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AS and A LEVEL

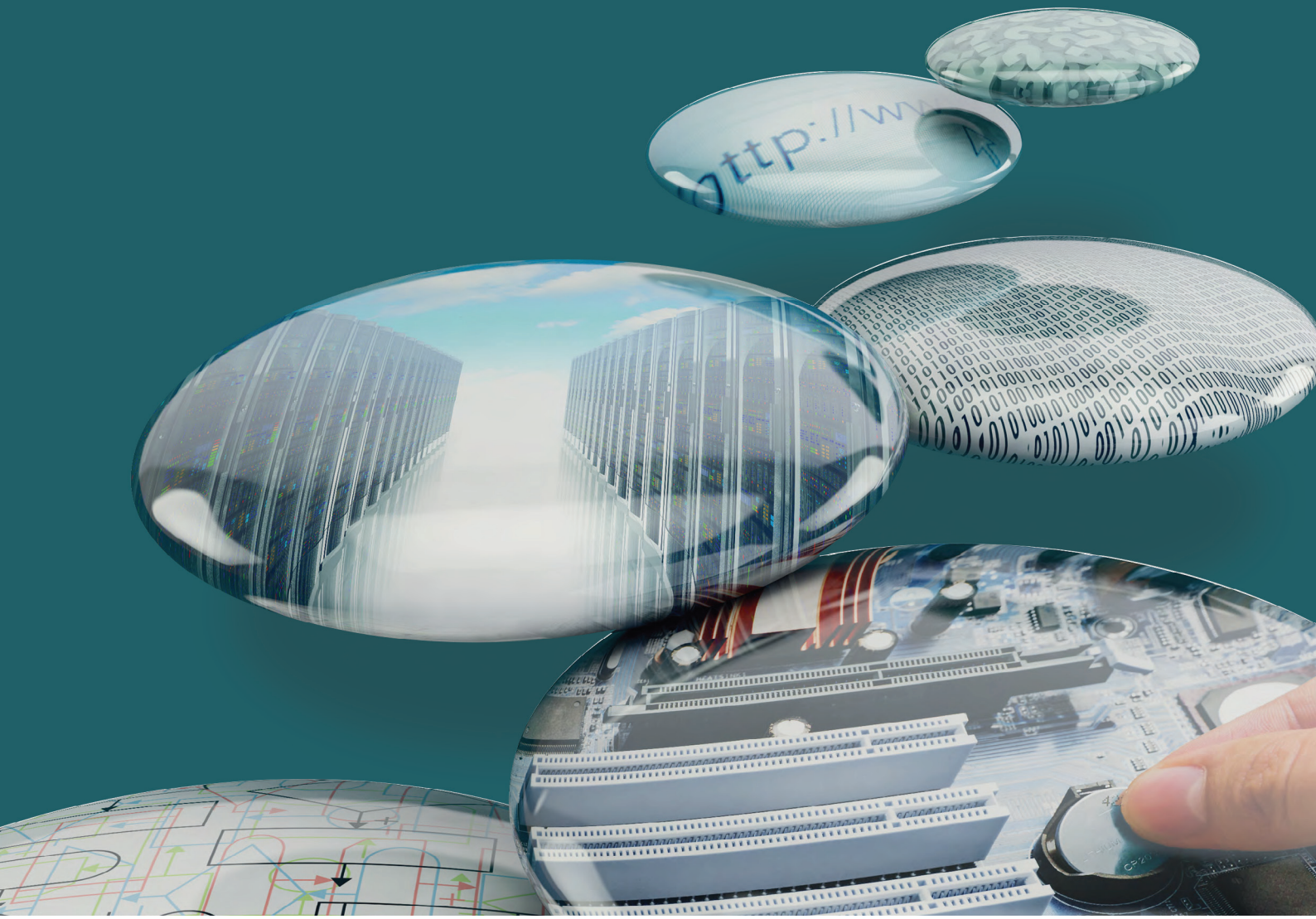
Topic Exploration Pack

H046/H446

COMPUTER SCIENCE

Theme: Web technologies

September 2015



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This activity offers an opportunity for English skills development.

Web Technologies

Introduction

HTML, CSS, client and server side scripting:

HTML provides the basic building block of the web. HTML is the standard used to define the markup for a web page and some knowledge of HTML is essential.

Search engine indexing process:

HTML is a markup program and for consistency web pages often use style sheets, CSS, to apply a consistent style for the HTML that follows, rather than applying style setting for each element of the underlying HTML.

To provide some interaction, scripting on the client side can be added; for example to validate data entry, JavaScript is considered the standard way to do this.

For data that requires a response from the server, some server side scripting is required and PHP is considered the standard approach to doing this.

The most effective way of learning about the interaction between these elements is to build a system incorporating these elements.

Page index and rank (PageRank Algorithm):

Search engine 'spider' searches the web for web pages.
It locates a home page and reads the header page content. It finds and follows links.

Data is returned to the search engine database and a list is made of the words found and web pages they were found on. The search engine then indexes the web pages.

When you search for something, the search engine looks through this index and returns the websites found in its list.

Pages are ranked by an algorithm and the higher the score the higher the web page appears in the results returned.

Factors which affect the page rank score include:

- The number of web pages that link to the target page
- Links to high-ranking web pages score more than those to low-ranking web pages.
- Pages with lots of links add less to the score than those with few links.
- The time that the web page has been in existence also adds to the score; more established sites score more highly than recently published sites.

The above concepts can be summarised with the following formula

$PR(A) = (1– d) + d(PR(t_1)/C(t_1) + ... + PR(t_n)/C(t_n))$

Where t_1 to t_n are the pages linking to it. C is the number of outbound links on the contributing page and d is a damper of 0.85.

Basically,

page rank = 0.15 + 0.85 times a share of the page rank for websites that link to it.

For a more detailed explanation with examples, see

Phil Craven on webworkshop.net http://www.webworkshop.net/pagerank.html

OR http://pagerank.suchmaschinen-doktor.de/index/index.html

OR Ian Rogers, detailed explanation on the Princeton University website: http://www.cs.princeton.edu/~chazelle/courses/BIB/pagerank.htm

Suggested activities

The best way to get to grips with HTML is to create a simple web page. The appendix for the OCR specification contains a range of basic HTML commands but access to the tutorials provided by w3 schools, http://www.w3schools.com/html/, will provide an excellent background to HTML.

Task 1

Create a simple web page in HTML that defines a form for a user to enter sign in details for a customer of an online business.

Adding a suitable style sheet will add consistency to any pages produced and once again excellent resources are provided by w3schools; http://www.w3schools.com/html/html_css.asp.

Task 2

Add suitable style sheet commands to format the web page you have created.

To add any interactivity to the web pages, access to client side scripting through javascript is required. Once again w3schools provide excellent resources, http://www.w3schools.com/html/html_scripts.asp.

Task 3

Add validation to ensure customer IDs are of the right length and that all fields have been completed.

Task 4

Server side scripting requires a server and programs such as XAMPP can run a server from software and web pages hosted on a USB memory stick.
Server side scripting often uses PHP scripting and there are numerous free to use examples such as EASYPHP. Access to the basics for PHP scripting can be found on w3 schools, http://www.w3schools.com/php/default.asp

Task 5

Create an online database with customer details that can verify a customer login by comparing their ID with a cleartext password in an online database.

Page rank activity

You can check page rank with web tools such as http://www.checkpagerank.net

Look at some websites you use frequently and find out how they do they compare to the school or college website?

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