UWE Bristol | University of the West of England

Introduction to Web Development and Databases and Hyper Text Markup Language – HTML

UFCFES-30-1

What are we covering today?

- Overview of the module
- Overall learning map
- Software
- Summary
- Start HTML

Module Team

- Module leaders
  - Prof. Zaheer Khan zaheer2.khan@uwe.ac.uk
  - Dr Barkha Javed Barkha.Javed@uwe.ac.uk
- Module tutors
  - Prof. Zaheer Khan zaheer2.khan@uwe.ac.uk
  - Dr James Lear James.Lear@uwe.ac.uk
  - Dr Barkha Javed Barkha.Javed@uwe.ac.uk
  - Mr James Vickers james3.vickers@uwe.ac.uk
  - Mr Mark Rhodes mark.rhodes@uwe.ac.uk
  - Dr Kun Wei kun.wei@uwe.ac.uk
  - Dr Eseosa Oshodin eseosa.oshodin@uwe.ac.uk

Module delivery

- Both Online and Face-to-face on campus learning
- **T**eaching:
  - Pre-recorded lectures
  - **1 practical session**
  - **Fortnight seminar (Online via Teams)**
  - self- study – check your timetable for two teaching terms.
  - You will meet all of the module staff during this time.

- You need to be prepared to do work in your own time - you should aim to spend at least **8-9 hours a week** on this module by either writing code, completing exercises, working on project or reading core text…

- **Tip 1: Do not miss lectures and practical sessions ….**
- **Tip2 : You need to practice by writing code – reading alone is not sufficient to make you a good programmer!**

Blackboard VLE

- There will be no paper hand-outs. All the information used will be available from the Web Programming on Blackboard VLE
  - Module Schedule
  - Module Handbook
  - Learning Material
  - Reading List
  - Assignments
  - Others… e.g., Recordings
- Discussion Board – post your queries/questions
- Webinars – for online lectures if needed

- **IMPORTANT:** 1) Check your UWE email regularly – at least once a day! 2) Keep an eye on the course announcements on blackboard

Reading list

- **No single book can cover all the syllabus** …. Pointers to library resources, online resources including books will be provided for different topics and technologies….
- **Reading list:** Reading List
- W3Schools - https://www.w3schools.com/
- Flask official documentation - https://flask.palletsprojects.com/en/2.3.x/
- Flask web development: developing web applications with Python, Miguel Grinberg (2018)
- A beginner's guide to Python 3, John Hunt (2019)
- Database Systems: practical. Approach to design, implementation, and management, Connolly and Begg (2015)
- Fundamentals of Database Systems, Ramez Elmasri (2017)
- UWE Online Library - https://www.uwe.ac.uk/study/library

Overarching module aims

This module aims to develop the **students' understanding of designing and developing secure web applications and managing data through databases**.

Skills

Appropriate for your future careers and based on practical experiment

Approaches

To the development of practical, functional and maintainable web systems and data

Creativity

And ‘good style’ in designing systems, are they pleasing to look at and easy to use and maintain

Expectations and key to success:

Attend lectures and practical sessions and complete exercises

Don’t underestimate **Self study**

Start **working on Project** as early as possible

Time management – organised people get better degrees than disorganised people

Take Regular Backup – OneDrive or GitLab - https://gitlab.uwe.ac.uk/users/sign_in

Learning Outcomes

1. Demonstrate the ability to select and use web development techniques and concepts to develop dynamic and responsive websites

2. Design and develop static web sites to solve simple problems

3. Identify and assess web security issues in a website

4. Demonstrate a basic understanding of legal, ethical, social and professional requirements when designing a web application

5. Design and develop data management solutions for a web application

What is Web Development?

- Going through the process of **designing, implementing** and **deploying** secure **websites**.
- ○ static/dynamic and responsive web pages
- ○ data manipulation

- Our emphasis is on accessing, processing, managing and presenting data as web system.

- **Two aspects:**
  - ○ *Front end*
  - ○ *Backend programming*

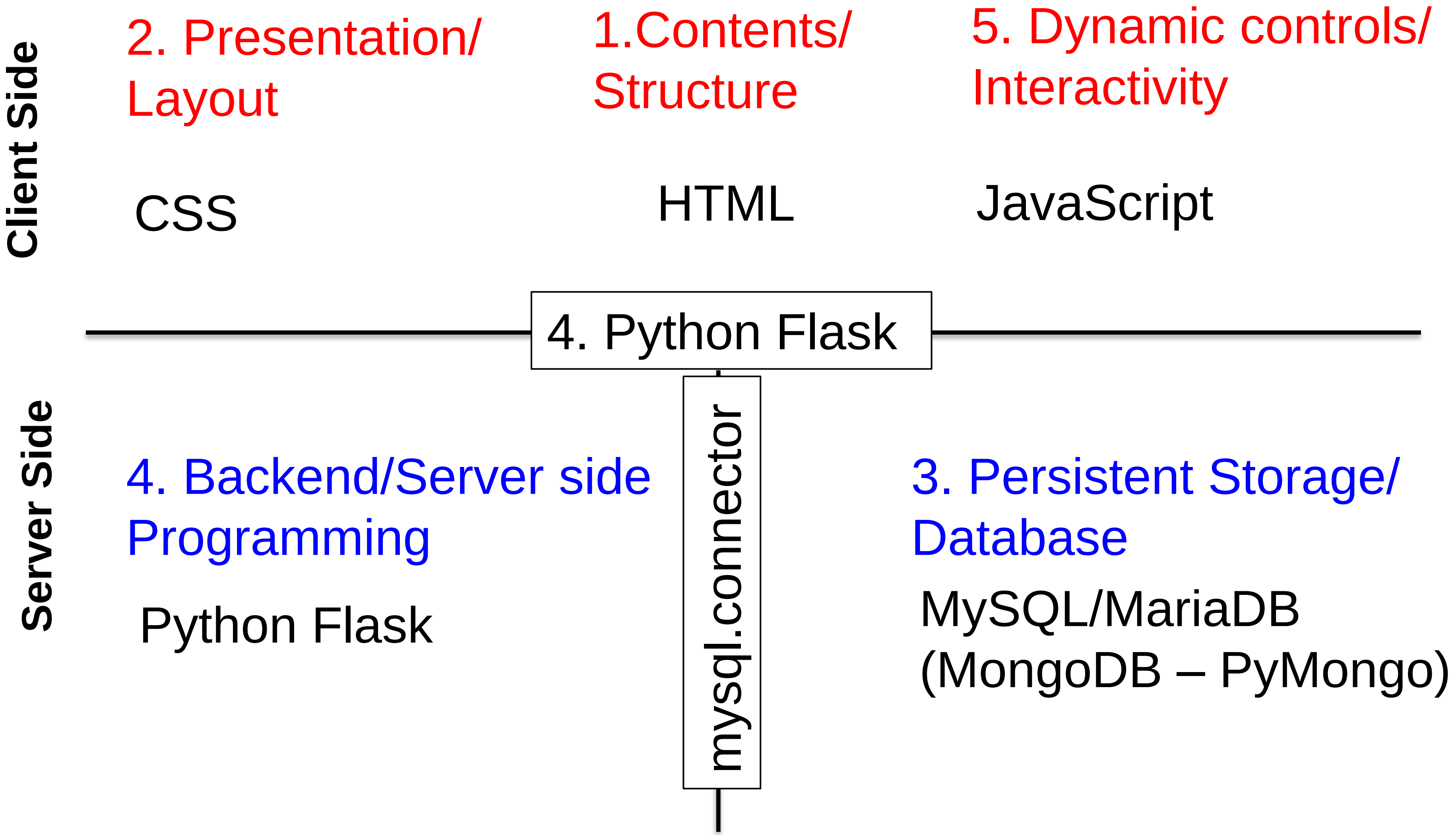
What is a Database?

- Collection of data or records
    - E.g., student records in a university, travel itinerary, imdb, etc.

- It provides structure to raw data that can be stored, processed and retrieved

- Database management system – collection of databases e.g., Oracle, MySQL, PostgreSQL etc.

Overall Learning Map



Client Side

2. Presentation/ Layout

CSS

1.Contents/ Structure

HTML

5. Dynamic controls/ Interactivity

JavaScript

4. Python Flask

Server Side

4. Backend/Server side Programming

Python Flask

mysql.connector

3. Persistent Storage/ Database

MySQL/MariaDB
(MongoDB – PyMongo)

Advanced topics: e.g., APIs, Security

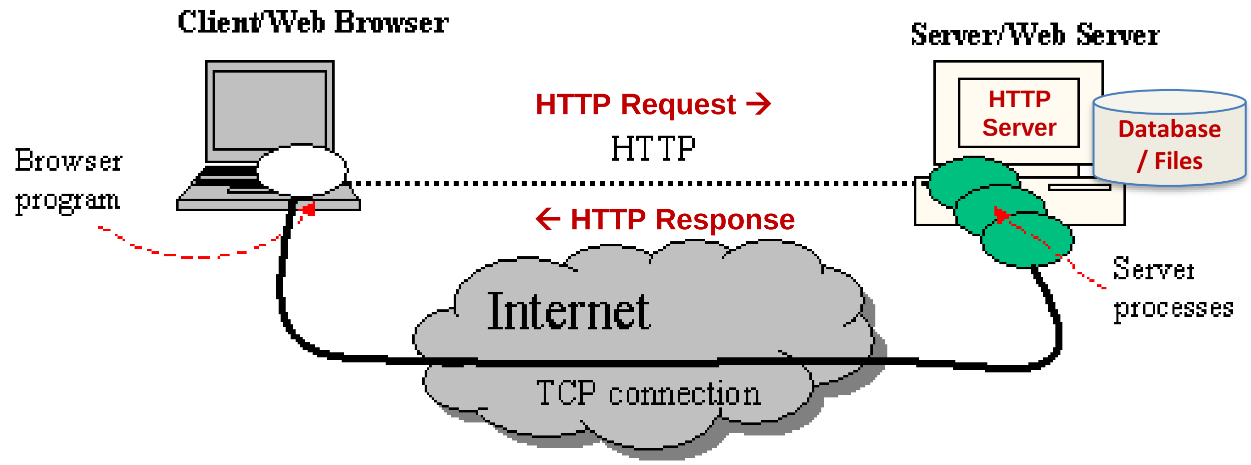
Software

- Web development
  - Python 3.10.x with many additional packages ideally installed in a **venv**
    - MySQL Python connector 8.0.20 (version 8 goes with python 3.8 and MySQL Community server 8.0.20)
    - Flask 1.1.x or latest (it comes with Jinja 2 template engine and Werkzeug)
    - Requests
    - Pymongo for Mongodb
    - Datetime
    - Flask extensions/libraries
  - VSCode (https://code.visualstudio.com/docs/python/python-tutorial)
- Database
  - MySQL Community Server 8.0.20
  - MySQL Workbench Community 8.0.20 3
  - MongoDB
  - Robo3T or MongoDB compass community edition
- Others
  - E.g., Selenium, Postman

Introduction to HTML

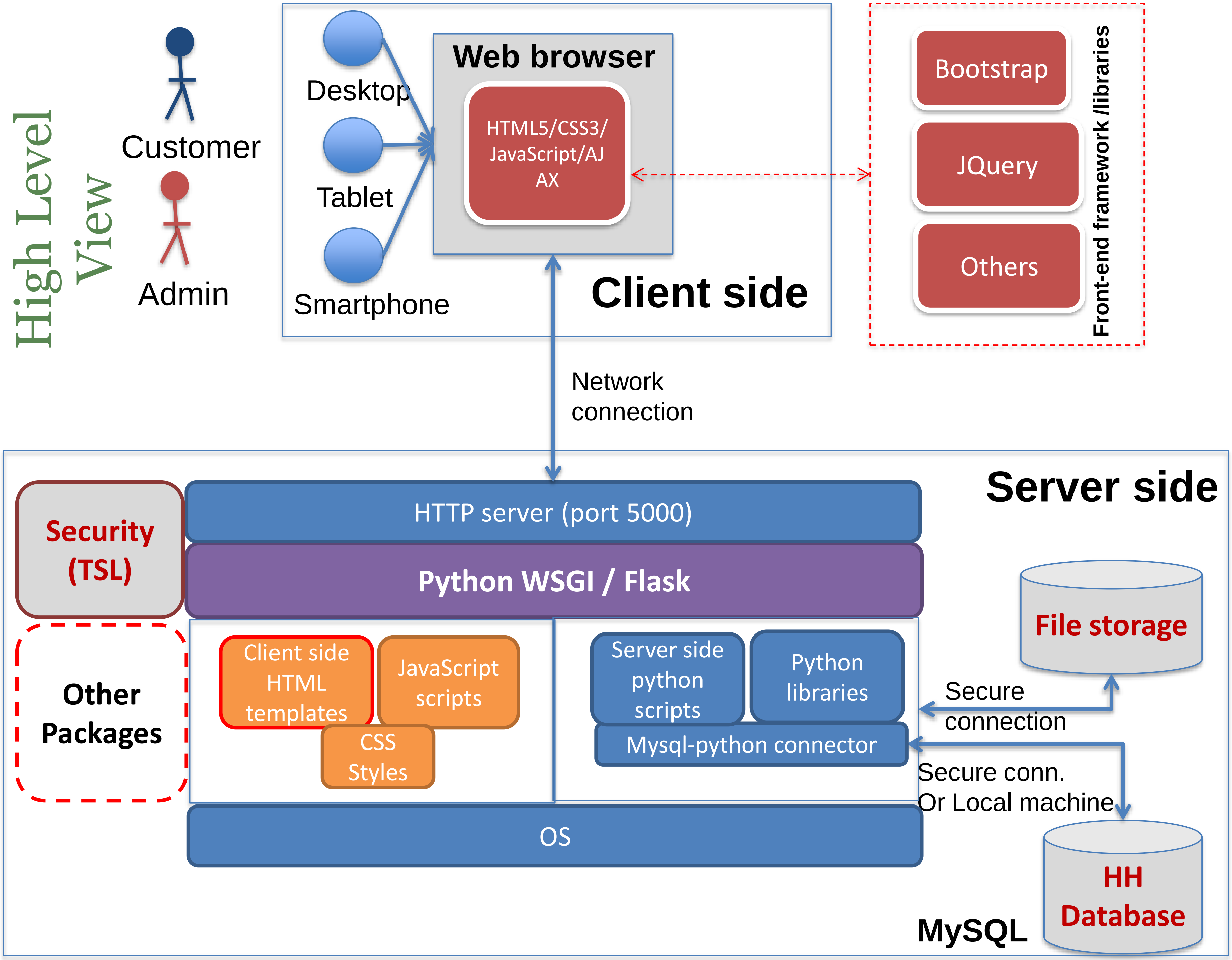
How does it work? Clients, Servers and Networks

Remember this?



A typical client server model

High Level View



Customer

Admin

Desktop

Tablet

Smartphone

Web browser

HTML5/CSS3/ JavaScript/AJ AX

Client side

Bootstrap

JQuery

Others

Front-end framework /libraries

Network connection

Server side

HTTP server (port 5000)

Security (TSL)

Python WSGI / Flask

Other Packages

Client side HTML templates

JavaScript scripts

CSS Styles

Server side python scripts

Python libraries

Mysql-python connector

File storage

Secure connection

Secure conn. Or Local machine

OS

MySQL

HH Database

Sources

- A good source to learn HTML5 with Examples is W3School https://www.w3schools.com/html/default.asp

- And, HTML5 tutorial - http://www.tutorialspoint.com/html5/index.htm

- **Related Books: (UWE Library)**

- Programming HTML5 Applications, Zachary kessin. 2011, O'Reilly (Read **chapter 1 -** 'The Web As Application Platform')

- Beginning HTML5 and CSS3, Richard Clark, Oli Studholme, Christopher Murphy and Divya Manian, published 01 Jan 2012, Springer Verlag

What is HTML?

- Text becomes interactive i.e. hypertext
- HTML is normally viewed using a web browser
- **Read:** Brief History of the Web: https://www.w3.org/wiki/The_history_of_the_Web
- HyperText Markup Language
  - First HTML in early 90s by Tim Berners-Lee.
  - HTML 4.01 – was stable version and commonly used
  - HTML 5 – the latest version
    - Helps in creating real applications on the web and helps in exploiting Javascript capabilities e.g., local storage of up to 5MB (key-value), supporting audio/video without plug-ins, input data validation etc.
    - Get detailed overview of new HTML5 elements - http://www.w3schools.com/html/html5_new_elements.asp

Why HTML?

- What is markup language?
  - To annotate contents using well defined/known/agreed tags <> so that client agents should be able to syntactically distinguish them from normal text and interpret and render the contents (e.g., in web browsers)
- W3C provides web standards – why do we need standards?
  - READ: Have a look at W3C standards: http://www.w3.org/standards/
  - READ: Web Content Accessibility Guidelines (WCAG): https://www.w3.org/WAI/standards-guidelines/wcag/ - useful for Legal, Ethical, Social and Professional (LESP) Issues
- A good brief intro to HTML is from the World Wide Web Consortium http://www.w3.org/MarkUp/Guide/

HTML is NOT Coding

- File extension .html
- HTML is not computer programming
- HTML is not coding
- Nor is CSS
- Sadly browser will render broken HTML – this is a pain for programmer building web apps!!!

- W3C Validation services: https://validator.w3.org/

HTML5 Aims

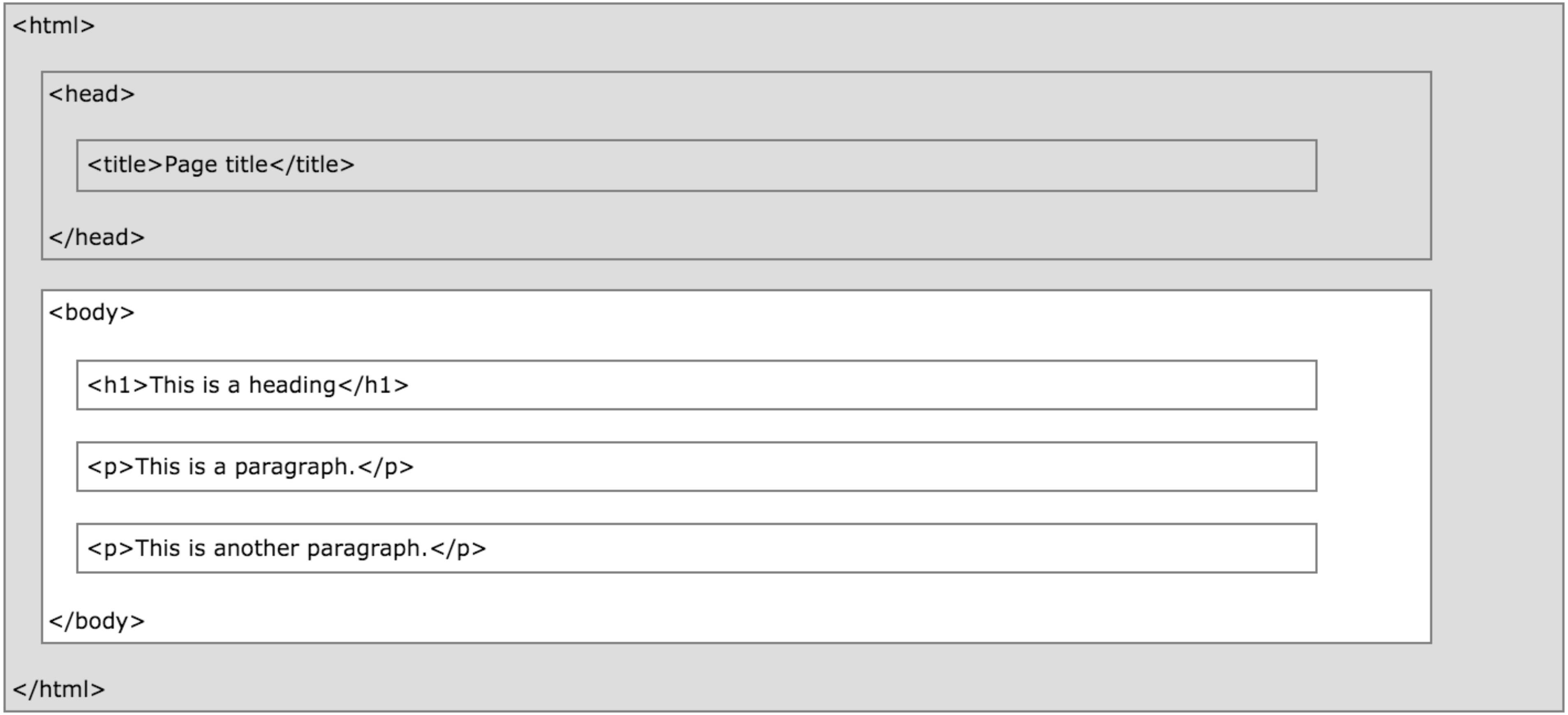
- The principle aims driving the development of HTML 5 are:
  - To fully separate content (written in HTML5) from presentation (dealt with by CSS3)
  - To properly support modern media such as audio and video
  - To tidy up the language to facilitate more consistent markup of documents
  - To unify HTML and XML syntaxes as a single language

HTML 5 Syntax

- Syntax redesigned for better consistency
  - <!DOCTYPE html> (NB – !doctype is now required at start of HTML5)

  - ALL tags are closed: <h1>...</h1> but now also <hr /> (self- closing)
    - Tags or elements are used to define a region
    - There will be a start tag and closing tag - this means the code is well formed
    - All HTML5 Tags [Self study: Very Important] - http://www.w3schools.com/tags/ref_byfunc.asp
  - Means of defining the character encoding now clarified

HTML Page Structure



```
<html>
    <head>
        <title>Page title</title>
    </head>
    <body>
        <h1>This is a heading</h1>
        <p>This is a paragraph.</p>
        <p>This is another paragraph.</p>
    </body>
</html>
```

Source: http://www.w3schools.com/html/html_intro.asp

HTML Page structure

```
 <!DOCTYPE html>
<html>
        <head>
                <meta charset="UTF-8">
                <title>Title of the document</title>
        </head>

        <body>
                <h1> Heading </h1>
                Content of the document......
                <p> … </p>
        </body>
</html>
```

Example HTML

```
<!DOCTYPE html>
< html >
< head >
        < title >Learning HTML5</  title >
</ head >
< body >
        < h1 >My First Heading</  h1 >
        < p >My first paragraph.</  p >
        < h2 >My second heading</  h2 >
        Now real fun begins!
</ body >
</ html >
```

Save it in a file with extension .html

And open in a web browser

OR you may install VS Code extensions

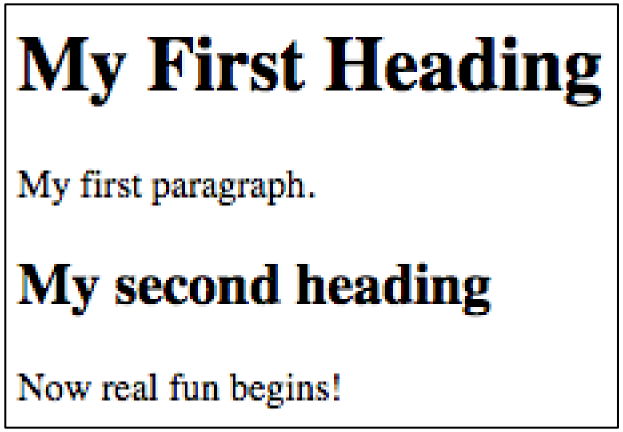
HTML CSS Support by ecmel

HTML Preview by Thomas Haakon Townsend

With HTML Preview you can preview the output of your HTML tags

HTTP Server/HTML Preview by shawnfunke

Output



My First Heading

My first paragraph.

My second heading

Now real fun begins!

Some Useful Tags

- All HTML Tags – Go through these tags – self study task http://www.w3schools.com/tags/ref_byfunc.asp
- Main Document
  - `<html> <head> <title> <body>`
- Text Blocks
  - `<p> <h1> <h2> <h3> <hr>`
- Text Type
  - `<pre> <b> <i> <u> <sub> <sup>`
- Form Elements
  - `<form><input><button>`
- Others
  - `<table><th><td>, <ul> <li>, <img>, <a>, <iframe>`
- Note: HTML 5 introduces many new tags e.g. <header>, <section>, <nav>, etc.

HTML 5 Language

- With HTML4, new elements ‘tags’ introduced:
  - New semantic element (i.e. elements with meaning) to improve the structuring of documents (e.g. <header>, <section>, <article>, <footer> etc.)
  - New graphic elements: <svg> and <canvas>
  - To provide multimedia support: <video>, <audio>, <track>, <embed>
  - To provide miscellaneous additional features (e.g. <progress> for a progress bar)
  - Many additional data types for <input> e.g. <datalist>, <keygen>, <output>
  - New form control elements like number, date, time, calendar, and range
  - New attributes / constraints e.g. required
- HTML5 APIs allow HTML5 to carry out drag & drop, geolocations, local storage, app cache, etc.

Lots to learn …

- We just scratched the surface and there is lots to learn from online resources and in practical

- Complete practical exercises as this will help you to learn HTML and use it when we'll start generating dynamic webpages through Python Flask

Summary

- Module Overview
- HTML background
- HTML Standards
- HTML Page structure
- HTML elements

- We’ll continue with HTML next week and also start CSS