Web Engineering:
A Web Engineering Process

The University of Aizu
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Outline

- Introduction
- Defining the Framework
- WebE Process Activities & Actions
- Conducting Framework Activities
- Modeling and Design
- Umbrella Activities

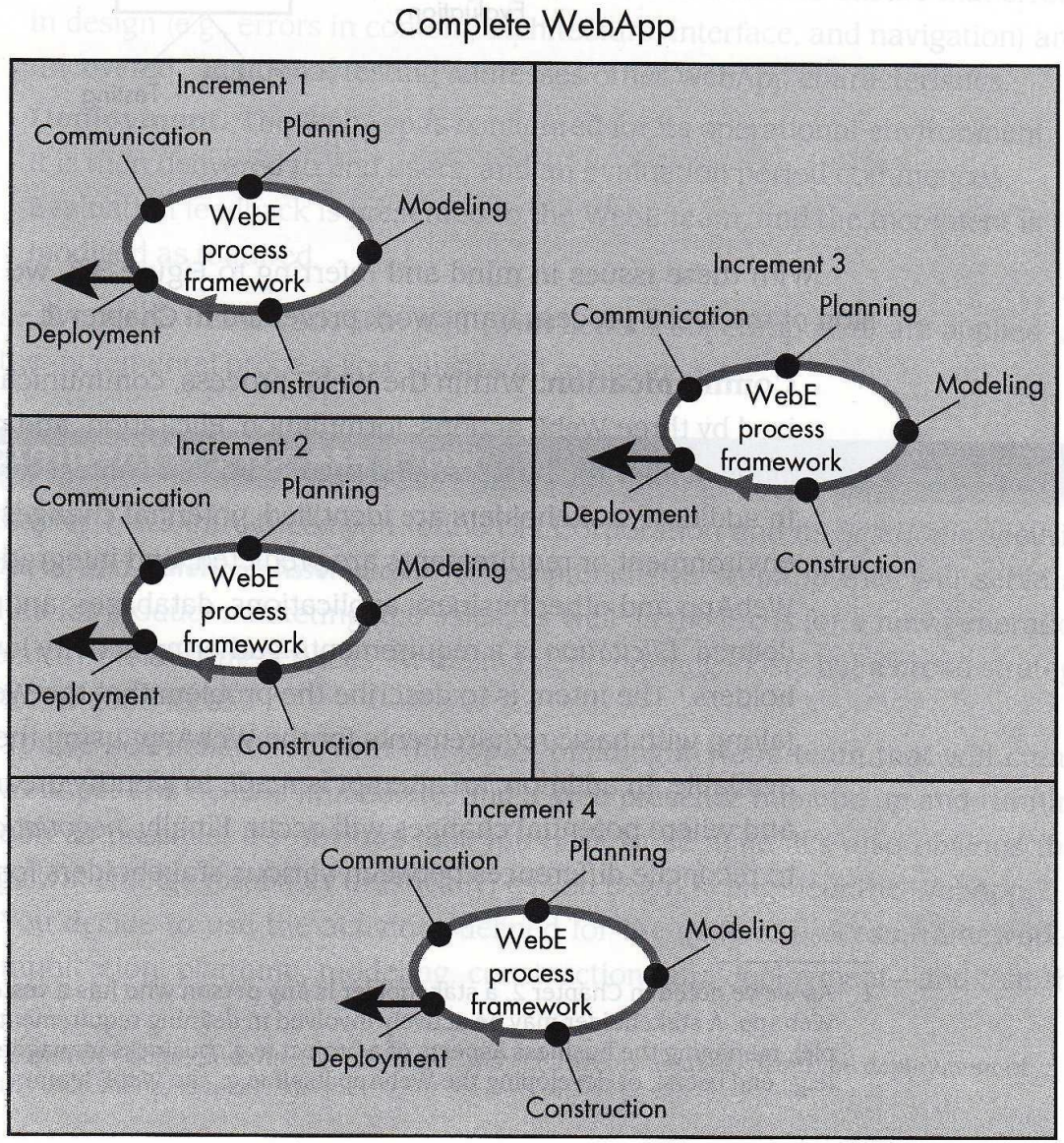
Introduction

- Some people believe that a company can define a process for WebApp development in advance.
- They believe that it can be applied when a new Web engineering project appears.
- That is not how the things work!
- The framework must be adopted to the specific characteristics of the problem, the project, and the people who will specify the need and do the work.

Defining the Framework

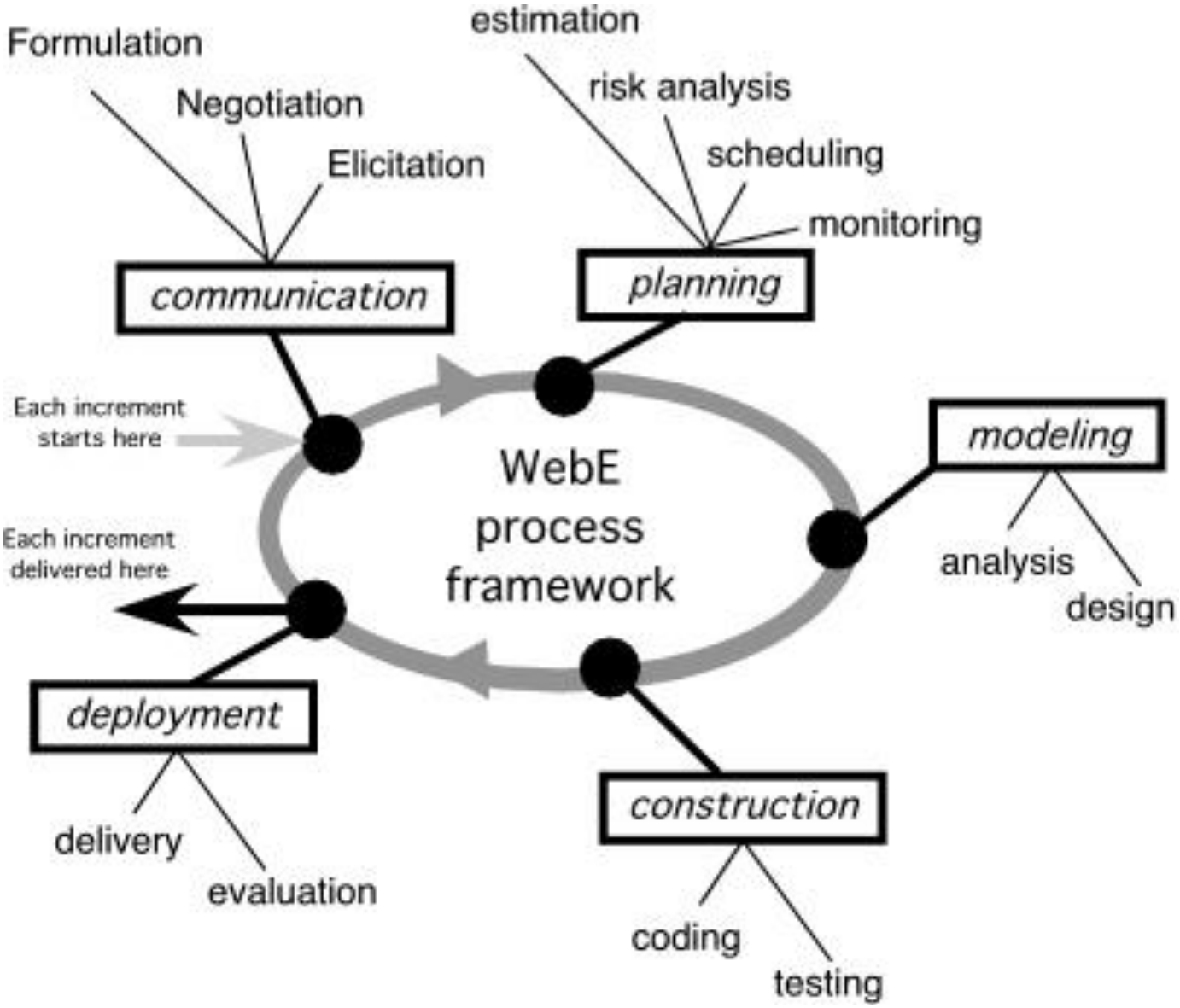
- Realities in most WebApp projects
  - Requirements evolve over time.
    - At the beginning, there may be uncertainly about some elements of the business strategy, the content of the functionality to be delivered, etc.
  - Changes will occur frequently.
    - The uncertainly implies changes to requirements.
  - Timelines are short.
    - This contradicts with creation of detailed engineering documentation. On the other hand, problem analysis, design, and testing must be documented in some manner.
- Because of these realities, WebApps are often delivered incrementally!

Incremental Delivery



- Repeat the development cycle for each increment!

WebE Process Activities & Actions



WebE Process Activities & Actions

- Communication
  - Characterized by three WebE actions: formulation, elicitation,, and negotiation.
- Planning
  - The planning work product consists of a task definition and a time line schedule for the period projected for the development of the WebApp increment.
- Modeling
  - Modeling is to develop agile analusys and desing models that define requirements and at the same time represent a WebApp that will satisfy them.

WebE Process Activities & Actions

- Construction
  - Once the WebApp increment has been constructed, a series of rapid tests are conducted to ensure that errors in design (errors in content, navigation, architecture, and interface) are uncovered.
- Deployment
  - The WebApp is configured for its operational envirounment. It is then delivered to the end users, and run for an evaluation period. Then feedback is presented to the WebE team, and the increment is modifyed as required.

How are Framework Activities Conducted?

- The very first iteration is focused on defining overall WebApp requirements and identifying the increments to be deployed in subsequent iterations.

Conducting Framework Activities

- The first iteration
  - define business context
  - establish overall requirements
  - create a set of usage scenarios
  - negotiate conflicting needs among stakeholders, and
  - from this information derive the set of WebApp increments that is to be delivered.
- Develop a broad outline of all components, recognizing that it will change.

Conducting Framework Activities

- The second iteration
  - You've learned that the first increment is an informational WebApp and it must be delivered in one week!
  - You meet with stakeholders and later review your notes
    - See next slide

Example of the notes

- Logo and graphics—need aesthetic design.
- One- or two-paragraph introduction.
- CPI mission statement (file exists)
- A word to visitors (someone will write this tomorrow)
- Basic navigation bar will look like …
- About the company
- Our offerings
- Home security products (hierarchical at next level)
- Monitoring services (a list)
- Our Technology (the new sensor)
- Contact us
- Other issues:
- Informational content will change over time.
  - This "home page" will be the navigation starting point for content and functions required for subsequent increments.

What to do next?

- Because you follow the WebE process framework, you next activity is planning.
- Since all content exists and no functionality is to be implemented at this stage, you do the work yourself.
  - See the next slide

Example of the Plan

- You spend a few minutes developing a plan
  - Day 1: Create a prototype layout (a model) of the WebApp.
  - Collect and review all existing CPI content and graphics.
  - Get stakeholder feedback on prototype, if possible.
  - Day 2: Using the prototype as a guide, begin construction of the increment.
  - Build navigation bar.
  - Lay out content areas.
  - Integrate graphics, links, etc.
  - Test all links for validity.
  - Review all content for completeness and correctness.
  - Day 3: FTP all files to (an existing) domain.
  - Perform navigation tests.
  - Deployment: Inform selected stakeholders that the increment is available.
  - Day 4: Poll stakeholders for feedback.
  - Make modifications based on stakeholder feedback

Conducting Framework Activities

- The next iteration
  - You've deployed the informational WebApp
- the communication activity during this second iteration will identify the requirements (including content and functionality)
  - assume that the second increment delivers the capability to select and download product specifications and related information
- the process flow is restarted at the beginning, performing the communication activity for this increment.
- The tasks you select to populate each framework activity for the increment may differ from the tasks performed for the preceding increment, but the overall process flow remains the same

How should the Communication Activity be Refined?

- Communication is the activity that establishes "destination" (goal) of the a WebApp project:
  - Identify business stakeholders
  - Identify user categories
  - Formulate the business context
  - Define the key business goals and objects for the WebApp
  - Identify the problem
  - Define information and application goals
  - Gather requirements
  - Develop usage scenarios

What is Modeling?

- Modeling is an activity that creates one or more conceptual representations of some aspect of the WebApp to be build.
- Forms of conceptual representation
  - Written documents
  - Sketches
  - Schematic diagrams
  - Graphical models
  - Written scenarios
  - Paper or executable prototypes
  - Executable code

What is Modeling?

- Two Web engineering actions occur during modeling:
  - Analysis
  - Design

What is Analysis?

- Analysis examines stakeholders requirements using information gathered during the communication activity.

What is Design?

- A good WebApp exhibits
  - Firmness
    - No bugs that inhibit its function
  - Commodity
    - WebApp is sutable for the purpose for which it was intended
  - Delight
    - The experience of using the WebApp should be a pleasurable one.

What are the Elements of a Design Model?

- The model can consider of some or all of the aspects of WebApp design
  - Interface design
  - Aesthetic (graphic) design
  - Content design
  - Navigation design
  - Architecture design

How is a WebApp Increment Deployed?

- Deliver the WebApp increment to a server at a predefined domain
- Establish an online feedback mechanism for end users
- Evaluate end-user interaction
- Asses lessons learned and consider all user feedback
- Make modifications to the WebApp increment as required

Umbrella Activities

- Umbrella activities are background activities which occur in parallel with the main development activities
- They are equally important to the success of a project
  - And so should be considered explicitly.
- Many umbrella activities can be defined
  - But only four are crucial for a successful Web engineering project
    - See the next slide

Umbrella Activities

- Change management. Manages the effects of change as each increment is engineered, integrating tools that assist in the management of all WebApp content
- Quality assurance. Defines and conducts those tasks that help ensure that each work product and the deployed increment exhibits quality
- Risk management. Considers project and technical risks as an increment is engineered
- Project management. Tracks and monitors progress as an increment is engineered

Conclusion

- The WebE process is an agile adaptable, iterative road map for building WebApps.
- It includes 5 activities
  - Communication
  - Planning
  - Modeling
  - Construction
  - Deployment
- All activities are adapted to accommodate the specific characteristics of the problem, the project, and the people who will specify the need and do the work.