end up with a fairly specific physical objects you need to buy or design/make, and put together. Note that interfaces between systems can be included if needed (ie the power supply has to support the light and the fan).
- Clean it up and add this entire set of objects to your WBS



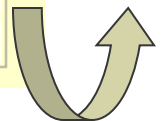
[WBS: Project Plan]



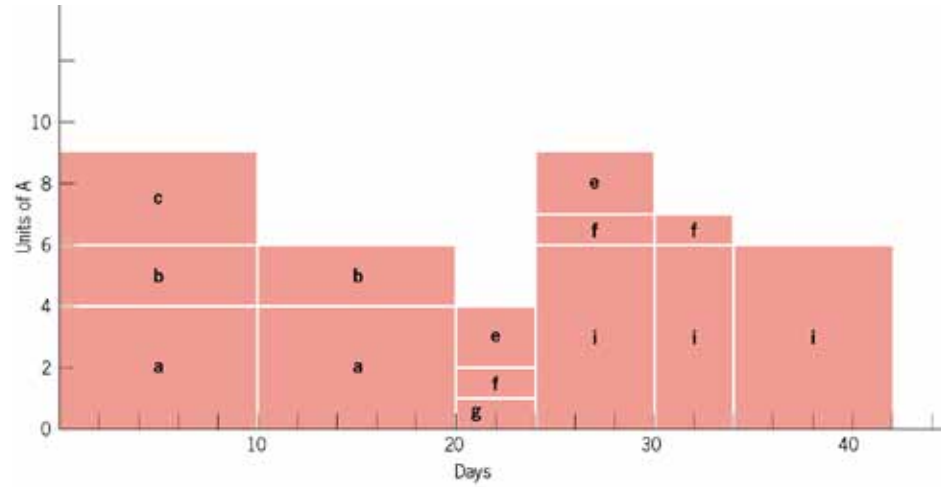
The function diagram converts to an outline style WBS

Work Breakdown Structure Outline

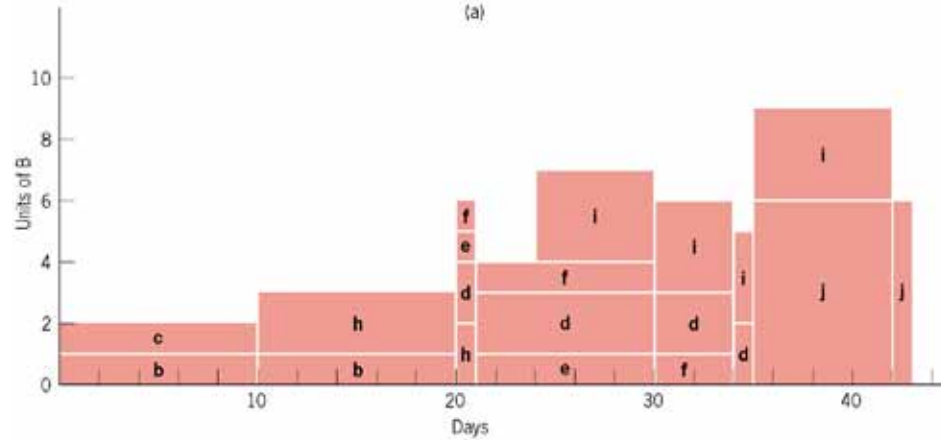
Level 1	Level 2	Level 3
Task 1		
	Subtask 1.1	
		Work Package 1.1.1
		Work Package 1.1.2
		Work Package 1.1.3
	Subtask 1.2	
		Work Package 1.2.1
		Work Package 1.2.2
		Work Package 1.2.3
Task 2		
	Subtask 2.1	
		Work Package 2.1.1
		Work Package 2.1.2
		Work Package 2.1.3



[Resource Loading Diagram]



(a)

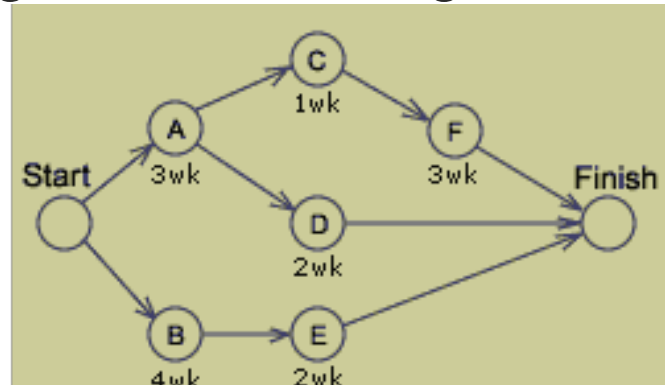


(b)



[Where do you start?]

- What has to be done first? How long will it all take? Try making a network diagram . . .



Hmm . . . 7 wks

- Make it fit - it all has to get done in 6 wks. The longest chain (in weeks) is how much time you need
- Make a judgment call – are you trying to do too much?

[Risk Management]

- Also known as “what if’s”
- Leave a little time for disasters and unforeseen details.
- Testing is essential.
- Set goals for features or functions that would be “nice to have”.
 - If there is insufficient time, the project will still be successful without them

[Risk Management (cont.)]

- FMEA (Failure Modes and Effects Analysis)
 - Consider system components
 - Identify symptoms of failure
 - Identify root cause
 - Predict consequences to other sub-systems
 - Rank failure modes by severity (1,2,3)
 - Rank failure modes by probability (1,2,3)
- Example FMEA.

[FMEA - Example]

FMEA					
Symptom	Root Cause	Consequence to other system?	Severity	Probability	Notes
Robot stops moving	Wheel	-	2	1	
	Drive	-	2	2	
	Controls	-	3	1	
	Pilot	-	3	1	
	Environment	-	1	1	<Don't care
	Code Error	Controls	3	2	
	Fire	All + safety	3	1	
Firing mech. Is dead	Controls	-	3	2	
	Actuators	-	2	3	<Design flaw?
	Mech. Drive	-	2	2	
	Mech. Clogged	-	1	3	<Design flaw?
	Code Error	-	3	3	<Warning!
	Structure	Drive	3	1	
Erratic behavior	Controls	All + safety	3	1	
	Code Error	All + safety	3	1	<Worth planning for?
Structural collapse	Structures	All + safety	3	3	<Warning!



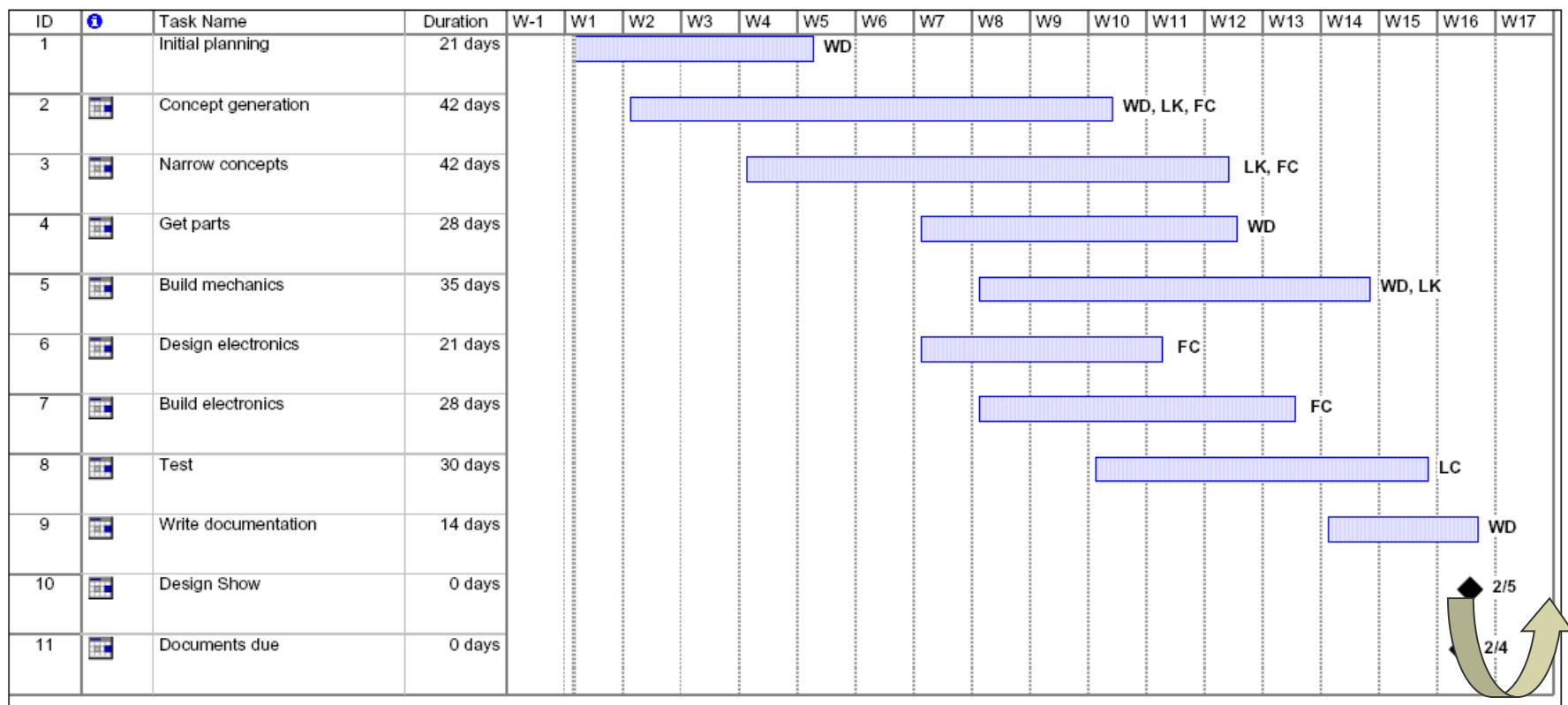
Work the Plan . . .

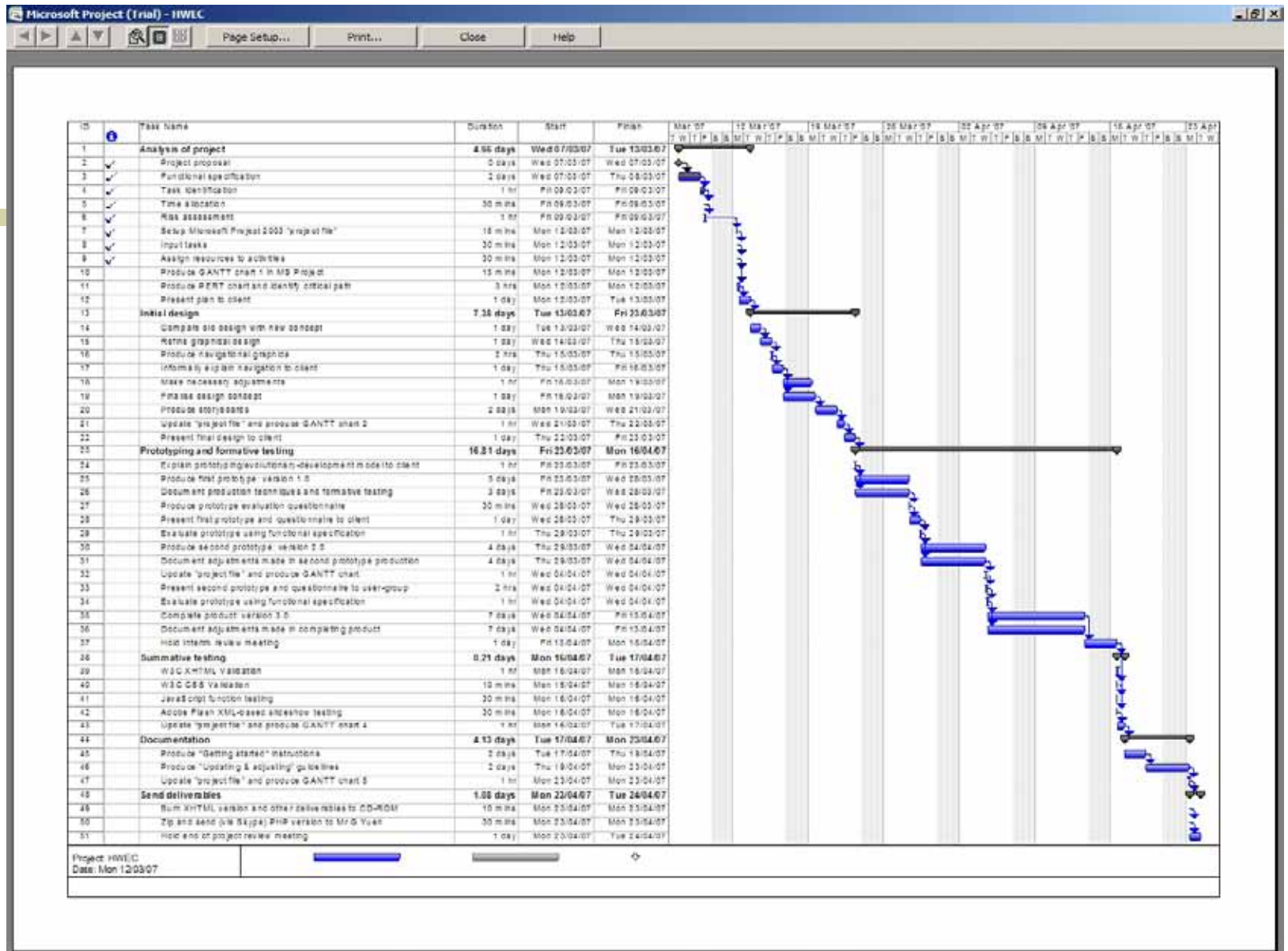
Make it happen

- Make a simple project schedule, easy to read and status.
- Stick to your plan
- Monitor progress – fill in the bars, but not if they are not done.
- Adjust on the fly – you may have to give up some goals, or shift more people to key tasks that are falling behind. Enlist more experts?
- Keep everyone productive, but don't forget this is all fun!
- Communicate!

[Sample Gantt chart]

This one is done in MS Project. Anything will work . . . Draw it out by hand on a big sheet of butcher paper!! Make it easy to read and understand (but don't take 16 weeks).





[References]

- MBA.com
- PMI PMBOK Guide

- Contact:
 - Ejvin Berry, ejvin.m.berry@boeing.com
 - Chris Imondi, chris.m.imondi@boeing.com
 - Tim Christensen, tim.christensen@boeing.com

Questions ?????