Information Technology

Spring 23-24

Semester 4

- Web Technology

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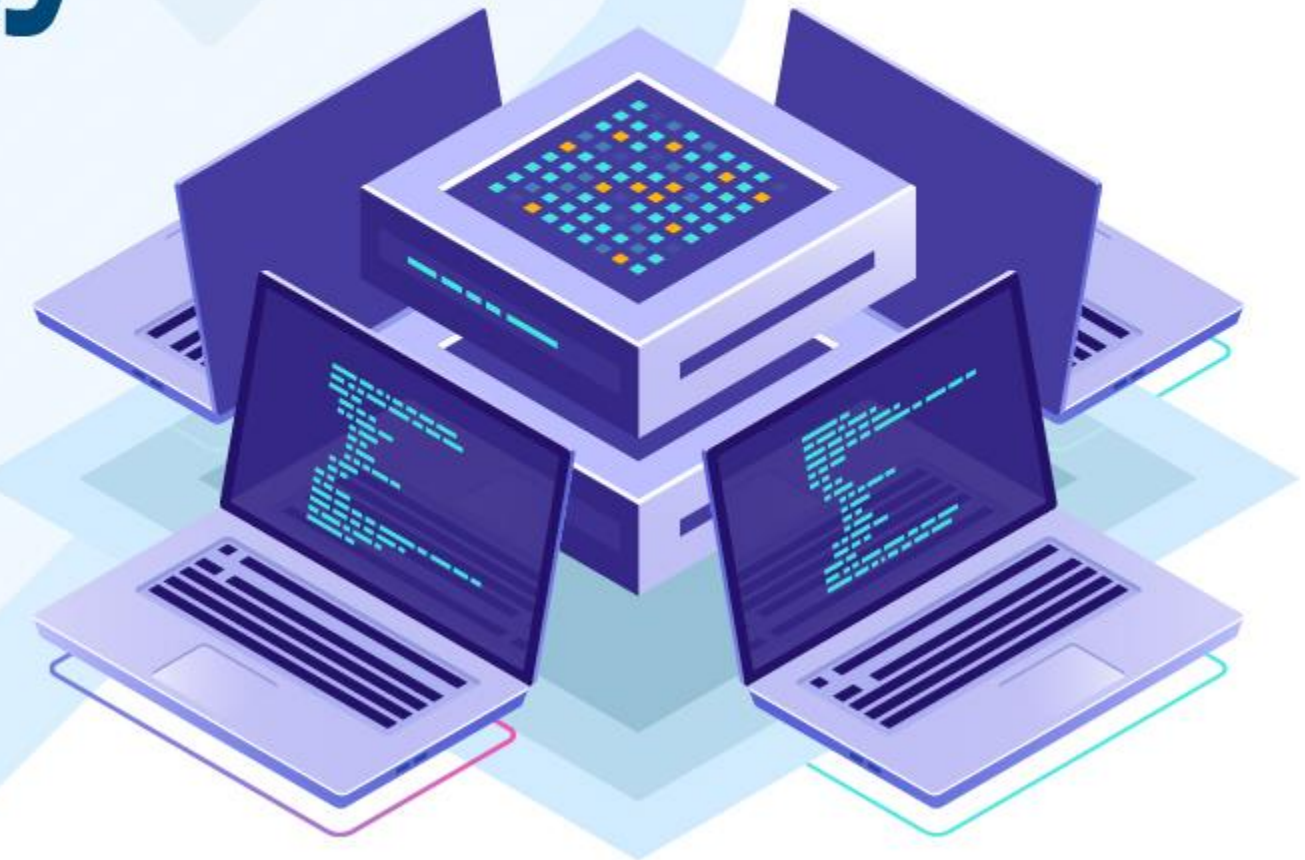

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About the course

New Regulations

- Course code: IT230
- Course Name: Web Technology
- Credit hours: 3 hours

This course is a prerequisite to the following course

- Sematic Web and Ontology (AI435)– 3rd year 2nd semester

About the course

Old Regulations

- Course code: NWE304
- Course Name: Web Engineering (1)
- Credit hours: 3 hours

This course is a prerequisite to the following course

- Web Engineering 2 (NWE405)– 4th year 1st semester

Student assessments

- 10% Attendance and Participation
- 20% Quizzes (2 quizzes each 10%)
- 20% Midterm Exam
- 50% Final Exam

- Types of Questions
  - MCQ
  - T/F
  - Essay 50%

Course Outline

1. Introduction to Internet Concepts
2. Front End Development: HTML – CSS – JS.
3. Backend Development: Web Development Platforms: J2EE – PHP
4. Content Management Systems: Drupal – Joomla
5. Introduction to Web Development Frameworks: Laravel – Symfony

Information Technology

- Before we start
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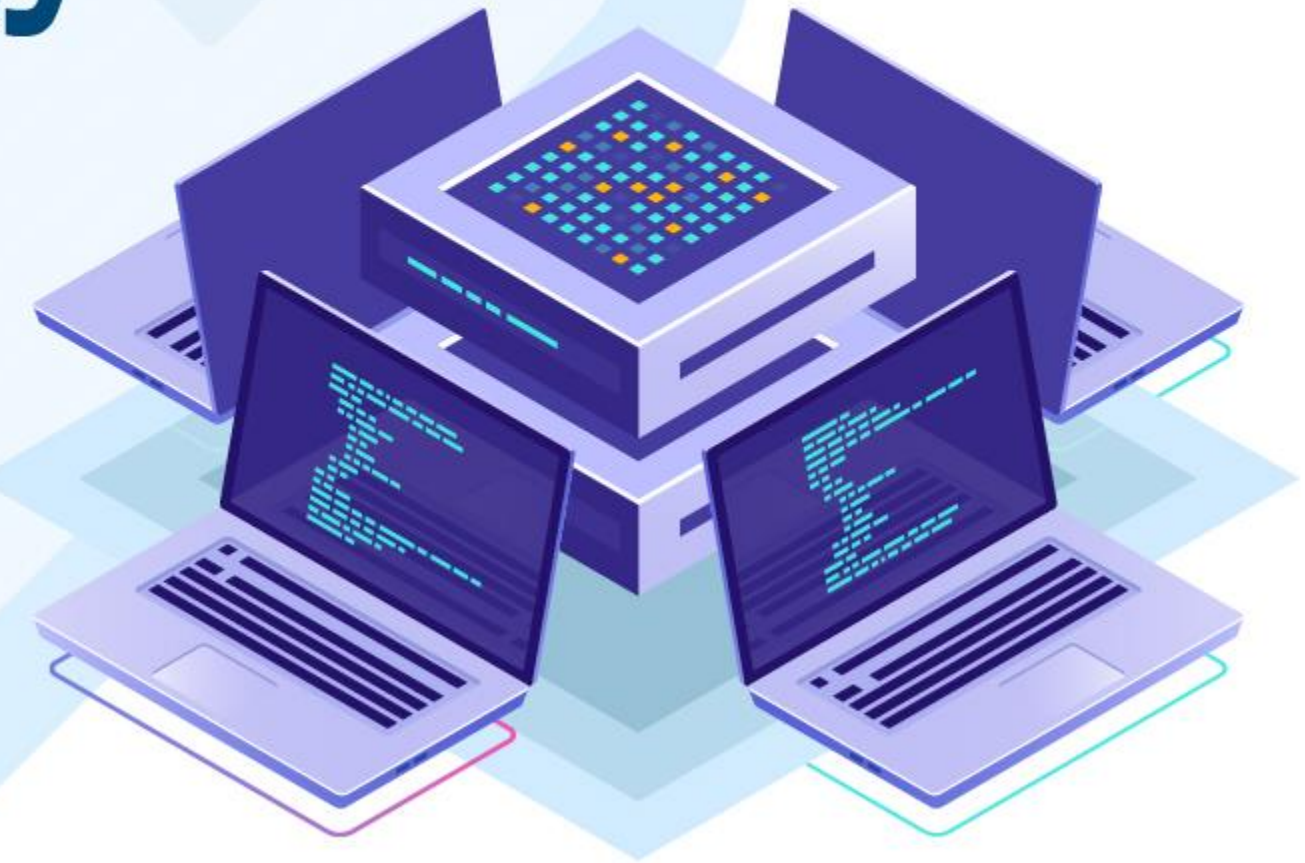

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Before we start

- If you are interested in pursuing web design or production as a career, you'll need to bring your skills up to a professional level.
- Employers may not require a web design degree, but they will expect to see working sample sites that demonstrate your skills and experience. These sites can be the result of class assignments, personal projects, or a simple site for a small business or organization.
- What's important is that they look professional and have well written, clean HTML, style sheets, and possibly scripts behind the scenes.
- Getting an entry-level job and working as part of a team is a great way to learn how larger sites are constructed and can help you decide which aspects of web design you would like to pursue.

Before we start

What Does a Web Designer Do?

- Over the years, the term “web design” has become a catchall for a process that encompasses a number of different disciplines, from user experience design, to document markup, to serious programming.
- The term “web design” has come to encompass a number of disciplines, including:
  - Visual (graphic) design
  - User interface and experience design
  - Web document and style sheet production
  - Scripting and programming
  - Content strategy
  - Multimedia
- If you are designing a small website on your own, you will need to wear many hats, you may be a part-time graphic designer, writer, HTML author, and information architect, but to you, it’ll just feel like “making web pages.” Nothing to worry about.

Before we start

- Large-scale websites are almost always created by a team of people, numbering from a handful to hundreds.
- In this scenario, each member of the team focuses on one facet of the site-building process. If that is the case, you may be able to simply adapt your current set of skills (writing, Photoshop, programming, etc.) and interests to the new medium.
- There are four very broad categories typically covered under the umbrella term “web design”; design, development, content strategy, and multimedia.

Before we start

Design

- “How something looks”!!!.
- On the Web, the first matter of business is designing how the site *works. Before* picking colors and fonts, it is important to identify the site’s goals, how it will be used, and how visitors move through it.
- These tasks fall under the disciplines of:
  - Interaction Design (IxD)
    - The goal of the Interaction Designer is to make the site as easy, efficient, and delightful to use as possible.
  - User Interface (UI) design
    - It is closely related to interaction design, but tends to be more narrowly focused on the functional organization of the page as well as the specific tools (buttons, links, menus, and so on) that users use to navigate content or accomplish tasks.
  - User Experience (UX) design.
    - The UX designer ensure the entire experience with the site is favorable. UX design is based on a solid understanding of users and their needs based on observations and interviews.

Before we start

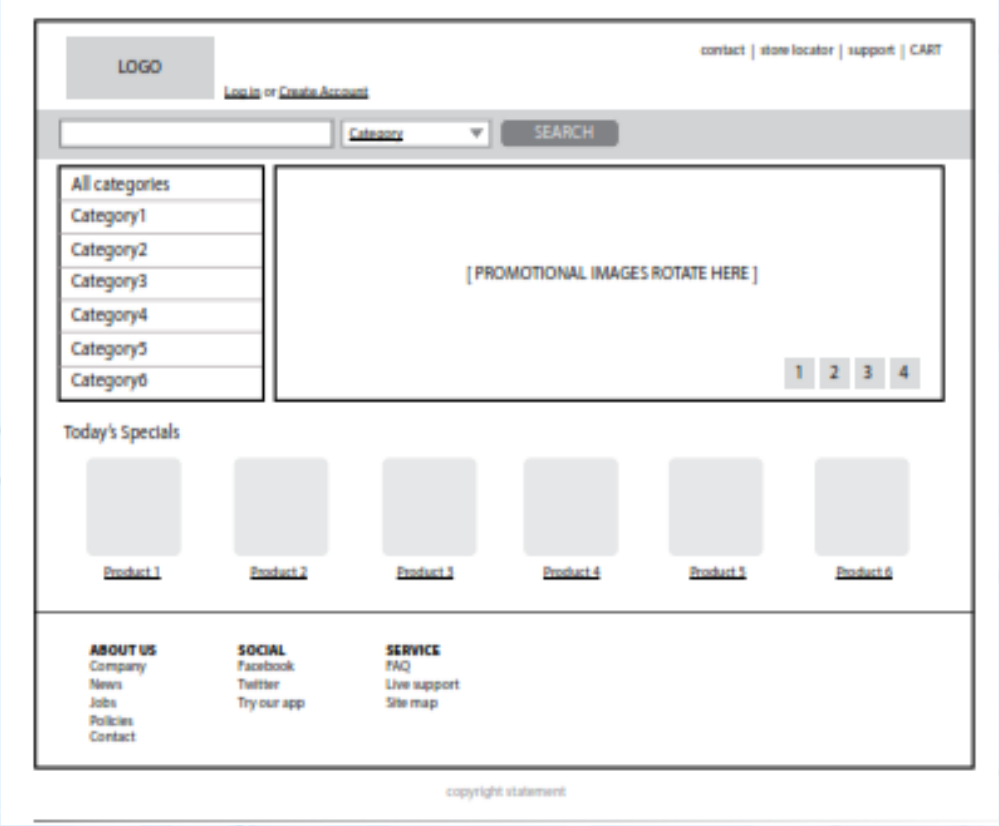
Design

- Some of the documents an IxD, UI, or UX designer might produce include:
  - **User research and testing reports**
    - Understanding the needs, desires, and limitations of users is central to the success of the design of the site or web application.
    - This approach of designing around the user's needs is referred to as User Centered Design (UCD), and it is central to contemporary design.
    - Site designs often start with user research, including interviews and observations, in order to gain a better understanding of how the site can solve problems or how it will be used.
    - It is typical for designers to do a round of user testing at each phase of the design process to ensure the usability of their designs.
    - If users are having a hard time figuring out where to find content or how to move to the next step in a process, then it's back to the drawing board.

Before we start

Design

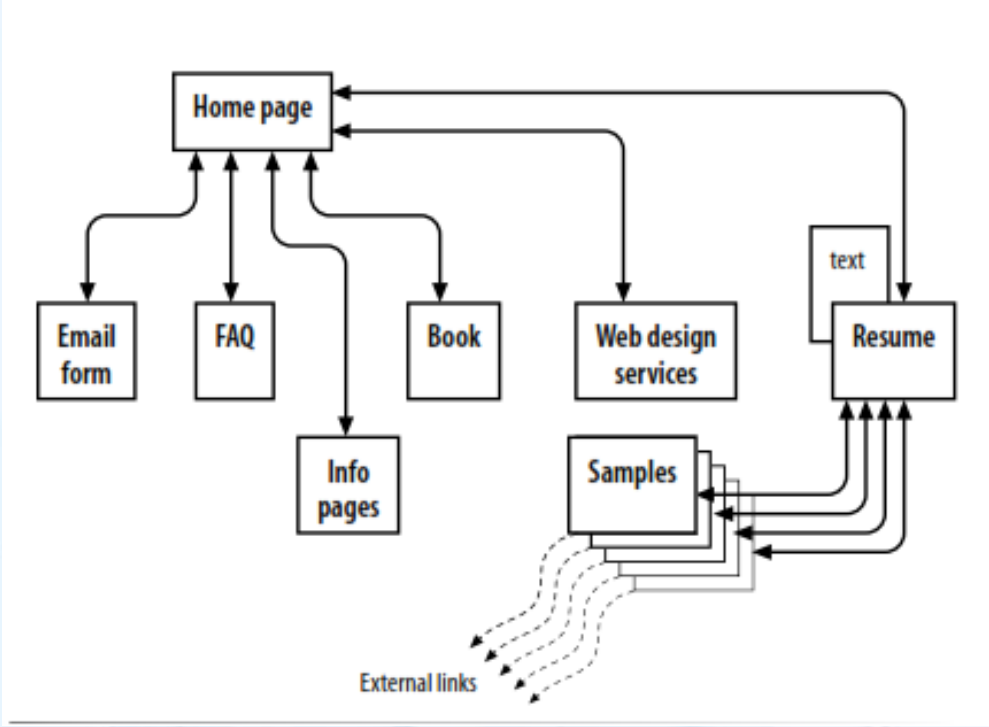
- **Wireframe diagrams**
  - A wireframe diagram shows the structure of a web page using only outlines for each content type and widget.
  - The purpose of a wireframe diagram is to indicate how the screen real estate is divided and indicate where functionality and content such as navigation, search boxes, form elements, and so on, are placed, without any decoration or graphic design.
  - They are usually annotated with instructions for how things should work so the development team knows what to build.



Before we start

Design

- **Site diagram**
  - A site diagram indicates the structure of the site as a whole and how individual pages relate to one another.
  - Some site diagrams fill entire walls!



Before we start

Design

Visual (graphic) design

- Because the Web is a visual medium, web pages require attention to presentation and design.
- A graphic designer creates the "look and feel" of the site—logos, graphics, type, colors, layout, etc.—to ensure that the site makes a good first impression and is consistent with the brand and message of the organization it represents.
- Visual designers typically generate sketches of the way the site might look. They may also be responsible for producing the graphic files in a way that is optimized for delivery over the Web.
- If you are interested in doing the visual design of commercial sites professionally, you should get graphic design training as well as a strong proficiency in Adobe Photoshop (the industry standard) or Adobe Fireworks.
- If you are already a graphic designer, you will need to acquire a solid understanding of HTML, CSS, and other web technologies.

Before we start

Development

- A fair amount of the web design process involves the creation and troubleshooting of the documents, style sheets, scripts, and images that make up a site.
- At web design firms, the team that handles the creation of the files that make up the website (or templates for pages that get assembled dynamically) is usually called the development or production department.
- Web developers may not design the look or structure of the site themselves, but they do need to communicate well with designers and understand the intended site goals so they may suggest solutions that meet those goals.
- The broad disciplines that fall under development are authoring, styling, and scripting/programming.

Before we start

Development

- **Authoring/markup**
  - Authoring is the term used for the process of preparing content for delivery on the Web, or more specifically, marking up the content with HTML tags that describe its content and function.
  - If you want a job as a web developer, you need to have an *intricate knowledge of HTML and how it functions on* various browsers and devices. The HTML specification is constantly evolving, which means you'll need to keep up with the latest best practices and opportunities as well as bugs and limitations.

Before we start

Development

- **Styling**
  - In web design, the appearance of the page in the browser is controlled by style rules written in CSS (Cascading Style Sheets).
  - In contemporary web design, the appearance of the page is handled separately from the HTML markup of the page.
  - Again, if you are interested in working in web development, knowing your way around CSS and how it is supported (or not supported) by browsers is part of your job description.

Before we start

Development

- *“Many visual designers translate their designs into HTML and CSS documents themselves. In fact, there is a popular argument that in order to call yourself a “web designer,” you must be able to build your designs yourself, and nearly everyone agrees that your job prospects will be better if you are able to code as well as design.”*

Before we start

Development

- **Scripting and programming**
  - JS (JavaScript) is the language that makes elements on web pages do things. It adds behaviors and functionality to elements in the page and even to the browser window itself.
  - There are other web-related programming languages as well, including PHP, Ruby, Python, and ASP.NET, that run on the server and process data and information before it is sent to the user's browser.
  - Web scripting and programming definitely requires some traditional computer programming skills. Still, if you have little experience with programming languages, the initial learning curve may be a bit steep.

Before we start

Frontend design

- “Frontend” refers to any aspect of the design process that appears in or relates directly to the browser.
- The following tasks are commonly considered to be frontend tasks:
  - Graphic design and image production
  - Interface design
  - Information design as it pertains to the user’s experience of the site
  - HTML document and style sheet development
  - JavaScript

Backend development

- “Backend” refers to the programs and scripts that work on the server behind the scenes to make web pages dynamic and interactive.
- The following tasks take place on the backend:
  - Information design as it pertains to how the information is organized on the server
  - Forms processing
  - Database programming
  - Content management systems
  - Other server-side web applications using PHP, JSP, Ruby, ASP.NET, Java, and other programming languages

Before we start

Content strategy and creation

- Ideally the first important thing in the actual website creation process, is the critical matter of the site's content itself. Anyone who uses the title "web designer" needs to be aware that everything we do supports the process of getting the content, message, or functionality to our users.
- Two content-related specialists on the modern web development team:
  - The Content Strategist
    - When the content isn't written right, the site can't be fully effective. A Content Strategist makes sure that every bit of text on a site, from long explanatory text down to the labels on buttons, supports the brand identity and marketing goals of the company. Content strategy may also extend to data modeling and content management on a large and ongoing scale, such as planning for content reuse and update schedules.
  - Information Architect (IA).
    - An Information Architect (also called an Information Designer) organizes the content logically and for ease of findability. May be responsible for search functionality, site diagrams, and how the content and data is organized on the server. Information architecture is inevitably entwined with UX and UI design, and it is not uncommon for a single person or team to perform all roles.

Before we start

Multimedia

- One of the cool things about the Web is that you can add multimedia elements to a site, including sound, video, animation, and even interactive games.
- You may decide to add multimedia skills, such as audio and video editing or Flash development, to your web design tool belt, or you may decide to go all in and become a multimedia specialist.
- Web development companies usually look for people who have mastered the standard multimedia tools, and have a good visual sensibility and an instinct for intuitive and creative multimedia design.

Before we start

What Languages Do I Need to Learn?

- If you are a visual designer who spends time in Photoshop and Illustrator, you may be put off by needing to learn how to create your designs with text.
- The following is a list of technologies associated with web development.
  - For building websites: HTML and Cascading Style Sheets (CSS)
  - For frontend web development: JavaScript
  - For more technically inclined web professionals: server configurations, databases, and site performance, but these are generally not frontend developer tasks (although a basic familiarity with the backend issues never hurts).

Before we start

What Languages Do I Need to Learn?

Hypertext Markup Language (HTML)

- HTML (HyperText Markup Language) is the language used to create web page documents.
- There are a few versions of HTML in use today: HTML 4.01 is the most firmly established while HTML5 is the newer, more robust, and is gaining steam and browser support. Both versions have a stricter implementation called XHTML (eXtensible HTML), which is essentially the same language with much stricter syntax rules.
- HTML is not a programming language; it is a markup language, which means it is a system for identifying and describing the various components of a document such as headings, paragraphs, and lists. The markup indicates the document's underlying structure (you can think of it as a detailed, machine-readable outline). You don't need programming skills—only patience and common sense—to write HTML.
- The best way to learn HTML is to write out some pages by hand.

Before we start

What Languages Do I Need to Learn?

Cascading Style Sheets (CSS)

- While HTML is used to describe the content in a web page, it is Cascading Style Sheets (CSS) that describe how that content should *look.*
- The way the page looks is known as its presentation. That means fonts, colors, background images, line spacing, page layout, and so on… all controlled with CSS.
- With the newest version (CSS3), you can even add special effects and basic animation to your page.

Before we start

What Languages Do I Need to Learn?

Cascading Style Sheets (CSS)

- CSS also provides methods for controlling how documents will be presented in contexts other than the traditional desktop browser, such as in print and or on devices with small screen widths.
- Style sheets are also a great tool for automating production because you can change the way an element looks across all the pages in your site by editing a single style sheet document.
- Style sheets are supported to some degree by all modern browsers.
- Although it is possible to publish web pages using HTML alone, you'll probably want to take on style sheets so you're not stuck with the browser's default styles. If you're looking into designing websites professionally, proficiency at style sheets is mandatory.

Before we start

What Languages Do I Need to Learn?

Javascript/DOM scripting

- JavaScript is a scripting language that is used to add interactivity and behaviors to web pages, just to name a few:
  - Checking form entries for valid entries
  - Swapping out styles for an element or an entire site
  - Making the browser remember information about the user for the next time she visits
  - Building interface widgets, such as expanding menus
- JavaScript is used to manipulate the elements on the web page, the styles applied to them, or even the browser itself. There are other web scripting languages, but JavaScript is the standard and most ubiquitous.

Before we start

What Languages Do I Need to Learn?

Javascript/DOM scripting

- You may also hear the term DOM scripting used in relation to JavaScript. DOM stands for Document Object Model, and it refers to the standardized list of web page elements that can be accessed and manipulated using JavaScript (or another scripting language). DOM scripting is an updated term for what used to be referred to as DHTML (Dynamic HTML), now considered an obsolete approach.
- Writing JavaScript is a type of programming.
- Most web-authoring tools come with standard scripts that you can use right out of the box for common functions.
- Professional web developers are required to know JavaScript, however, plenty of visual designers rely on developers to add behaviors to their designs. So while JavaScript is useful, learning to write it may not be mandatory for *all* web designers.

Before we start

What Languages Do I Need to Learn?

Server-Side Programming

- Some simple websites are collections of static HTML documents and image files, but most commercial sites have more advanced functionality such as forms handling, dynamically generated pages, shopping carts, content management systems, databases, and so on. These functions are handled by web applications running on the server.
- There are a number of programming languages and frameworks (listed in parentheses) that are used to create web applications, including:
  - PHP (CakePHP, CodeIngniter, Drupal, Joomla)
  - Python (Django, TurboGears)
  - Ruby (Ruby on Rails, Sinatra)
  - JavaScript (Node.js, Rhino, SpiderMonkey)
  - Java (Grails, Google Web Toolkit, JavaServer Faces)
  - ASP.Net (DotNetNuke, ASP.Net MVC)

Before we start

What Languages Do I Need to Learn?

Server-Side Programming

- Developing web applications is a programmer territory and is not expected of all web designers.
- However, that doesn't mean you can't offer such functionality to your clients. It is possible to get shopping carts, content management systems, mailing lists, and blogs as prepackaged solutions, without the need to program them from scratch.

Before we start

What are Content Management Systems?

There are several Content Management Systems among which are Drupal and Joomla:

Drupal and Joomla are both popular content management systems (CMS) used for creating and managing websites.

- Drupal is a powerful and highly configurable platform that developers and companies with complex needs prefer. It is appropriate for complicated, large-scale projects because of its feature-rich feature set and modular architecture. Meanwhile, the intricacy and higher learning curve could be intimidating for newcomers.
- However, Joomla is a great option for people who value simplicity due to its intuitive design and more direct approach. It is appropriate for people with different technical backgrounds and tiny to medium-sized websites. Joomla is accessible and functional in equal measure. However, it might not be suitable for users who need extensive customization.

Before we start

What are web development frameworks?

There are several web development frameworks among which are Laravel and Symfony:

- Laravel and Symfony are both well-developed web frameworks. Both were developed as open-source projects and they are suitable for **creating server-based web applications**. Laravel and Symfony use the Model View Controller (MVC) pattern to separate critical concerns. Web application requests are processed by a controller. The controller manages the model's data and presents it on the View:
  - **Model**: Data model and management
  - **View**: User interface
  - **Controller**: Interface between model and view
- Laravel is considered simpler and better suited for smaller projects. Its flat learning curve and fast results have contributed to the success of this popular PHP framework. Laravel is a modern PHP framework that's known for its elegant syntax and robust features, making it a favorite among developers for web application development.
- Symfony is famous for its decoupled components.

Before we start

What Do I Need to Buy?

Equipment

- For a comfortable web development environment:
  - **A solid, up-to-date computer.**
    - Macintosh, Windows, or Linux, is fine. Unless you're getting into sound and video editing, don't worry if your current setup is not the very latest and greatest.
  - **Extra memory.**
    - Because you'll tend to bounce between a number of applications, it's a good idea to have enough RAM installed on your computer that allows you to leave several memory-intensive programs running at the same time.
  - **A large monitor.**
    - Although not a requirement, a large monitor makes life easier, particularly for a visual designer, it helps to have more windows and control open at the same time. You can also see more of your page to make design decisions. However, If you're using large monitor, just make sure you design for users with smaller monitors and devices in mind.

Before we start

What Do I Need to Buy?

Equipment

- For a comfortable web development environment:
  - **A scanner and/or digital camera.**
    - If you anticipate making your own images and textures.
  - **A second computer.**
    - Many web designers find it useful to have a test computer running a different platform than the computer they use for development (i.e., if you design on a Mac, test on a PC). If you are a hobbyist web designer working at home, check your pages on a friend's machine. Mac users should check out the "Run Windows on Your Mac" sidebar.
  - **Mobile devices.**
    - It is absolutely critical that you test the appearance and performance of your site on a mobile browser on a smartphone or tablet device.

Before we start

Popular Web Design Software Links

Web page authoring

Adobe Dreamweaver *www.adobe.com*

Microsoft Expression Web *www.microsoft.com/products/expression*

Nvu (open source web page editor) *www.nvu.com*

HTML editing

TextMate by MacroMates for Mac OS *www.macromates.com*

Sublime Text *www.sublimetext.com*

TextPad for Windows *www.textpad.com*

Coda by Panic Software *www.panic.com/coda/*

BBEdit by Bare Bones Software *www.barebones.com*

Image editing and drawing

Adobe Photoshop *www.adobe.com*

Adobe Photoshop Elements *www.adobe.com*

Adobe Illustrator *www.adobe.com*

Adobe Fireworks *www.adobe.com*

Corel Paint Shop Pro Photo *www.corel.com/paintshoppro*

GIMP *gimp.org*

Browsers

Microsoft Internet Explorer (Windows only) *www.microsoft.com/windows/internet-explorer/*

Firefox *www.firefox.com*

Google Chrome *www.google.com/chrome*

Opera *www.opera.com*

Safari *www.apple.com/safari*

Networking

WS_FTP, CuteFTP, AceFTP, and others for Windows available at: *www.download.com*

Transmit (for Macintosh OSX) *www.panic.com/transmit*

Cyberduck (for Macintosh OSX) *cyberduck.ch*

Fetch (for Macintosh OSX) *fetchsoftworks.com*

Cygwin (Linux emulator for Windows) *www.cygwin.com*

PuTTY (telnet/SSH terminal emulator) *www.chiark.greenend.org.uk/~sgtatham/putty/*

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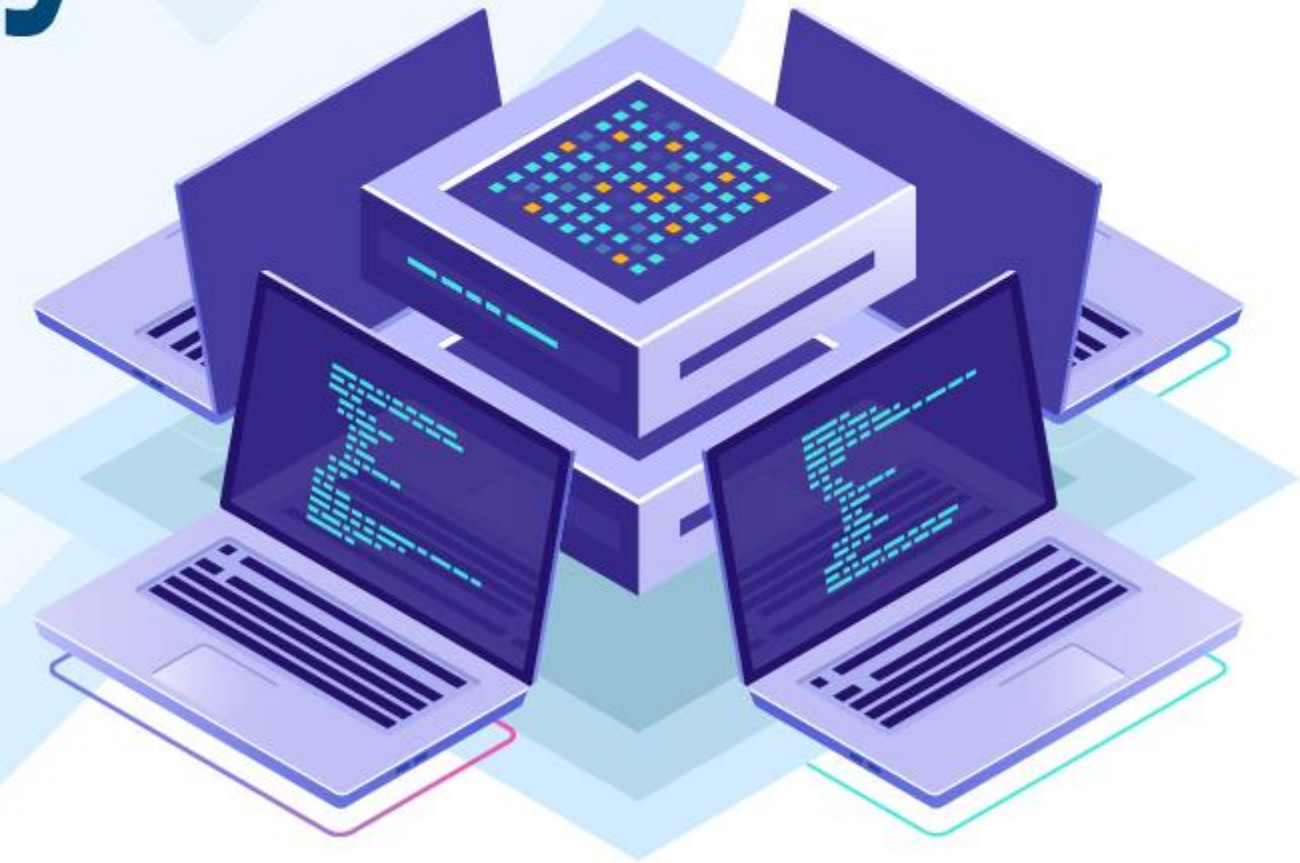
Information Technology

- Introduction to
- internet concepts



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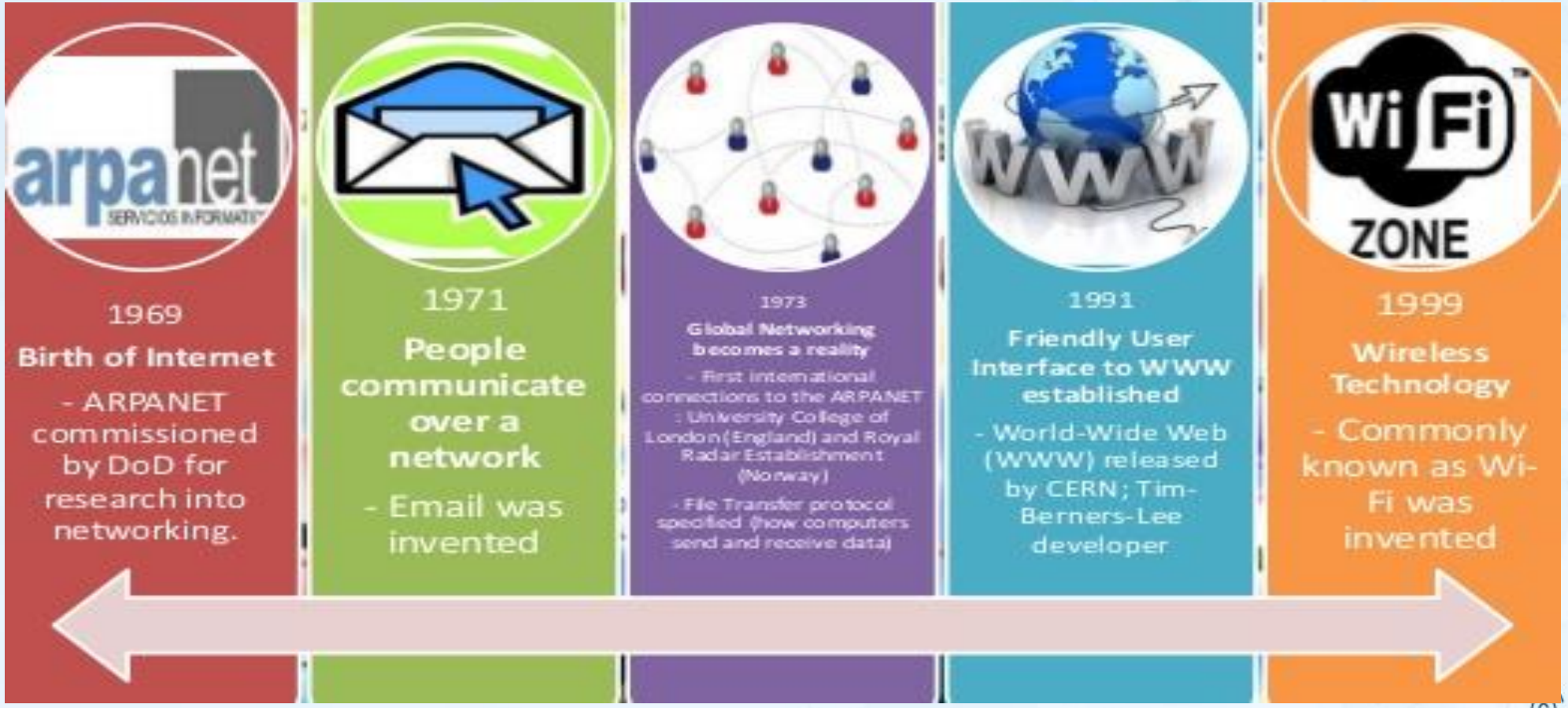
What is the Internet?

- **The Internet** is a collection of local, regional, national, and international computer networks that is linked together to exchange data and distribute processing tasks.

Evolution of the Internet



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Who owns the Internet?

- There is no single “owner” of the Internet but rather each of the networks comprising the internet has its own owner such as an Internet Service Provider (ISP), a government, an enterprise or a university.

Who is Structuring and Controlling The Internet?

Who is Structuring and Controlling The Internet?

- **Currently, Internet structure is provided by the following Entities:**
  1. Networks from corporations, commercial firms, and other companies.
  2. Telephone companies.
  3. Cable companies.
  4. Satellite companies.
  5. Governments.

Who controls the internet?

- The Internet is a public, cooperative, and independent network.
- No single entity controls or owns the Internet.
- Several non-profit organizations advise and define standards for internet such as.
  - **I**nternet **C**orporation for **A**ssigned **N**ames and **N**umbers (ICANN).
  - Internet 2.
  - **W**orld **W**ide **W**eb **C**onsortium (W3C).

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THANK YOU FOR WATCHING

QUESTIONS?