Requirements and their Verification

CECS 460

CSULB

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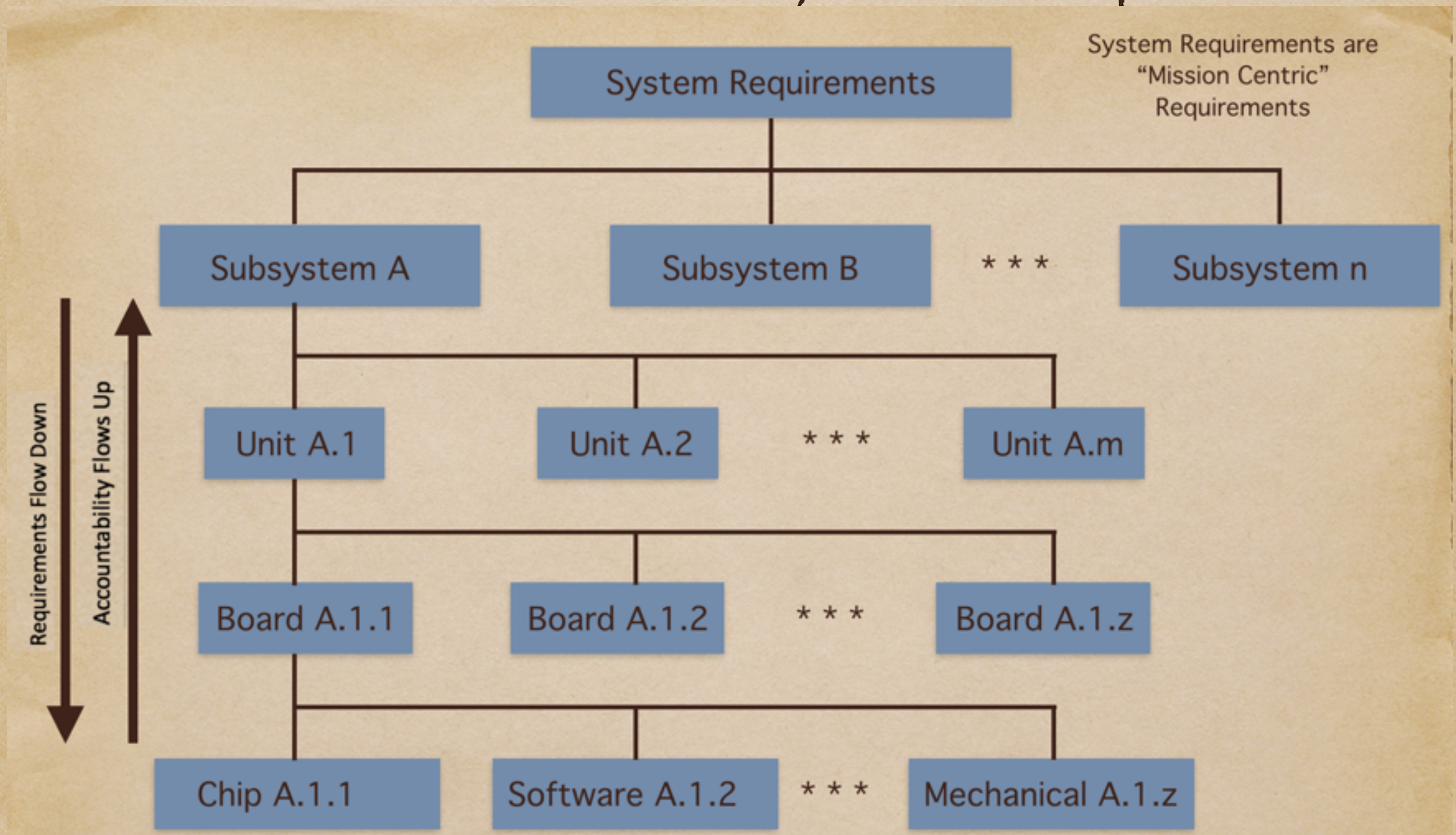
Requirement Flow Down

- In any design process there is the need to precisely define the operation of a system such that all of the components may be developed in such a way that they will be compatible with each other while still performing the overall task(s) of the system
- This discussion is SoC specific but the same concepts would apply to any type of engineering or developmental activity where the final product is a collection of individual pieces

Requirements Flow Down
Accountability Flows Up

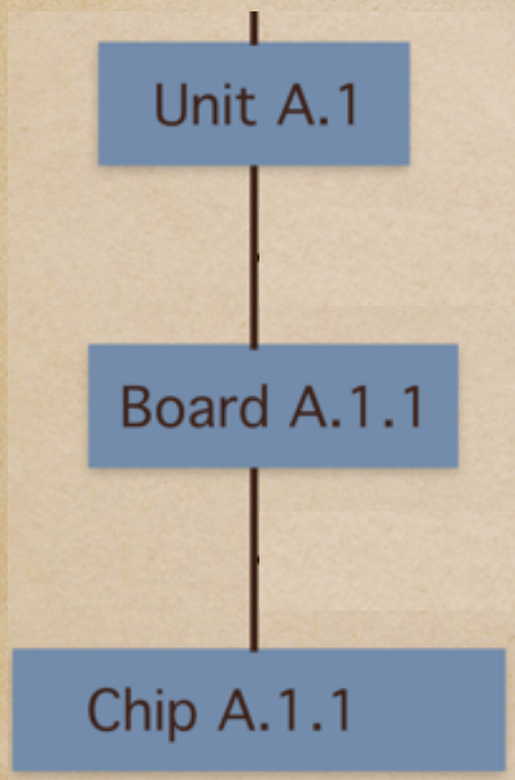


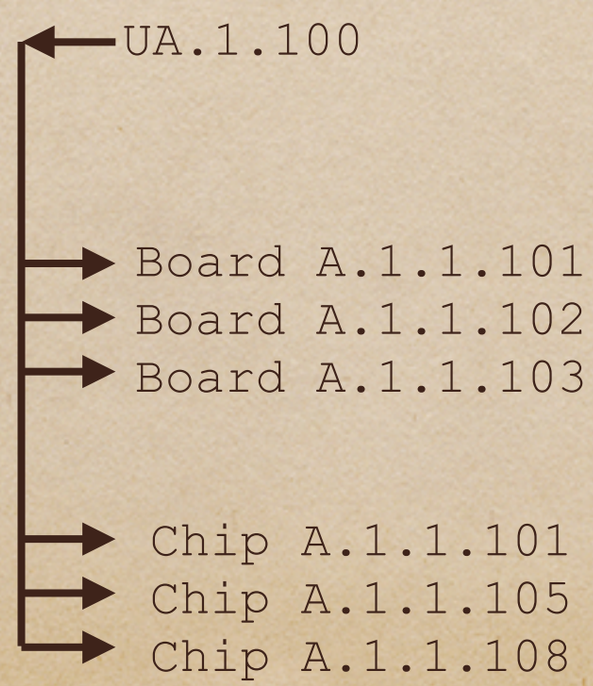
Requirements Traceability

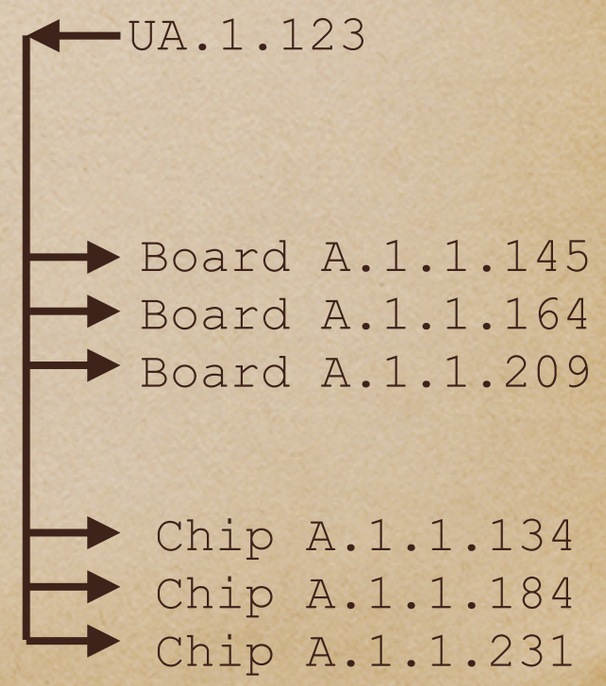
- At any step in the requirements flow there is the concept of a parent and a child
- The child will have a list of requirements that will completely specify the functionality of its design
- Each requirement must be enumerated at every level
- Part of the flow down of requirements will be identifying the parent requirement (from the next higher assembly)
- Each child will have a parent identified (it is

Requirements Tracing

- Requirements are traced by their "requirements identifier" (REQID)
- Each REQID must identify its genealogy
  - UA.1 = Unit A.1
  - Board A.1.1
  - Chip A.1.1







Requirements Traceability

- With an automated scheme in place the management of the system being designed have a means to quantify the impact of a proposed change
- When a system level requirement is proposed to be changed the impact can be assessed by identifying the impacted subsystems and then working with the responsible design engineering teams to understand the change(s) in order to allow them to quantify the impact (in terms of

Tracking and Verifying Requirements

- A scheme needs to be devised and follows that allows "back-tracking" of requirements as well as an identification of how each requirement will be verified
- One common scheme is to produce a matrix that identifies requirements, their parent, how the requirement will be verified and for those that are simulated, which simulation scenario will be used to verify the requirement

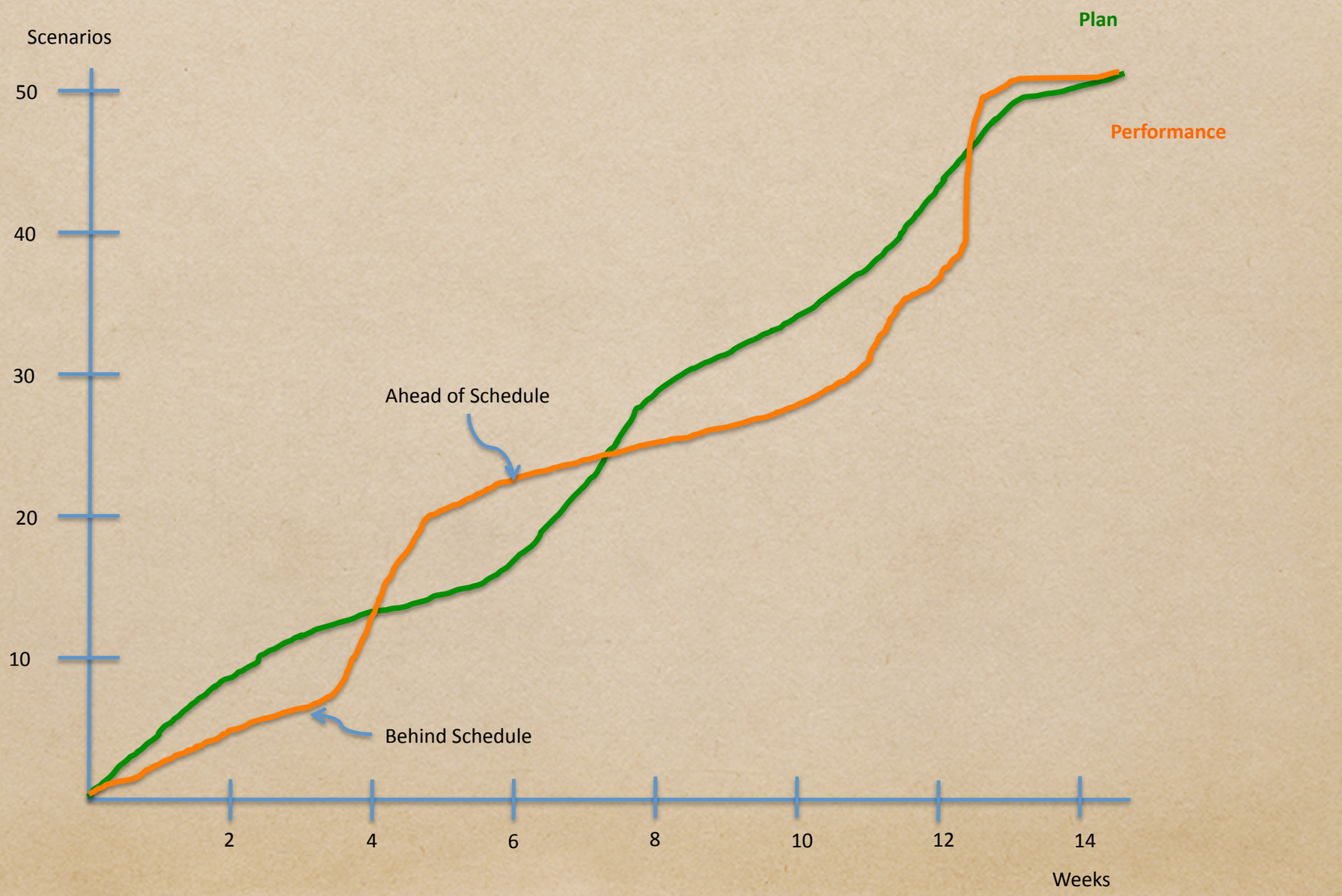
Requirements Matrix

- Each requirement identified with its parent (could be hundreds of rows)
- Verification approach identified (A) Analysis, (I) Inspection, (T) Test & (S) Simulation
- For simulation the scenario identifies which simulation scenario verifies this requirement

REQ ID	PARENT ID	A/I/T/S	Scenario
CA.1.100	UA.1.130	A	
CA.1.105	UA.1.150	S	Scenario 10
CA.1.110	UA.1.115	S	Scenario 8
CA.1.115	UA.1.200	T	

Tracking Development

- The development of the scenarios must be planned and then tracked
- Managers then use these tools to monitor performance and raise



Bug Tracking

- When faults are discovered they should be tracked by number, date discovered, scenario involved, date resolved, source identified
- This allows tracking of converging on a solution and completeness