

# Software Engineering

## Project I - Overview

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# Introduction

## ◆ Module Objective

- Experience of designing complex software in small groups

## ◆ Groups

- Each group consists of 6 students (5 or 7 in very rare or exceptional cases).
- Groups will decide on their own composition.
- All groups will implement a common class project as it is proposed.

## ◆ PROJECT

- ***Implementation of Scientific Calculator with Integration***

# Assessment

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## ◆ Assignments

- The submissions outside interim worth 10%
- The Interim report worth 25%
- The final submission report worth 25%
- The implementation worth 40%

# Development

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## ◆ Group Work

- Team Formation: This week
- Project design: 4 weeks
- Project development: 4 weeks

## ◆ Submissions

- Assignment: weekly basis
- Interim Report: June 26<sup>th</sup> 2014
- Final Report: July 21<sup>st</sup> 2014
- Project Submission: July 24<sup>th</sup> 2014

# Interim Report

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## ◆ Content & Structure

- **Project Specifications, Design and Schedule**
- The size of the interim report is about 12 – 15 pages
- Equal contribution from all group members
- State the specifications of the project (*what is to be achieved, features, etc.*)
- Detailed design (*functional description, flowcharts, etc.*)
- Schedule and work breakdown (*who does what, in what order*)
- Reporting structure: *how is communication maintained, progress measures?*

# Team Structure: Who does What?

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## ◆ Choosing Your Team

- Decide on key role of each individual member

## ◆ Project Leader

- Who will be responsible for *pushing, organising, cajoling*?

## ◆ Technical Skills

- Who is capable of doing which part of the project

## ◆ Reporting

- Everyone should contribute equally to reports, BUT:  
someone should own the document in each case.

# Team Structure: Who does What?

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## ◆ Rule 1

- Identify the key skills required for the project, and who can provide them

## ◆ Rule 2

- After initial design, create a Work Breakdown Structure (WBS)

## ◆ Rule 3

- Assign individuals to elements of the WBS, ensure equal workloads

# Team Structure: Getting Started

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Start putting together your team now. Submit the following information

◆ **Team Name**

- Give yourself a convenient handle, for listing, etc.

◆ **Team Leader**

- Identify contact person for the team (provide email, etc.)

◆ **Team members**

- Provide names and students IDs for all the team members
- (6 members is ideal, 5 or 7 in rare cases only)

# Team Structure: Getting Started

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... more Rules !!!

## ◆ Skills

- Make sure your team includes a balanced set of skills

## ◆ Weakness

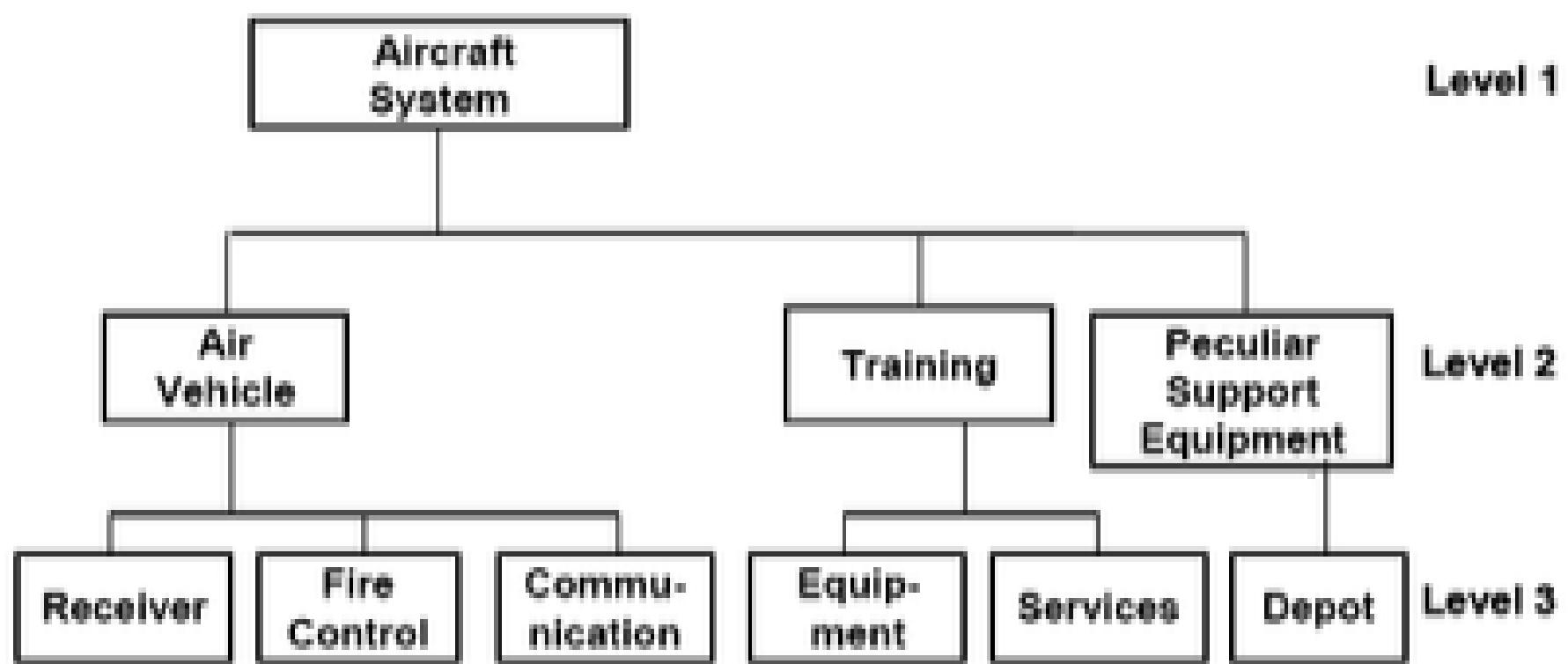
- Try to identify weak links early on, and put support structures in place

## ◆ Communication

- Establish internal communication routines (e.g., weekly discussions, etc.)

# Work Breakdown Structures (WBS)

Identify key functions / components / behaviour in top-down fashion



# Creating your own WBS

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- ◆ Start with the end objectives
- ◆ Then successively subdivide these into manageable components
- ◆ Manageable work packages with deliverables and milestones, with
  - Size,
  - Duration
  - Responsibility
  - (e.g., systems, subsystems, components, tasks, work packages)
- ◆ Ensure you include all steps necessary to achieve the objectives

# The 100% Rule in WBS construction

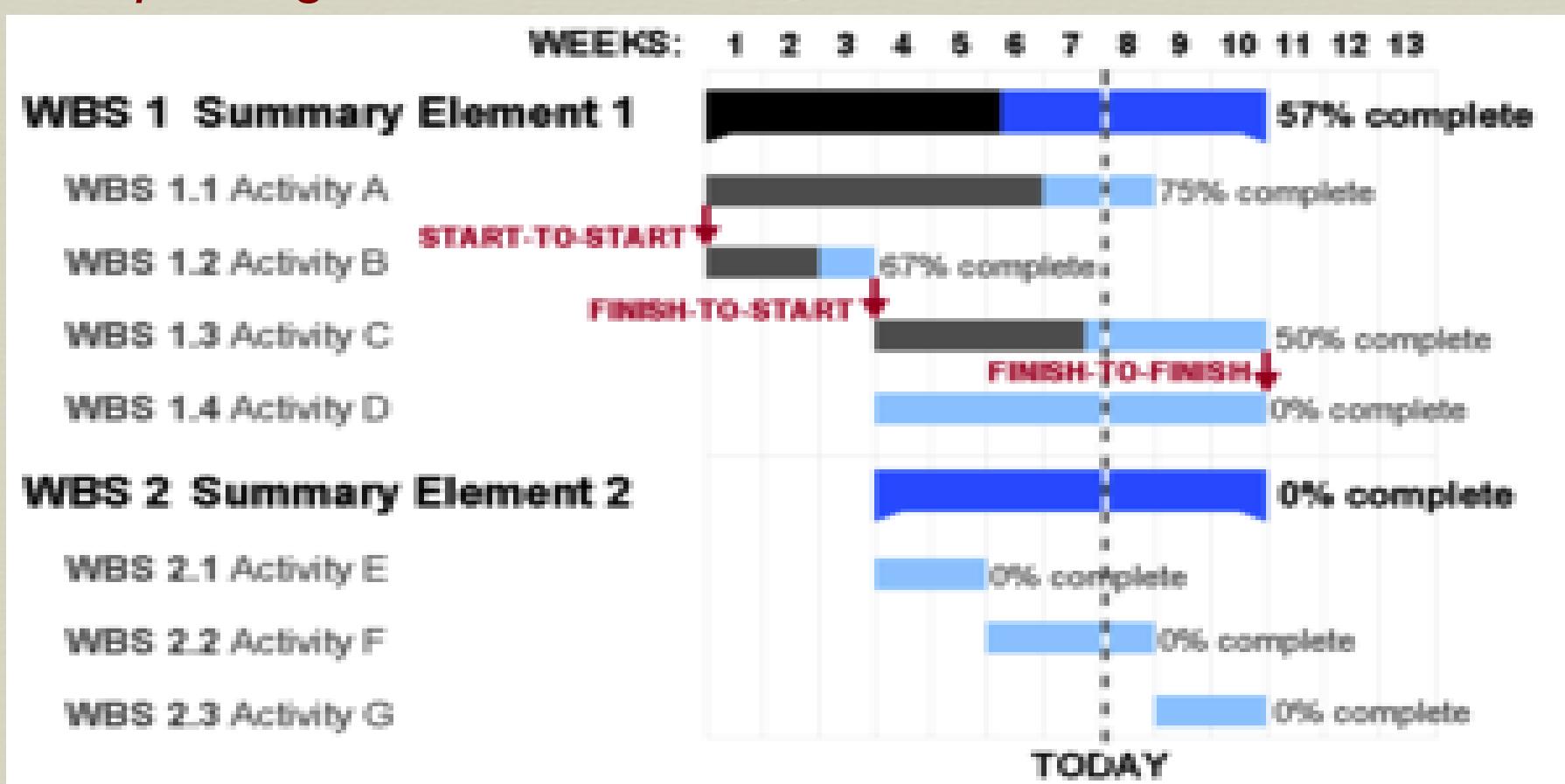
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An obvious Piece of Common-Sense, yet one that is often overlooked

- ◆ The Total amount of project work should sum to exactly 100%
  - Not less than 100% (i.e., some work not identified or reported)
  - Not more than 100% (i.e., some work doubly counted or reported)
- ◆ In the Work Breakdown Structure, each task is listed just once
- ◆ Do not include the same task/feature in two or more parts of the WBS
- ◆ The work content of all children of a WBS node should sum to 100%
- ◆ Each WBS node should be fully exhausted by its child nodes

# Scheduling with Gantt Charts

*We use a special bar-chart to indicate start & duration of work-packages*



*X-Axis is timescale. Bars indicate duration*

# Interim Report: What to Include

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Your Interim report should state the following:

- ◆ Name of team, and names of team members
- ◆ Project description (requirement and specifications as you see them)
- ◆ Project Design (discussion of key issues, your approach to be taken)
- ◆ A detailed WBS (with work-packages, deliverables)
- ◆ Assignment of team members to work-packages in the WBS
- ◆ A Gantt chart describing the schedule of development on the WBS

# Final Report: What to Submit

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Your Final report should state the following:

- ◆ Specification of the project, with work-packages overview
- ◆ Implementation Description (class diagrams, etc.)
- ◆ Analysis of Success / Failure (what you did/didn't implement, and why)
- ◆ Discussion of additional features (draw attention to extra/clever elements)
- ◆ Team analysis: who did what, and how much (breakdown of effort)
- ◆ Overall size; about 20 pages