J2EE Web Component

Week 1

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Agenda

- Review the course outline
- Introduction to J2EE programming

What we are going to learn…

- Develop Java Servlets for n-tier application
- Develop Java Server Pages for n-tier application
- Design custom tag libraries for java web application
- Describe Java Web Applications and their components
- Apply MVC architecture to projects in designing J2EE applications
- Design HTML forms and JDBC database access with servlets and JSP
- Implement state management and tracking using sessions and cookies
- Securing J2EE Web application
- Design and implement JavaBeans in J2ee application

Required Resources

- Core Servlets and JavaServer Pages, Volume 1: Core Technologies,
  - By: Marty Hall and Larry Brown; Prentice Hall; ISBN:978-0130092298

- Murach's Java Servlets and JSP (3rd edition),
  - By: Joel Murach and Andrea Steelman; Mike Murach & Associates ; ISBN 978-1-890774-78-3

Assessment Weighting

Assessment	%
Test-1	15
Test-2	15
Test-3	15
Lab/class work	25
Assignment	30

Check BlackBoard

- Go to BB-> Find the course -> Getting start

Class Terms & Rules

- Punctuality
  - Attending in class on time
  - Submitting assignments on time
- Plagiarism is strictly avoided
  - **Plagiarism** is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

Let’s Start

- Enjoy the journey!

What is Web Application

- What are the differences between Web Application vs Windows (or console) Application?

Web Application

- A web application is a set of web pages that are generated in response to user requests.
  - The Internet has many different types of web applications, such as search engines, online stores, auctions, news sites, discussion groups, and games.
- Web applications are a type of client/server application.
  - In a client/server application, a user at a client computer accesses an application at a server computer. For a web application, the client and server computers are connected via the Internet or an intranet

Evaluation 1

- Develop a Java program (console) which
  - Displays your name
  - Extracts/Displays current time/date
- Submit it to the Blackboard (assignment section)
  - Please zip the project

REVIEW SOME CONCEPTS

Internet vs Web

- What is Internet?
- What is Web?

Internet vs WEB

- The **Internet** is a Big Collection of Computer networks, computers and Cables.
- The World Wide Web (abbreviated WWW or the Web) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the Internet
  - The **Web** is a Big Collection of Web documents (HTML, ASP, PHP, Perl, …) Pages on the Internet.
- Internet is a Brain and Web is its mind

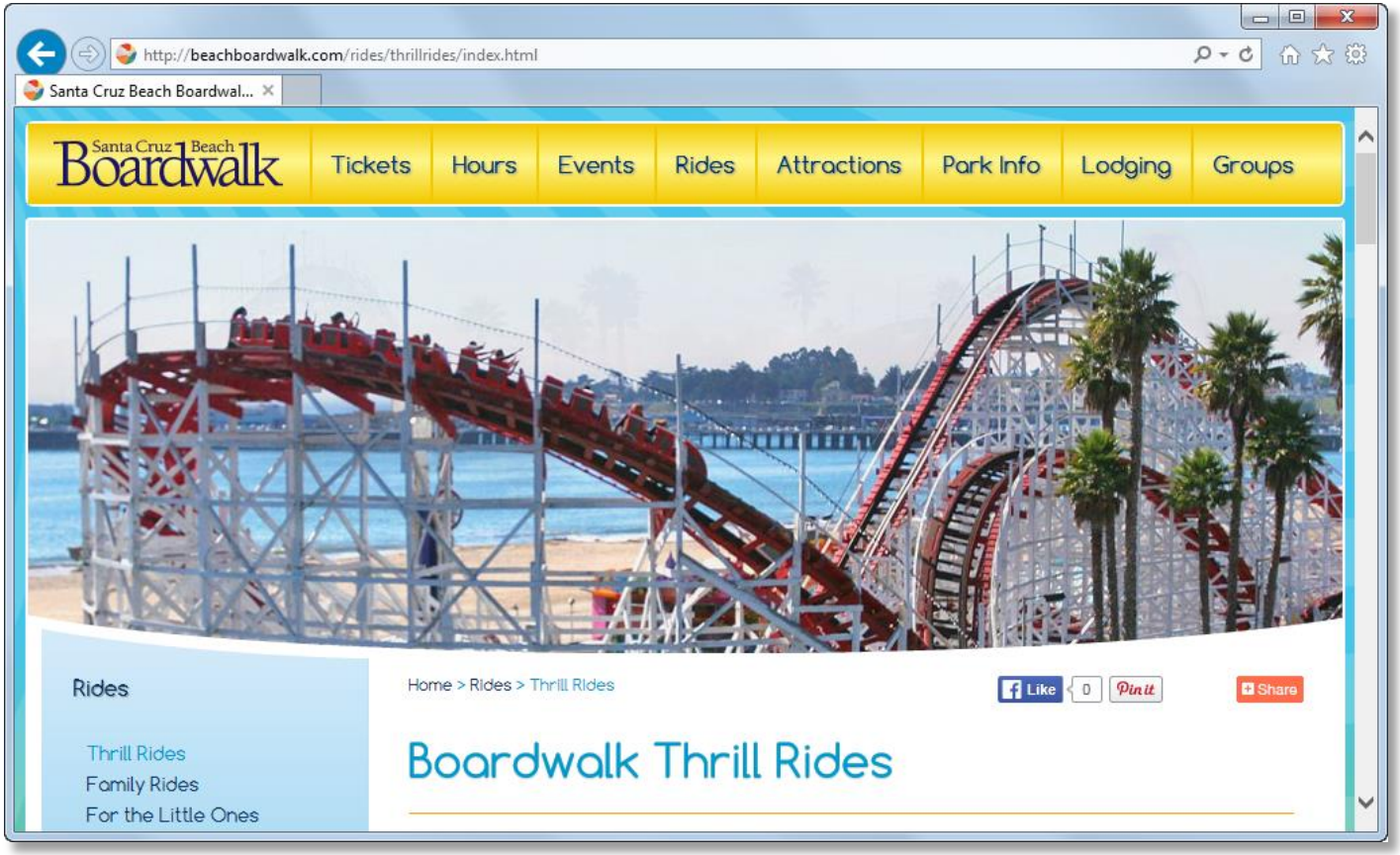
LAN vs WAN

- We use Computer networks in order to share **network resources**
- Local Area Network uses LAN Connections
  - Cables, Wifi
- Wide Area Network uses WAN Connections
  - Use Modem, Satellite
- The **Internet** is a good example of a WAN

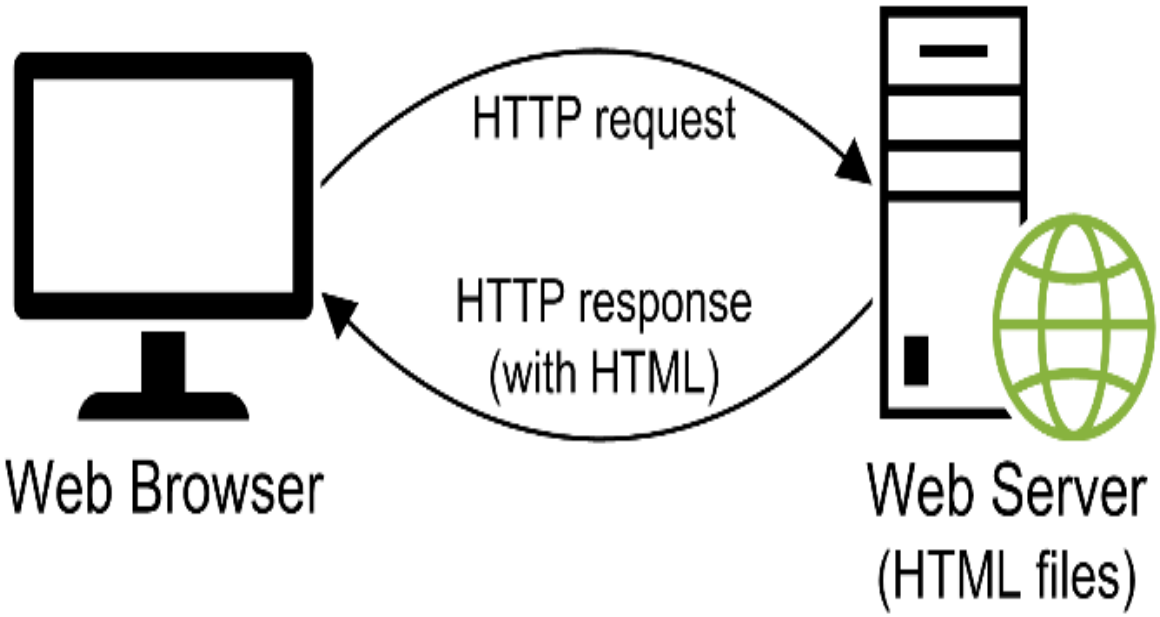
Static Page vs Dynamic page

- What is Static Web Page?
- What is Dynamic Web page?

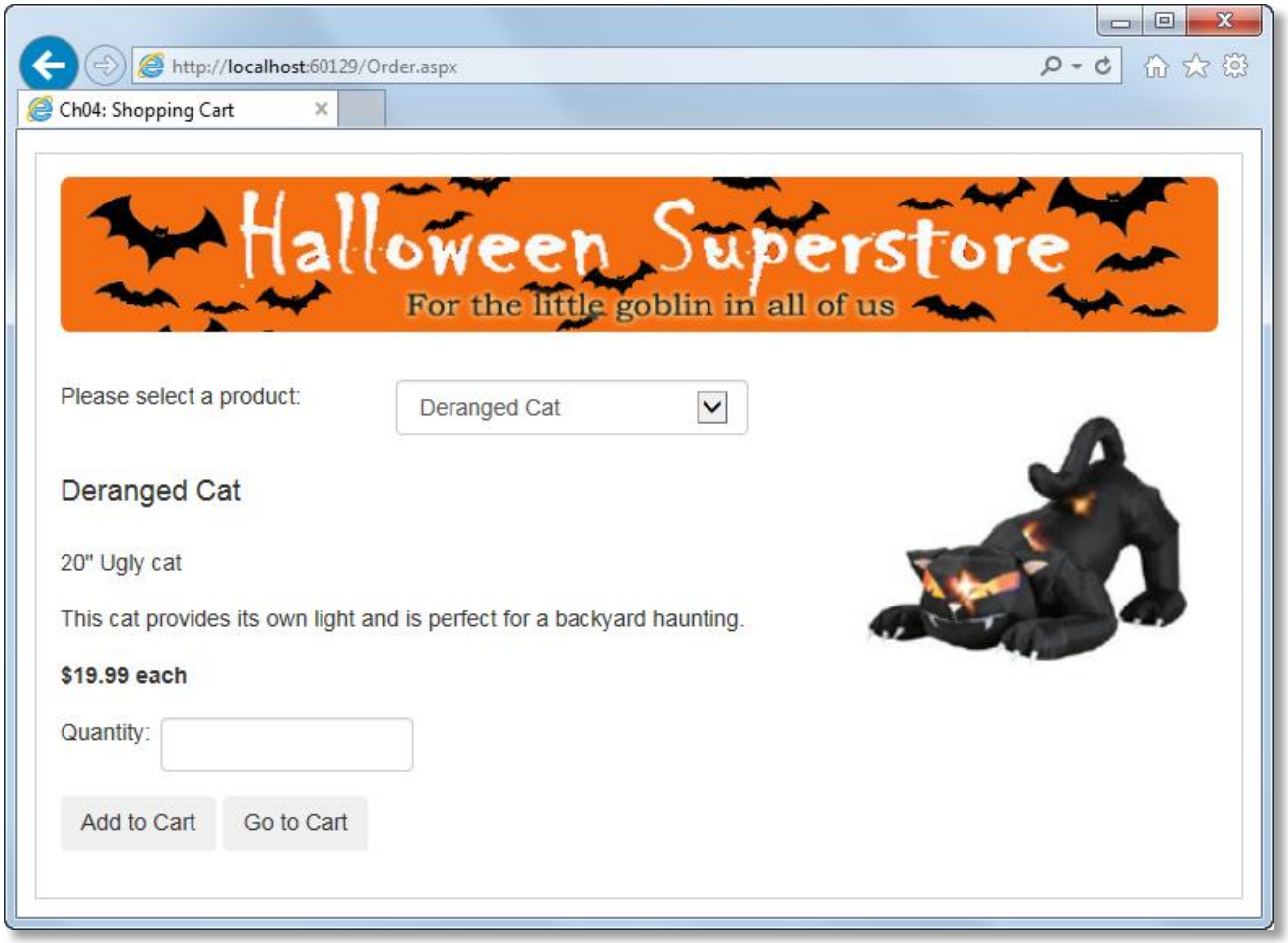
A static web page



How a web server processes a static web page



A dynamic web page



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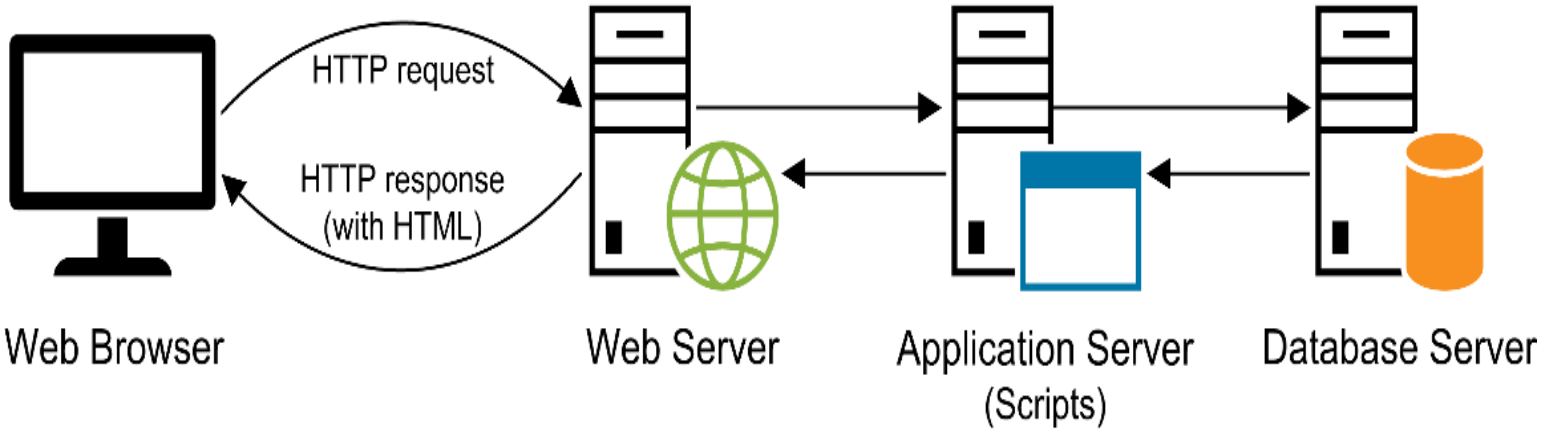
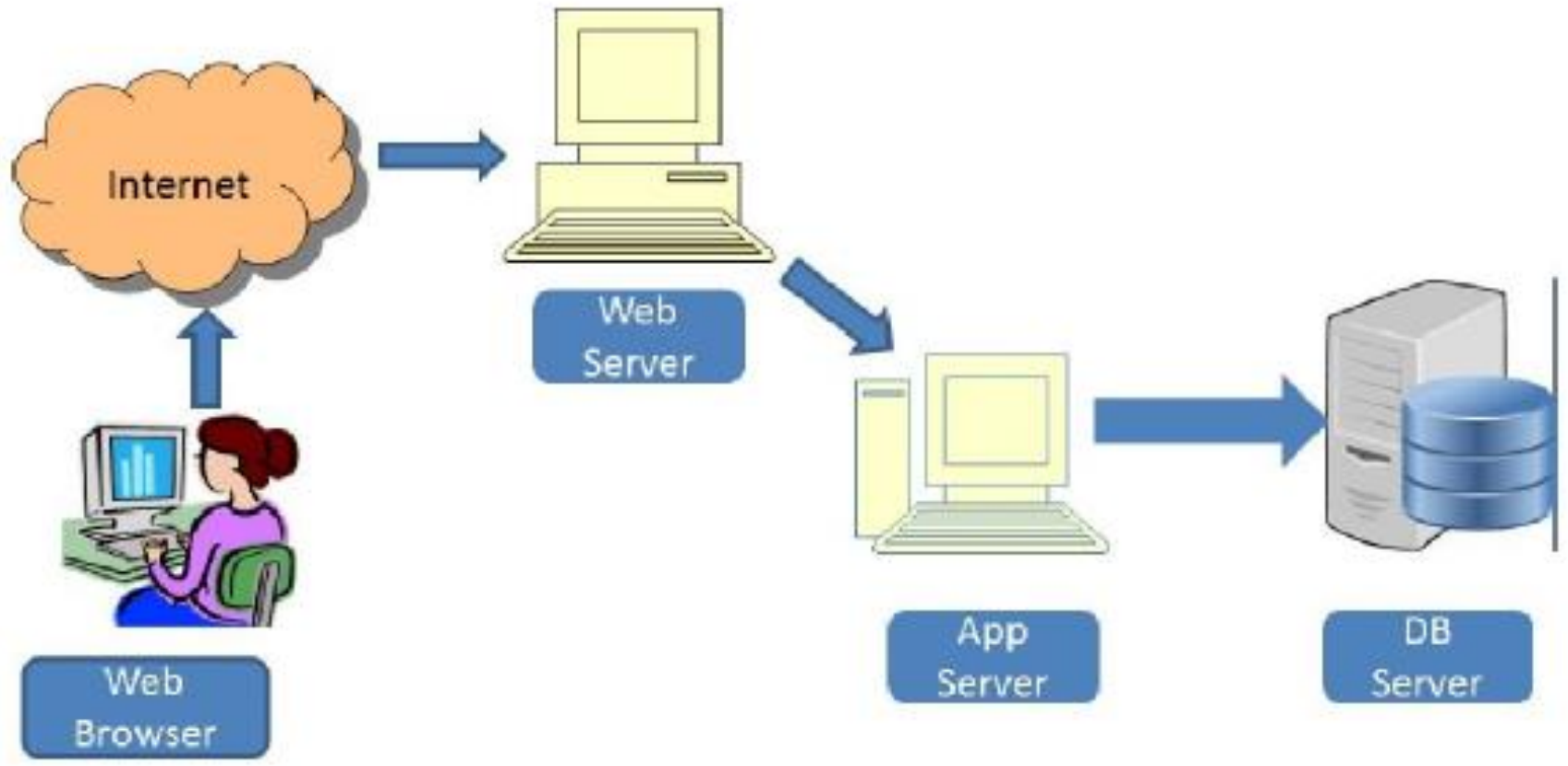


Static vs Dynamic Web content

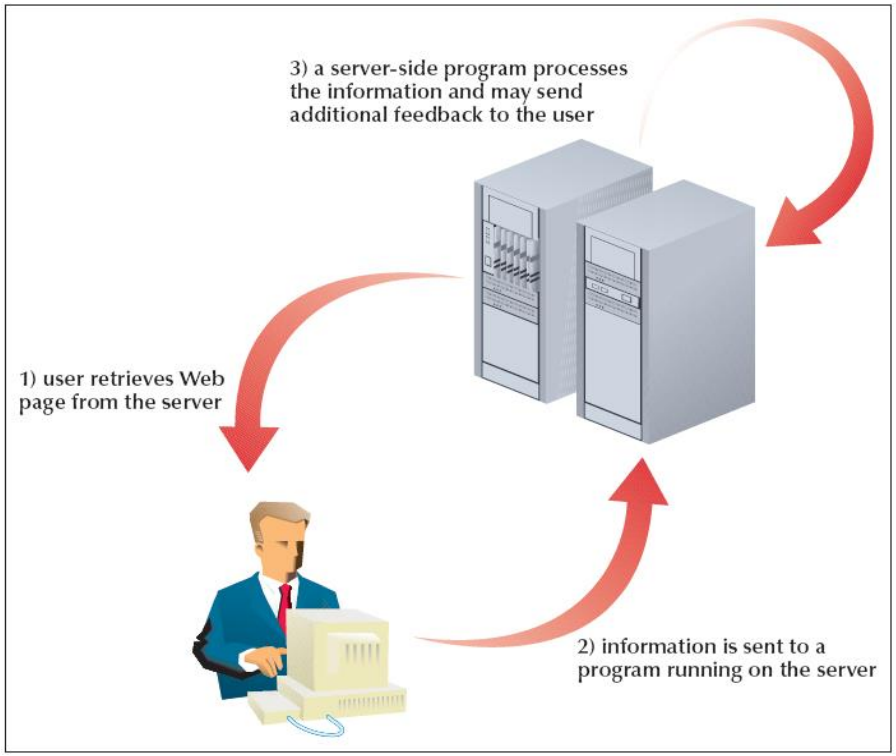
- **Static** web page request:
  - User requests web page
  - Server locates HTML page
  - Server returns HTML page
  - Page shown in browser
- **Dynamic** web page request:
  - User request a program (script)
  - Server locates program (script)
  - Server runs program (script)
  - Program (script) creates HTML page
  - Program (script) returns HTML page to user

Web Architecture : Client/Server

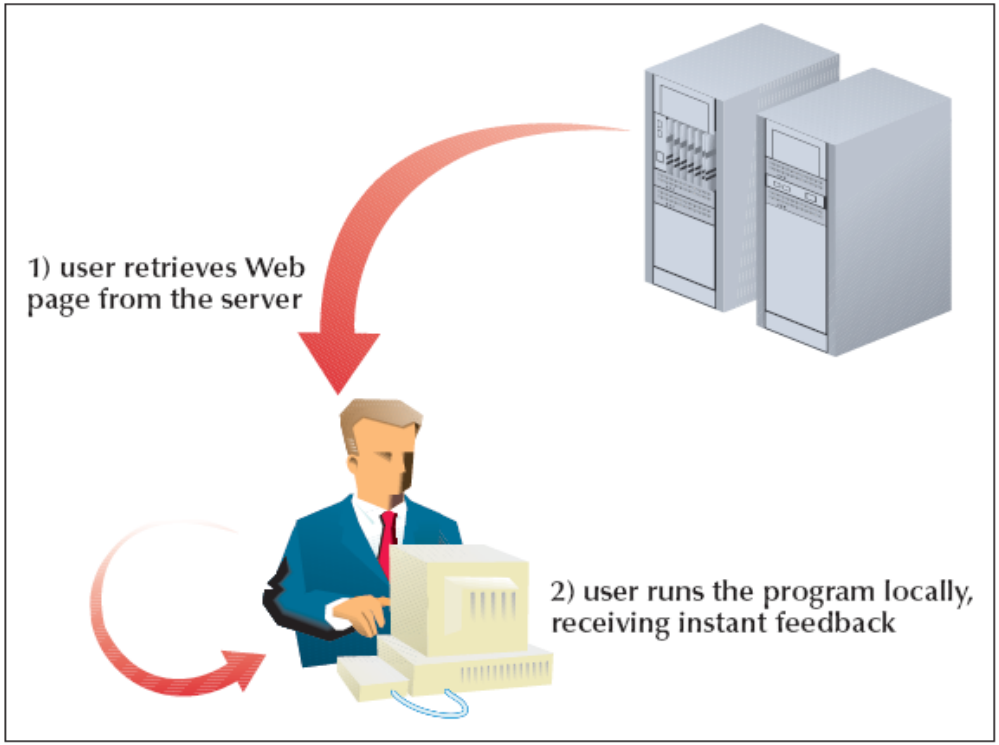


Server Side vs Client Side Programming

Server-Side Programming



Client-Side Programming



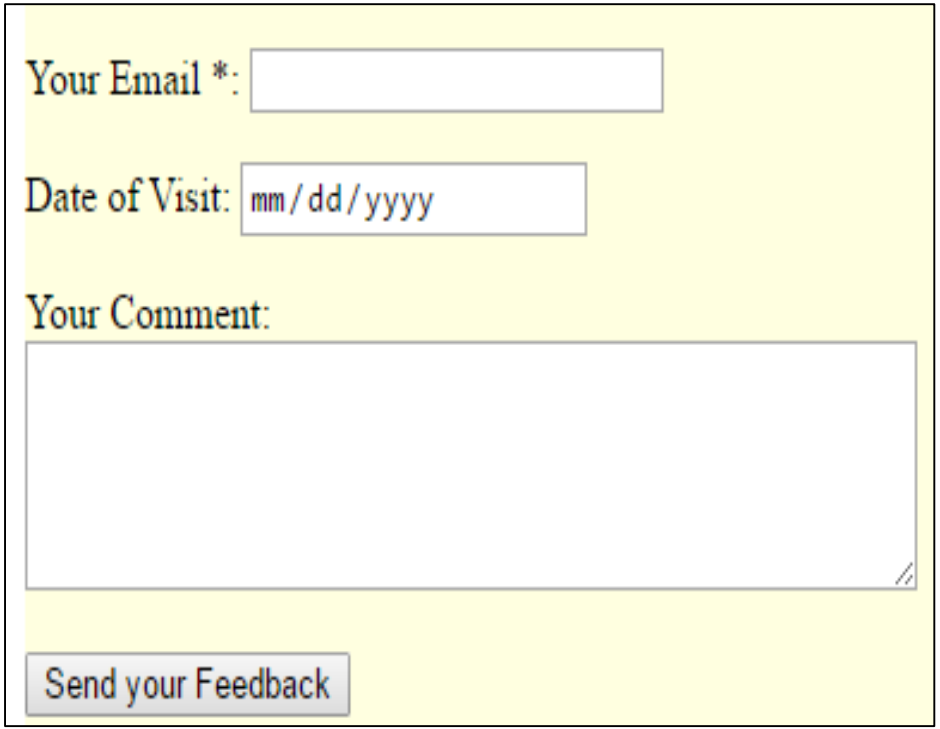
Server Side vs Client Side Programming

- Client-side
  - All takes place within browser
    - JavaScript
- Server-side
  - All takes place on the server
    - PHP, JSP, ASP

Web Technologies

Evaluation 2

- Design the following webform, and add some CSS style (like color)
  - Use any tools!



Let’s have a break

- **Until 12:05pm**

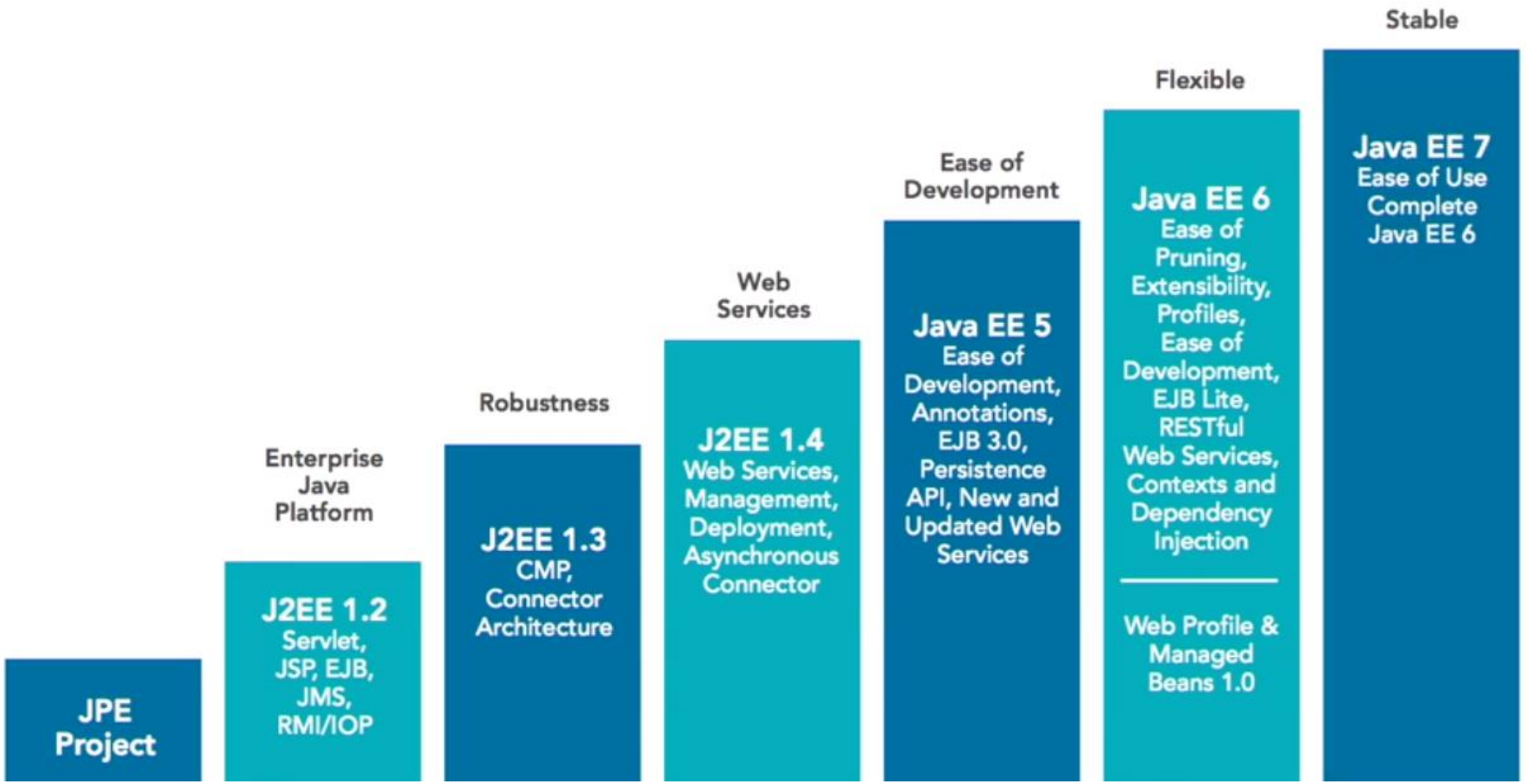
J2EE or Java EE

- When the enterprise Java platform was first introduced, it was called "Java 2 Platform, Enterprise Edition", with the abbreviation "J2EE".
  - These are old names :“J2EE, “J2SE”, and “J2ME”
- With the versions of the platform shipped early 2006, the Java name lost the "2", and the "dot zero".
  - J2EE 5.0 became Java EE 5
- The following terms should always be used at first reference:
  - Java™ Platform, Standard Edition
  - Java™ Platform, Enterprise Edition
  - Java™ Platform, Micro Edition
- http://www.oracle.com/technetwork/java/javase/overview/javanaming-2227065.html

Java EE vs J2EE

- Java EE was the successor to J2EE; which was a wildly popular set of specifications for implementing enterprise software.
- Sun Microsystems, together with the Java community as part of the Java Community Process (JCP), replaced J2EE with Java EE in 2006.
- Java EE introduced a much nicer, lightweight programming model, making enterprise Java development much more easier than what could be accomplished with J2EE.

J2EE / Java EE versions



What is the latest version of Java EE?

Java EE latest releases

- In 2010 Oracle purchased Sun Microsystems, and became the steward for Java technology, including Java EE.
  - Java EE 7 was released in 2013
  - Java EE 8 was released in 2017

Class Activity 1: Explain the following terminologies

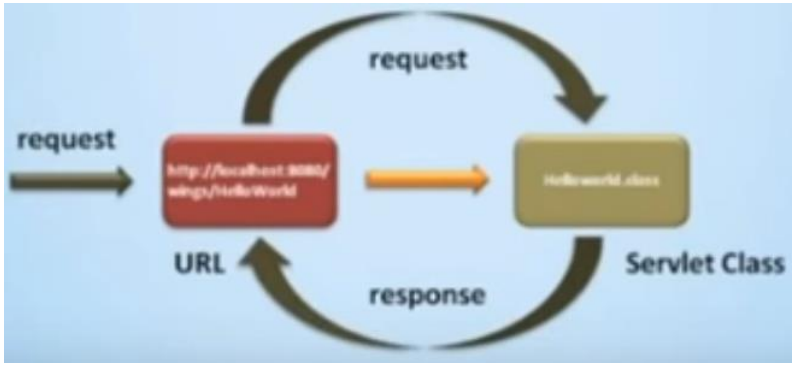
- Do some research and explain the followings:
  - J2EE vs Java EE
  - EE4J
  - Jakarta EE
- Add the citation to the document

Java EE Web Component Java EE Business Component

- Java EE web components can be either JSP pages or servlets.
  - **Servlets** are Java programming language classes that dynamically process requests and construct responses.
  - **JSP pages** are text-based documents that contain static content and snippets of Java programming language code to generate dynamic content.

Servlets

- Servlets is a component that is used for generating dynamic web pages in response to the client requests.
- Web Server
  - Contains the Java servlet classes – execute within a servlet container



Java Server Page

- It is an extension of Java Servlets to generate dynamic content for a Web client
- Contains
  - Static HTML codes
  - JSP Scripting elements
  - Java Codes ,….

Web Application

- A servlet/JSP application must have a web server and a servlet/JSP engine, also known as a servlet/JSP container, to process the HTTP request and return an HTTP response, which is typically an HTML page.
- Most servlet/JSP applications use Tomcat as both the web server and the servlet/JSP engine.

Web Application

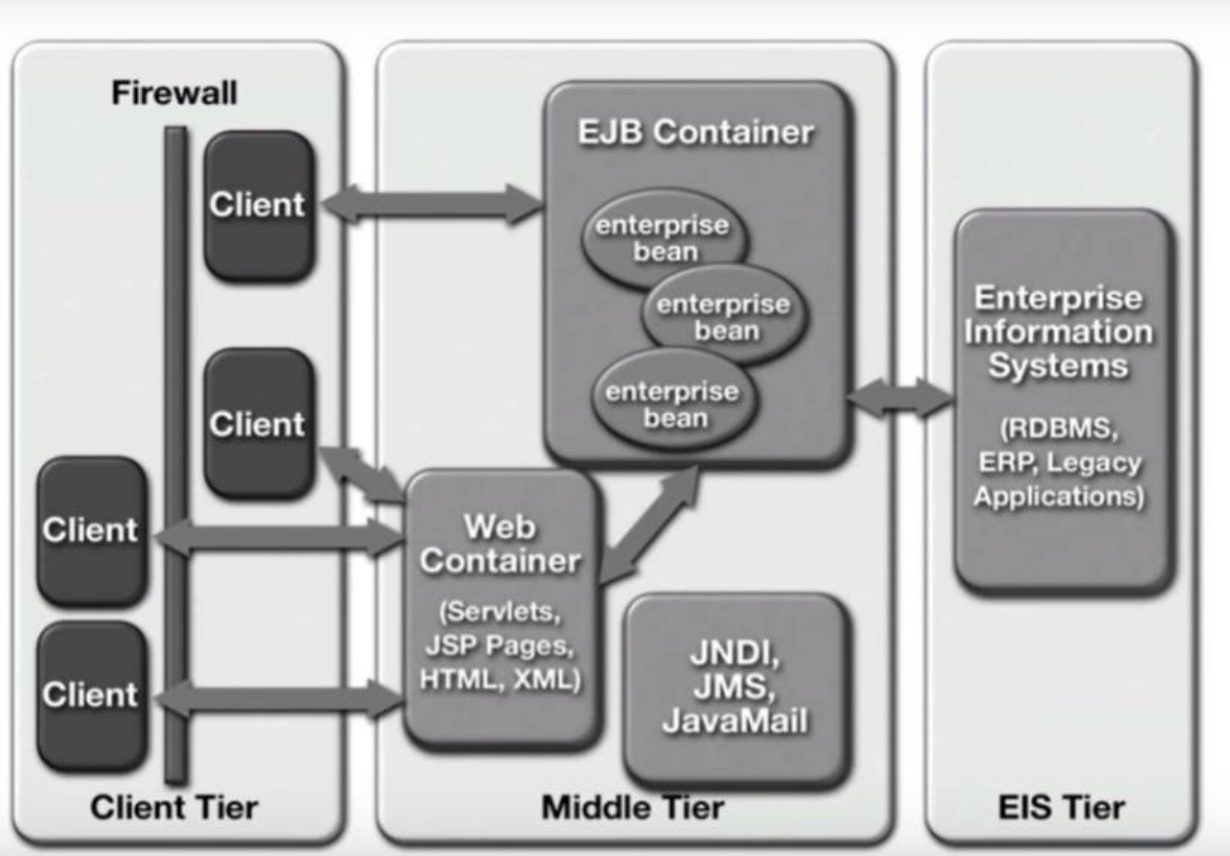
- Most servlet/JSP applications use a database to store the data that's used by the application. Many servlet/JSP applications use MySQL as the database, though there are many other databases to use.
- For a servlet/JSP engine to work, it must have access to Java's Java Development Kit (JDK), which comes as part of the Java Standard Edition (Java SE). Among other things, the JDK contains the core Java class libraries, the Java compiler, and the Java Runtime Environment (JRE).

Java EE Business Component

- Business code, which is logic that solves or meets the needs of a particular business domain such as banking, retail, or finance, is handled by enterprise beans running in the business tier.
  - **An Enterprise bean** receives data from client programs, processes it (if necessary), and sends it to the enterprise information system tier for storage.
  - An **Enterprise bean** also retrieves data from storage, processes it (if necessary), and sends it back to the client program.

J2EE Components

- Java EE divides all components into separate groups according to the functionalities.



Components provided by Java EE Platform

- Enterprise JavaBeans specification
- Java Persistence API (JPA)
- Java Server Pages Specification (JSP)
- Java Servlet specification
- Java Server Faces (JSF)
- JDBC API
- Java Naming and Directory Interface Specification (JNDI)
- Java Transaction API (JTA)

Components provided by Java EE Platform

- Java Transaction Service (JTS)
- Java Mail API Specification
- JavaBeans Activation Framework specification (JAF)
- J2EE Connector architecture
- Java API for XML Processing (JAXP)
- Java authentication and Authorization service (JAAS)

Components provided by Java EE Platform

- Java server Pages Standard Tag Library (JSTL)
- Web Services for Java EE
- Java API for XML-based RPC (JAX-RPC)
- Java API for XML Registries (JAXR)
- Java Management Extensions (JMX)
- Java Platform, Enterprise Edition Management Specification
- Java Platform, Enterprise Deployment Management Specification
- Java API for XML-based Web Services (JAX-WS)
- Java architecture for XML Binding (JAXB)

Enterprise JavaBeans Components

- A server-side technology for developing and deploying and deploying components containing the business logic of an enterprise application.
- EJB components are scalable
- Three types of enterprise Java Beans
  - Session beans
  - Entity beans and
  - Message-driven beans

Activity 2

- Open the BlackBoard->Module1 and follow the installation instruction
- You need to install the following tools
  - Install JDK (1.8)
    - You may have this tools if you did java programming with netbeans before
  - Install Eclipse for Java EE developers edition
  - Install Tomcat 9.0