
Advanced Software Engineering **(CS6401)**

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Topics covered in Previous Lecture:

- ▶ RAD Model
- ▶ Agile development model
- ▶ Extreme Programming model

Scrum Model

Scrum: Characteristics

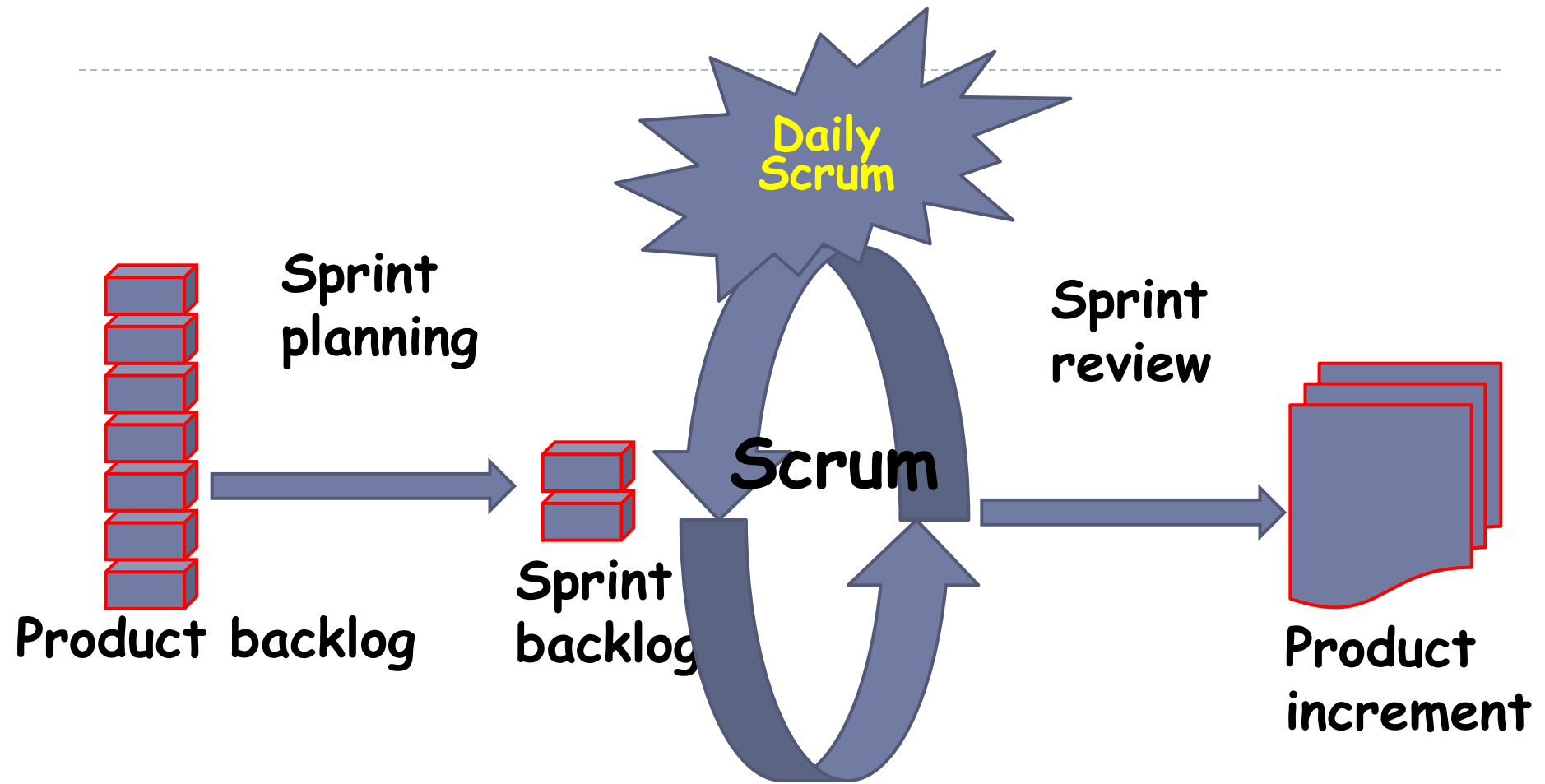
- Entire project work is divided into small work parts
 - These parts can incrementally developed and delivered over time boxes.
 - Time boxes are called **Sprints**.



Scrum: Characteristics

- Self-organizing teams
- Product progresses in a series of month-long sprints
- Requirements are captured as items in a list of product backlog
- One of the agile processes





Sprint

- Scrum projects progress in a series of “sprints”
 - Analogous to XP iterations or time boxes
 - Target duration is one month
- Software increment is designed, coded, and tested during the sprint
- No changes entertained during a sprint

Scrum Framework

- **Roles** : Product Owner, Scrum Master, Team
- **Ceremonies** : Sprint Planning, Sprint Review, Sprint Retrospective, and Daily Scrum Meeting
- **Artifacts** : Product Backlog, Sprint Backlog, and Burndown Chart

Key Roles and Responsibilities in a Scrum Team

- **Product Owner**

- Represents customers' views and interests.
- Guide the team toward building right software.

- **Development Team**

- Team of five-nine people with cross-functional skill sets.

- **Scrum Master (aka Project Manager)**

- Facilitates scrum process and resolves impediments at the team and organization level by acting as a buffer between the team and outside interference.

Product Owner

- Defines the features of the product
- Decides on release date and content
- Prioritizes features according to usefulness
- Adjusts features and priority every iteration, as needed
- Accepts or reject work results.

The Scrum Master

- Represents management in the project
- Removes impediments
- Ensures that the team is fully functional and productive
- Enables close cooperation across all roles and functions
- Shields the team from external interferences

Scrum Team

- Typically 5-10 people
- Cross-functional
 - QA, Programmers, UI Designers, etc.
- Teams are self-organizing
- Membership can change only between sprints

Sprint

- Fundamental process flow of Scrum
 - It is usually a month-long iteration:
 - during this time an incremental product functionality completed
 - NO outside influence allowed to interfere with the Scrum team during the Sprint
 - Each day begins with the Daily Scrum Meeting

Ceremonies

- Sprint Planning Meeting
- Daily Scrum
- Sprint Review Meeting

Sprint Planning

- Goal is to produce Sprint Backlog
- Team members commit to develop and deliver certain features in the ensuing sprint
- Product owner works with the Team to negotiate what Backlog Items
- Scrum Master ensures Team agrees to realistic goals

Daily Scrum

- Daily Stand-up meeting for 15-minutes to review the status of progress achieved so far
- Not for problem solving
- Three questions:
 1. What did you do yesterday?
 2. What will you do today?
 3. What obstacles are in your way?

Daily Scrum

- Is NOT a problem solving session
- Is NOT a way to collect information about WHO is behind the schedule
- Is a meeting in which team members review what is done and make informal commitments to each other and to the Scrum Master
- Is a good way for a Scrum Master to track the progress of the Team

Sprint Review Meeting

- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features
- Informal
 - 2-hour prep time rule
- Participants
 - Customers
 - Management
 - Product Owner
 - Other team members

Product Backlog

- A list of all desired work on the project
 - Usually a combination of
 - story-based work (“let user search and replace”)
 - task-based work (“improve exception handling”)
- List is prioritized by the Product Owner
 - Typically a Product Manager, Marketing, Internal Customer, etc.

Product Backlog

- Requirements for a system, expressed as a prioritized list of Backlog Items
 - Managed and owned by Product Owner
 - Spreadsheet (typically)

Sample Product Backlog

	Item #	Description	Est	By
Very High				
	1	Finish database versioning	16	KH
	2	Get rid of unneeded shared Java in database	8	KH
		- Add licensing	-	-
	3	Concurrent user licensing	16	TG
	4	Demo / Eval licensing	16	TG
		Analysis Manager		
	5	File formats we support are out of date	160	TG
	6	Round-trip Analyses	250	MC
High				
		- Enforce unique names	-	-
	7	In main application	24	KH
	8	In import	24	AM
		- Admin Program	-	-
	9	Delete users	4	JM
		- Analysis Manager	-	-
	10	When items are removed from an analysis, they should show up again in the pick list in lower 1/2 of the analysis tab	8	TG
		- Query	-	-
	11	Support for wildcards when searching	16	T&A
	12	Sorting of number attributes to handle negative numbers	16	T&A
	13	Horizontal scrolling	12	T&A
		- Population Genetics	-	-
	14	Frequency Manager	400	T&M
	15	Query Tool	400	T&M
	16	Additional Editors (which ones)	240	T&M
	17	Study Variable Manager	240	T&M
	18	Haplotypes	320	T&M
	19	Add icons for v1.1 or 2.0	-	-
		- Pedigree Manager	-	-
	20	Validate Derived kindred	4	KH
Medium				
		- Explorer	-	-
	21	Launch tab synchronization (only show queries/analyses for logged in users)	8	T&A
	22	Delete settings (?)	4	T&A

Sprint Backlog

- A subset of Product Backlog Items, which define the work for a Sprint
 - Created by Team members
 - Each Item has its own status
 - Updated daily

Sprint Backlog during the Sprint

- Changes occur:
 - Team adds new tasks whenever they need to in order to meet the Sprint Goal
 - Team can remove unnecessary tasks
 - But: Sprint Backlog can only be updated by the team
- Estimates are updated whenever there's new information

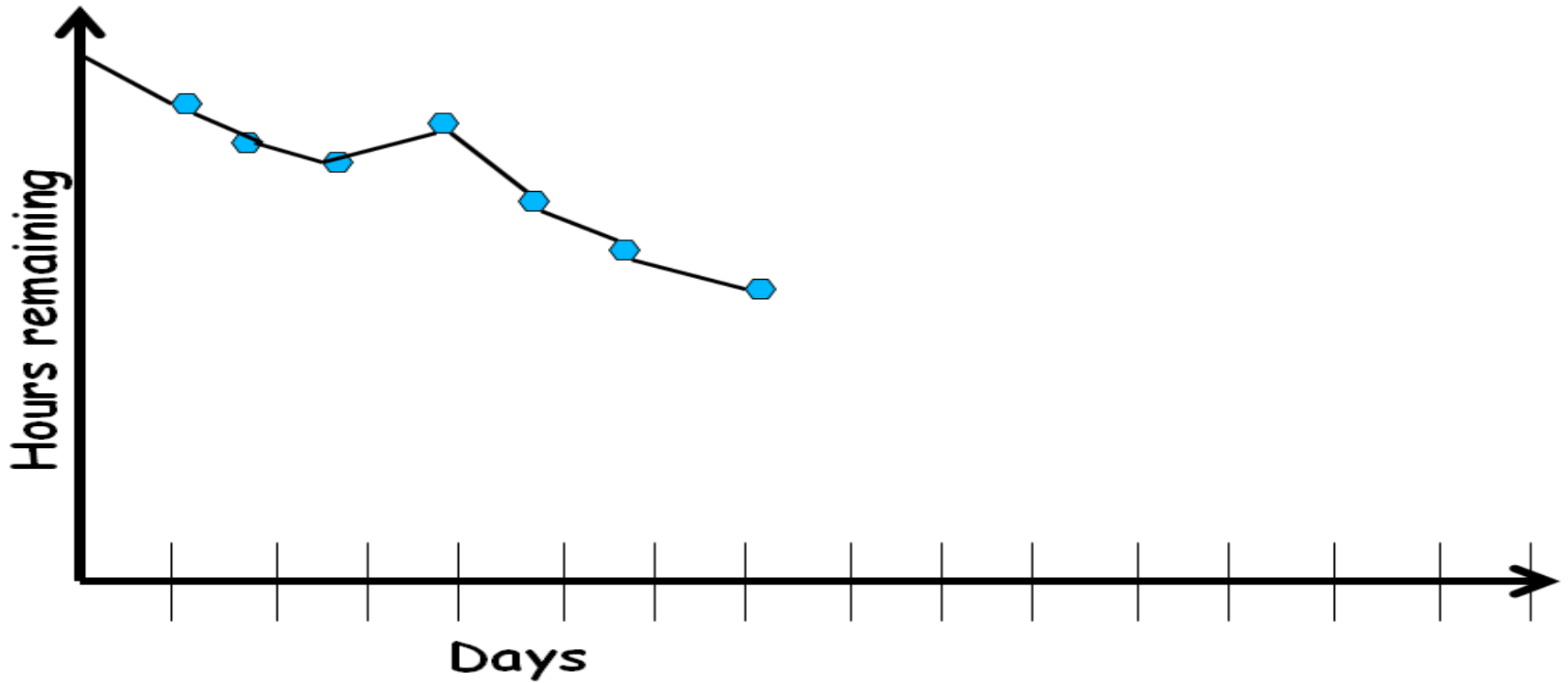
Burn down Charts

- Are used to represent “work done”.
- Are remarkably simple but effective Information disseminators
- 3 Types:
 - Sprint Burn down Chart (progress of the Sprint)
 - Release Burn down Chart (progress of release)
 - Product Burn down chart (progress of the Product)

Sprint Burn down Chart

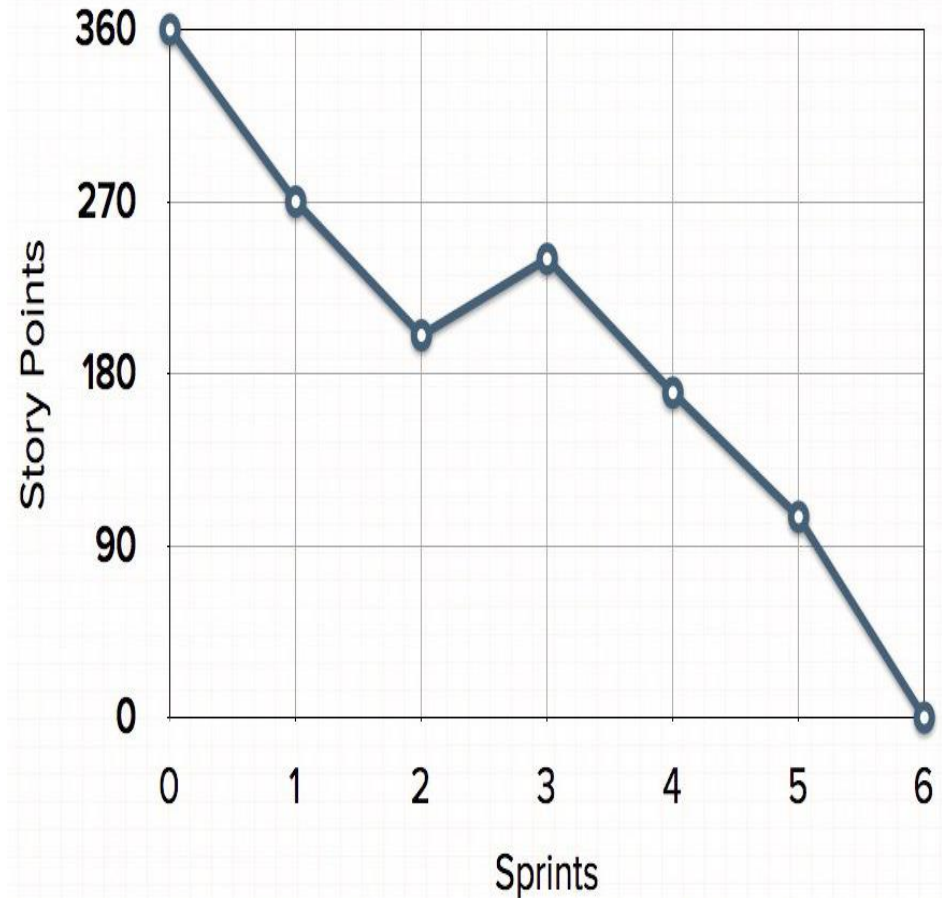
- Depicts the total Sprint Backlog hours remaining per day
- Shows the estimated amount of time to complete
- Ideally should burn down to zero to the end of the Sprint
- Actually is not a straight line

Sprint Burndown Chart



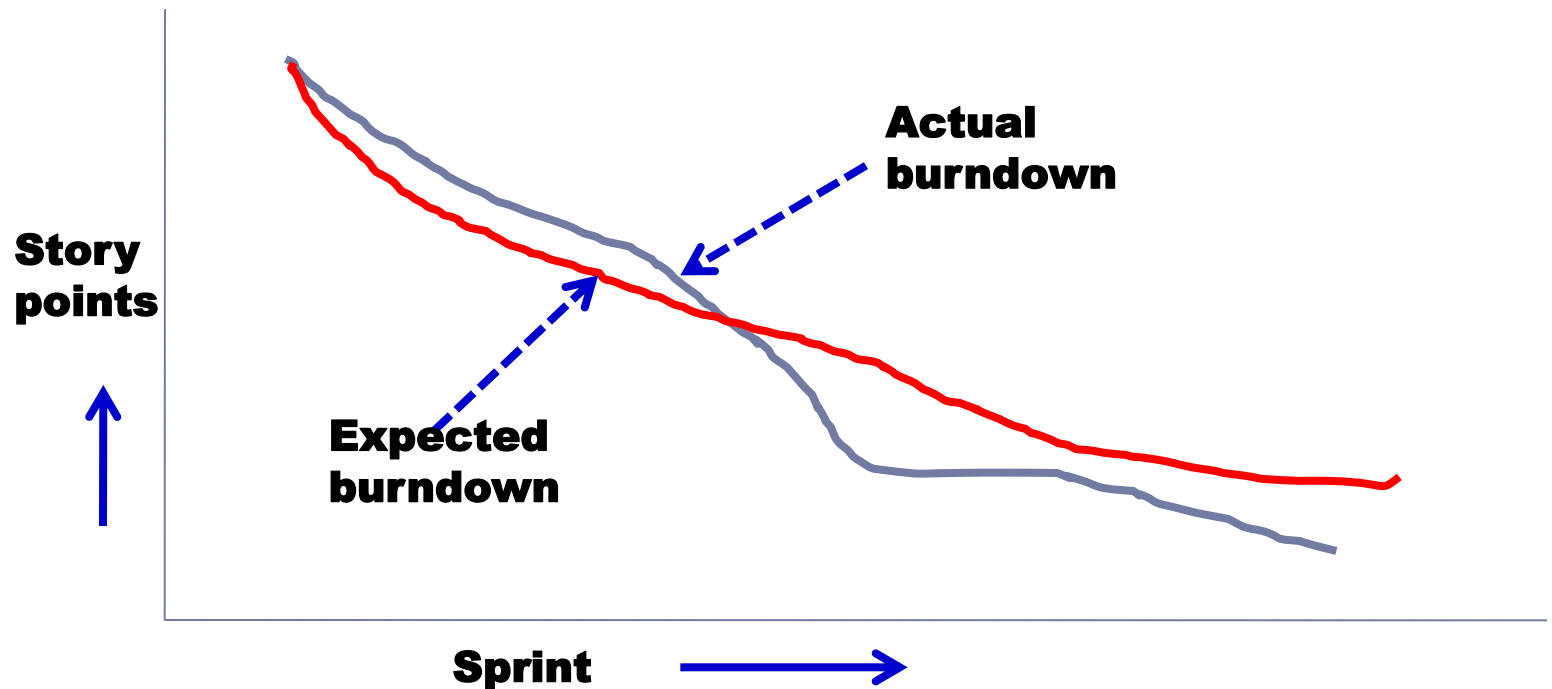
Release Burndown Chart

- Will the release be done on right time?
- How many more sprints?
- X-axis: sprints
- Y-axis: amount of story points remaining



Product Burndown Chart

- Is a “big picture” view of project’s progress (all the releases)



Scalability of Scrum

- A typical Scrum team is 6-10 people
- Jeff Sutherland - up to over 800 people
- “Scrum of Scrums” or “Meta-Scrum”

Feature Driven Development

Feature Driven Development

- Originally conceived by Peter Coad and his colleagues as a process model for Object-Oriented Software Engineering.
- Stephen Palmer and John Felsing have extended and improved Coad's work
- An adaptive, agile process that can be applied to moderately sized and larger software projects

Philosophy of FDD

- Emphasizes the collaboration among people on an FDD Team
- Manages project and complexity using feature-based decomposition followed by the integration of increments.
- Communication of technical detail using verbal, graphical and text-based means.

FDD

- A feature is a client-valued function that can be implemented in two weeks or less

Benefits of feature definitions

- Features are small blocks of deliverable functionality, users can describe more easily; easily understand their relationships; better review for ambiguity, error, or omission.
- Organized into hierarchical business-related grouping.
- A feature is the FDD deliverable increment
- Design and code representations are easier to inspect
- Project planning, scheduling and tracking are driven by the feature hierarchy

Template for defining a feature

- **<action>** the **<result>** **<by | for | of | to>** a(n) **<object>**
- **<object>** is a person, place, or thing (including roles, or catalog-entry-like descriptions)
- Examples of features for an e-commerce application might be:

Add the product to shopping cart

Display technical-specifications of the product

Store the shipping-information for the customer

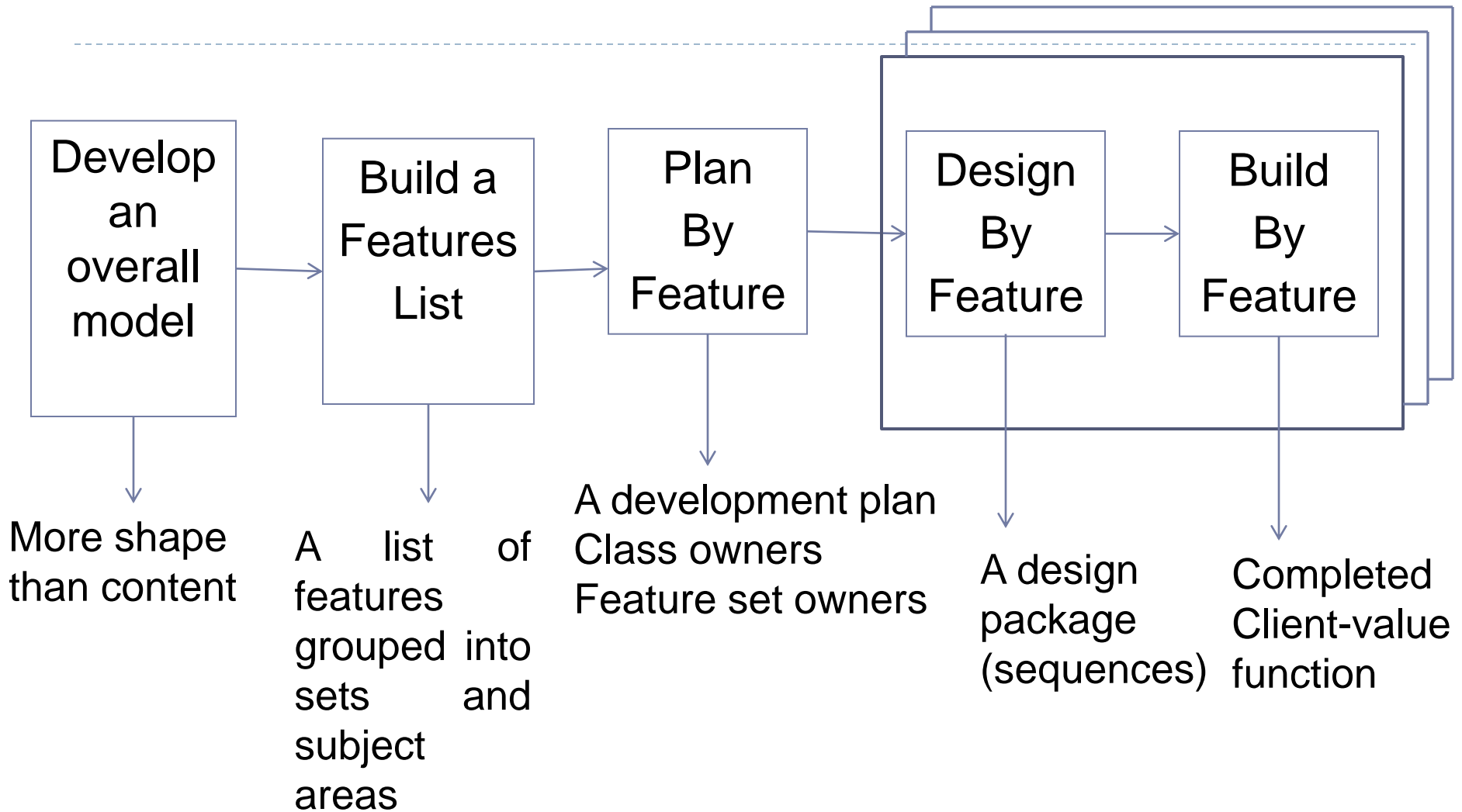
Grouping of related features into business-related categories

- **<action> <-ing> a(n) <object>**
- For Example: ***Making a product sale*** is a feature set that would encompass the features noted before and others.

Five collaborating framework activities

- **Develop an overall model**
 - Domain object model, important objects in the system
- **Build a features list**
 - Divide the domain model into subdomain (a set of features)
- **Plan by Feature**
- **Design by feature**
- **Build by feature**

FDD Model



FDD Model

- To understand project status- what accomplishments have been made and problems have been made model
- If deadline pressure is significant, it is to determine if software increments (features) are properly scheduled
- FDD defines six milestones during the design and implementation a feature: “Design walkthrough, design, design inspection, code, code inspection, promote to build”

Reference

- ▶ R. S. Pressman, *Software Engineering A Practitioner's Approach*, McGraw Hill Publications , 2006
- ▶ R. Mall, *Fundamentals of Software Engineering*, Prentice Hall of India , 2014