Introduction to Web Engineering SENG2050/6050

Lecture 1e
Web Engineering

Lecture 1e: Web Engineering

- What is Web Engineering?
- Evolution of the Web
- Requirements of the Web
- The Need for Web Engineering
- Web Engineering vs. Software Engineering

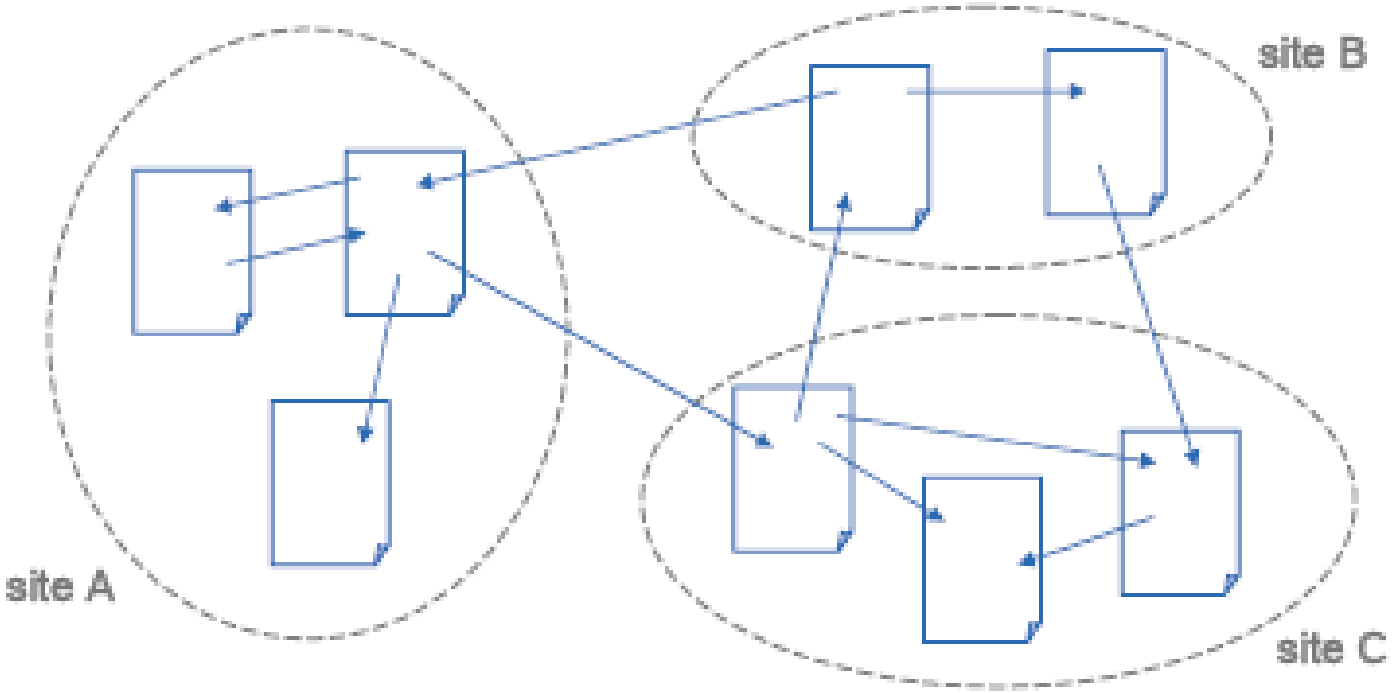
What is Web Engineering?

- What is Web Engineering?

  Technologies, tools and methods to support **systematic** approaches to the development, deployment, operation and maintenance of high-quality **web systems**.

- What is a web system?
  - Web site
  - Internet application
  - Application based on web technologies
  - Portal
  - ……

Web-Based Hypertext Model

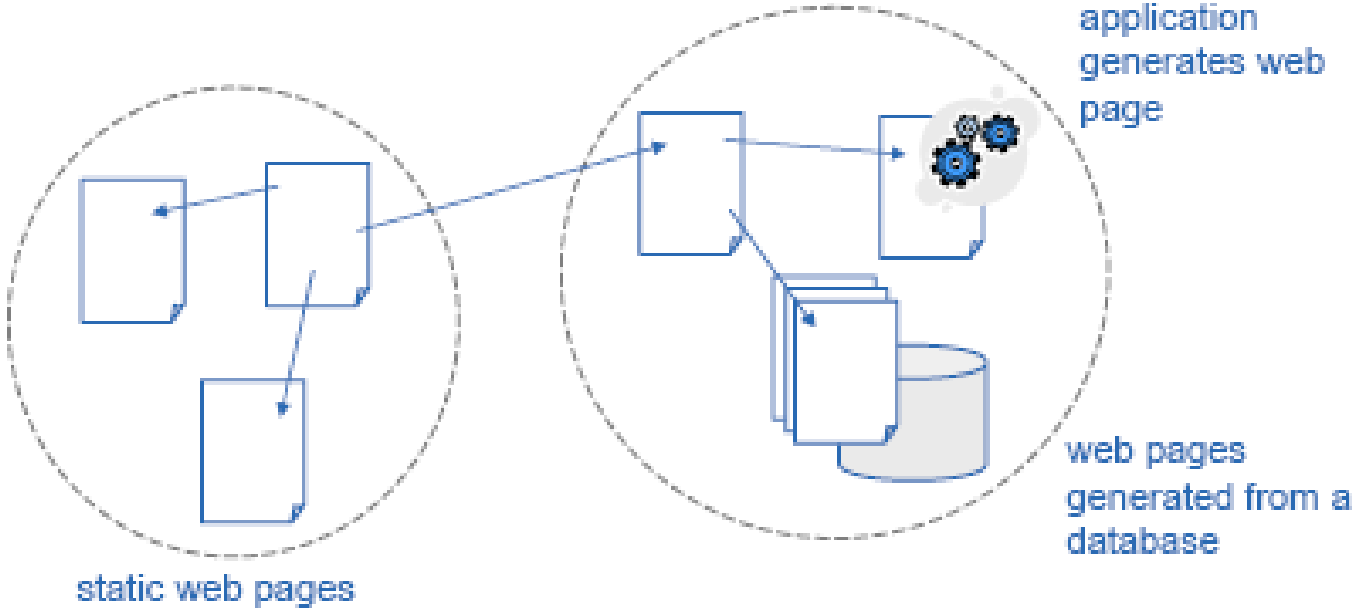


The Web Today

- Environment to deliver all kinds of information and services
  - multimedia of different types and formats (images, video, animations, audio)
  - software distribution
  - applications (search engines, currency converters, kitchen design, …)
  - complex systems (e-Commerce, enterprise planning, ...)
- Platform for collaboration
  - discussion forums
  - community portals
  - collaborative authoring (wikipedia, ...)
  - web conferencing and meeting systems
  - .....

Web Nowadays…

Increasing number of documents generated dynamically rather than being stored statically.



Multi-channel Access

- Web publishing no longer only about desktop browsers
- Web technologies used to deliver information to a range of devices
- Presentation may be generated using XML/XSLT technologies

Adaptive Web sites

- Personalization
  - adapt content, functionality and presentation to the user
- Context-Awareness
  - adapt content, functionality and presentation to situation and/or task at hand (i.e. user context)
- Internalization/Localization
  - adapt content, functionality and presentation to particular community
    - language
    - currency
    - cultural acceptance
    - .....

Quality

- Little customer loyalty
- Quality keeps customers
- 3 main quality criteria
  - Reliability
  - Usability
  - Security
- Other criteria:
  - Availability
  - Scalability
  - Maintainability

Need for Web Engineering

- Private individuals, businesses, governments and all sorts of organizations have come to rely on the web
- Web-based systems and applications now deliver a wide range of information and application services to a diversity of users
- Web technologies increasingly being adopted as a universal platform for all kinds of applications
- Large-scale commercial sites developed by multi-disciplinary teams of people with diverse skills and backgrounds, using cutting edge technologies
- In many ways, the development, deployment and maintenance of web sites is more complex than traditional software development

Need for Web Engineering

Although it is one of the leading and most important branches of the software industry, development of web sites still tends to be ad-hoc

- poor quality
  - outdate/irrelevant information
  - difficult to use or find relevant information
  - crashes
- difficult to maintain
- unsuitable design and development processes
- poor management practices
- tend to be over-budget
- tend to be late

Need for Web Engineering

- In many ways, more difficult than traditional software development
- Many users and developers still seem to think that web development is
  - mainly about content authoring and design
  - involves tools such as HTML editors, Front Page, DreamWeaver, ...
  - involves use of PHP and JavaScript if something dynamic required ....
- To successfully build and maintain large-scale, complex web-based systems and applications requires
  - disciplined development process and sound methodology
  - better models and tools to support the process
  - good set of guidelines

Differences to **Traditional** SE

- Variety of people involved in development
  - programmers, database experts, designers, content providers, ...
- Typically developed for unknown set of users with no training
- Intrinsic characteristics of web applications
  - reliance on communication technologies
  - multi-platform accessibility
  - hypertext-based interaction (non-sequential)
- Range of technologies
- Speed of development and evolution

Differences to **Traditional** SE

Users

- Generally unknown
  - ✓expectations, behavior patterns not known at development time
  - ✓more difficult to design interface
  - ✓no training
  - ✓dealing with globalization - different cultures, languages, etc.
- Nowadays covers a variety of roles
  - ✓browsers
  - ✓customers in e-Commerce
  - ✓content providers
  - ✓editors

Differences to **Traditional** SE

Information Sources

- Dealing with a range of information sources and systems
  - ✓database systems
  - ✓file systems
  - ✓multimedia storage devices
- Variety of types and formats of multimedia content
  - ✓images, sound, animation, video, ... in different formats
  - ✓documents of different forms
  - ✓text in different languages (alphabets)
  - ✓clients may only be able to handle certain formats
  - ✓certain formats may be specific to certain clients

Differences to **Traditional** SE

Technologies

- Web developers must work with a range of technologies and languages
  - ✓document formats (HTML, XML, VoiceXML ...)
  - ✓presentation (CSS, XSLT, ...)
  - ✓programming (CGI, PHP, JavaScript, JSP, Java, ...)
  - ✓databases
  - ✓content management systems
  - ✓web servers
  - ✓application server
  - ✓……
- Made even more difficult because of the rapid development of new technologies and standards

Differences to **Traditional** SE

Maintenance

- Web sites evolve continuously without specific releases
- Maintenance cycles may be days or even hours
- Content, functionality, structure and presentation may change significantly from one moment to the next
- Necessary to provide some sort of controls over changes
  - ✓accuracy and quality of content
  - ✓translation of content into different languages
  - ✓conforms to corporate presentation guidelines
  - ✓modifications to structure and navigation
  - ✓modifications to services

Differences to **Traditional** SE

Legal, Social and Ethical Issues

- Copyright
  - ✓content
  - ✓links
- Privacy
- Criminal Activities
- Libel versus Freedom of Speech
- Internationalization of Laws
- Access for the disabled and minorities

Differences to **Traditional** SE

Visual Creativity and Presentation

- At same time, we must not forget the emphasis on look-and-feel and it's importance in attracting and keeping users
- Importance of corporate identity
- Style has to adapted to intended audience
- Navigation is key
  - ✓structuring a web site based on organization structures doesn't help users
  - ✓can be difficult if catering for multiple user groups
- Certain "standardization" of site structures has evolved, but at the same time organizations want to stand out among competitors

Summary -- Web Engineering

- Tools and methodologies to design and implement complex web sites
- Technologies to support the on-line input and update of content
- Technologies and architectures to support access from various forms of devices
- Technologies to support context-aware access to information

THE END

QUESTIONS??

THANKS!!