



QM and [I]IV&V

A Winsor Brown
AWBrown@CSE.USC.edu

CS577a
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Outline

- **CS577 Quality Management overview**
- **The IV&V Role for DEN remote students**
 - What it is & how it works
 - Principles behind it
 - How it's distinct from other's project participation

CS577

Software Engineering of Real Systems

- Not enough time to do a "large" system, but
 - Real client
 - Real deliverables
- Teach and Use "best practices": techniques, tools and ...
 - MBASE: WinWin Spiral Model; Risk Driven; COCOMO II
 - OO Analysis and Design
 - Quality Management (QM)
 - Peer Reviews and other QM early assessment techniques
 - Configuration Management (CM)
 - Independent Verification and Validation (IV&V)
 - ...
- Projects run & documented like "Professional Systems"
- Evolving: MBASE, QM, IV&V, ...

CS577 (cont.)

IV&V option – for DEN-remote students ONLY!

- There are NO non-DEN remote students!
- DEN-remote students DO NOT develop projects, unless:
 - ENTIRE TEAM is collocated and can be at one location for all eMeetings with client(s).
 - ENTIRE TEAM always comes to campus to participate

IV&V option – A project quality and learning enhancer

- Not totally "Independent": More "Integrated" IV&V (IIV&V)
 - Originally "independent" meant no direct contact
 - Integrated IV&V permits working closely but independently
 - IIV&V requires demanding corrections for tacit knowledge
- Project results are improved as a result of YOUR efforts
- You learn by doing and interacting with a real project

Process :: Quality Improvement :: CM

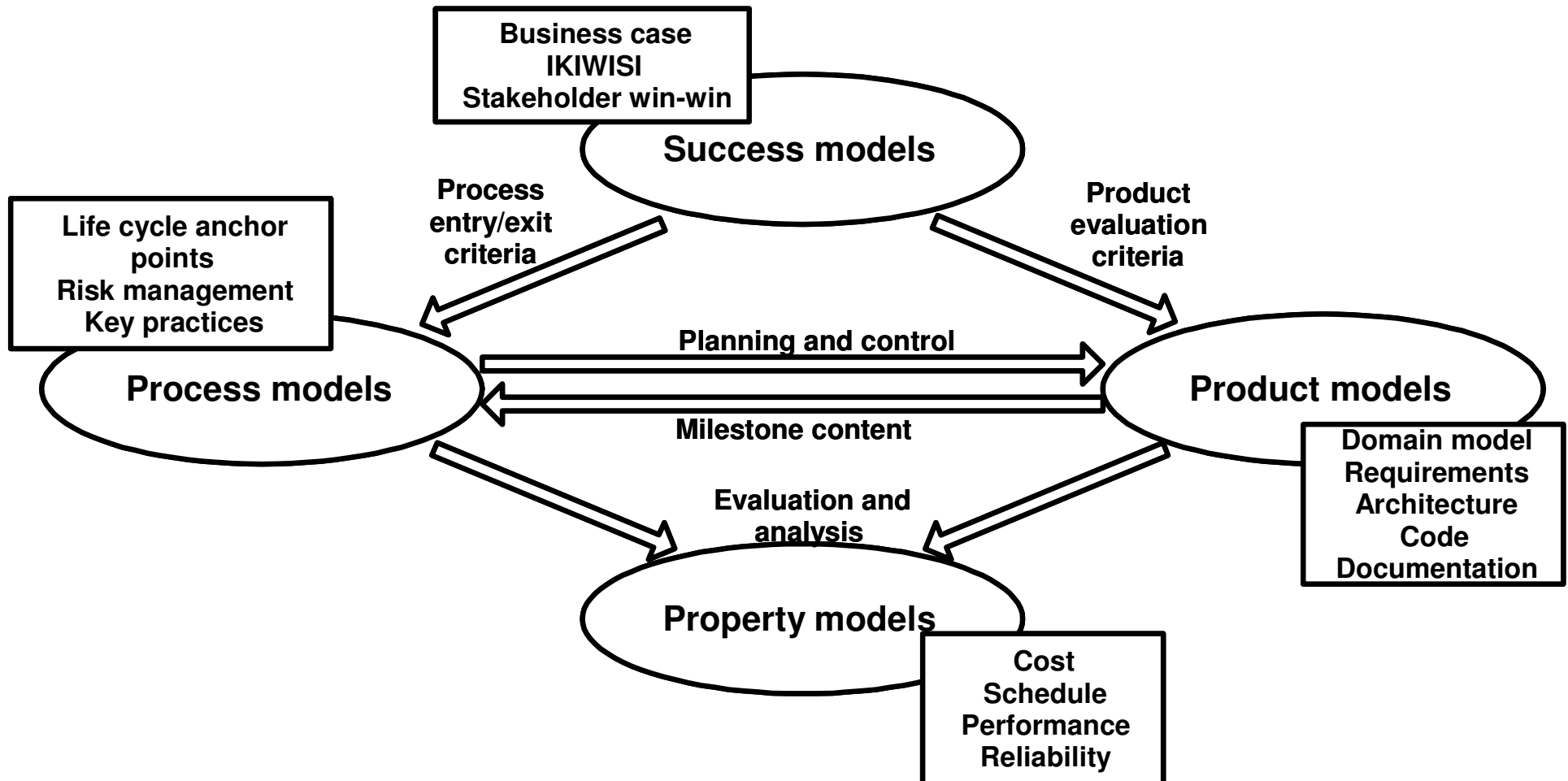
MBASE meta-processes

- MBASE model framework:
MBASE -- A Four Model Specifier
- MBASE Model Integration Process

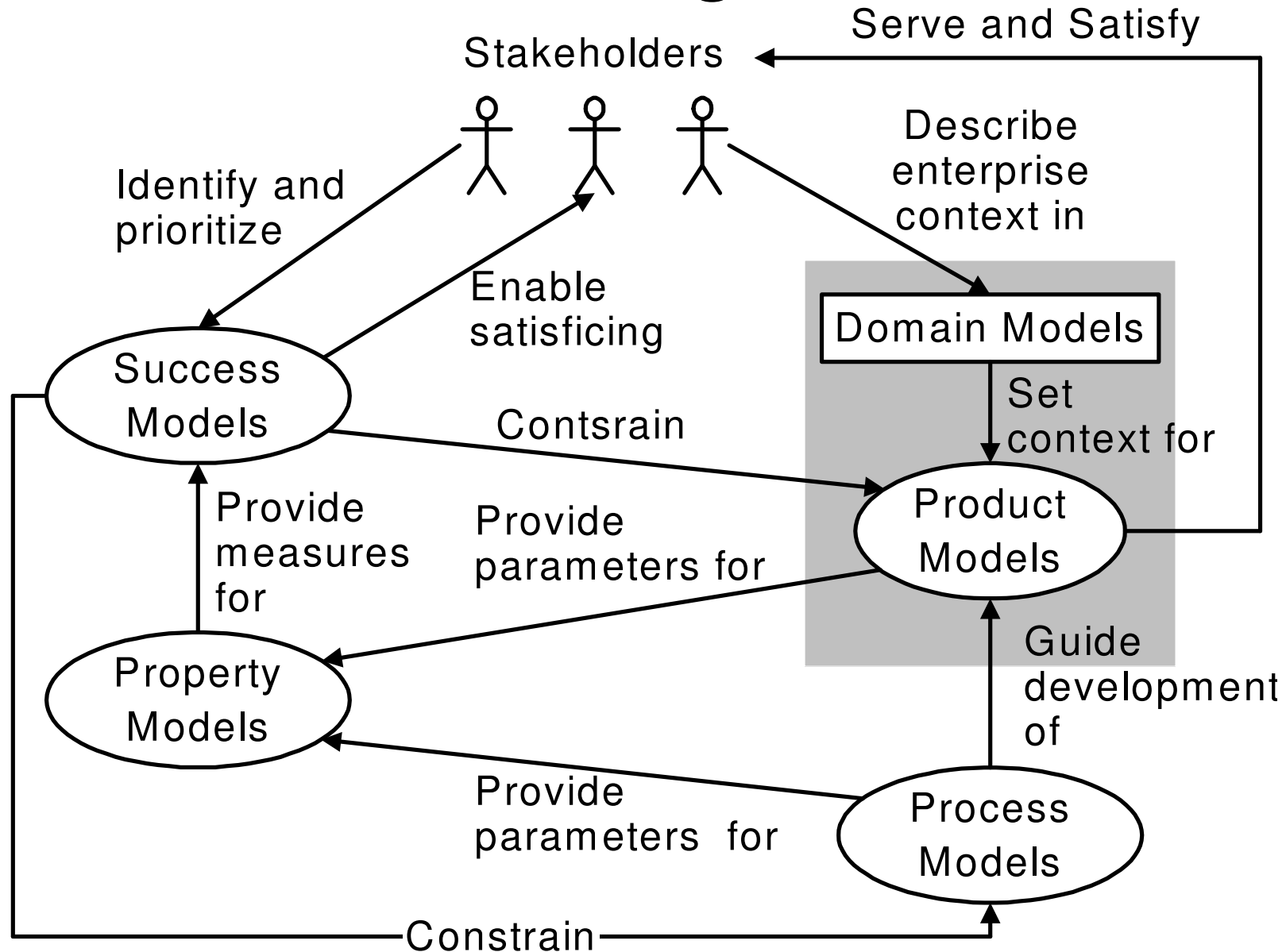
MBASE/RUP development process

CS577a development WW Spiral unrolled

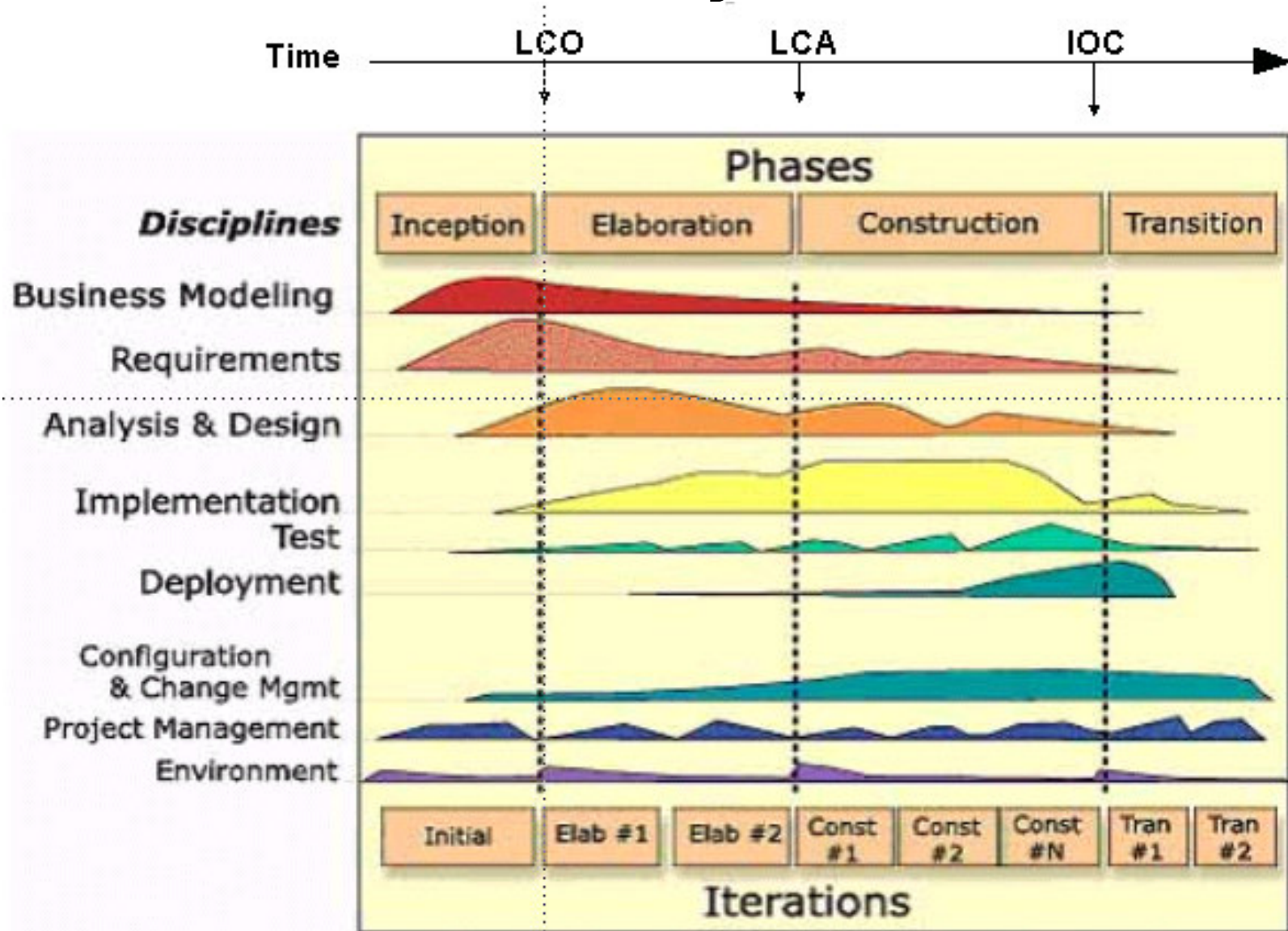
MBASE -- A Four Model Specifier



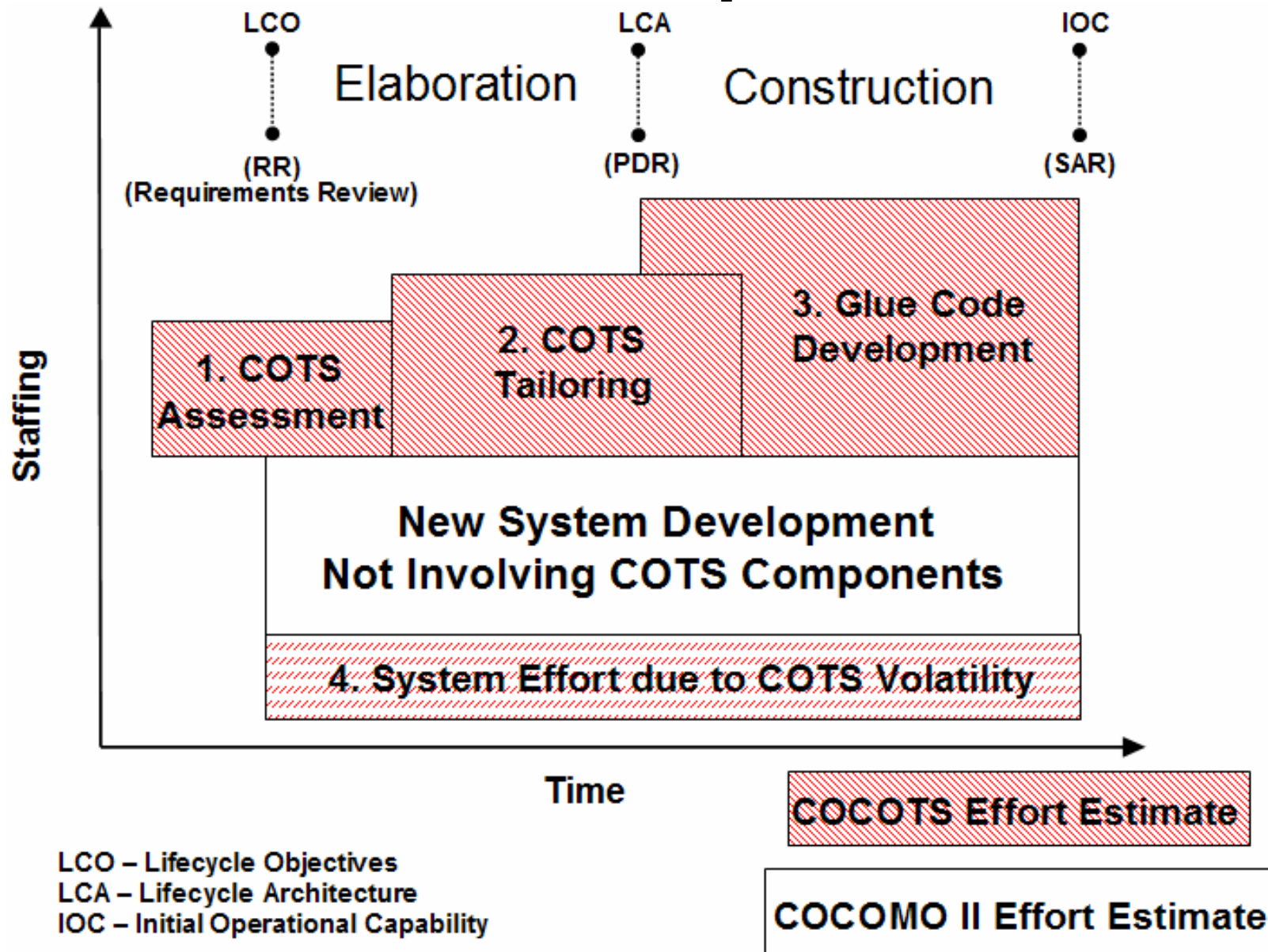
MBASE Model Integration Process



MBASE/RUP Activity/Process Model

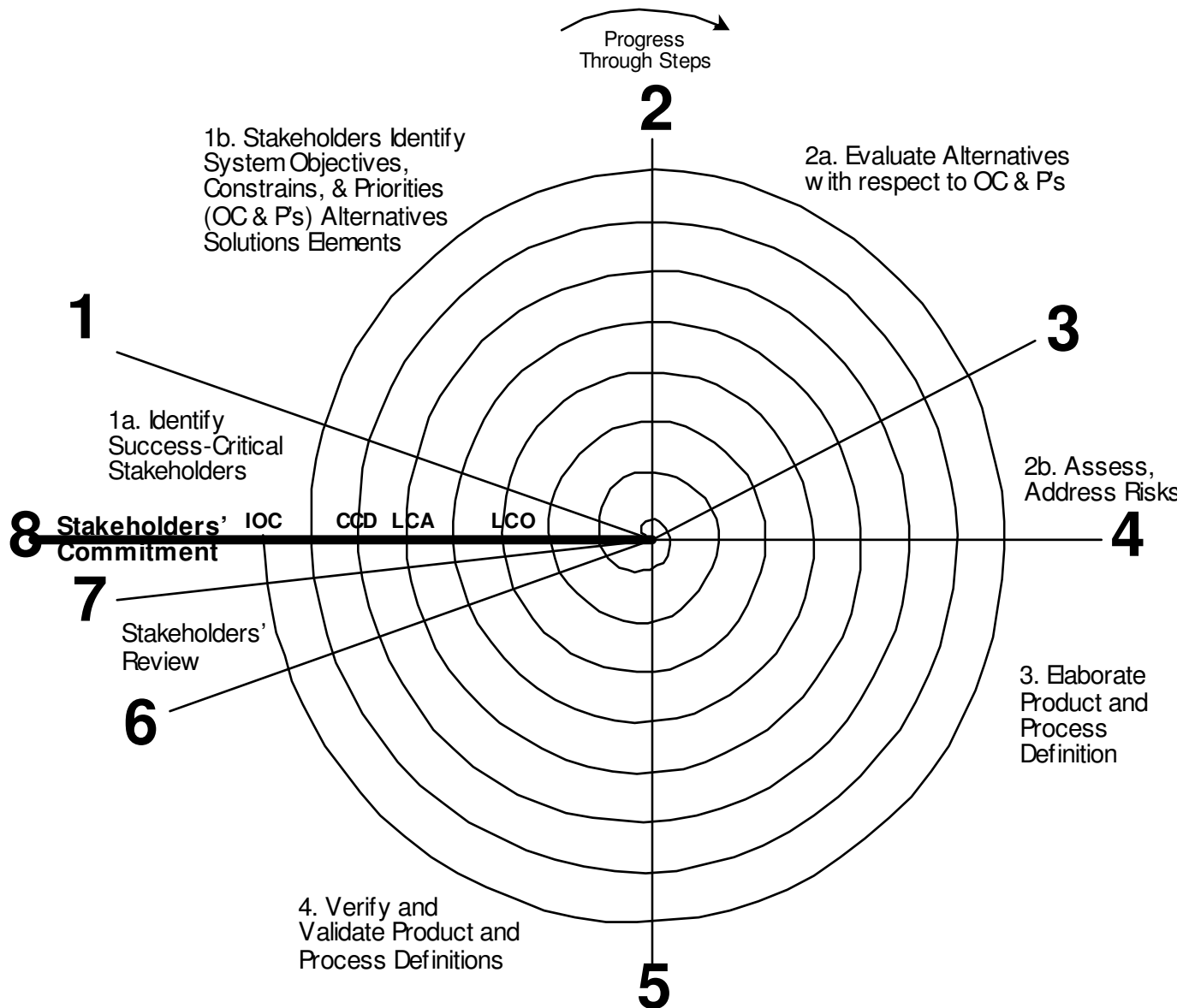


COCOTS: Development Model

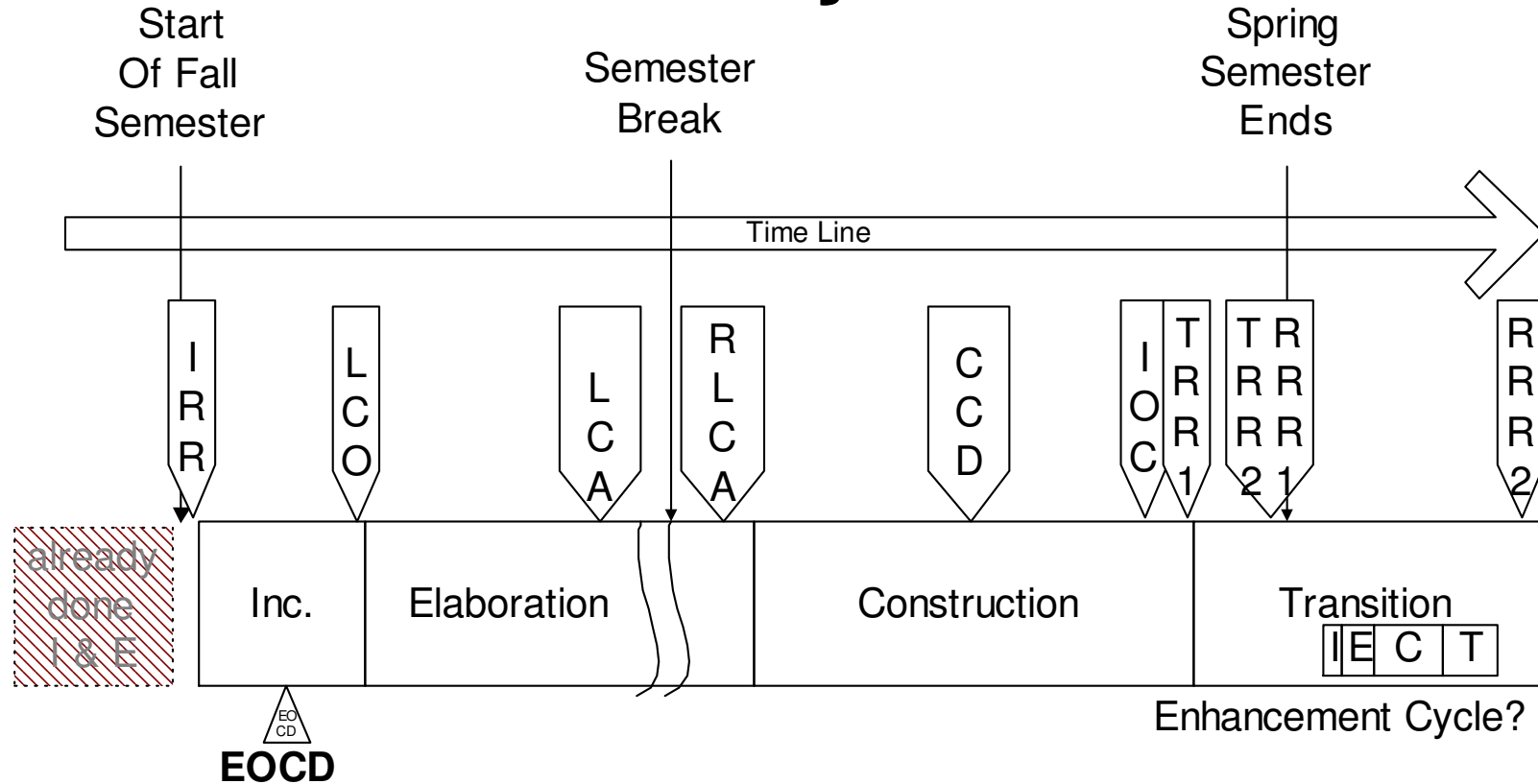


LCO – Lifecycle Objectives
LCA – Lifecycle Architecture
IOC – Initial Operational Capability

WinWin Spiral Model



Iterations and Cycles in CS577



- Key:
- IRR - Inception Readiness Review
 - LCO - Life Cycle Objective
 - LCA - Life Cycle Architecture
 - RLCA- Rebaselined LCA
 - CCD- Core Capability Demo.
 - IOC- Initial Operational Capability
 - TRR- Transition Readiness Review

Quality Management

The Quality tasks in QM

- Quality Assessment (and Reporting)
 - Peer (team) Reviews
 - Agile (IIV&V) Artifact Reviews
 - Testing
- Quality Tracking (Follow up on the "Reports")
- Quality Improvement

With pre-requisites

- Configuration Management
- Early Defect Finding (Identification) mechanisms
- Defect and Effort Data submittal

Lessons Learned [So Far]

For Quality Management in CS577 (Software Engineering I & II) which teaches MBASE

- Different information relevant for different types of reviews
- Subjective definition of a "defect":
 - Who decides? Only the "author": every change made
 - Call all identifications from review activity a "concern"
- Value-based: Criticality AND Priority

From Quality Improvement World

- Push on Productivity, get Productivity impact;
Push on Quality, get a multiplicative impact on productivity
- Defect prevention and early defect detection:
 - Increases Quality AND decreases [total] Cost
 - Requires an investment
 - Seems to require/imply "process"

IV&V for DEN-remote Students

Integrated IV&V (IIV&V) person assigned to campus-based project.

- You do all the same individual homework assignment, quizzes and learning, including the use of the class tools.
- You PRODUCE the draft QM and CM plans.
- You MONITOR QM and CM activities and report to Proj. Ldr.
- Rather than producing a project team's artifacts or "team homework" assignments, you will be "reviewing" them.
- You do a thorough technical review of the document packages and models (at various stages)
- If things are "wrong", you blow the whistle
- If things might be OK but have to be explained verbally, you "see" that it gets documented and fixed
- You PARTICIPATE telephonically in the ARBs for your team

IIV&V for DEN remote Students (cont.)

"Reviewing" a project team's artifacts . As a result of the review,

- You may resolve simple questions directly with the Artifact's "author"
- Send all "concern logs" to the team electronically & a copy to the TAs
- You should generate "problem reports" for open issues.

Thorough technical review of the document packages and models

- Made available just prior to the "Architecture Review Board"
- Submit "concern logs" directly the CS577a instructional staff before the scheduled ARB (and to the team afterwards)

Participate in ARB for your team

- Telephonically (we can and will call you)
- Possibly supplemented by other remote meeting capabilities, like Skype or NetMeeting

CS577 MBASE Defect Reporting Concepts

Agile Artifact Review

Project Name:				Review #				
Artifact:				Review Date:				
Module:				Review Time:				
MBASE Phase/level:								
Activity:								
Exit Criteria:								
Reviewer:				Date Sent to Reviewer:				
Reviewer email:				Date Returned to Author:				
Reviewer phone:				Date Returned to QAT:				
Auhor:				Total Preparation Time:				
<p>Use this sheet to record the areas of concern that come up during your reading/review of the Artifact. Give the "location" information and the associated technical description of the area of concern to indicate to the developer/author during his/her analysis of this information about the relevant part of the Artifact. Give your opinion for the classification of the area of concern in M/W/E field. Write in letter each for Missing(M)/Worng(W)/Extra(E). Also, rank the priority and criticality in both field as High, Medium or Low.</p> <p>Keep this sheet with you during the analysis of the artifact. When an area of concern you recorded here requires corrective action and is placed on the artifact's Problem list, note the number of the Defect/Issue(s) in the Areas of Concern Log. Problems are things you believe the author of this artifact can/should fix; "open issues" are things which can not be corrected solely in this artifact or at this time.</p>								
#	Location(s)	Area of concern				M/W/E	Priority	Criticality

CS577 MBASE Defect Reporting Concepts (cont.)

Agile Artifact Review (cont.)

Project Name:	_____	Review #:	_____ - _____
Artifact:	_____	Date:	_____
Module:	_____	Activity:	_____
Type of review: [Indepent] Review	MBASE Phase/level:		Review Date(s):
No. of Priority: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	No. of Criticality: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> No. of open issues	
Comments:			

Defects/Issues

D/I #	Location (s)	Description	Classification	Priority	Criticality	Activity of Defect Injection (Requirements, Design, Code, etc.)	Location of correction(s)	Date of fix	Comments
			<input type="checkbox"/> Missing <input type="checkbox"/> Wrong <input type="checkbox"/> Extra <input type="checkbox"/> Open issue	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low				
			<input type="checkbox"/> Missing <input type="checkbox"/> Wrong <input type="checkbox"/> Extra <input type="checkbox"/> Open issue	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low				

CMM Level 3 KPA--Peer Reviews

Purpose

"The purpose of Peer Reviews is to remove defects from the software work products early and efficiently. An important corollary effect is to develop a better understanding of the software work products and of the defects that can be prevented. The peer review is an important and effective engineering method that is called out in Software Product Engineering and that can be implemented via Fagan-style inspections [Fagan86], structured walkthroughs, or a number of other collegial review methods [Freedman90]."

CMM Level 3 KPA--Peer Reviews (cont.)

"The purpose of Peer Reviews is to remove defects from the software work products early and efficiently. An important corollary effect is to develop a better understanding of the software work products and of defects that might be prevented.

"Peer Reviews involve a methodical examination of software work products by the producers' peers to identify defects and areas where changes are needed. The specific products that will undergo a peer review are identified in the project's defined software process and scheduled as part of the software project planning activities, as described in Integrated Software Management."

CMM Level 3 KPA--Peer Reviews (cont.)

"This Key Process Area (KPA) covers the practices for performing peer reviews. The practices identifying the specific software work products that undergo peer review are contained in the key process areas that describe the development and maintenance of each software work product."

"The goals of Peer Reviews are:

- "1. Peer review activities are planned.
- "2. Defects in the software work products are identified and removed."

CMM Level 3 KPA--Peer Reviews (cont.)

"The top-level activities performed for Peer Reviews are:

- "1. Peer reviews are planned, and the plans are documented.
- "2. Peer reviews are performed according to a documented procedure.
- "3. Data on the conduct and results of the peer reviews are recorded."

CS577 MBASE Defect Reporting Concepts

Range of Defect identification & reporting mechanisms

- One at a time: a problem reporting system
- Multiple issues/problems found by a single reviewer:
Agile Artifact Review
(only two types of forms: Issues/Concern and Defect List)
- Agile Internal/Informal Review: Two types of forms
- Agile Formal Review: Three different types of forms
- Internal/Informal Review: Four different types of bigger forms
- Formal Review: Four different types of bigger forms
- Fagan's Inspection: Five different types of forms

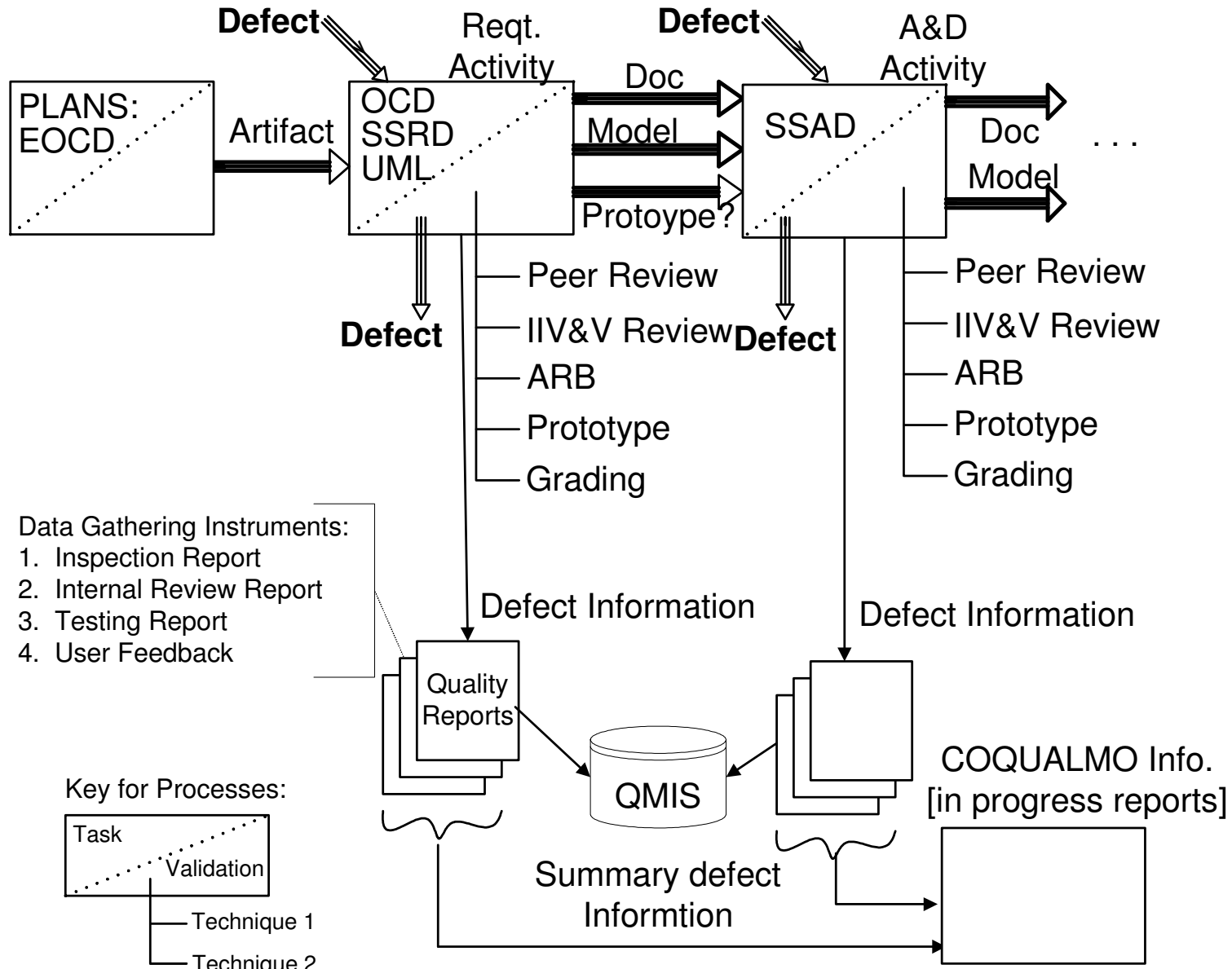
What & Where for Reviews

CS577 Model/Document Assessment

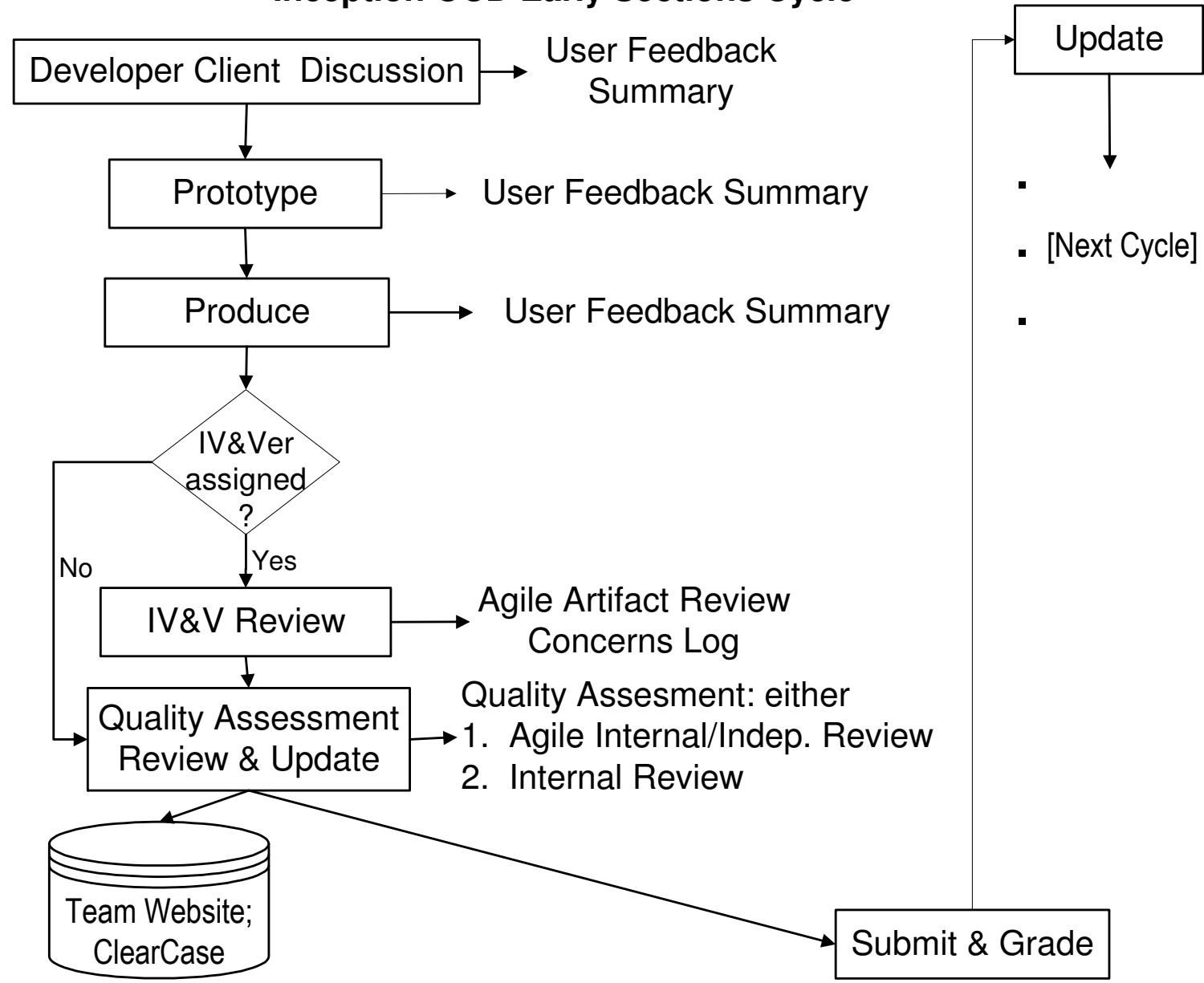
CS577 Inception OCD Early Sections Sub-cycle

CS577 Inception Artifact Life Cycle

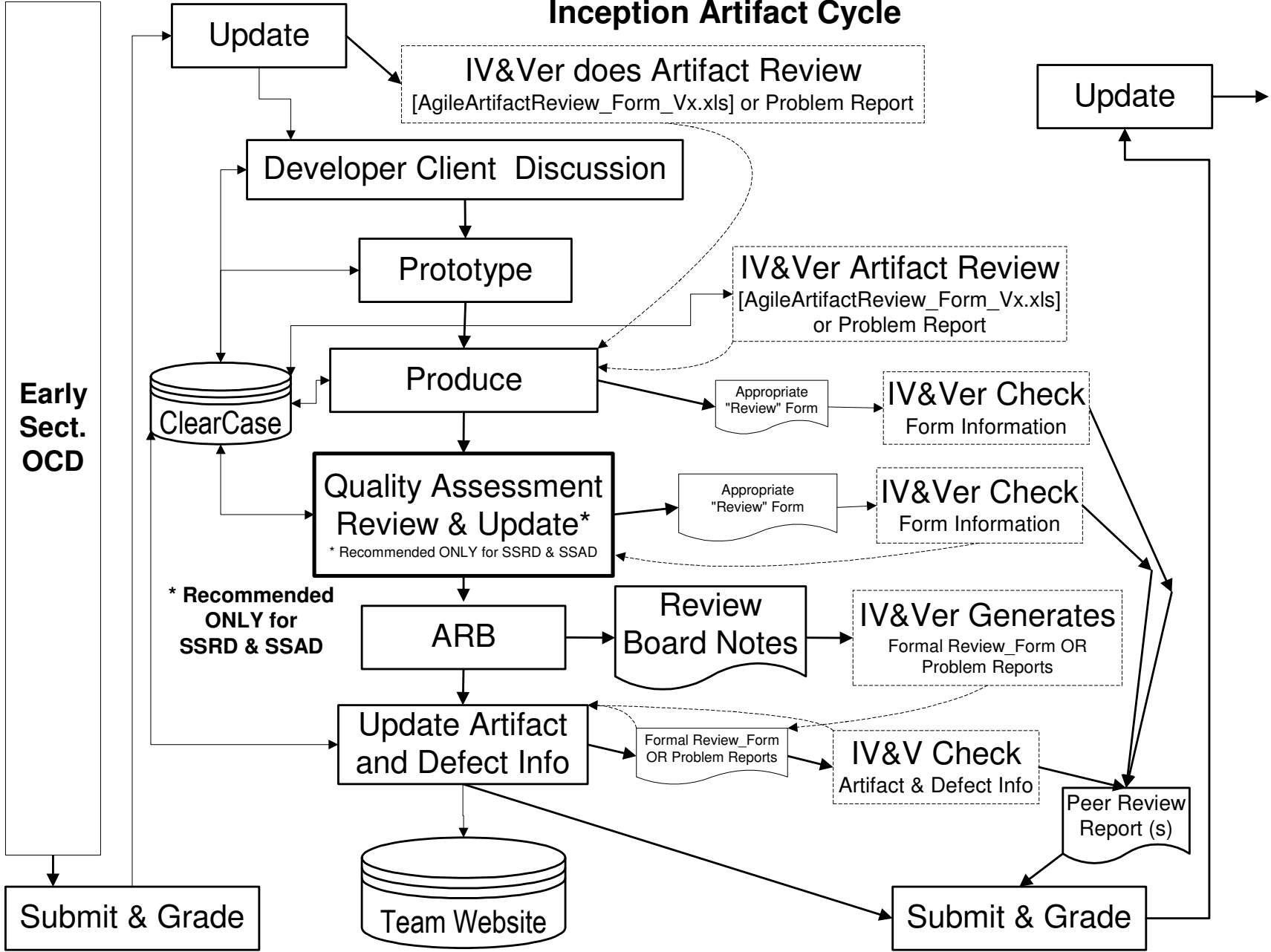
CS577 Model/Document Assessment



Inception OCD Early Sections Cycle



Inception Artifact Cycle



CS577 MBASE Defect Reporting Concepts

Agile Artifact Review

Project Name:				Review #				
Artifact:				Review Date:				
Module:				Review Time:				
MBASE Phase/level:								
Activity:								
Exit Criteria:								
Reviewer:				Date Sent to Reviewer:				
Reviewer email:				Date Returned to Author:				
Reviewer phone:				Date Returned to QAT:				
Auhor:				Total Preparation Time:				
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#	Location(s)	Area of concern				M/W/E	Priority	Criticality

New CS577 MBASE Defect Reporting Concepts (cont.)

Agile Artifact Review (cont.)

Project Name:	_____	Review #:	_____ - _____
Artifact:	_____	Date:	_____
Module:	_____	Activity:	_____
Type of review: [Indepent] Review	MBASE Phase/level:		Review Date(s):
No. of Priority: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	No. of Criticality: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> No. of open issues	
Comments:			

Defects/Issues									
D/I #	Location (s)	Description	Classification	Priority	Criticality	Activity of Defect Injection (Requirements, Design, Code, etc.)	Location of correction(s)	Date of fix	Comments
			<input type="checkbox"/> Missing <input type="checkbox"/> Wrong <input type="checkbox"/> Extra <input type="checkbox"/> Open issue	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low				
			<input type="checkbox"/> Missing <input type="checkbox"/> Wrong <input type="checkbox"/> Extra <input type="checkbox"/> Open issue	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low				

CS577 MBASE Defect Reporting Concepts (cont.)

Agile Internal Review

Project Name:		Review #	-
Artifact:		Review Date:	
Module:		Review Time:	
MBASE Phase/level:			
Activity:			
Exit Criteria:			
Review Leader:		Date Sent to Reviewer:	
Review Leader email:		Date Returned to Author:	
Review Leader phone:		Date Returned to QAT:	
Auhor:		Total Preparation Time:	
Reviewer 1:		Reviewer 2:	
Reviewer 4:		Reviewer 5:	
		Reviewer 3:	
		Reviewer 6:	

Use this sheet to record the areas of concern that come up during your reading/review of the Artifact. Give the "location" information and the associated technical description of the area of concern to indicate to the developer/author during his/her analysis of this information about the relevant part of the Artifact. Give your opinion for the classification of the area of concern in M/W/E field. Write in letter each for Missing(M)/Wrong(W)/Extra(E). Also, rank the priority and criticality in both field as High, Medium or Low.

Problems are things you believe the author of this artifact can/should fix; "open issues" are things which can not be corrected solely in this artifact or at this time.

#	Location(s)	Area of concern	M/W/E	Priority	Criticality

CS577 MBASE Defect Reporting Concepts (cont.)

Agile Artifact Review (cont.)

Artifact:						Date:		
Module:								
Type of review:				MBASE Phase/level:			Review Date(s):	
Defects found:	<input type="checkbox"/> Major	<input type="checkbox"/> Minor	<input type="checkbox"/> No. of Open Issues	<input type="checkbox"/> Number of Unavoidable defects	<input type="checkbox"/> Number of Avoidable defects			
Comments:								

Defects/Issues									
D / # / I	Location (s)	Description	Classification	Priority	Criticality	Activity of Defect Injection (Requirements, Design, Code, etc.)	Location of correction(s)	Date of fix	Comments
			<input type="checkbox"/> Missing	<input type="checkbox"/> High	<input type="checkbox"/> High				
			<input type="checkbox"/> Wrong	<input type="checkbox"/> Medium	<input type="checkbox"/> Medium				
			<input type="checkbox"/> Extra	<input type="checkbox"/> Low	<input type="checkbox"/> Low				
			<input type="checkbox"/> Open issue						

CS577 MBASE Defect Identification Processes

Agile Artifact Review: IIV&Ver

- Multiple issues/problems found by a single reviewer:
(only two types of forms: Issues/Concern and Defect List)

Agile Internal Review:

- Three types of forms
- Peers/Team (at least three, preferably four)
- Process description exists

Agile Formal Review: Three different types of forms

Internal/Informal Review: 4 different types of bigger forms

Formal Review: Four different types of bigger forms

Fagan's Inspection: Five different types of forms