Lecture 02

- IT1100 - IWT
- Web based Systems
- Dilani Lunugalage

Content

- Distributed systems and their architectures
- Main concepts of web
- E-commerce systems and forms

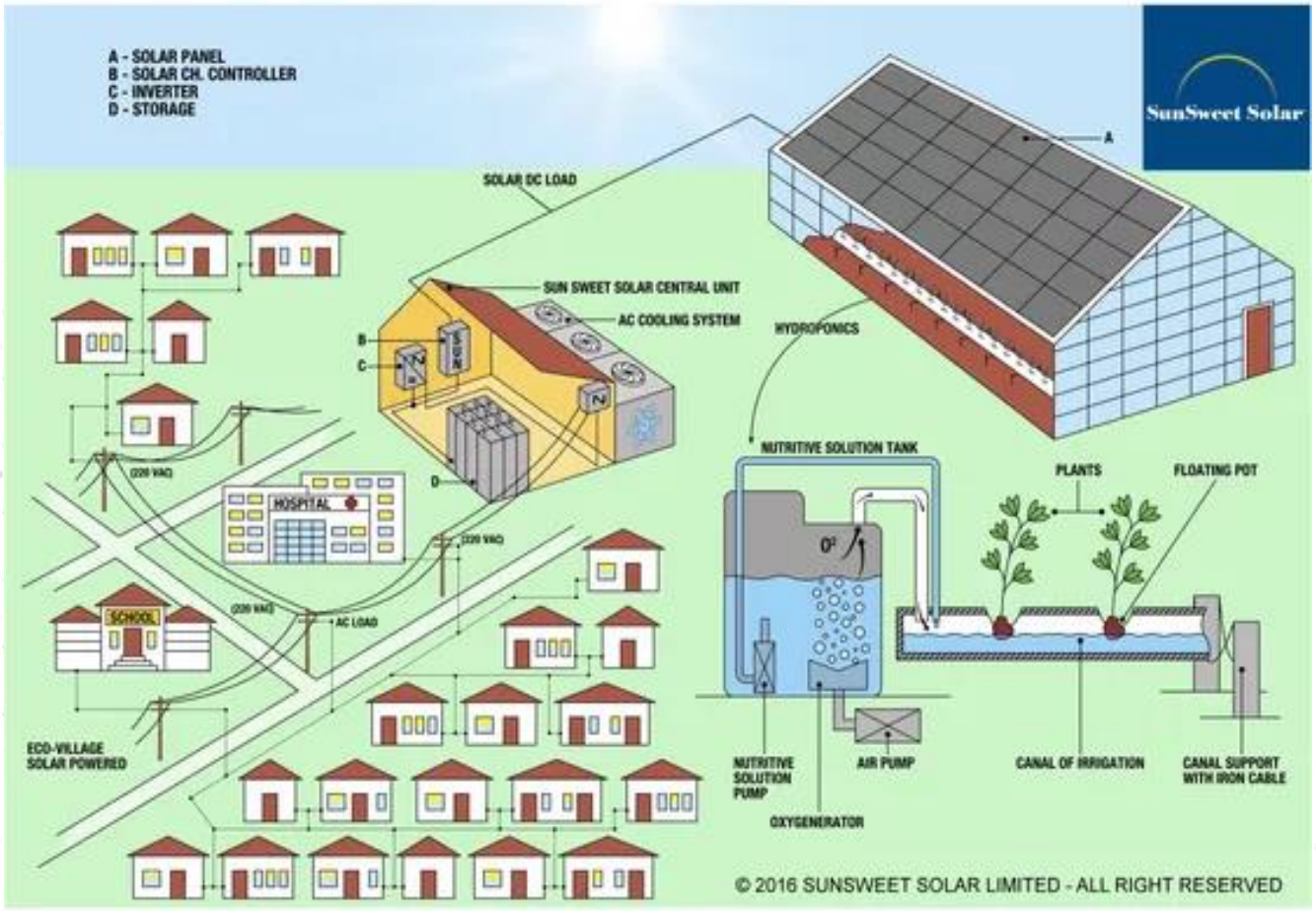
Distributed systems and their Architectures

Computer based systems can be mainly divided into 2 types, *according to the distribution of the components*

- Standalone systems (or commonly referred as desktop applications)
- Distributed systems

Distributed systems and their Architectures

Stand Alone/ Distributed



Distributed systems and their Architectures

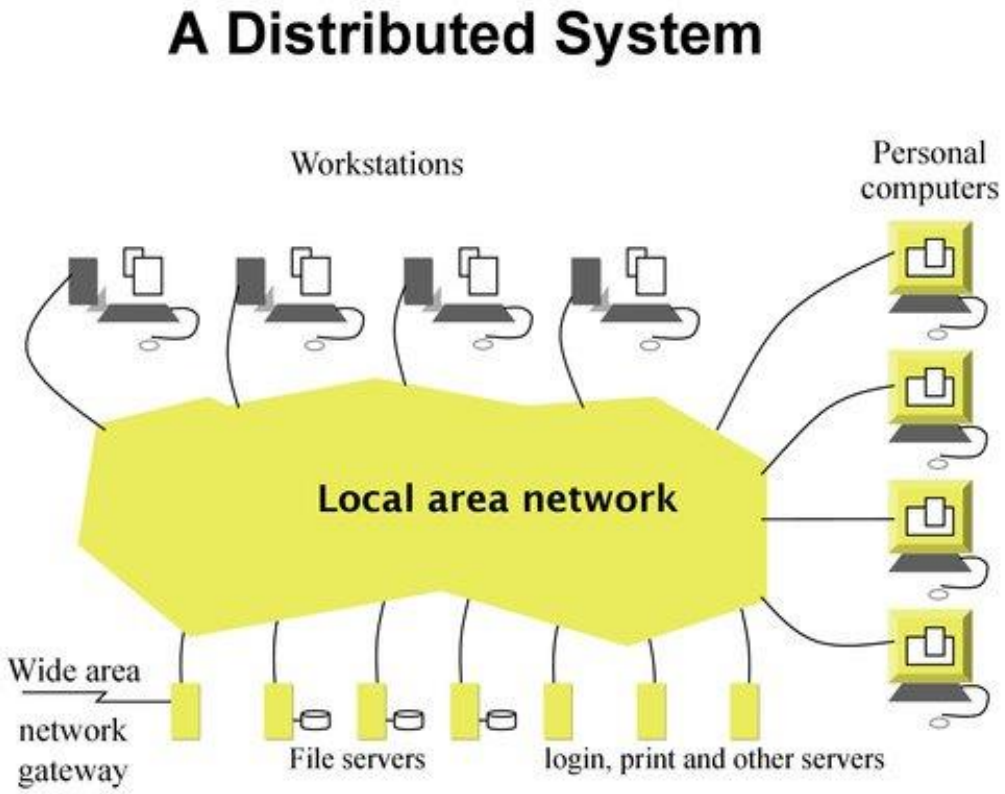
Standalone Computer System	Distributed system
▪ All the components are executed within a single device	▪ The components are distributed and executed in multiple devices
▪ Do not need a network	▪ Need a network
▪ Usually one or tightly coupled set of technologies are used to develop (JAVA, .NET)	▪ Multiple and loosely coupled set of technologies are used to develop (HTML+CSS+JS + PHP)

Distributed systems and their Architectures

Distributed systems

- There are multiple, slightly different definitions and arguments about the terms **distributed systems** and **distributed computing**
- We are here focusing on the systems, whose components are distributed among multiple devices and using a network for the communication between these components.

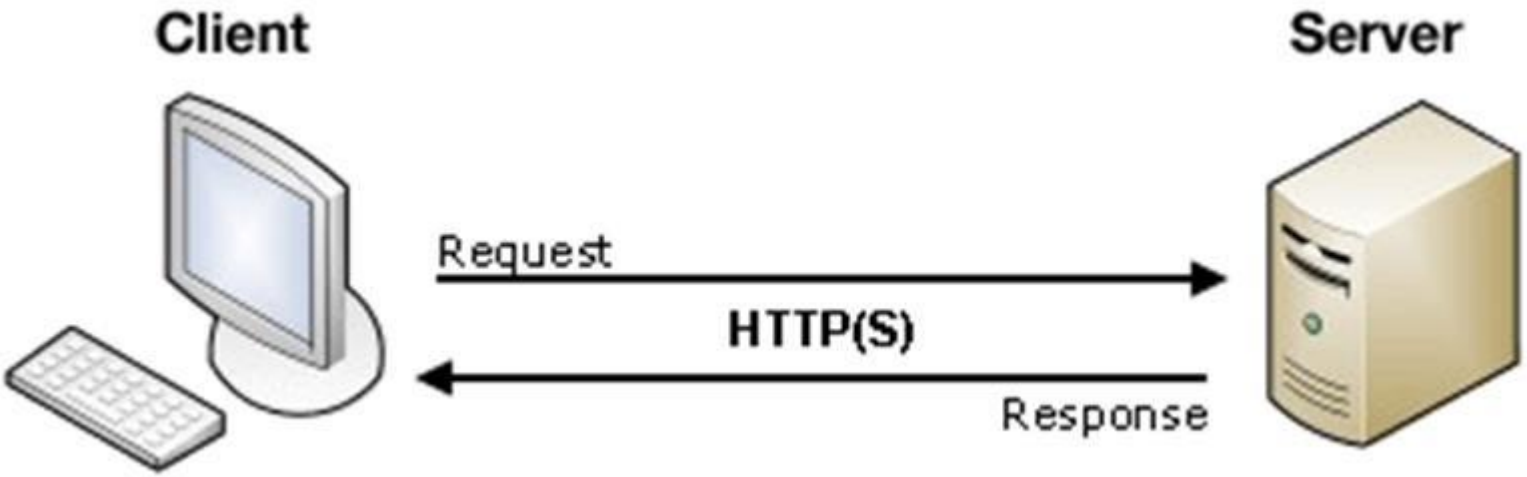
Distributed systems and their Architectures



Distributed systems and their architectures

Client-server architecture (2-tier)

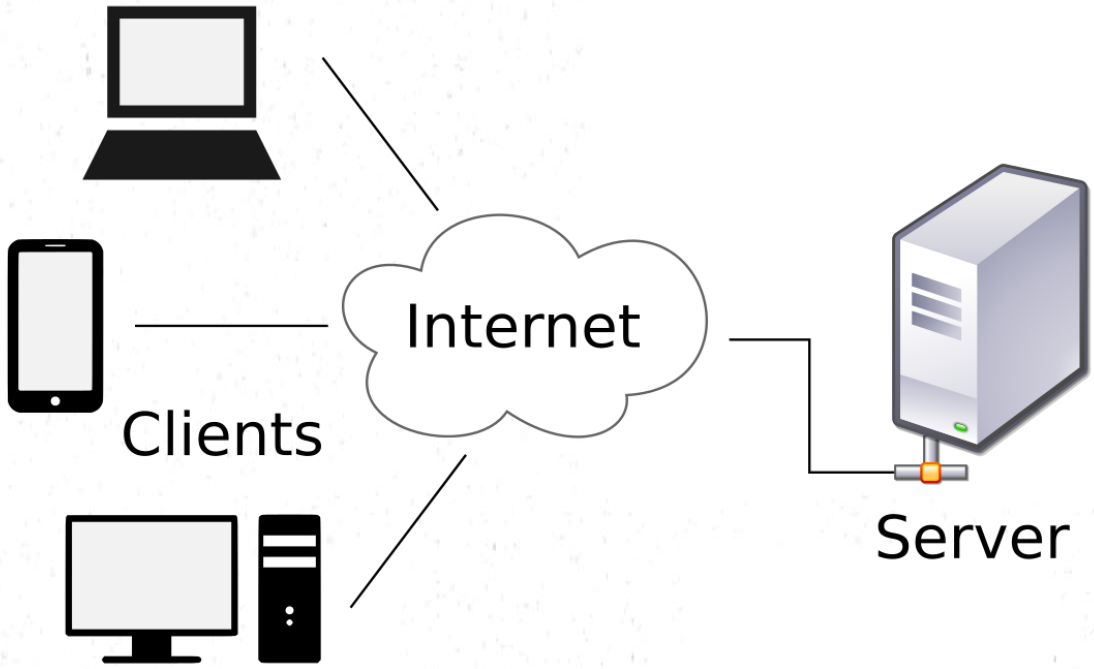
- The basic architecture of the distributed systems is called the client-server (or two-tier) architecture
- Usually the client (user) sends a **request** asking the server for some service and the server **responses** with the resources



Distributed systems and their Architectures

Client-server architecture (2-tier)

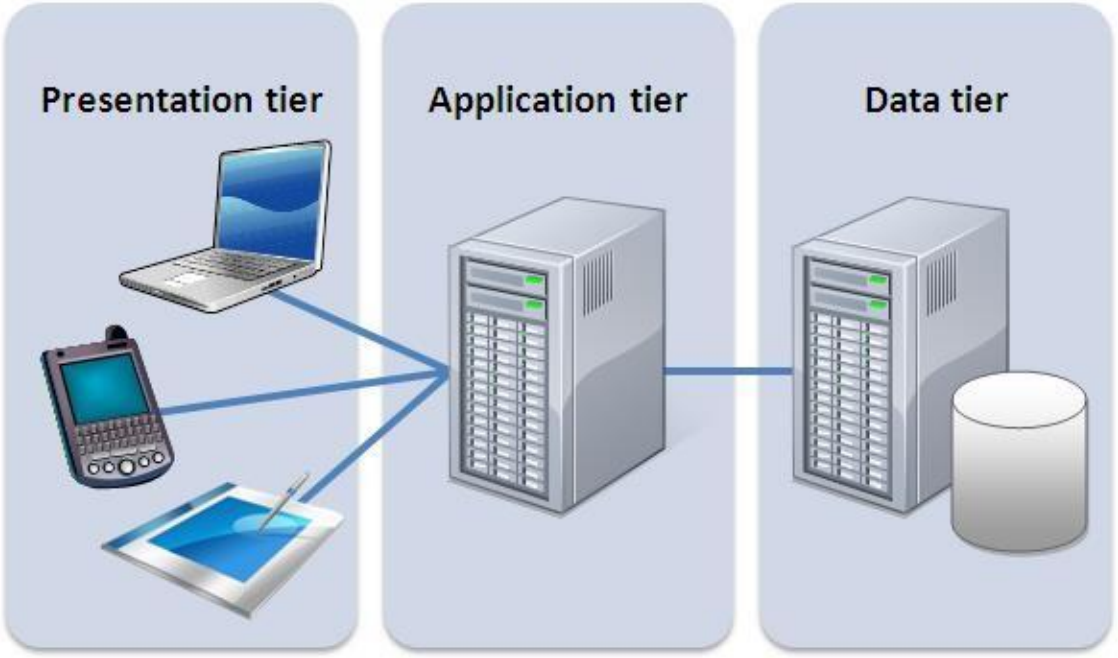
- There can be multiple clients, accessing the same server.
- These clients may use different types of devices



Distributed systems and their Architectures

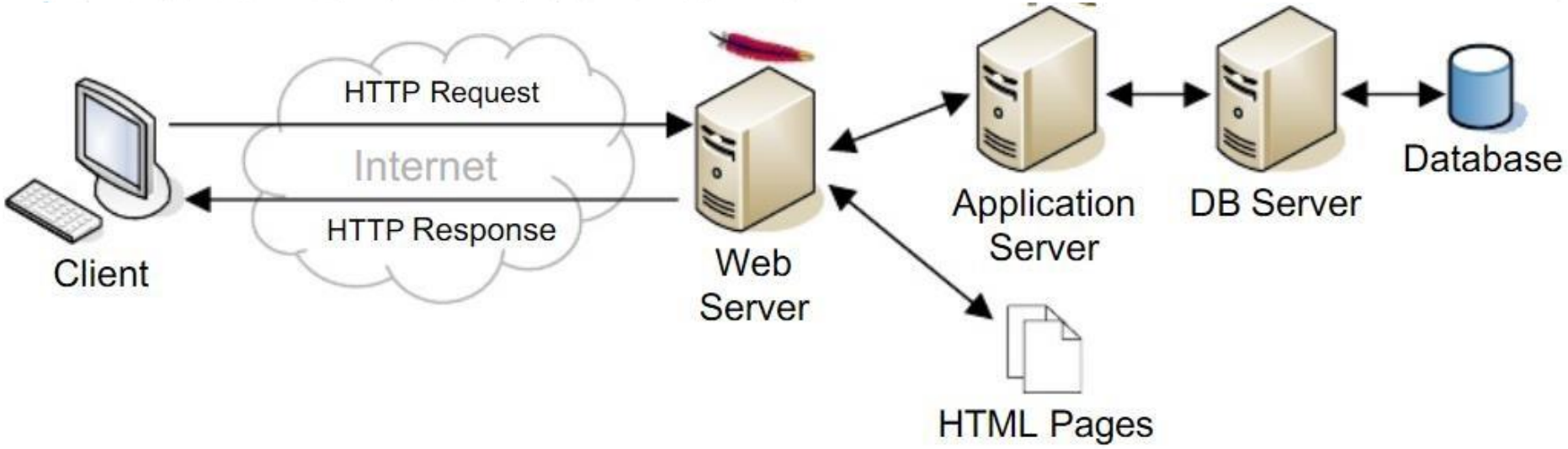
Client-server architecture (3-tier)

- 3-tier architecture is used, when there is a need for data persistence and also to separate the application logic from the data
- This can be seen as an extension of 2-tier architecture



Distributed systems and their Architectures
Client-server architecture (n-tier)

- When there is a need for further separation and distribution of the components, more tiers can be added and extend the 2-tier or 3-tier architecture into an n-tier architecture



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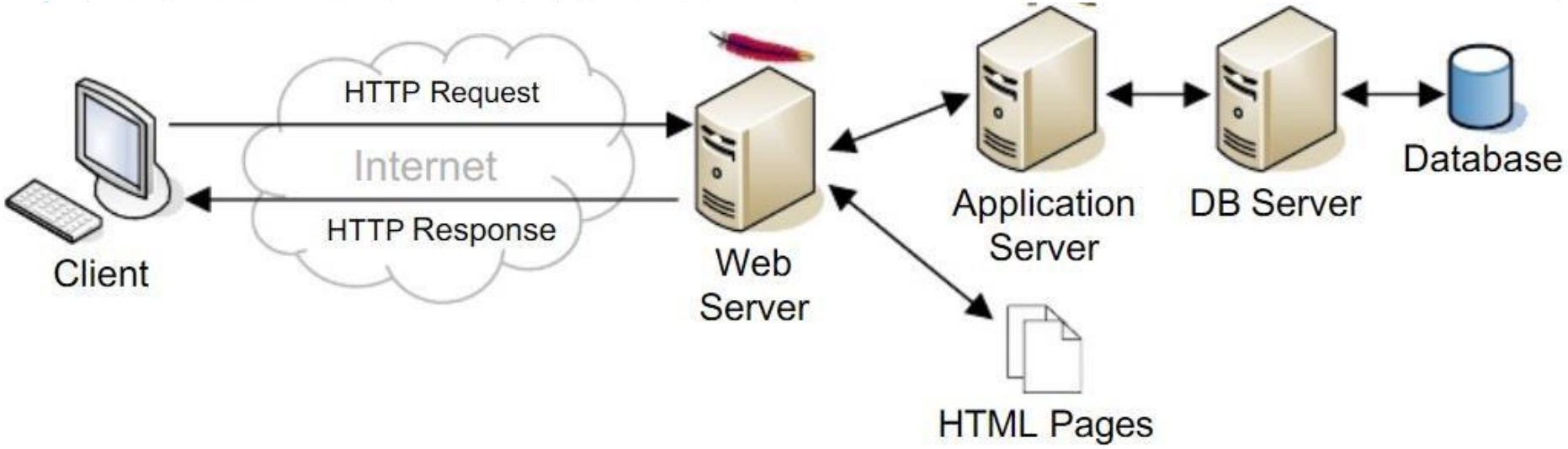


Main concepts of Web

Web server

- Web server is a server software, which responses to the HTTP requests.
- Web server means
  - The server software
  - the hardware
  - other software infrastructures
    - which provide a platform to the server software to work and perform well.

Main concepts of Web

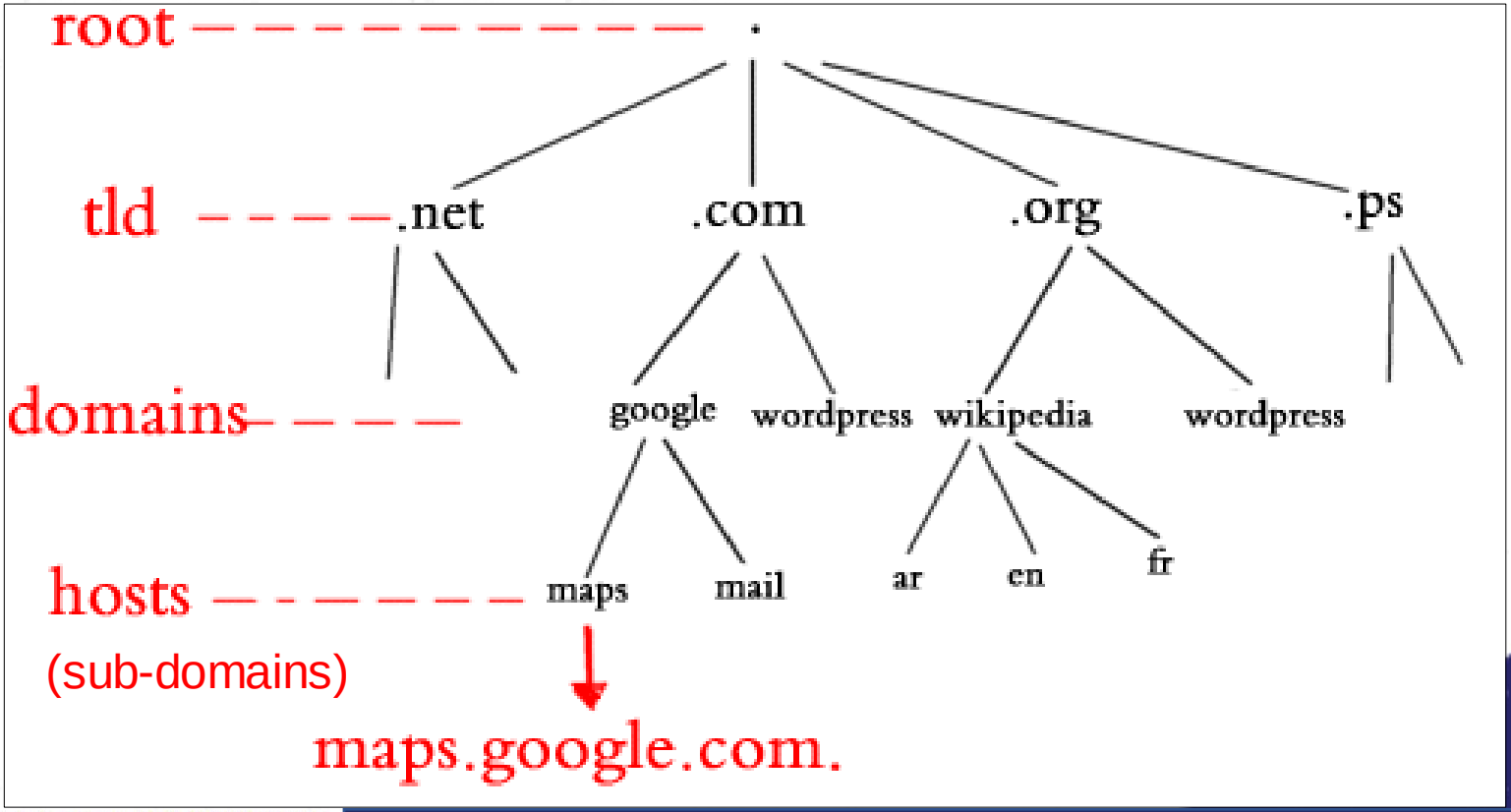
Domain name

- The server computer has an IP address, which is used to access and communicate with the server.
  - Ex: 74.125.236.199
- An IP address is *not human friendly,* therefore more human friendly name is given for humans to identify the server, which is called the **domain name**
  - ex: www.google.com

Main concepts of Web

Domain name

There is a hierarchy for the domain names

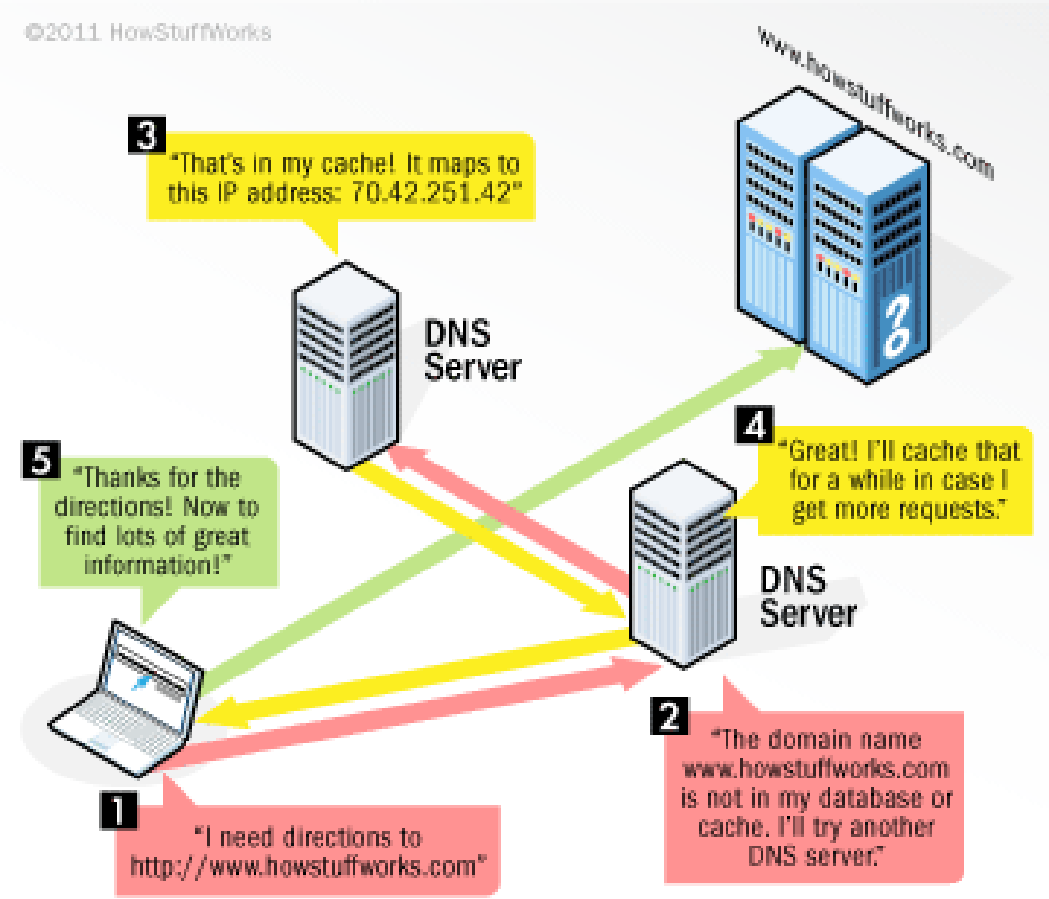


Main concepts of web
Domain Name System (DNS)

- DNS is a network, which consists of Domain Name Servers
- DNS helps to map the domain name to the IP address
  - This process is called the address resolution (DNS resolution)

https://en.wikipedia.org/wiki/Domain_Name_System

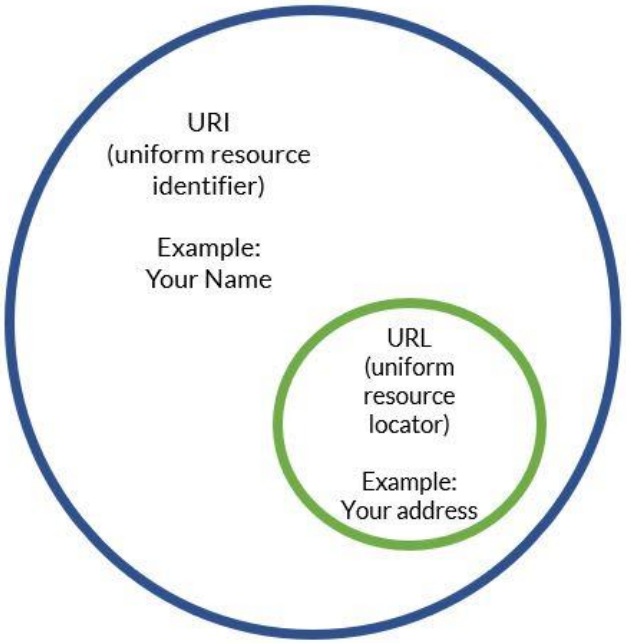
Main concepts of web
Domain Name System (DNS)



Main concepts of web

Unified Resource Identifier (URI)

- URI is a string of characters designed for **unambiguous identification** of resources.
- URI is extensible via the URI scheme



Main concepts of web

Unified Resource Identifier (URN)

- Unified Resource Name(URN) is a persistent, location-independent identifier

Main concepts of web
Unified Resource Identifier (URI)

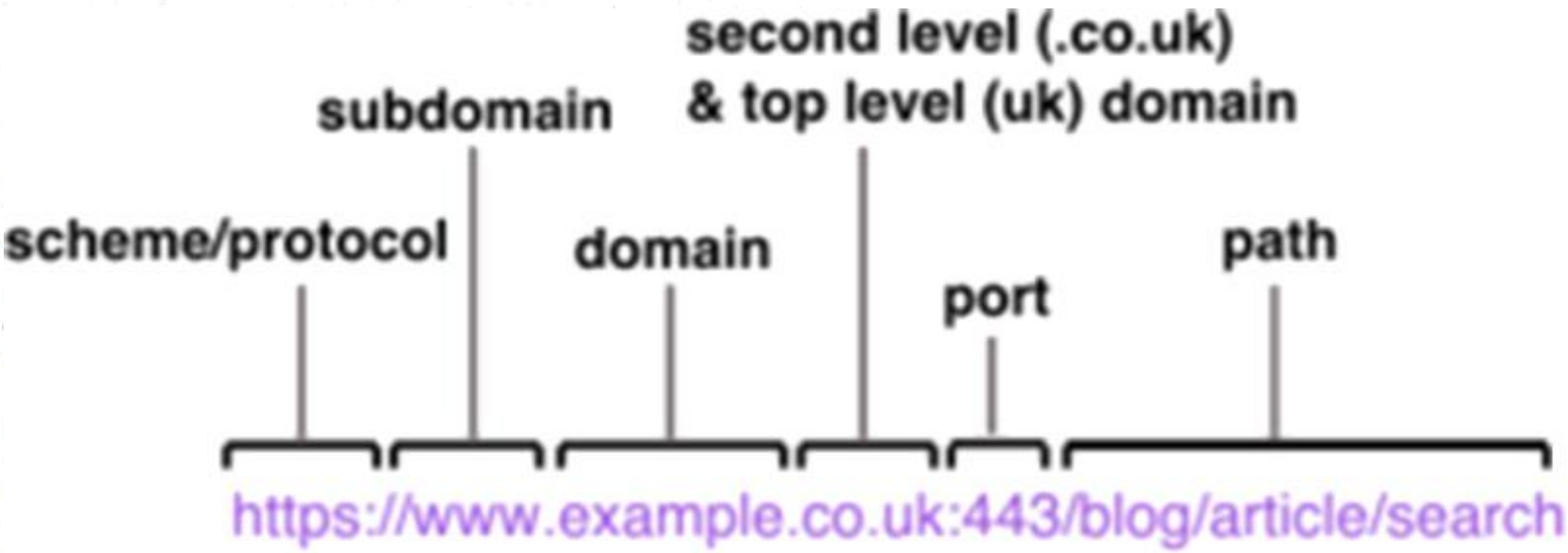
Unified Resource Locator (URL) can be seen as a web address, which is a reference to a web resource that specifies its location on a computer network.

- www.google.com/search?q=examples
- https://www.w3schools.com/html/default.asp
- https://en.wikipedia.org/wiki/URL

Main concepts of web

Unified Resource Identifier (URI)

- Sections of URIs



2. Main concepts of web

Websites Vs. Web Applications

- **Website** can be seen as a collection of web pages with static content
- Early websites were entirely developed only using HTML
  - Nowadays, some server-side application components and databases are used to dynamically generate the content
  - However, still the content is not user tailored

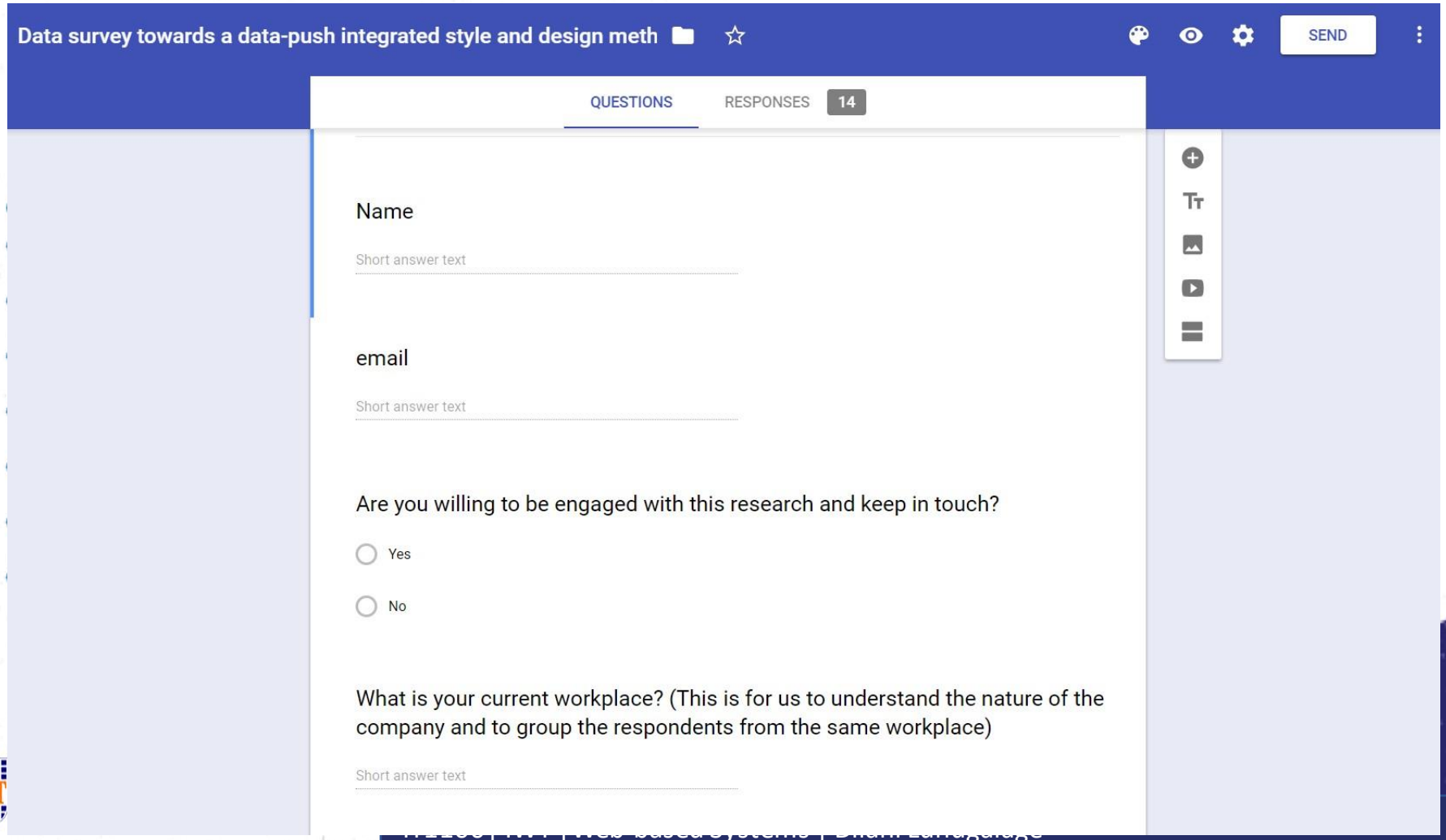
Main concepts of web

Websites Vs. Web Applications

- Web application is a single page or a collection of web pages, with *interactive components* to *dynamically* generate the content
- Users can enter data., process them, and get information as the result using a web application

Main concepts of web

Websites Vs. Web Applications



Websites Vs. Web Applications

- The processing is done by the application components in
  - Client-side (in browser) [JS is used to develop]
  - Server-side (in web server) [PHP, Java can be used]
  - Both the client and the server sides
- These application components may allow the user to interact with the web application by entering data, selecting content, clicking, dragging and dropping, etc…

3. E-commerce systems and forms

Nowadays, the web technologies are used to develop many types of applications, including

- Email (Gmail, yahoo mail, outlook)
- Office tools (Google docs, google sheets, etc..)
- Games (Poki, Miniclips)
- Multimedia (YouTube)
- Social media and networking (Facebook, Tweeter)
- E-commerce (Amazon, e-bay)
- And many more……..

E-commerce systems and forms

E-commerce is a large domain, which covers many related concepts like

- Internet marketing
- Electronic fund transfer
- Online transaction processing
- And many more…..

E-commerce systems and forms

E-commerce systems provide online buying and selling over the internet.

There is a large variety of types of e-commerce systems

- Online goods/soft items(software, e-books, videos)
- Retail services (travel, food, cloths)
- Marketing services (advertising, auctions)
- Customer services (help centers, online banking)
- Many more…..

E-commerce systems and forms

- E-commerce systems can also be categorized according to the stakeholder engagement
  - Business-to-Business (B2B)
  - Business-to-Consumer (B2C)
  - Consumer-to-Consumer (C2C)
  - between companies
  - traditional operations
  - via an online platform

E-commerce systems and forms

Advantages of e-commerce

- To customers
  - No queues
  - Reduced price
  - Global transactions
  - Available 24/7
  - Wide collection for easy selection

E-commerce systems and forms

Disadvantages of e-commerce

- To customers
  - Cannot examine the product
  - Lacks the shopping experience
  - Needs internet access
  - Can be addicted

E-commerce systems and forms

Advantages of e-commerce

- *To businesses*
  - After the capital cost, maintenance cost is low
  - Global customers
  - Increased market share

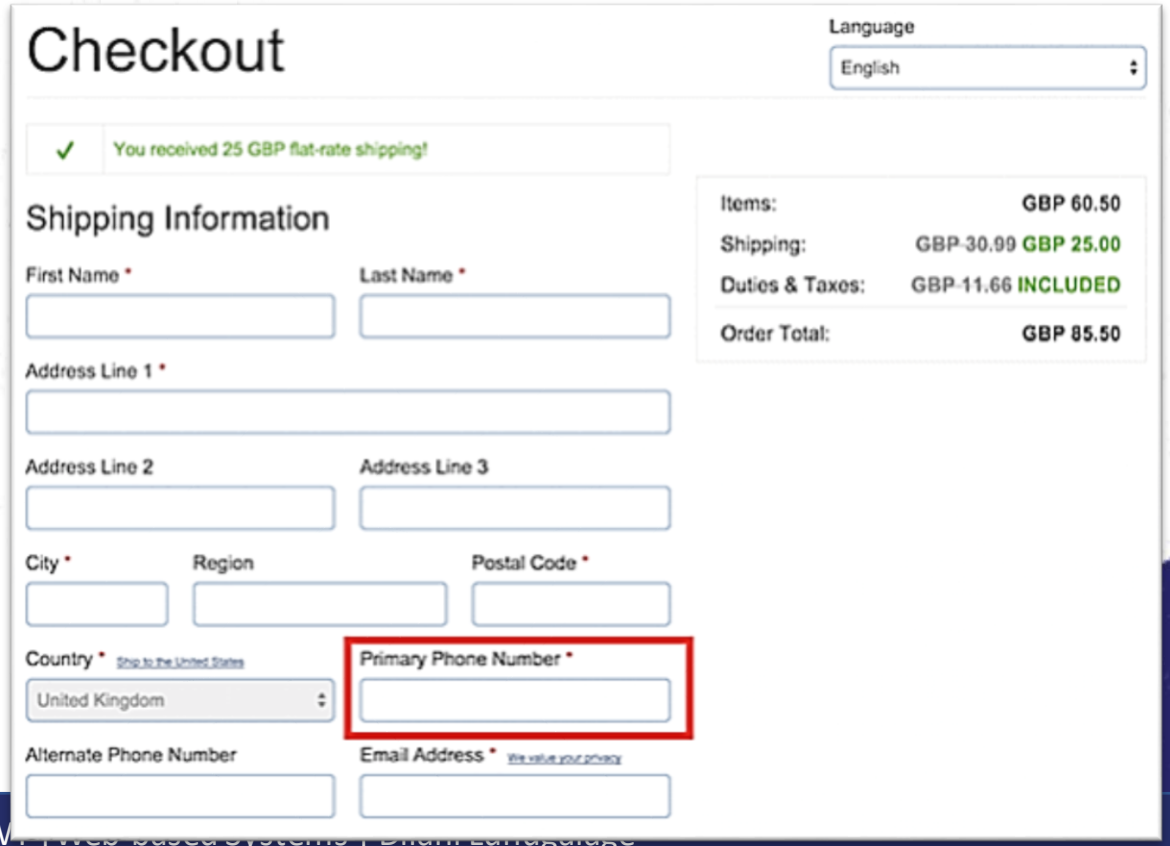
3. E-commerce systems and forms

Disadvantages of e-commerce

- *To businesses*
  - For physical items, storing and distributing is needed
  - Need to update the system frequently
  - Depends on the power and the internet

E-commerce systems and forms

- E-commerce systems use web forms to capture the customers' data and send to the server for processing

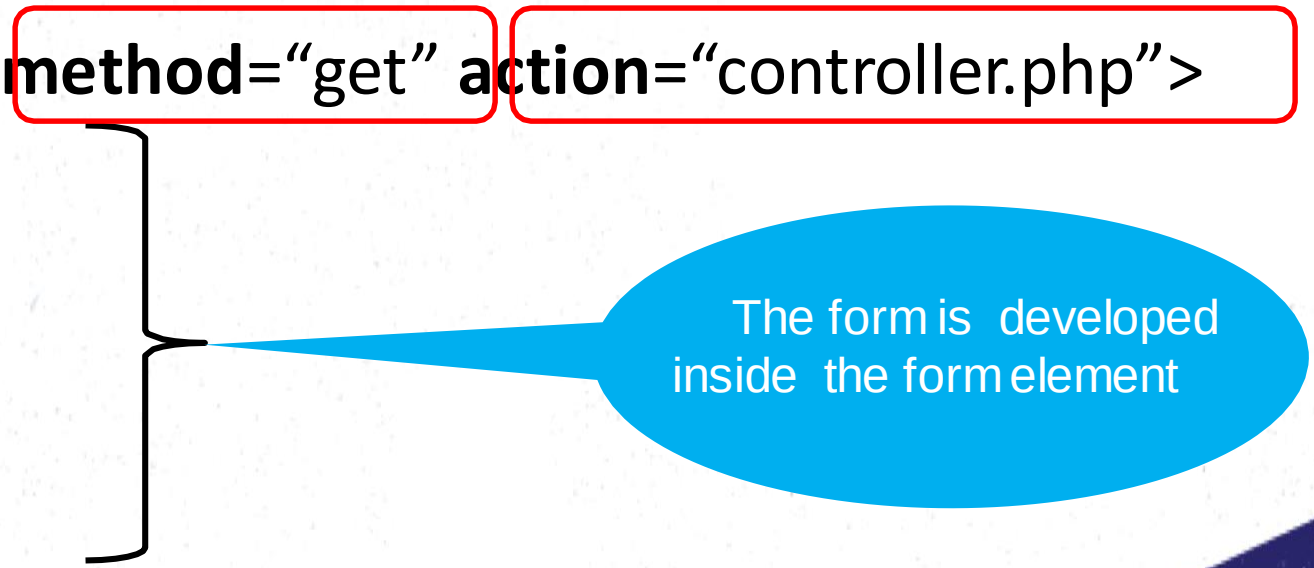


E-commerce systems and forms

- Forms use variety of fields (elements) or structures not only to capture the users' data, but also to display data and information
- Input fields
  - Text boxes, dropdown lists, option buttons, radio buttons, selectable items, drag and drop items, file selectors, etc..
- Data/information display structures
  - Lists, tables, charts, images, files, etc..

E-commerce systems and forms

- When developing HTML web forms, all the form elements are wrapped by the parent element named “form”, which has 2 main attributes



E-commerce systems and forms

Form method

- Used to specify the type of the intended action the form submission is needed

Ex: available form methods in HTML

- When submitting data, the form method specifies the way the data should be submitted
  1. GET
  2. POST

E-commerce systems and forms

Form method – get

- Default form method to submit data
- Data is visible on the address bar
- www.myDomain.com/controller.php?name=Saman&age=35
- Appends form-data into the URL in name/value pairs (Query string)
- The length of a URL is limited (about 3000 characters)
- Never use GET to send sensitive data! (will be visible in the URL)
  - GET is better for non-secure data
- Useful for form submissions where a user want to bookmark the result

E-commerce systems and forms

Form method – post

- Use POST method to send sensitive or personal information.
  - The POST method does not display the submitted form data in the page address field.
- POST has no size limitations, and can be used to send large amounts of data.
- Form submissions with POST cannot be bookmarked

E-commerce systems and forms

Form action

- Specifies the address (URL) to submit the form
  - Usually a script file or a program
- This address points to a component in the server
- When the form is filled and submitted, this component will receive the form values then process and responds with the necessary output

E-commerce systems and forms

Form submission

- There should be a submit button to submit the form to the action end, using the specified form method

```
<input type="submit" value="Submit">
```

E-commerce systems and forms

Form elements

- Many form fields are developed using the input element

<input type="text">	Defines a one-line text input field
<input type="radio">	Defines a radio button (for selecting one of many choices)
<input type="submit">	Defines a submit button (for submitting the form)

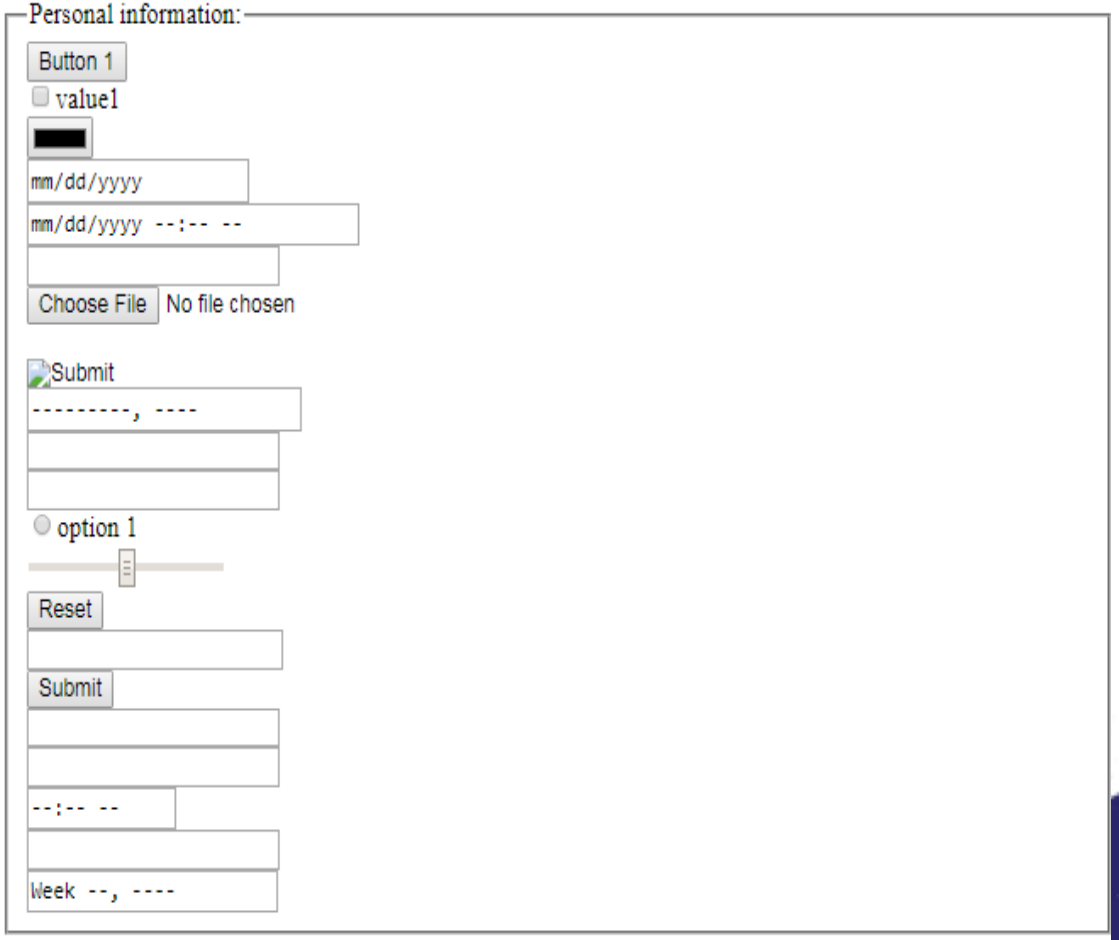
- You will learn more possible form elements and their use in the practical session

https://www.w3schools.com/htmL/html_forms.asp

```
<fieldset>
<legend>Personal information:</legend>

<input type="button" value="Button 1"><BR />
<input type="checkbox">value1<BR />
<input type="color"><BR />
<input type="date"><BR />
<input type="datetime-local"><BR />
<input type="email"><BR />
<input type="file"><BR />
<input type="hidden"><BR />
<input type="image"><BR />
<input type="month"><BR />
<input type="number"><BR />
<input type="password"><BR />
<input type="radio">option 1<BR />
<input type="range"><BR />
<input type="reset"><BR />
<input type="search"><BR />
<input type="submit"><BR />
<input type="tel"><BR />
<input type="text"><BR />
<input type="time"><BR />
<input type="url"><BR />
<input type="week"><BR />

</legend>
</fieldset>
```



E-commerce systems and forms

Form validation

- It is very important to validate the data values entered into a form, before processing them
- Form validation can be done
  - Using HTML5 in **client-side** (before submitting the form)
  - Using JS in **client-side** (before submitting the form)
  - Using a **server-side** component (usually the component pointed by the form action) in the server (After submitting the form)

E-commerce systems and forms

Form validation – using HTML

<input type="text" name="name" **required**>

<input type="text" name="name" value="Sam" **readonly**>

<input type="text" name="name" value="Sam" **disabled** >

<input type="text" name="name" value="Sam" **size="20"** >

<input type="text" name="name" value="Sam" **maxlength="50"** >

- You will learn the use of JS and PHP to validate form data, when you learn JS and PHP

Summary

1. Distributed systems and their architectures
2. Main concepts of web
3. E-commerce systems and forms