SIT725-Software Engineering

Lecture 2

Formulation and Planning

(Get into WebE)

Outcomes of This Session

- First Part :
  - Web engineering process
  - Best practices for Web engineering
  - Goals of WebE formulation
  - Methods of WebE formulation
  - Necessities of WebE planning
  - WebE management issues (team, outsourcing, in-house development, etc)
- Second part: Requirements in Scrum process

WebE Process

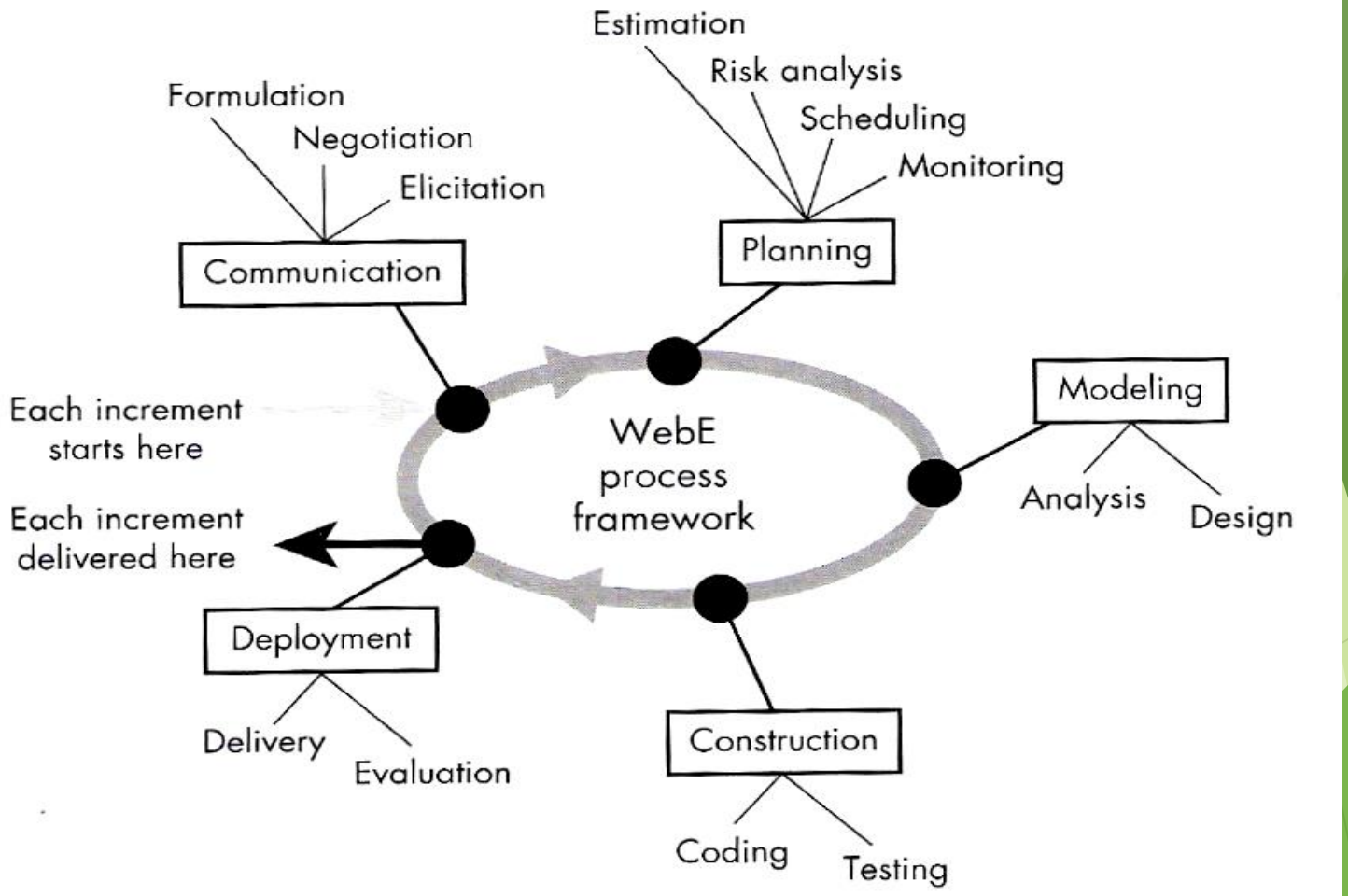
WebE process must accommodate:

- Incremental delivery
- Frequent changes
- Short timeline

Therefore,

- An incremental process model should be used in all situations
- Advanced approaches (an agile process model) is appropriate in most situations

The WebE Process



The WebE Process Framework—I

- Customer communication
  - *Business analysis* defines the business/organizational context for the WebApp.
  - *Formulation* is a requirements gathering activity involving all stakeholders. The intent is to describe the problem that the WebApp is to solve
- Planning
  - The “plan” consists of a task definition and a timeline schedule for the time period (usually measured in weeks) projected for the development of the WebApp increment.

The WebE Process Framework—II

- Modeling
  - Analysis model—establishes a basis for design
    - Content Analysis (text, video, image).
    - Interaction Analysis (use case, sequence diagram, state diagram, user interface prototype).
    - Functional Analysis (user observable function, behavior associated with the classes, UML activity diagram).
    - Configuration Analysis (hardware, operating system environment, distributing load multiple server, remote database).
  - Design model—represents key WebApp elements
    - Content design (linear structure, hierarchical structure)
    - Aesthetic design (graphic design, complements technical aspect of content and interface)
    - Architectural design
    - Interface design
    - Navigation design

The WebE Process Framework—III

- Construction
  - WebE tools and technology are applied to construct the WebApp that has been modeled
  - Testing of all design elements
- Deployment (Delivery and Evaluation)
  - configure for its operational environment
  - deliver to end-users, and
  - Evaluation feedback is presented to the WebE team
  - the increment is modified as required (the beginning of the next incremental cycle)

Most Fundamental SE Principles

- Understand the problem before you begin to solve it.
- Be sure that the solution you conceive is one that people really want.

These are the basis of formulation.

- Plan the work before you begin performing it.

This is the philosophy that underlies project planning.

Formulation

Formulation represents a sequence of Web engineering actions

- begins with the identification of business need
- moves into a description of WebApp objectives
- defines major features and functions
- establishes a requirements gathering activity that will lead to the development of an analysis model
- allows stakeholders and the web engineering team to establish a common set of goals and objectives for the construction of the WebApp.
  - identifies the scope of the development effort
  - provides a means for determining a successful outcome.

Formulation Questions

- What is the main motivation (business need) for the WebApp?
  - Example: “Mobile.com will allow customers to purchase mobile phones and get services over the Web”
- What are the objectives that the WebApp must fulfill?
- Who will use the WebApp?

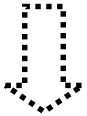
[Please read more examples of answering these question on page 50, chapter 4]

Answers provide …

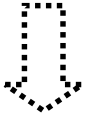
- *Informational goals*—indicate an intention to provide specific content and/or information for the end-user
- *Applicative goals*—indicate the ability to perform some task within the WebApp

Formulation Activities

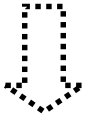
- Identify all informational and applicative goals



- Develop a user profile
  - Captures relevant features of potential users including their background, knowledge, preferences and even more.
  - User Role, Personas



- Identify the scope of the WebApp
  - In many cases, the goals are integrated into the statement of scope



WebE Requirements Gathering

It is also called “Requirement Elicitation”

Objectives:

- Identify content requirements.
- Identify functional requirements.
- Define interaction scenarios for different classes of users.

These objective are achieved by conducting the following steps

WebE Requirements Gathering Steps

- Ask stakeholders to define user categories and develop descriptions for each category
- Communicate with stakeholders to define basic WebApp requirements
- Analyze information gathered and use information to follow-up with stakeholders

Step - Defining User Categories/ Roles

- What is the user's overall objective when using the WebApp?
- What is the user's background and sophistication relative to the content and functionality of the WebApp?
- How will the user arrive at the WebApp?
- What generic WebApp characteristics does the user like/dislike?

Step - Communicating with Stakeholders

- *Traditional focus groups*—a trained moderator meets with a small group of representative end-users (or internal stakeholders playing the role of end-users).
- *Electronic focus groups*—a moderated electronic discussion conducted with a group of representative end-users and stakeholders.
- *Iterative surveys*—a series of brief surveys, addressed to representative users and requesting answers to specific questions about the WebApp
- *Exploratory surveys*—a Web-based survey that is tied to one or more WebApps that have users who are similar to the ones that will use the WebApp to be developed.
- *Scenario-building*—selected user are asked to create informal use-cases that describe specific interactions with the WebApp.

Step - Preliminary Analysis

- Categorize information gathered by user class and transaction type
- Develop lists of …
  - content objects
  - Operations that are applied to content objects within a specific user transaction
  - functions (e.g., informational, computational, logical, and help-oriented) that the WebApp provides for end-users
  - other non-functional requirements that are noted during the communication activities.

Step - Preliminary Analysis
Writing your high level requirements

Format of requirements

Description (intent of requirement):

The <software/**system**> (must / shall) <**perform ,do, action, behaviour**> when/unless/while <**condition**>

Rationale: Reason behind the requirement's existence. Why is requirement important.

Originator: The person who raised the requirement at first instance, whom it can be attributed

Fit criterion: This is the quantified goal that solution has to meet. This is an acceptance criteria.

Description: The product shall be intuitive

Fit criterion: Nine out of ten engineers shall be able to successfully operate the product after one day's training program

Example of Writing requirements:

Description: The product shall issue an alert if a weather station fails to transmit readings

Rationale: Failure to transmit reading indicates that station is faulty and need maintenance, data used to predict may be incomplete

Originator: Mr Rodger, Engineering section

Fit Criterion: For each weather station the recorded number of each type of reading per hour shall be within the manufactured specific range

The WebE Team

- WebE team roles
  - Content Developer/Providers (generation, collection of content)
  - Web Publisher (liaison person between technical and non-technical content developer to include content)
  - Web Engineer (analysis modeling, requirement elicitaion, architectural, navigational and interface design, webApp implementation and testing)
  - Business domain experts (should be able to answer all question related to business goal)
  - Support Specialist (support to the end user for webApps)
  - Administrator (a.k.a. “Web Master”) (development and implementation of policies for the operation of the WebApp, establishment of support and feedback procedure, implementation of security and access right, measurement and analysis of web site traffic, participate technical activities performed by WebEngineer

The WebE Team

- Key points for building a WebE team
  - A set of team guidelines should be established
  - Strong leadership is a must
  - Respect for individual talents is critical
  - Every member of the team should commit
  - It is easy to get started, but it’s very hard to sustain momentum

Web Engineering Metrics

Three primary goals:

- *Indication of WebApp quality (technical point of view)*
- *For effort estimation*
- *Indication of WebApp success (business point of view)*

Please read Section: How Do We Estimate Effort and Time of chapter 5 (page 91) of the textbook

Metrics

Software metrics provides a basis for:

- *Improving the software process*
- *Increasing the accuracy of project estimates*
- *Enhancing project tracking*
- *Improving software quality*

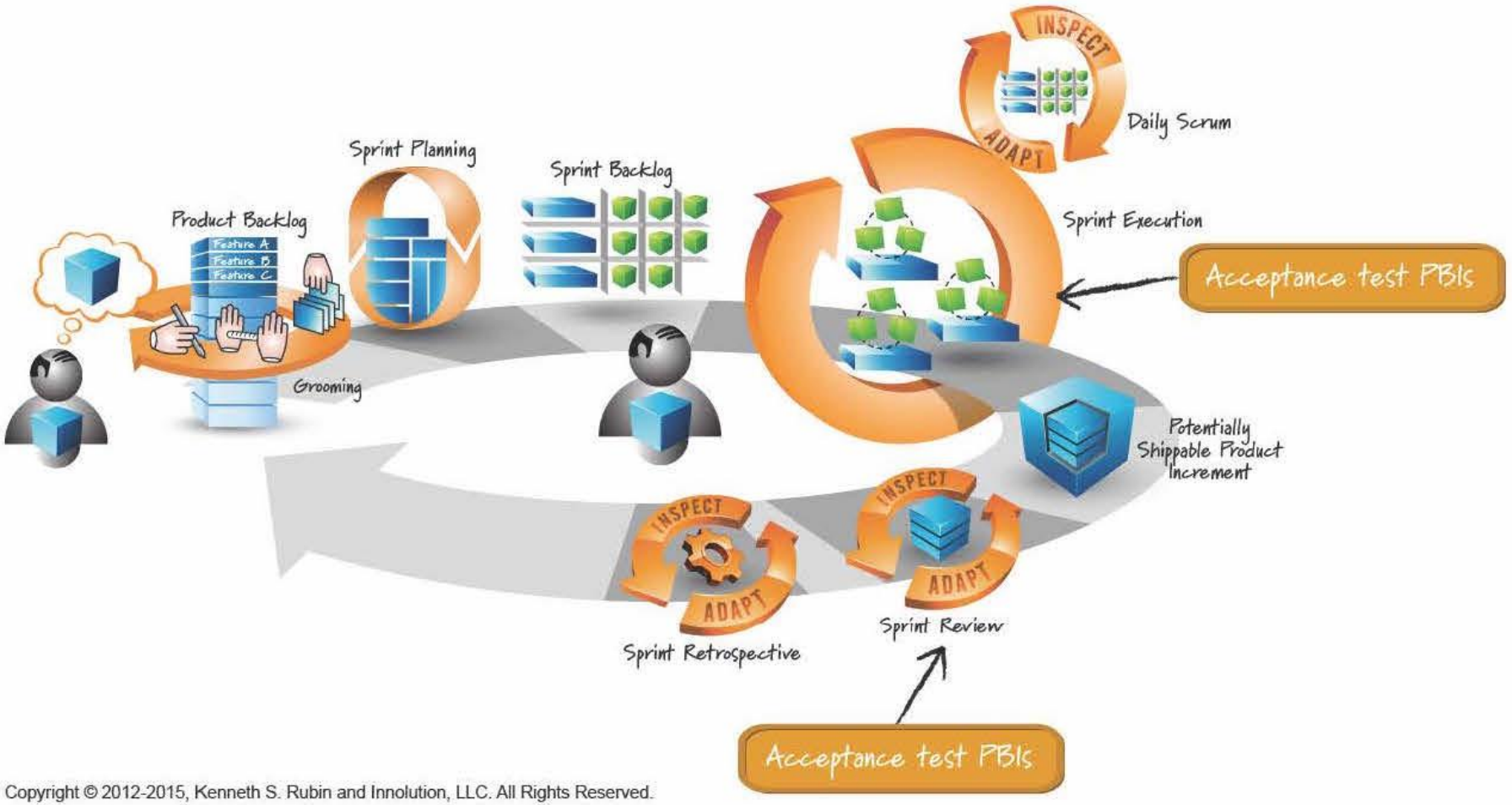
Web engineering metrics:

- *Achieve all above benefits*
- *Improve usability, WebApp performance, user satisfactions*

WebE “Worst Practices”

- *We have a great idea, so lets begin building the WebApp—now.*
- *Stuff will change constantly, so there’s no point in trying to understand WebApp requirements.*
- *Developers whose dominant experience has been in traditional software development can develop WebApps immediately. No new training is required.*
- *Be bureaucratic.*
- *Testing? Why bother?*

Second part of Lecture: Agile approach: The Scrum



Envisioning session and Initial product backlog

- Envisioning sessions is the primary step in scrum which has mainly two parts.
  - **The first part:** is known as ideation.
  - **The second part:** is known as the high level product backlog creation.
- Ideation session (First part): This finds the product idea: Identify problems (pain points), market review, competitor reviews, internal analysis of current system, identify needs, create projects
  - This ideation of envisioning outputs:
    - the vision and project scope,
    - product perspective (high level architecture of product).

Envisioning session and Initial product backlog

➢ The vision Statement

- ***For***. [target customer]
- ***Who***. [statement of the need or opportunity]
- ***The***. [product name]
- ***Is***. [product category]
- ***That***. [major capabilities, key benefit, compelling reason to buy or use]

  Customer will submit order online and pay online. Customer will get attractive loyalty reward and promotional benefit, managers will be able to determine the promotion policies easily
- ***Unlike***. [primary competitive alternative, current system, current business process] Manual process
- ***Our product***. [statement of primary differentiation and advantages of new product]
- *[Ref-5]:*

Project Scope: At the highest level, scope is defined when the customer decides which business objectives to target.

Then you can define scope at different levels such as initial release, subsequent releases (often include product features) *[Ref-5]:*

Envisioning session and Initial product backlog

➢ The vision Statement

Here's a sample vision statement for the Chemical Tracking System, with the keywords in boldface:

For *scientists* ***who*** *need to request containers of chemicals,* ***the*** *Chemical Tracking System* ***is*** *an information system* ***that*** *will provide a single point of access to the chemical stockroom and to vendors. The system will store the location of every chemical container within the company, the quantity of material remaining in it, and the complete history of each container's locations and usage. This system will save the company 25 percent on chemical costs in the first year of use by allowing the company to fully exploit chemicals that are already available within the company, dispose of fewer partially used or expired containers, and use a standard chemical purchasing process.* ***Unlike*** *the current manual ordering processes,* ***our product*** *will generate all reports required to comply with federal and state government regulations that require the reporting of chemical usage, storage, and disposal. [Ref-5]:*

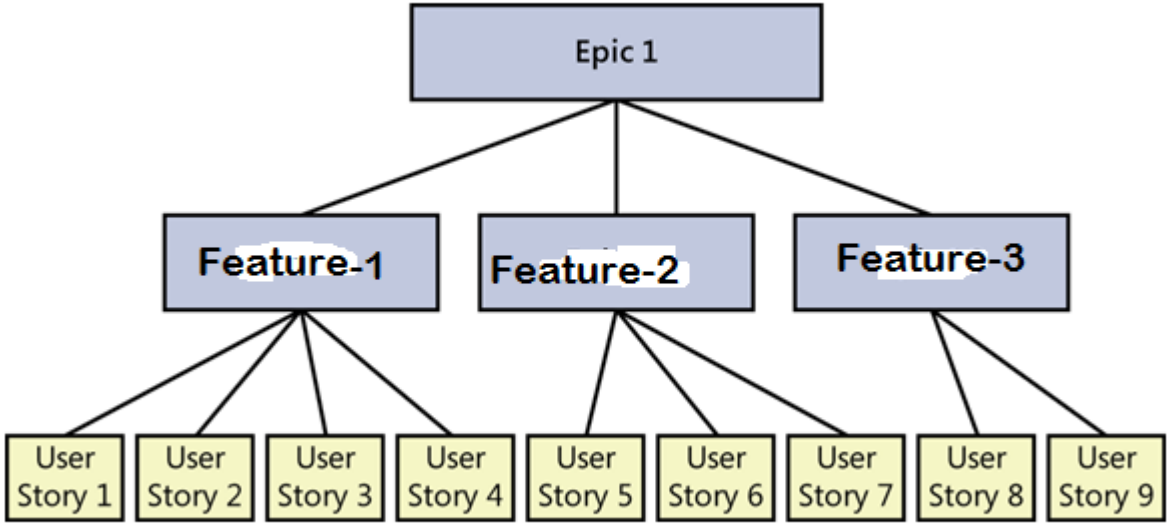
Envisioning session and Initial product backlog

- **The second part of envisioning➔ Initial high level product backlog**
  - Initial high level product backlog is created through the requirements gathering.
- **1. Organizations runs user-story writing workshops**
  - These requirements can be a set of questions as:
    - Who are the most important users of the system and what are their roles?
    - What are the high level product features system needs to perform for those users?
    - Is there any constraint that needs to be addressed?
- **2. Perform user role analysis.**
    - User role analysis categories the users of the system into different roles
    - Prepare a characteristics description of each role.
    - Persona (an example of a particular user role).

Example of a persona: Fred, 41, has been a chemist at Contoso Pharmaceuticals since he received his Ph.D. 14 years ago. He doesn't have much patience with computers. Fred usually works on two projects at a time in related chemical areas. His lab contains approximately 300 bottles of chemicals and gas cylinders. On an average day, he'll need four new chemicals from the stockroom. Two of these will be commercial chemicals in stock, one will need to be ordered, and one will come from the supply of proprietary Contoso chemical samples. On occasion, Fred will need a hazardous chemical that requires special training for safe handling. When he buys a chemical for the first time, Fred wants the material safety data sheet emailed to him automatically. Each year, Fred will synthesize about 20 new proprietary chemicals to go into the stockroom. Fred wants a report of his chemical usage for the previous month to be generated automatically and sent to him by email so that he can monitor his chemical exposure. [##Ref-5]

Envisioning session and Initial product backlog

- **3. Initial product backlog**
  - Different CASE tools and different graphical models are used
    - to discover the `Epics'.
  - **Epics are finally listed in the initial product backlog.**
- We will talk about Epics in next slide



Epics

- The high level product functions are quite broad description of user requirements described by the users usually known as `Epics
- Epics are large user stories' (Epics) which does not have very detail of the requirements.
- Later in the Backlog grooming meeting, epics are decomposed into a collection of smaller stories that can be implemented in a particular sprint.
- An epic can spread over multiple sprints duration. We will discuss more about the size of user stories later in the unit.

Format of writing Epics:

`As a' <user role> `I want to‘ <goal> `so that‘ <benefit>

- **Example of Epic**
- As a regular customer I want to buy a product through online so that my order is processed and product is delivered faster than a manually submitted order.
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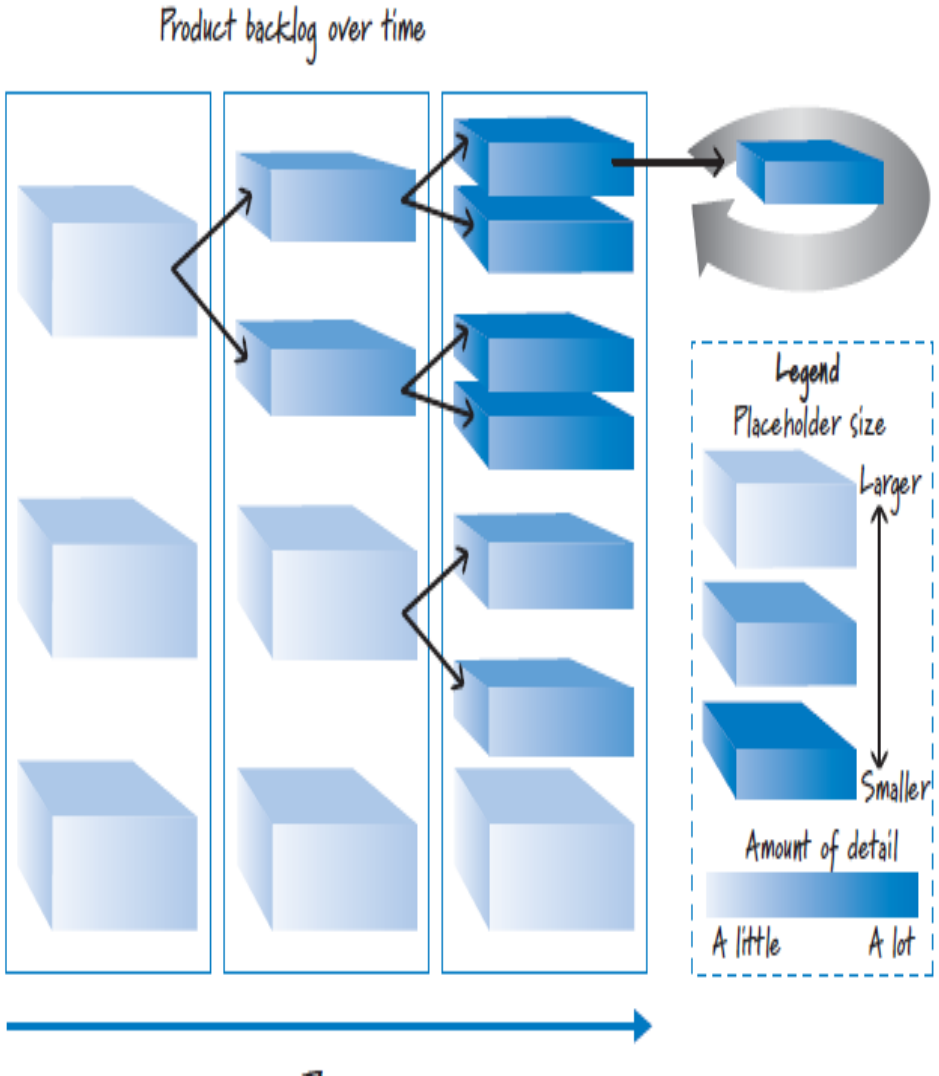


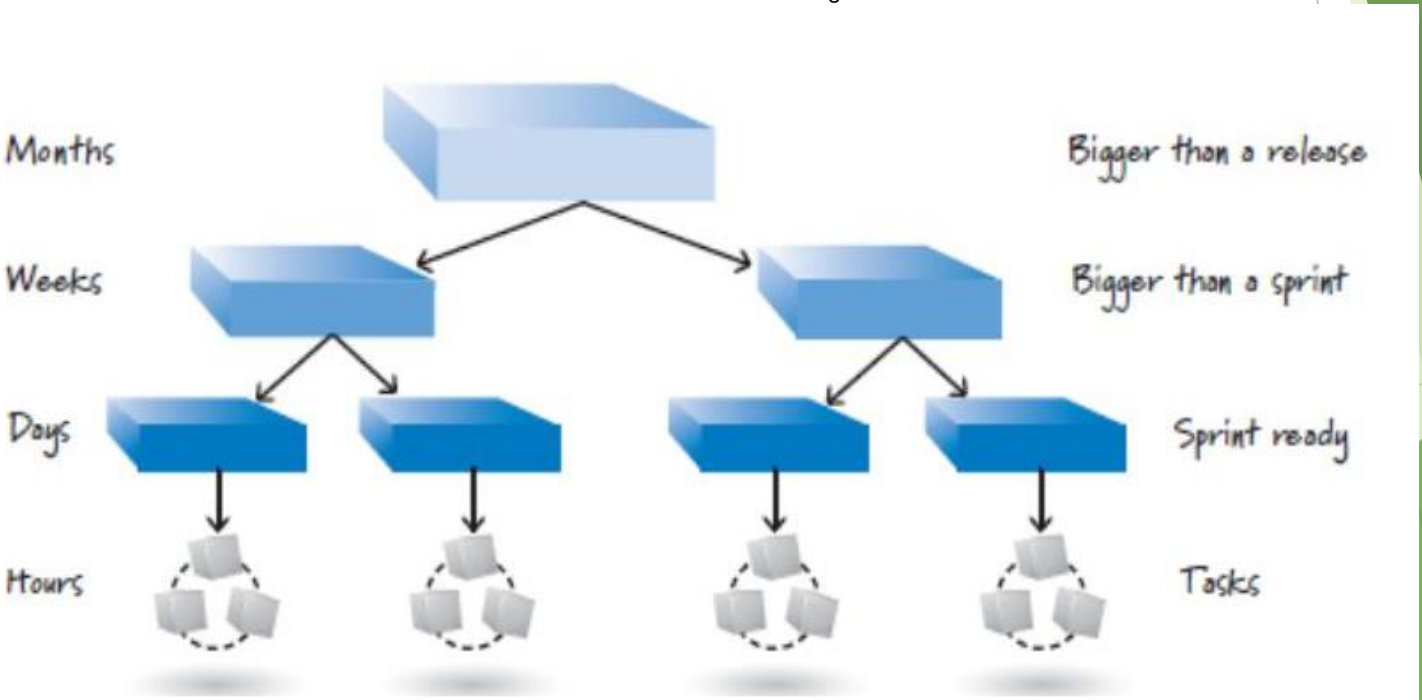
Reference of image: Book-- **Essential Scrum—Kenneth S. Rubin**

Epics and Product Features

- User requirement which are a bit smaller than epic in size can also be discovered and written as part of the initial product backlog.
- These can be of few weeks size or a bit more than one sprint duration. These are known as product features.
- These can be written using the same template of Epics.
- Example of product feature:

As a regular customer I want to have a shopping cart in online order so that I can see the final items and know total costs.

Reference of image: Book-- **Essential Scrum—Kenneth S. Rubin**



Summary

- Formulation is a customer communication activity that defines the problems a WebApp is to solve. It identifies:
  - Business needs.
  - Project goals and objectives.
  - End-user categories.
  - Major functions and features.
  - Degree of interoperability with other applications.
- Planning is still needed in Web engineering.
- WebE team: technical and non-technical members.
- Outsource and in-house WebApp development.
- Web engineering metrics: indicators and estimation

Readings

R. S. Pressman and D. Lowe: ***Web Engineering, A Practitioner's Approach,*** McGraw-Hill, 2009.

- Chapter 3: A Web Engineering Process
- Chapter 4: Communication
- Chapter 5: Planning

(concentrate on the topics covered in the lecture)

Essential Scrum—Kenneth S. Rubin

Papers and other reading materials in "Week 2 Readings" folder on CloudDeakin.

##Ref-5: Software requirement (3rd ed.) –Karl Wiegers and Joy Beatty