COMP30680
Web Application Development

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Web Applications

Full Stack Web Development

Frameworks

A **web framework** (**WF**) or **web application framework** (**WAF**) is a software framework that is designed to support the development of web applications including web services, web resources and web APIs.

Web frameworks aim to alleviate the overhead associated with common activities performed in web development. For example, many web frameworks provide libraries for database access, templating frameworks and session management, and they often promote code reuse.

Though they often target development of dynamic websites they are also applicable to static websites.

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

Core skills

Major pieces

The Internet and the Web

The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet.

What is The Web (World Wide Web)?

The World Wide Web, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, one of the languages spoken over the Internet, to transmit data. The Web also utilizes browsers, to access Web documents called Web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video.

The Web is a Portion of The Internet

The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for email, which relies on SMTP, Usenet news groups, instant messaging and FTP.

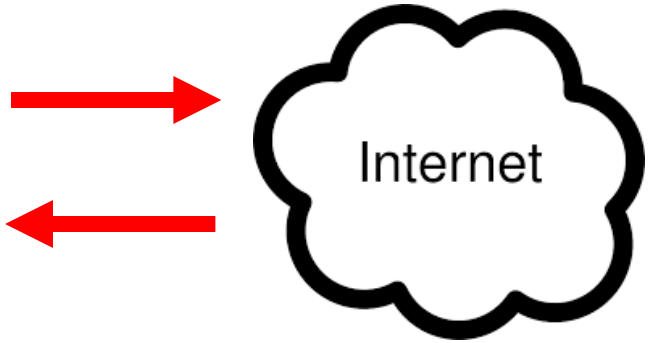
http://www.webopedia.com/DidYouKnow/Internet/Web_vs_Internet.asp

Major pieces

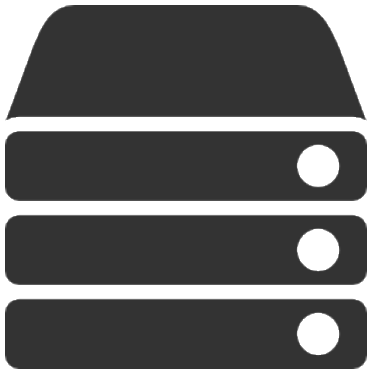
Major pieces

A client

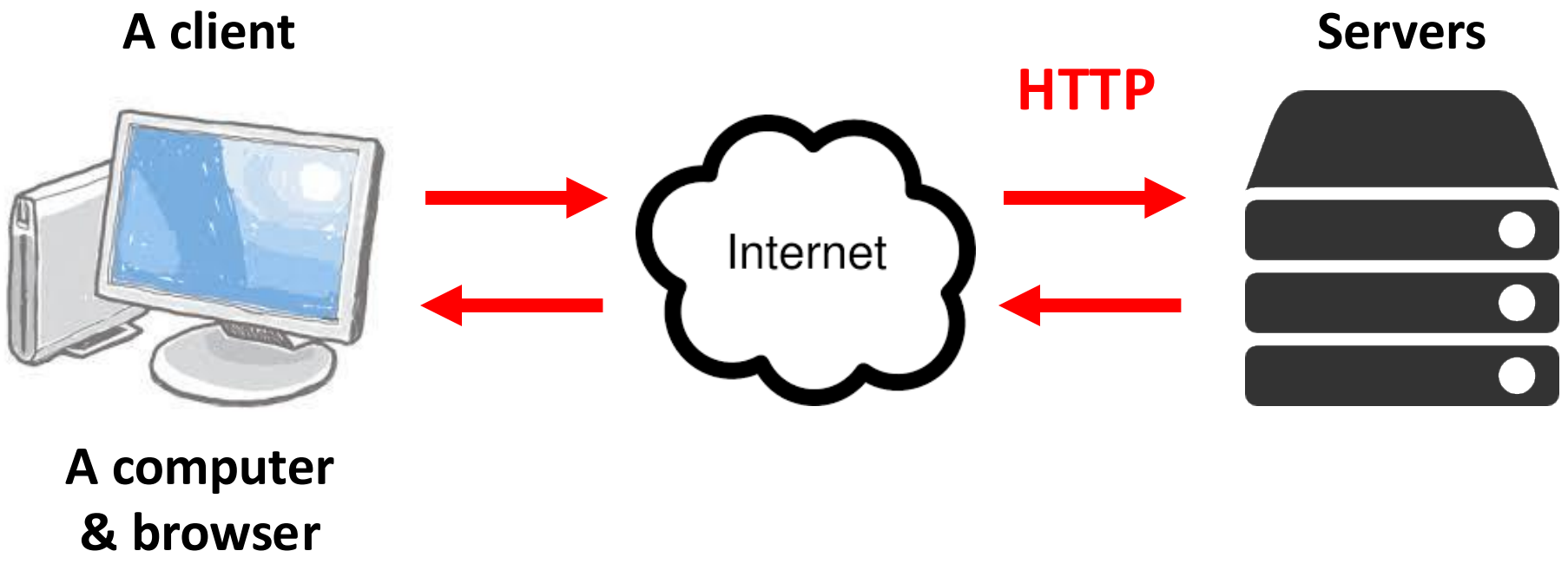
A computer & browser



Servers



Major pieces



The Hypertext Transfer Protocol (**HTTP**) is an application protocol for distributed, collaborative, hypermedia information systems. **HTTP** is the foundation of data communication for the World Wide Web. Hypertext is structured text that uses logical links (hyperlinks) between nodes containing text.

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

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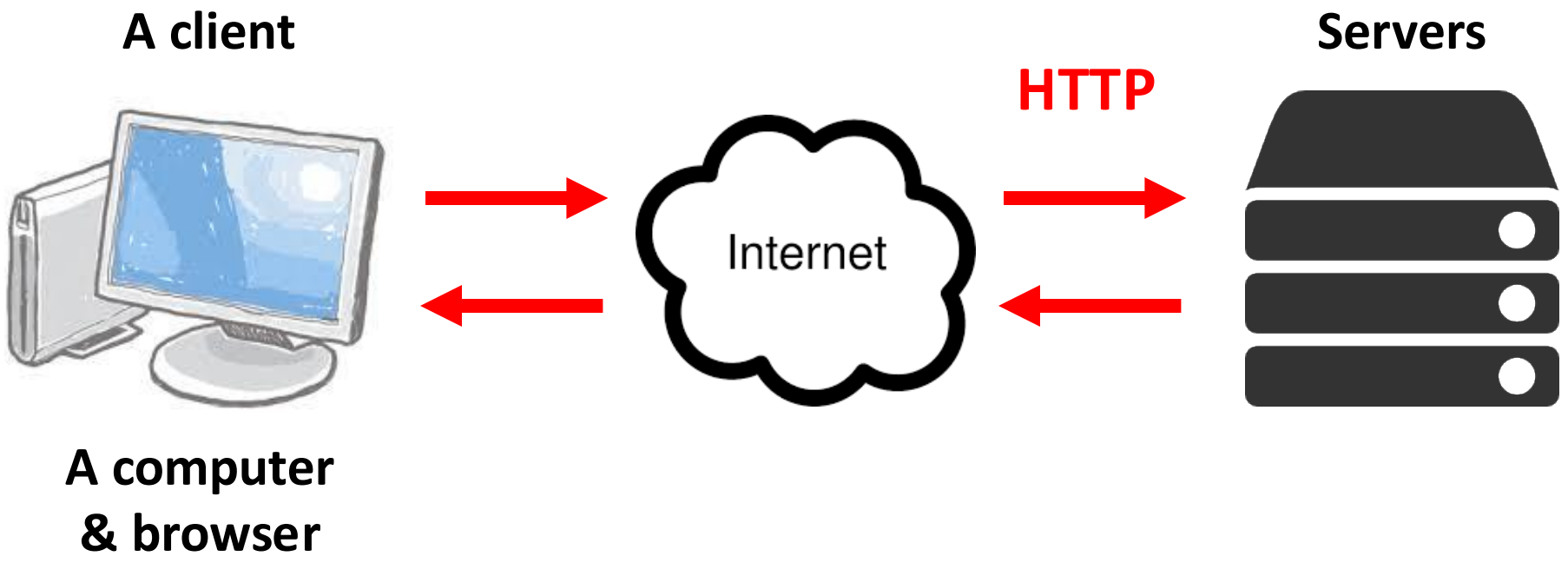

We will use the HTTP protocol, but it not be a major focus of the module.

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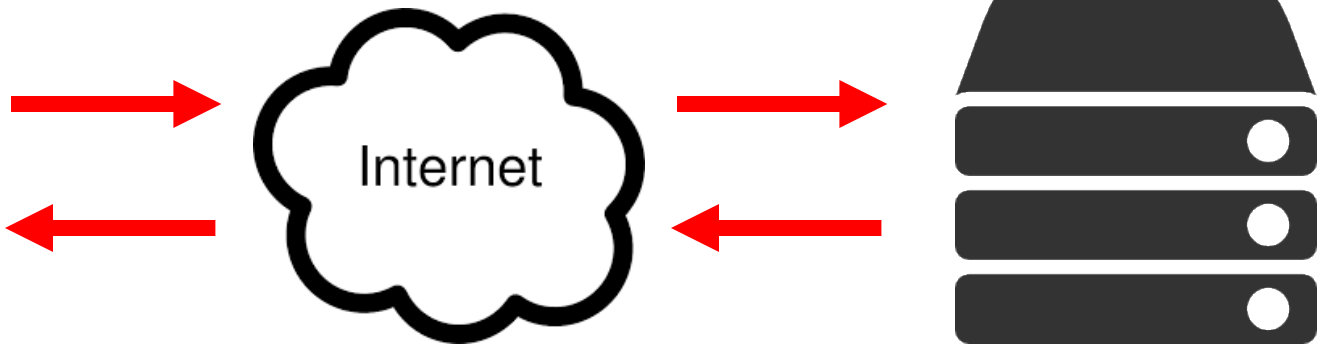


Servers

HTML
CSS
JavaScript

HTML

HTML or HyperText Markup Language has two essential features:

Hypertext

- Means you can create a link in a Web page that leads any visitor to any other Web page or to practically anything else on the Internet. Thus, the information on the Web can be accessed from many different directions.

Universality

- Means that because HTML documents are saved as Text Only files, virtually any computer can read a Web page. It doesn’t matter if your visitors have Machintosh or Windows machines, whether they use a Unix box or even a hand-held device like an iPhone. Put simply, the Web is open to all.

Open but not Equal!

While HTML is open to all, that doesn’t mean that everyone experiences it in the same way. The are variations due to:

Open but not Equal!

While HTML is open to all, that doesn't mean that everyone experiences it in the same way. The are variations due to:

- the type of operating system
- the screen size/resolution
- the speed of the Internet connection,
- the software used to view the page: the ***browser***
- the hardware they use to access the browser, e.g., traditional desktop, laptop/notebook, mobile phone (android/iPhone issues), PDA, internet kiosk, iPad/Tablet, airline seat-back, TV, etc.

Browser Trends

- Information can vary across sources. See for example:
- W3Schools.com
- Statcounter
- NetApplications
- W3Counter
- Clicky

The Browser Wars!

In 1994, Netscape put up the first ***fences*** on the Web in the so-called ***browser wars***.

- Created a set of extensions to HTML that only Netscape could handle.
- For example, Web surfers using Netscape could view pages with coloured text, photographs and other improvements. Surfers using other browsers would get errors, weird looking results or nothing at all.

The Resulting Effect

- People liked these extensions and many converted to using Netscape
- By 1996, Netscape had become the world's most popular application
- Microsoft started fencing their own chunk of the Web…their own way

The Push for Standards

The World-Wide Web Consortium

- Often abbreviated as W3C.
- Directed by the Web's inventor Tim-Berners Lee.
- Its aim is to convince the Web community of the importance of **universality** when designing web pages by attempting to standardize the extensions.
- They wanted to take down the fences!

Standardisation Begins

HTML 3.2

- Key Focus: Browser Compatibility.

HTML 4 and CSS

- Key Focus: Simplicity and Power.

And the story continues... HTML5, CSS3

- Key Focus: Enhanced Features, User-Centered

HTML5 and CSS3

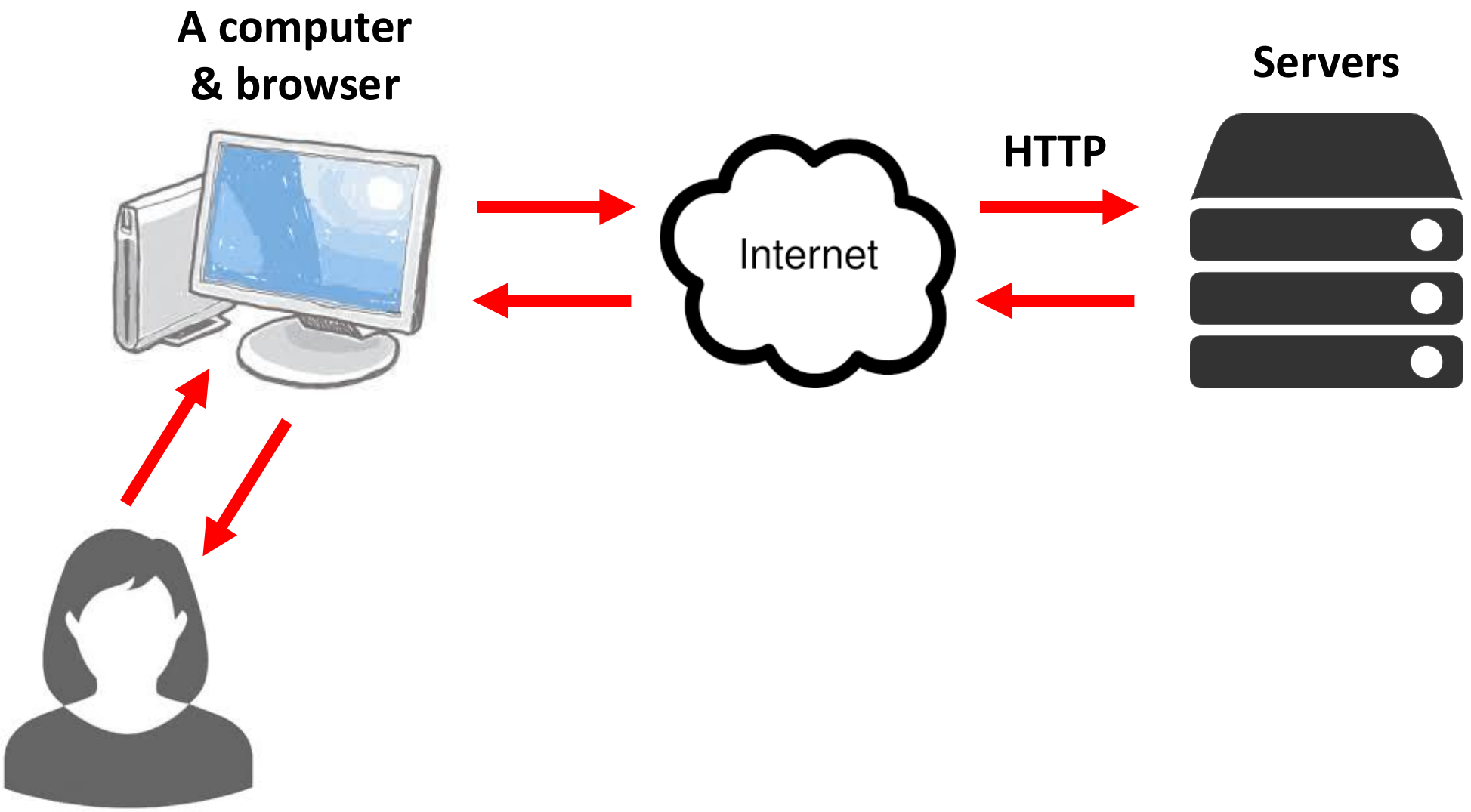
HTML5 is the latest iteration of the HTML standard

- Key focus: enhanced features, **user oriented**
- Addition of native video and audio support

CSS3 is the latest iteration of Cascading Style Sheets

- Backwards compatible
- Feature rich, e.g., Backgrounds, Borders, Text Effects, 2D/3D Transformations, etc.

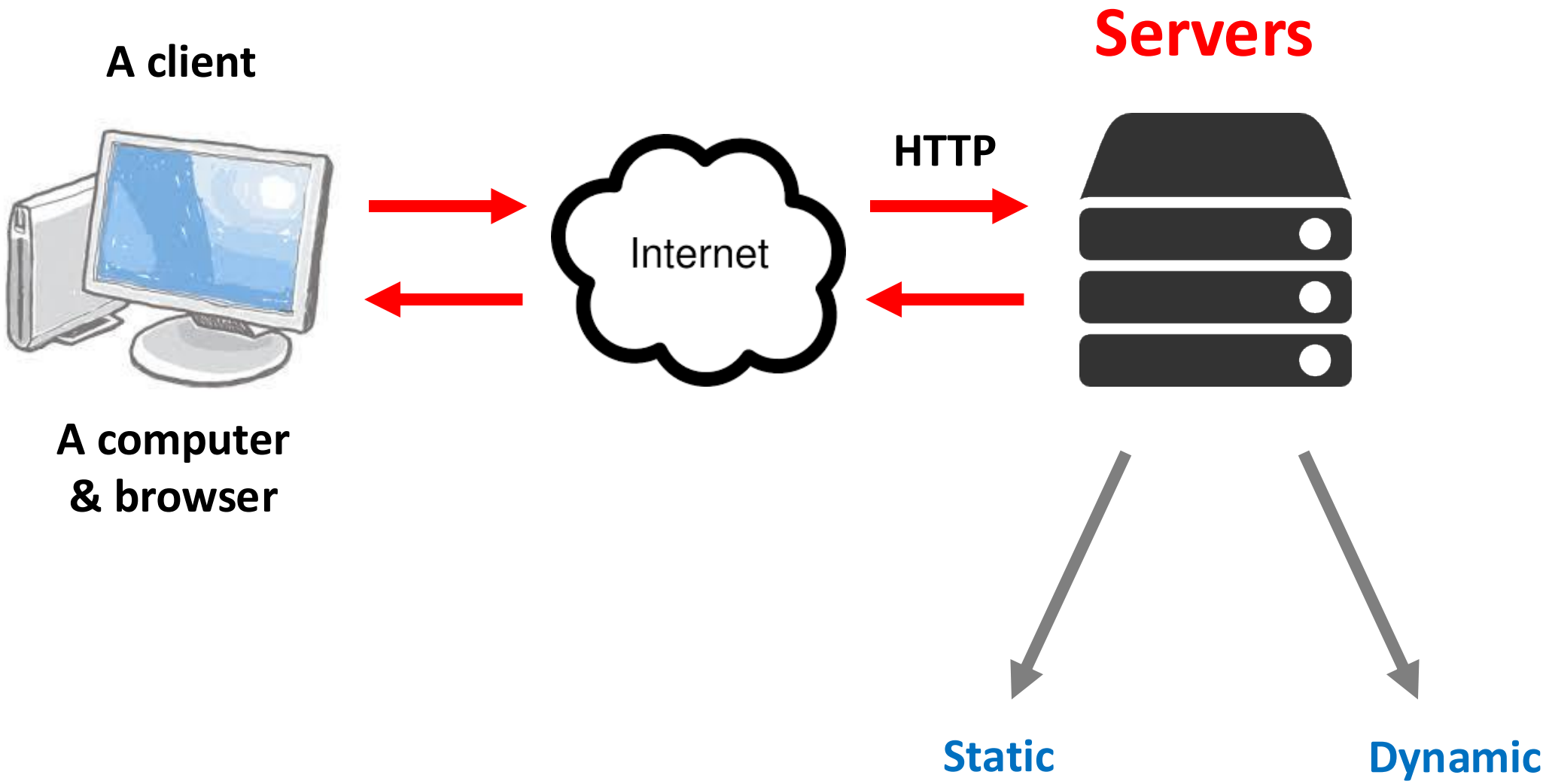
Major pieces



Design

Web Design is the process of planning and creating a website.
Websites consist of numerous components pieced together by web designers to create the page as viewed by a user in their browser
The aim is to present that contents in the most effective and appropriate way through the delivery medium of the World Wide Web.

Major pieces



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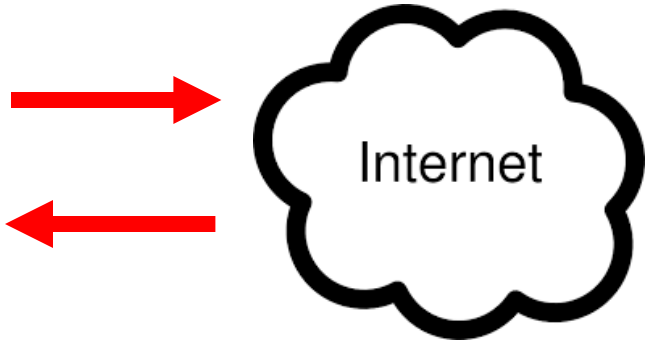
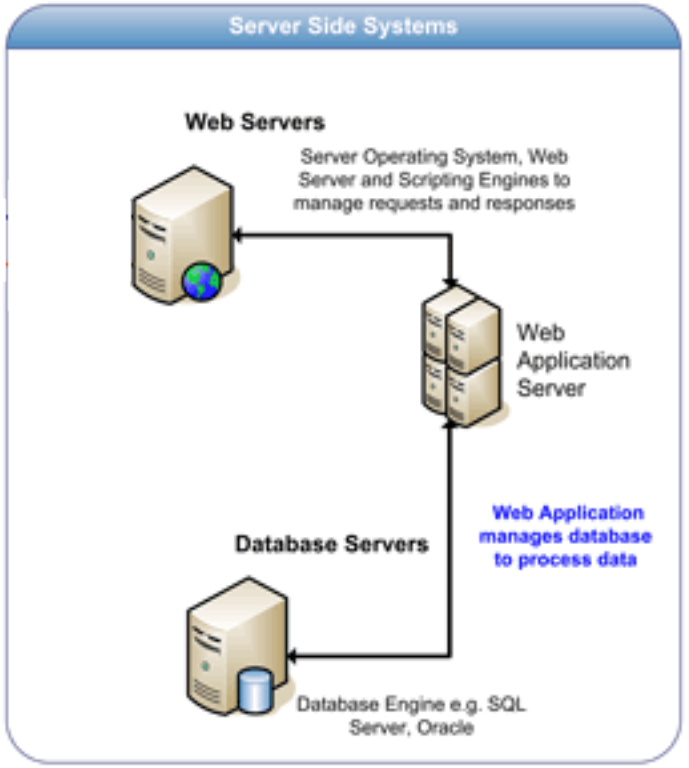


HTTP



PHP
Database Connections

WampServer
Apache, PHP, MySQL on Windows

MAMP
by webEdition

LAMP
Linux Apache MySQL PHP,Perl,Python

XAMPP

XAMPP Apache + MariaDB + PHP + Perl

What is XAMPP?

XAMPP is the most popular PHP development environment

XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use.

Download
Click here for other versions

XAMPP for **Windows**
v5.6.19 (PHP 5.6.19)

XAMPP for **Linux**
v5.6.19 (PHP 5.6.19)

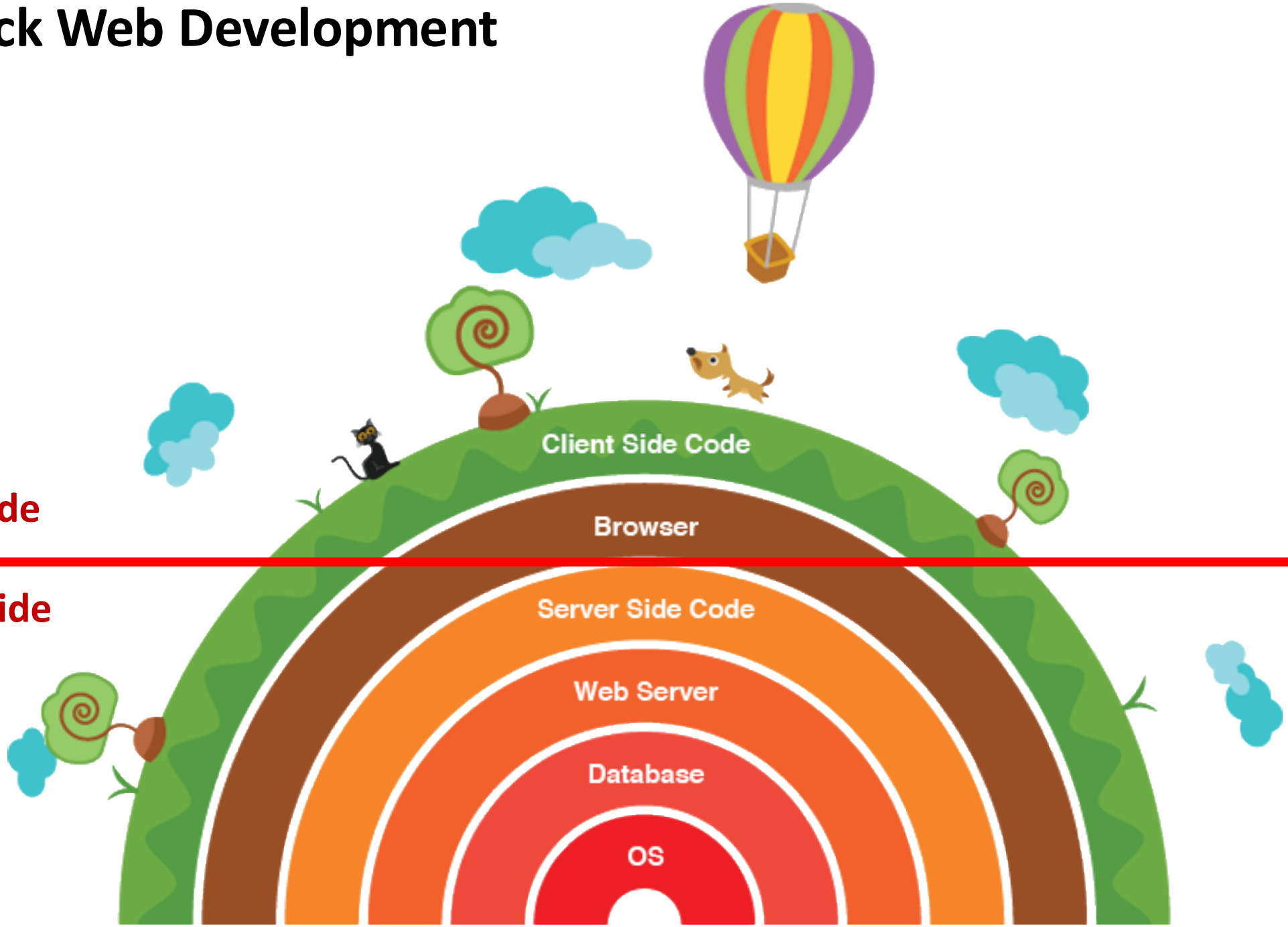
XAMPP for **OS X**
v5.6.19 (PHP 5.6.19)

https://www.apachefriends.org/index.html

Full Stack Web Development

Client - side

Server - side



Learning outcomes

On successful completion of this module the learner will be able to:

1. Develop client-side applications using HTML and CSS
2. Develop interactive applications with JavaScript
3. Become familiar with the JSON data-interchange format and RESTful web service APIs.

4. Develop server-side applications and connect to a database using PHP.
5. Implement web applications using LAMP/WAMP/MAMP solution stacks.

6. Display an overall awareness of how to approach website development.

Module Admin

Slides, Files, Announcements and Student Forum located on BrightSpace

The Discussion Forum should be your first port of call for any questions/queries relating to lectures and practicals.

Any queries regarding attendance, timetabling, medical certs, extension requests, should be directed to me by email.

Email: d.coyle@ucd.ie

Timetable

Lectures:

- Monday 10am – 11am
- Wednesday 9am – 10am

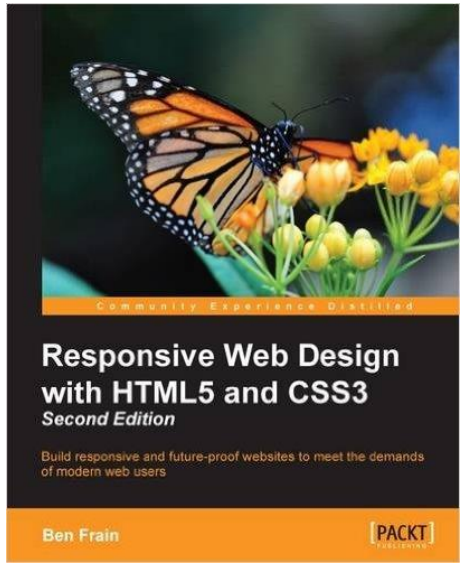
Practical:

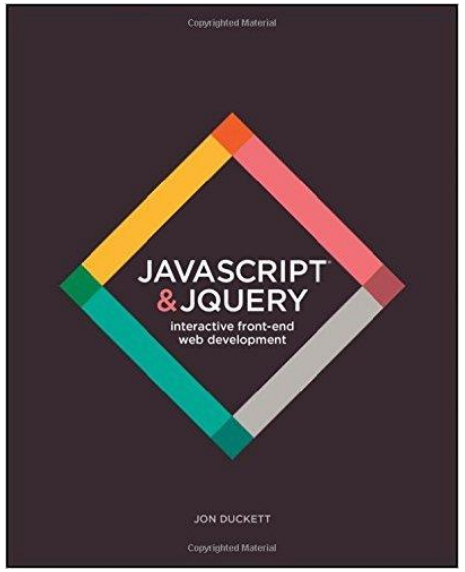
- Tuesday 11am – 1pm

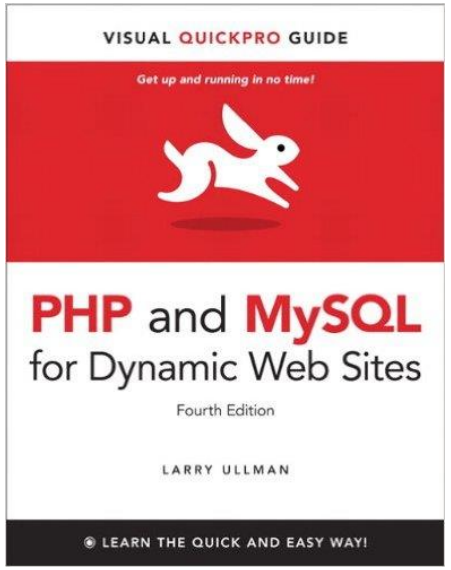
* There is no practical in week 1.

Suggested Reading

We will emphasise web-based resources, so book are not necessary, but if you prefer that option …







Web Resources

- http://www.webplatform.org
- http://www.codecademy.com
- http://www.w3schools.com

This will be our primary reference point.

Module Assessment

- Assignment 1 (HTML and CSS) – 20% (due W5)
- Assignment 2 (JavaScript and CSS) – 40% (due W9)

- Final quiz – 40% (In class in W12)

- The **in-term workload** on this module is quite high!
- But, you will learn a lot of new languages and develop many new skills in quite a short space of time.
- Doing the practical exercises makes a big difference. They are not marked. Instead they are a chance to practice.

LATE SUBMISSIONS

When the coursework is submitted late the following penalties apply:

Coursework submitted at any time up to 1 week after the due date: -1 grade points (from B- to C+);

Coursework submitted more than 1 week but up to 2 weeks after the due date: -2 grade points (from B- to C);

Coursework submitted after 2 weeks from the due date will not be accepted;

Late submissions may be accepted without penalty if agreed ***in advance***. The Late Submission Form fully completed, stating clearly the reason for late submission must be presented. The decision will be based on this form.

Plagiarism & UCD Computer Science

- **Plagiarism is a serious academic offence**
  - UCD Student Code of Conduct / UCD Student Plagiarism Policy / Computer Science Plagiarism Policy and Procedures
- Our staff & demonstrators are **proactive** in looking for possible plagiarism
- Suspected plagiarism is investigated by the CS Plagiarism subcommittee
  - Usually includes an interview with the student(s) involved
  - 1st offence: **typically** 0 or NM in the affected components
  - 2nd offence: more serious consequences e.g. UCD Disciplinary process
- Student who enables plagiarism is equally responsible for it
- All students in a group which plagiarises are held responsible for it
- **Examples** of plagiarism:
  - Copying some/all of the work of another student and submitting it as your own work
  - Copying some/all of an assignment from the Internet/book/etc without referencing it
  - Sharing individual work with another student (by e-mail, FB messenger, WhatsApp, …)
  - Making your work available (on GitHub, website, social media, …) before lecturer gives permission
  - A group of students working on a solution, then individually submitting the same work
  - Students collaborating at too detailed a level e.g. consulting each other after implementing a line/block/segment of code and sharing the results

Professional behaviour in UCD Computer Science

- You are expected to behave professionally in any environment where you are acting as a member of the student body of the school of Computer science.
- This includes **lectures**, **tutorials**, and **labs** run by the school, and also environments not run by the school but informally connected to school membership (such as **social media groups** run by students for students in a certain stage, course, or module).
- Professional behaviour means following UCD's student code of conduct and means
  - Not disrupting others' ability to learn by causing conflict or division, making distracting or upsetting comments, or making any student feel unwelcome in an environment which they attend as a member of the student body
  - Enhancing others' ability to learn by being supportive rather than discouraging, by being tolerant of difference, by sharing your insights rather than sharing your solutions, and by maintaining good attendance, communication and timekeeping
- The school will intervene in cases where unprofessional behaviour is affecting other students' ability to learn.

Questions?

This module will be more interesting if you actively participate.