Information Technology

Spring 23-24

Semester 4

- Web Technology

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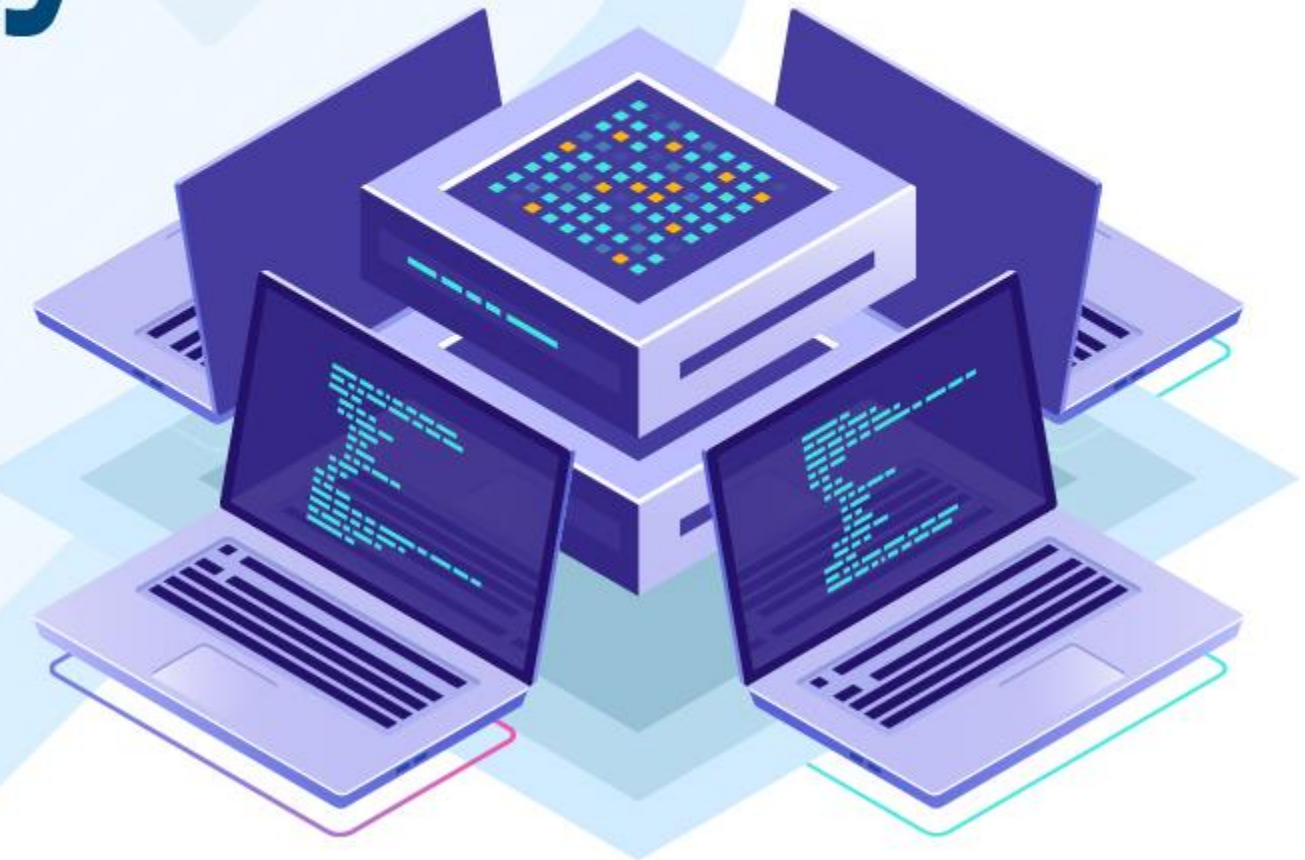

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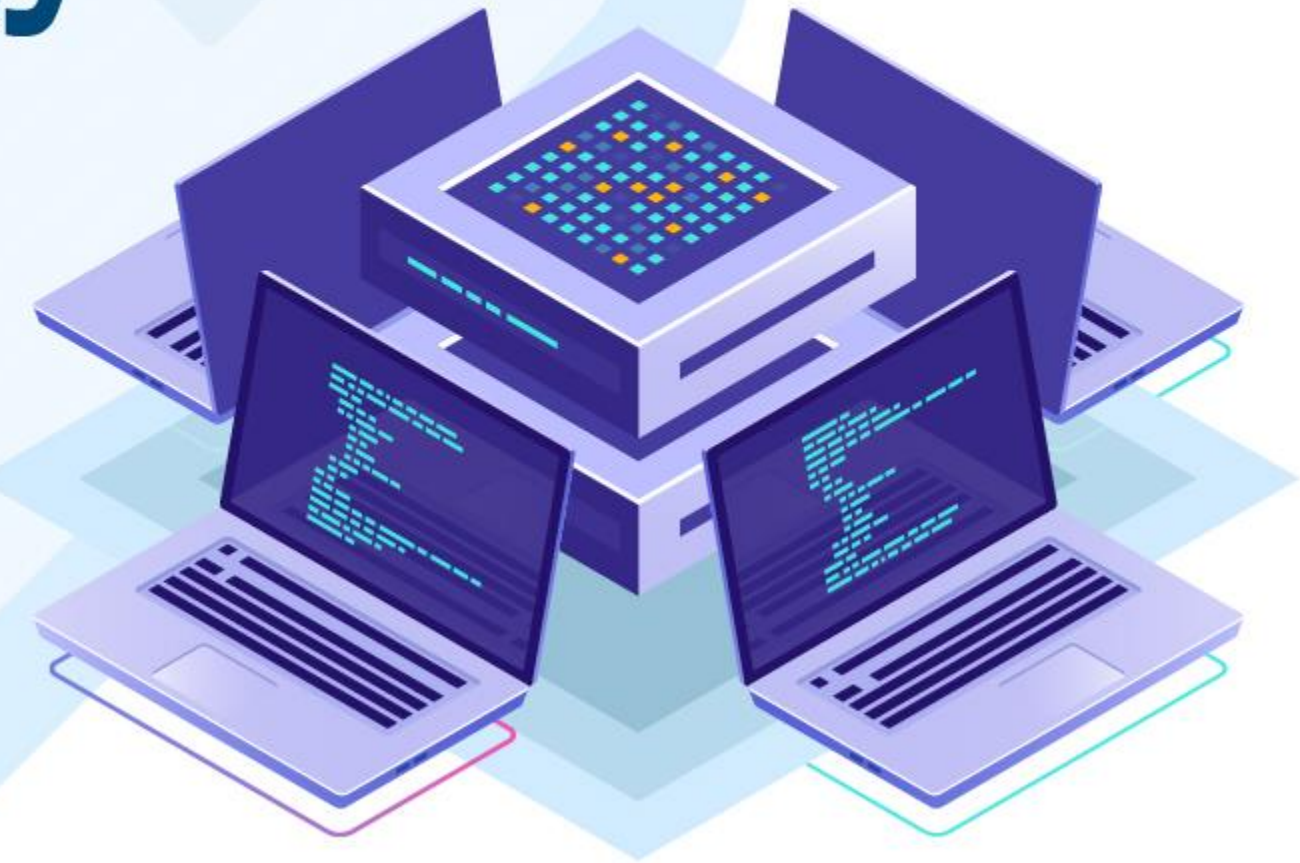
Information Technology

- Introduction to
- internet concepts



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Web Application Design

Presentation Design

- A website presentation is a virtual presentation that takes place in a website format.
- A website presentation, involves two parts:
  - **The presenter**; who is in charge of the website and presentation design.
  - **The viewers**; who log on to the website using individual passwords to view the presentation.
- Presentation design defines the look and extent to the structure of how multimedia contents are presented.
- Tools available to create Web applications can be grouped into two categories by how they support the presentation design:
  - Conventional Page Editors "(i.e.: Dreamweaver , FrontPage"), and
  - more advanced Content Management Systems "(i.e.: Wordpress, Joomla , Drupal).".

Web Application Design

Presentation Design

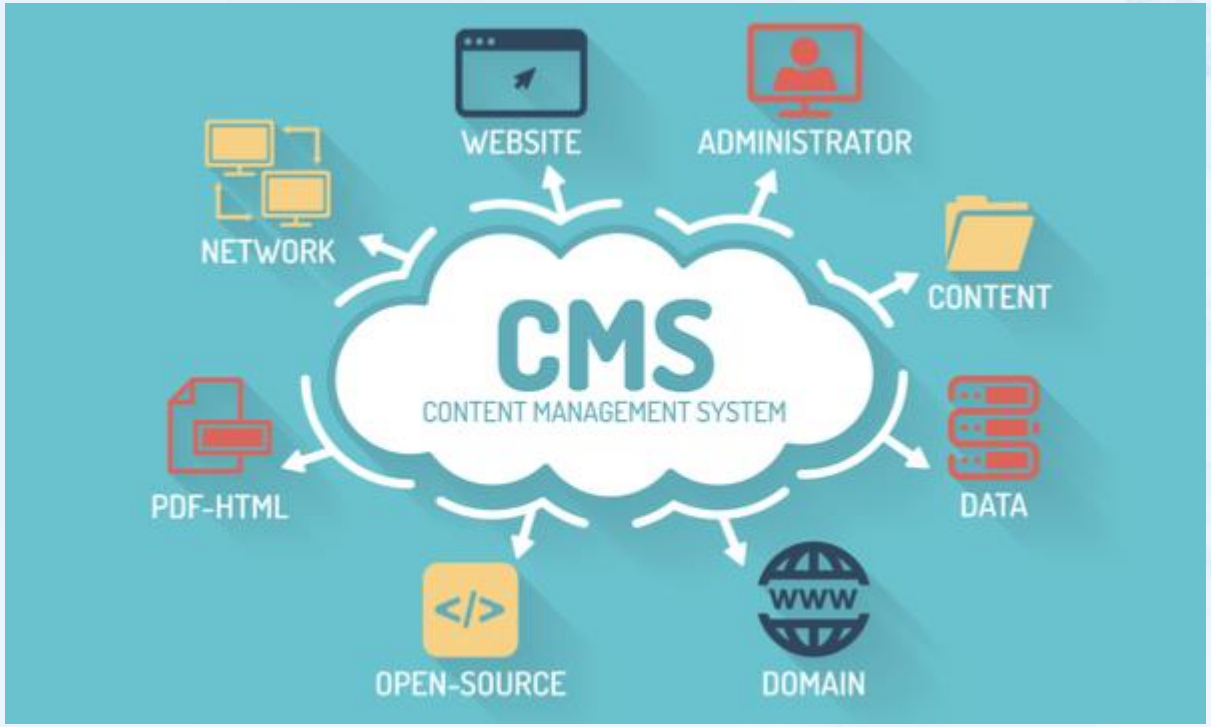
Conventional Page editors are generally used to create smaller ad-hoc Internet presences.

- **Their major benefits** are that they are similar to standard software, which lets users work in a familiar environment, and that they allow to directly format contents.
- **Their major drawbacks:**
  1. HTML knowledge is necessary for significant tasks
  2. Developers work on page level, which means that they can easily lose the bigger conceptual picture.
  3. Layout, navigation, and interaction are mixed, which can be considered a simplification for insignificant applications only.

Web Application Design

Presentation Design

- **Content Management Systems (CMS)**, is software that helps users create, manage, and modify content on a website.
- It allows anyone, even those without a formal technical background, to place content on a website and keep track of it with ease.



Web Application Design

Presentation Design

- **Examples of Content Management Systems (CMS)**
  - **WordPress.** is used by more than 30% of the websites on the web, it offers unsurpassed ease when it comes to not only managing a website, but also creating professional and engaging web pages, all for an affordable, or even free, price. It is also reliable and flexible, offering exceptional performance to you and your website visitors.
  - **Joomla.** is the second most-used CMS, after WordPress. It's also an open-source CMS, enabling you to create powerful web pages without needing to know code.
  - **Drupal.** offers all the benefits of a normal CMS. It is often said to be more complex than WordPress or Joomla because it was created by developers for developers.

Web Application Design

Presentation Design

- **Content Management Systems (CMS)**
  - **Their major benefits:**
    1. **User friendly features:** CMS is a user-friendly program that enables any approved team member (with little to no programming experience) to upload text and images or edit files online.
    2. **Instant content updates:** A CMS allows users to control, manage, and structure their content in real-time.
    3. **Quick, easy content integration:** With a CMS, information isn't coded into web pages but rather extracted from databases that can be easily maintained by authorized users.
    4. **Scalability:** CMS creates an environment where adding new web pages, or also themes, images, buttons can be updated or swapped out.

Web Application Design

Presentation Design

- **Content Management Systems (CMS)**
  - **Their major drawbacks are:**
    1. Slow loading speed of a website
    2. SEO (Search Engine Optimization) features are limited and may require a further purchase and difficult for dynamic pages (Search engines have a difficult time spidering these types of pages)
    3. Expensive design and plug-ins for the addition of certain special features to the website.

Interaction Design

- An **interactive web design** is a design for websites which uses other inbuilt software, modules or features aimed at creating an environment for a website or web application user to be actively engaged during visit or use, thereby improving his user experience (UX).
- **Interaction design** pays attention to five dimensions: words, images, space, time, and behavior.
- Interaction design concerns the intersection of the visual, dynamic, functional, and technical elements of Web applications.
- That divides the **interaction of Web applications** into four sections:
    1. user interaction,
    2. user interface organization,
    3. navigation, and
    4. user activities.

Interaction Design

User Interaction:

- Means translating users' views into HTML
- In addition to; information transport, layout, user interaction, navigation, processes (as a by-product of subsequent link traversal), and direct access to digital content.

Interaction Design

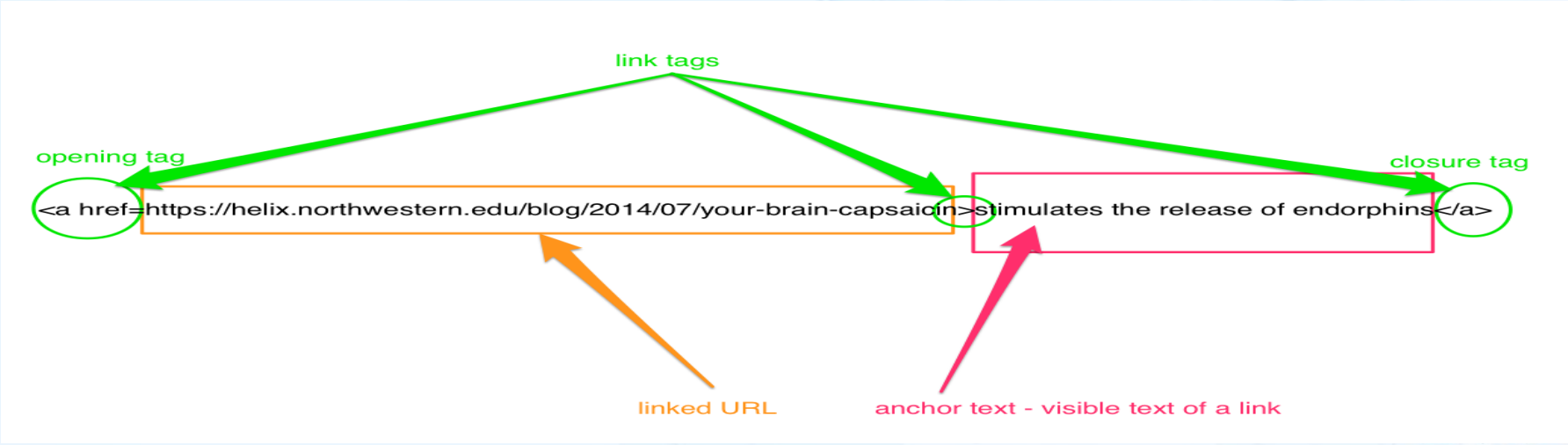
User Interface Organization:

- Means presentation design through different approaches such as the following:
  1. The **entire node** is sent to the user as HTML. The HTML page **includes either scripts or a custom plug-in technology** to let the user access subsets of the information. The use of embedded programming avoids unnecessary navigation.
  2. The **entire node** is sent to the user as one large HTML page **without scripts**. The user selects relative links on the page to navigate in the page.
  3. A **partial view to the node** is sent to the user. This page shows meaningfully arranged subsets of information. The user can navigate to other pages to fully read the desired information.

Interaction Design

Navigation Design:

- Means the interaction design defines the aspects required for the navigation itself (**anchor** and **URL**), and elements that are required for the users to orient themselves.
- **Designing a Link Representation**
  - **Anchors** are visible correspondences of URLs. The text of an anchor should ideally be self-explanatory. In addition, icons can be used inside anchors to visualize links.
- **Designing Link Internals**
  - Navigation processes are triggered by activating anchors in user interface. These anchors represent links (**URLs in HTML**) specifying the destination and navigation process should lead to.



Interaction Design

Configuration Management:

- Configuration Management is to manage the technical description of a system, and manage all changes during the evolution of the system.
- Configuration management is used to manage complex systems.

User Interface

- A **Web application's user interface** often has to represent a large amount of information, operations on this information and relationships between this information.
- The design process must balance technical functionality and visual elements, in order to create a system that is not only operational but also usable and adaptable to changing user needs

User Interface

- **Processes of User Interface**
  - There are several phases and processes in the user interface design, some of which are more demanded than others, depending on the project.
    1. Functionality requirements gathering
    2. User analysis
    3. Information architecture
    4. Prototyping
    5. Usability testing
    6. Graphic Interface design

User Interface

Processes of User Interface

1. **Functionality requirements gathering:**
    1. Assembling a list of the functionality required by the system
    2. Requirements to accomplish the goals of the project
    3. Understand the potential needs of the users.

User Interface

Processes of User Interface

2. **User analysis**:
   - Analysis of the potential users of the system either through discussion with people who work with the users and/or the potential users themselves.
   - Typical questions involve:
     a. What would the user want the system to do?
     b. How would the system fit in with the user's normal workflow or daily activities?
     c. What is the level of technical knowledge does the user have? and what similar systems does the user already use?
     d. What are the interface look & feel styles that appeal to the user?

User Interface

Processes of User Interface

3. Information architecture:

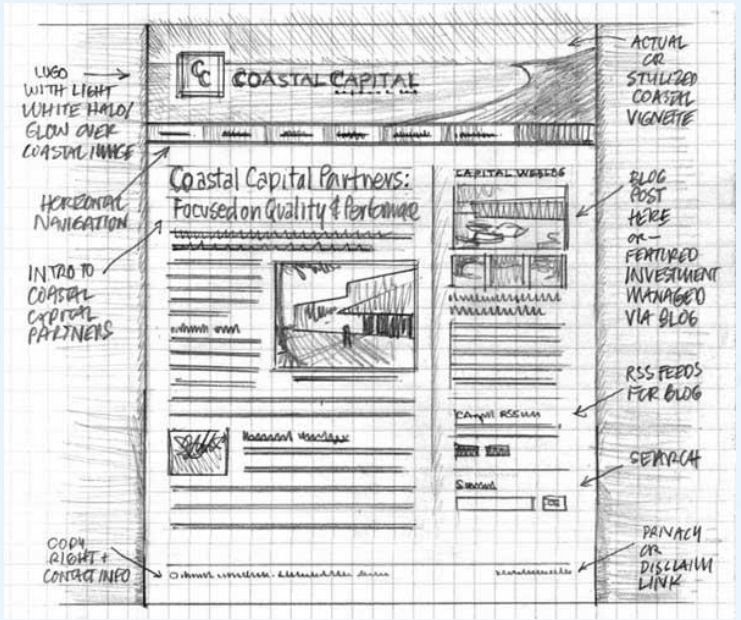
- Development of the process and/or information flow of the system, e.g. hierarchy of web pages in a site, and the possible screens/options.

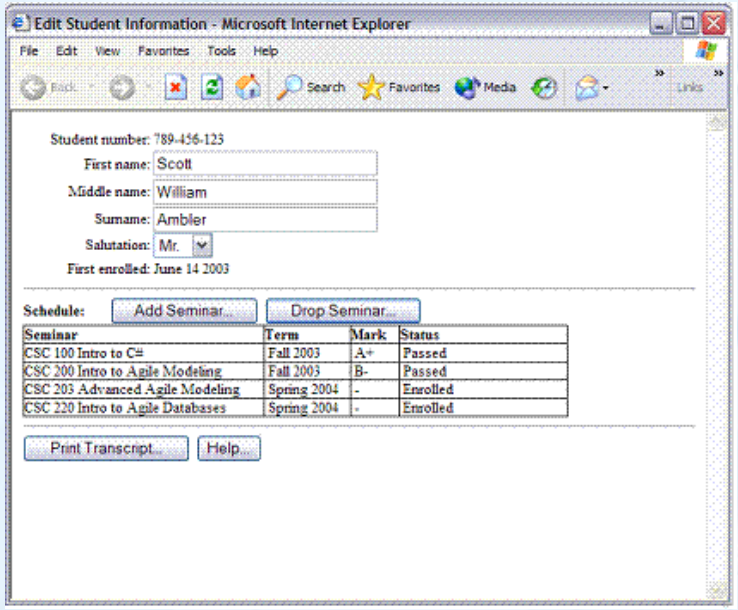
User Interface

Processes of User Interface

4. Prototyping:

- Development of wireframes, either in the form of paper prototypes or simple interactive screens.
- These prototypes are stripped of all look & feel elements and most content in order to concentrate on the interface.





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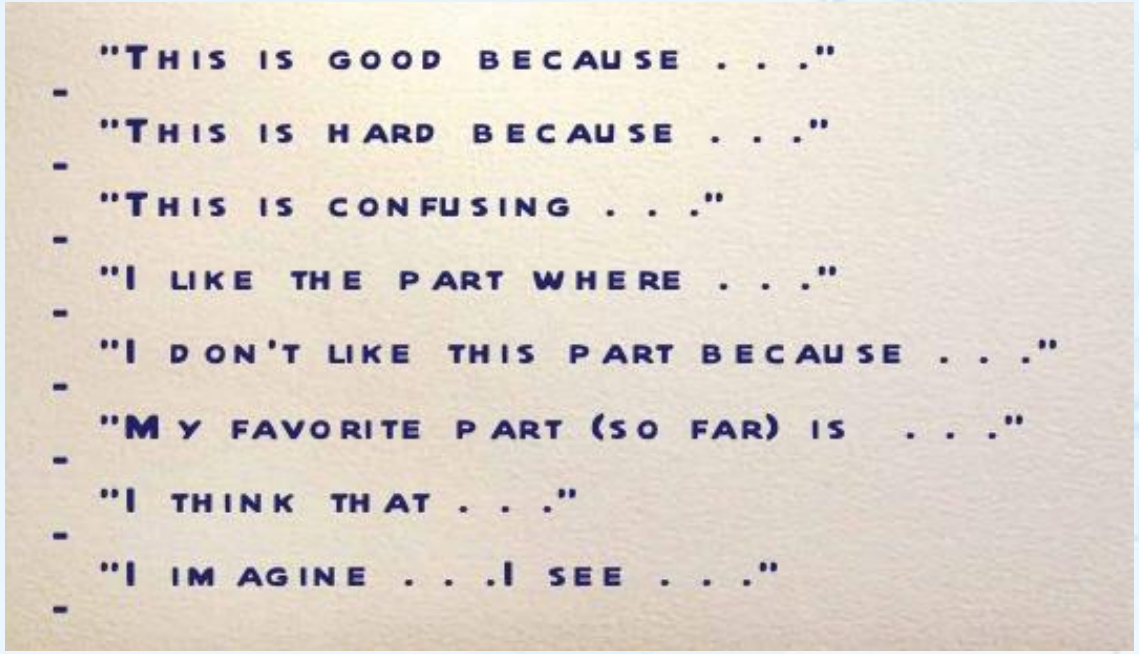
User Interface

Processes of User Interface

5. Usability testing:

- testing of the prototypes on an actual user— often using a techniques where you ask the user to talk about their thoughts during the experience. Example: “think aloud protocol”



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User Interface

Processes of User Interface

6. Graphic Interface design:

- Actual look & feel design of the final graphical user interface (GUI).
- It may be based on prototyping, the findings developed during the usability testing, and communication with users.

Outline

1. Modeling Web Applications
2. Web Application Architectures
3. Web Application Design
4. Web Metrics
5. Testing Web Application

Web Metrics

- Website metrics are a variety of measurements made on a given website in order to better track its performance and statistics.
- Web Metrics: Focus on different aspects of web sites or different quality characteristics that can confuse rather than help the practitioners interested in using them.
- Website metrics may sound complicated, but they are actually very straightforward.

Examples of Web Metrics

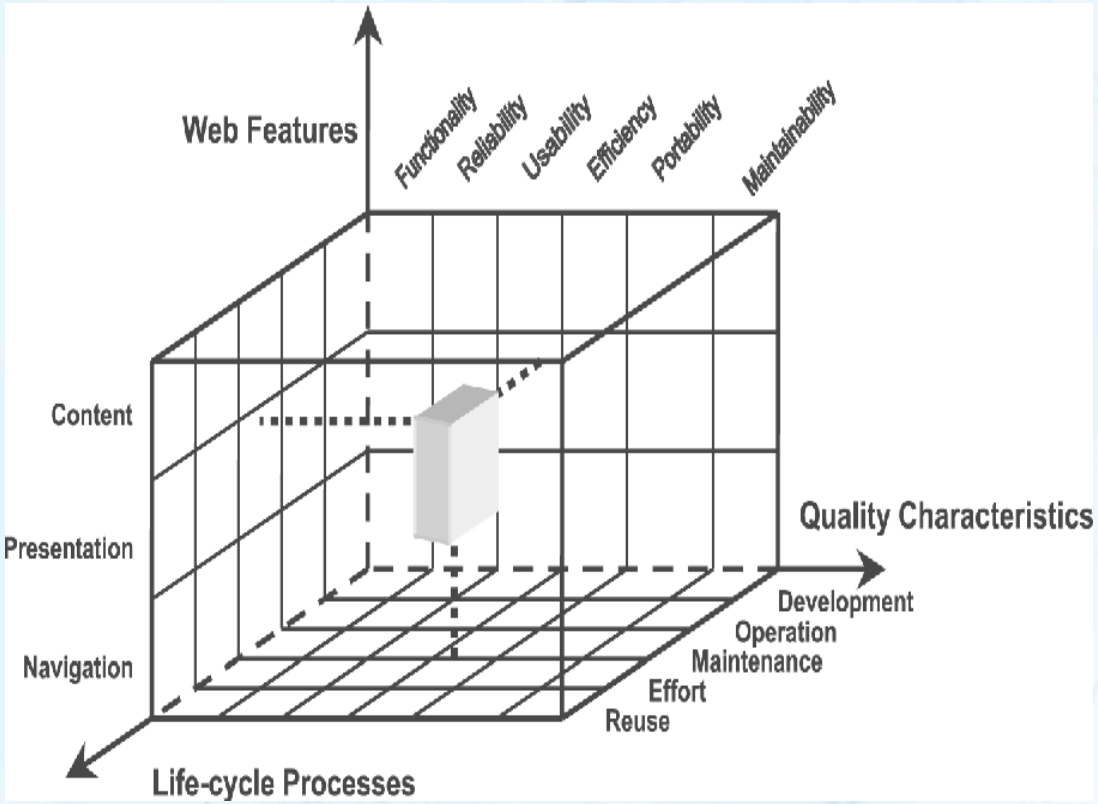
- Here are a few examples of website metrics that you can track and measure, just to make things a little more clear:
  - **Visitor traffic**
    - Visitor traffic is probably the most common website metric. It is important to know how many people are visiting the site.
    - Traffic numbers are a good indication of success.
  - **Traffic sources**
    - Just like you want to track how many visitors you're getting, you'll also want to track where they're coming from.
    - Tracking traffic sources will allow you to see exactly how visitors are getting to your website, whether it be search engine results, a link from another website, or anything else.

Examples of Web Metrics

- **Top viewed pages**
  - If you're operating a blog or have multiple landing pages, knowing which piece of content brings in the most page views is important. Everything on a page can affect the traffic either positively or negatively.
  - By knowing what pages pull in the most traffic, you can essentially optimize all the other, lower-performing pages.
- **Bounce rate**
  - Bounce rate refers to how many people click your website and click away or close their browser shortly after. The reason this is a problem is that it means people aren't finding what they're looking for.
  - As the bounce rate goes down, the amount of people that are finding your website helpful goes up.
- **Conversion rate**
  - If your website aims to sell something, knowing how many people click on it and continue with a sale is important.
  - Conversion rate refers to the people following through with a sale once they land on your website.

Dimensions in Web Quality

- Quality is an essential characteristic for web success. Usability metrics are important in order to do a product easy to use. If a system is usable, it is easy to learn how to use it productively.
- Several studies have described different methodologies and techniques to assure the quality of web sites. Among them is the is WQM (Web Quality Model), which distinguishes three dimensions related to web features, lifecycle processes and quality characteristics, presented in a cube structure.



Dimensions in Web Quality

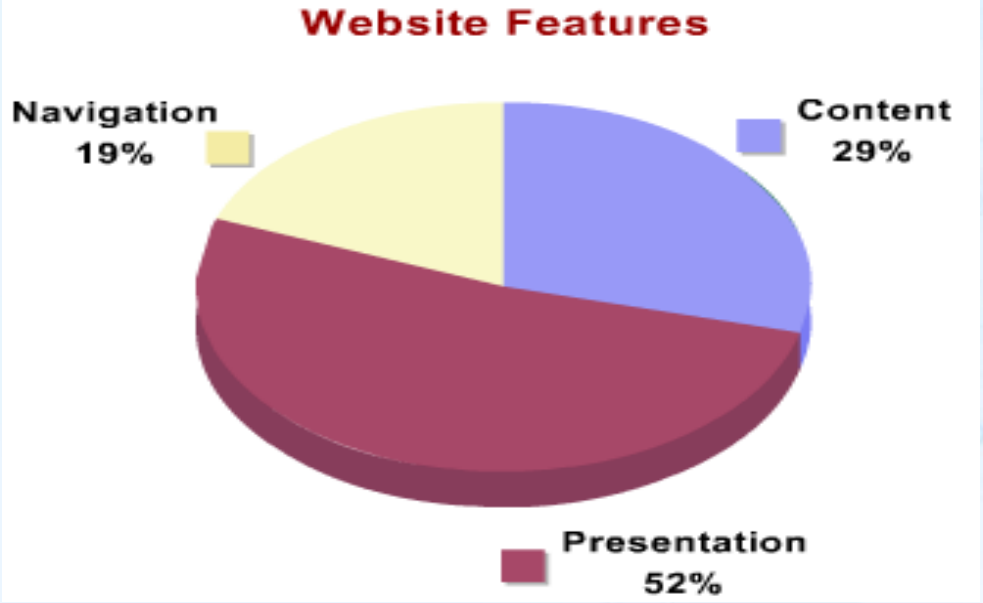
1- Web Features Dimension:

- In this dimension include three "classic" web aspects :
  a. **Content:** Include data such as text, figures, images, video, clips, and also, programs and applications that provide functionalities like scripts, CGI programs, it also deals with structure and representations issues.
  b. **Navigation (hyperlinks):** Is an important design element allowing users to acquire more of the information they are seeking and making that information easier to find.
  c. **Presentation:** Is related to the way in which content and navigation are presented to the user.

Dimensions in Web Quality

1- Web feature dimensions:

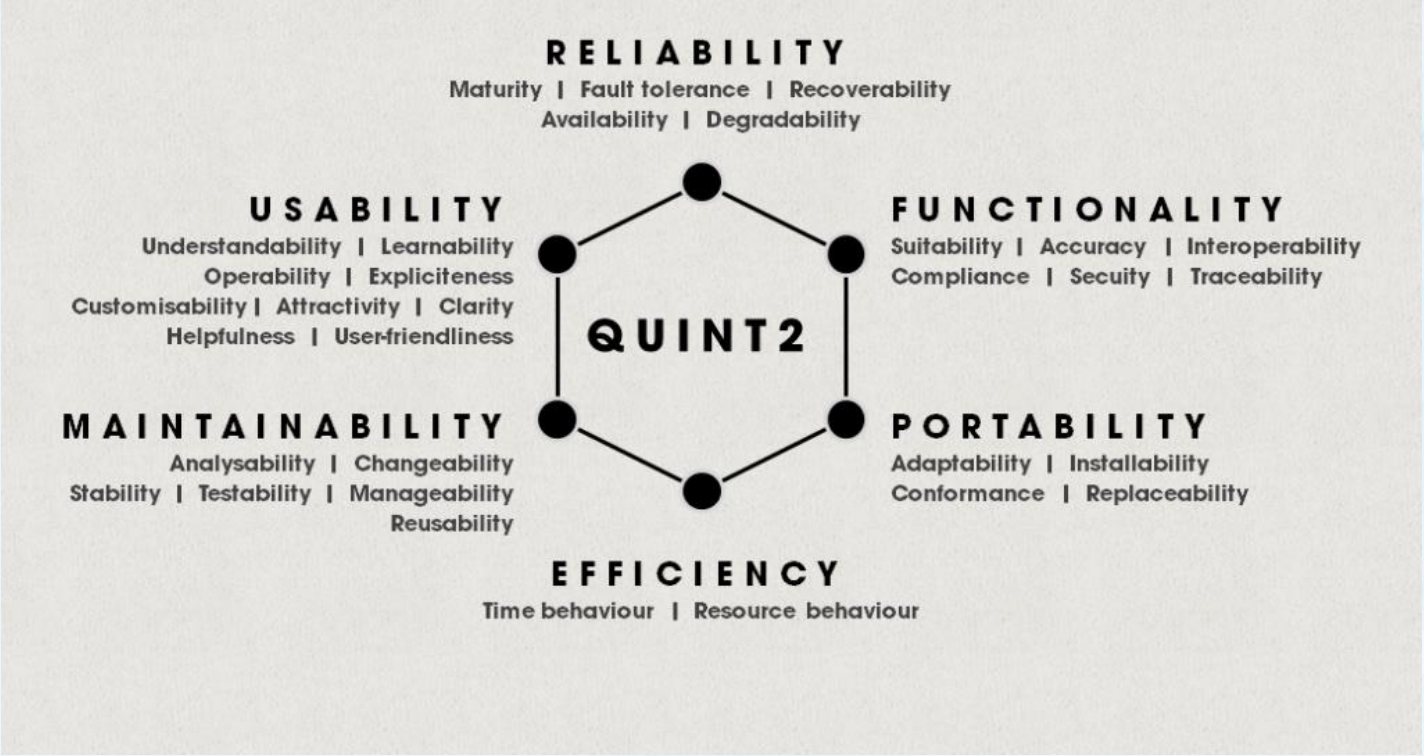
- Presentation and content are prime components in making the page easier to use.
- About 52% of the metrics were "presentation" metrics, this value confirms the tendency in the web world to give it the greatest importance, making the sites as attractive as possible for the end user.



Dimensions in Web Quality

2- Quality Characteristics Dimension:

- We use as a basis the Quint2 model based on the ISO 9126 standard.
- Qunit2 models have new characteristics that are appropriate for web products and is a hierarchical model that fixes the six basic characteristics.



Dimensions in Web Quality

2- Quality characteristics:

- **Functionality:** Shows the existence of a set of functions and their specified properties. The functions satisfy stated or implied needs
- **Reliability:** That capability of software which maintains its level of performance under given conditions for a given period of time
- **Usability:** Attributes that determine the effort needed for use and the assessment of such use by a set of users
- **Efficiency:** The relationship between the level of performance of the software and the amount of resources used under stated conditions
- **Maintainability:** The effort needed to make specified modifications
- **Portability:** The ability of the software to be transformed from one environment to another

- Most of the metrics are usability metrics, this confirms the end user focus.

Dimensions in Web Quality

3- Lifecycle Processed Dimension

- This dimension includes the diverse processes of the web site lifecycle in a Qunit2 model including the three main processes :
  a. The development processes.
  b. Exploitation process (which includes the operative support for users).
  c. Maintenance process (which includes the evaluation that the web site undergoes).

Dimensions in Web Quality

3- Life cycle processes:

- The exploitation and maintenance processes are the ones with most metrics. These results can be justified by taking into account the evolutionary nature of the web.
- The fact that there are not too many metrics defined for the development process can be explained because getting their software to the market first is the top priority for firms doing business on the web and so, rather than develop software from requirements through the waterfall, web development firms try to use rapid application development methods and continuous prototyping.

True /False

1. The architecture of an application is primarily influenced by functional requirements, quality considerations, technical constraints, and software architect's experiences	T
2. The easiest way to integrate heterogeneous components is to recreate them as homogeneous elements	F
3. One of the advantages of conventional page editors is that layout, navigation, and interaction are mixed	F
4. Content Management Systems (CMS) enables any team member even those with little to no programming experience to place content on a website and keep track of it with ease	T

MCQ

1. The type of infrastructure involve location transparency where remote objects appear the same as local objects
   a. Distributed Object Middleware (DOM).
   b. Virtual Shared Memory (VSM).
   c. Peer to Peer (P2P).
   d. Service Oriented Middleware (SOM).

   A

2. A piece of software regulating the communication between insecure networks and secure networks.
   a. Web server
   b. Firewall
   c. Proxy
   d. Legacy application

   B

True /False

In website metrics, bounce rate is a good indication of success	F
In website metrics, visitor traffic number is a good indication of success	T
The cash flows of investment in the project management can be negative	T
Web Metrics focus on different quality characteristics of web sites that can confuse rather than help the practitioners interested in using them.	T
Related to quality characteristics, most of the metrics are functionality metrics	F

MCQ

- The phase of user interface design concerned with the development of wireframes, either in the form of paper prototypes or simple interactive screens
    a. User analysis
    b. Information architecture
    c. Prototyping
    d. Graphic Interface design

C

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THANK YOU FOR WATCHING

QUESTIONS?