

- [L8] Demonstrate an appreciation of the field of Computer Science and Software Engineering
 - Investigate defining questions and issues from at least three areas of Computer Science and Software Engineering. [Note that the intention is for students to have a broad view of the kind of topics covered by CS and SE; the areas would not be studied in detail.]
 - *Example areas include Algorithms and Complexity, Architecture, Boolean Logic, Cloud Computing, Computability, Computer Security, Databases, Discrete Structures, Formal Methods, Graphics and Visual Computing, Human Computer Interaction, Information management, Intelligent systems, Distributed Computing, Computer Networks, Operating Systems, Programming Languages, Social and Professional Issues, Software Engineering, Web computing, Multitasking/Scheduling, Information Retrieval, Data Communication, Queuing Theory*
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Generic Resources for teaching Computer Science Concepts

- A question bank of CS concepts by [Rong Yang](#) has a comprehensive set of questions that can be used to test the understanding of most concepts. This question bank can be printed out with the answers hidden. Teachers can access the online version with answers. View here at <http://www.cems.uwe.ac.uk/~ryang/HEQB/>
- [Next Generation Learning UK](#) has some motivational videos on engaging students in the classroom more using technology in the following areas:
 1. [GPS: 21st Century Field Trips](#)
 2. [Gaming: Nintendo and Maths](#)
 3. [Visualisers: Using Visualiser technology in the Classroom](#)
 4. [Gaming for reengaging Learners](#)
 5. Your Child and Technology: [Part 1](#), [Part 2](#), [Part 3](#)
 6. You can view the [complete video archive here](#)

Algorithms and Complexity

Online Guides

- A presentation 'Analysis of Algorithms' by [Kevin Wayne](#) and [Robert Sedgewick](#) discusses estimating running time, mathematical analysis, order-of-growth hypotheses, input models, measuring space at <http://www.cs.princeton.edu/courses/archive/fall08/cos226/lectures/02Analysis-2x2.pdf>

- [Richard Jozsa](http://www.cs.bris.ac.uk/Teaching/Resources/COMS30126/) has a complete online course in Computational Complexity Theory at <http://www.cs.bris.ac.uk/Teaching/Resources/COMS30126/>
- [CS4FN](#) has the following articles that demonstrates concepts in algorithms and complexity:
 1. [Swap Puzzle \(cs4fn-interactive activity\)](#)
 2. [Bean Counting](#)
 3. [Mission:Impossible](#)
 4. [Mission:Impossible:I - Tile that floor](#)
 5. [Mission:Impossible:II - Stop it](#)
 6. [Hotel Doors and Keycards](#)
 7. [This mirror never lies](#)
 8. [The cure that just folds away](#)

Computer Architecture

Textbooks

- A good introduction to computer architecture can be found in Chapter 7.2 of textbook 'AQA Computing' by Kevin Bond and Sylvia Langfield.

This book costs can be purchased for \$62 from fishpond.co.nz at http://www.fishpond.co.nz/Books/Computers/General/product_info/12010070/

Videos

- A lecture on an introduction to Computer Architecture by Anshul Kumar can be viewed at <http://nptel.iitm.ac.in/video.php?courseId=1075>

Online Guides

- A collection of resources that teach Computer Architecture compiled by Robert Strandh at <http://dept-info.labri.fr/~strandh/Teaching/Architecture/Common/Strandh-Tutorial/Dir.html>
- A complete module on machine architecture by [Virginia Tech CS department](#) is at <http://courses.cs.vt.edu/~csonline/MachineArchitecture/Lessons/index.html>
- View a good introduction to computer architecture at [David Schmidt's](#) course in Data Structures at <http://people.cis.ksu.edu/~schmidt/300s05/Lectures/ArchNotes/arch.html>

- [CS4FN](http://www.cs4fn.org/computerarchitecture/gettingoffbeach.php) has the following online article that explains architecture called 'Getting off the beach, fast' at <http://www.cs4fn.org/computerarchitecture/gettingoffbeach.php>

Boolean Logic

Textbooks

- See the section on 'Logic Gates and Boolean Algebra' in Chapter 7.1 of textbook 'AQA Computing' by Kevin Bond and Sylvia Langfield.

This book costs can be purchased for \$62 from fishpond.co.nz at

http://www.fishpond.co.nz/Books/Computers/General/product_info/12010070/

Online Guides

- A tutorial on [Boolean Algebra](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2000_4/index.htm) by [developers from University of Saskatchewan](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2000_4/index.htm) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2000_4/index.htm
- [Do I.T.](http://doit.ort.org/course/hardware.htm) has a free course in IT that covers hardware and Boolean logic and logic gates with demo tryout applets at <http://doit.ort.org/course/hardware.htm>
- University of Plymouth offers a tutorial in [Truth Tables](http://www.tech.plym.ac.uk/maths/resources/PDFLaTeX/boolean_alg1a.pdf) and [Boolean Algebra](http://www.tech.plym.ac.uk/maths/resources/PDFLaTeX/boolean_alg1a.pdf) by various authors at http://www.tech.plym.ac.uk/maths/resources/PDFLaTeX/boolean_alg1a.pdf
- [Ken Koehler](#) has tutorials in related topics below:
 1. [Logical Operations and Truth Tables](#)
 2. [Properties of Logical Operators](#)
 3. [Arguments](#)
 4. [Boolean Algebra](#)
 5. [Logic Gates and Circuits](#)
 6. [Practice with Truth Tables](#)

Classroom Activities & Games

- [CS Unplugged Activity 17](#) – Cryptographic Protocols (a related activity)
- John Hopkins University has a webpage for Logic Circuits which offers an explanation and an interactive circuit builder at the locations:
 1. [Logic Circuits](#)
 2. [Circuit Builder](#)

Students can build circuits from the textbook section on 'Logic Gates and Boolean Algebra' in Chapter 7.1 of textbook 'AQA Computing' by Kevin Bond and Sylvia Langfield.

- [NRICH](#) has articles/activities to test student understanding of truth tables and electronic circuits using logic gates at:
 1. [Logic, Truth Tables and Switching Circuits Challenge](#) (theory)
 2. [Circuit Maker](#) (flash tool)
 3. [Simple Counting Machine](#) (activity)
- [Do I.T.](#) has logic gates tryout applets at <http://doit.ort.org/course/hardware.htm>
- [raft](#) has a few resources that be used to teach concepts in Boolean logic and related topics below:
 1. [Creating Circuits with Symbols](#): These materials will greatly aid students in designing basic electrical circuits. Open (off) and closed (on) circuits can be modelled with the lit and unlit symbols.
- A concept in mathematics and computer science where truth tables are useful is [propositional logic](#). [SwissEduc](#) has developed an application called LogicTraffic (requires Java installed) to illustrate propositional logic with the help of an everyday situation and enables an explorative-intuitive learning of the basic concepts of propositional logic with teaching materials at locations below:
 1. [Download LogicTraffic](#)
 2. Introductory presentation 'a little excursion to logic and traffic control'[PDF \[237 KB\]](#) · [Powerpoint \[411 KB\]](#)
 3. Handout 'exercice truth table' to the introductory presentation[PDF \[49 KB\]](#) · [Powerpoint \[73 KB\]](#)
 4. Instruction to LogicTraffic[PDF \[61 KB\]](#) · [Word \[126 KB\]](#)
 5. Exercices to LogicTraffic[PDF \[32 KB\]](#) · [Word \[125 KB\]](#)
 6. Solutions to the exercises[PDF \[51 KB\]](#) · [Word \[127 KB\]](#)

[Cloud Computing](#)

Online Guides

- Cloud Computing topics are explained by [Jonathan Strickland](#) on howstuffworks.com at the locations:
 1. [How Cloud Computing works](#)
 2. [How Cloud Storage works](#)
- [Chris Polette](#) explains 'How the Google-Apple Cloud Computer Will Work' on howstuffworks.com at <http://computer.howstuffworks.com/google-apple-cloud-computer.htm>

- [Smart Schools Program](#) has several articles on Cloud Computing below:
 1. [The Ups and Downs of Cloud Computing](#)
 2. [Education-related Questions on Cloud Computing](#)
 3. [How to use Cloud Computing in schools](#)
 4. [Cloud Computing 101](#)
 5. [The Pros and Cons of Cloud Computing](#)
 6. [Companies and Cloud Computing](#)

Videos

- Watch a clear and simple presentation from [Common Craft](#) called 'Cloud Computing in Plain English' at <http://www.youtube.com/watch?v=XdBd14rjcs0>

Podcasts

- Tech Stuff Podcasts from howstuffworks.com by [Jonathan Strickland](#) at the following locations:
 1. [The Dark Side of Cloud Computing](#)
 2. [How the Google-Apple Cloud Computer Will Work](#)

Computer Security

Classroom Activities & Games

- [CS Unplugged Activity 17](#) – Cryptographic Protocols
- [CS Unplugged Activity 18](#) – Public Key Encryption

See also Wikipedia entry on [RSA](#), an algorithm for public-key encryption

- [James W. Benham](#) has lab exercises for Encryption at <http://pages.csam.montclair.edu/~benham/enclabs/index.html>
- [CS4FN](#) has the following online activities/articles that demonstrates concepts in binary and [Gray code](#):
 1. [Locking a Dead Man's Chest](#)
 2. [The French Peasant's Lock and Gray Code](#)

- [The Royal Institution UK](#) and [Microsoft Research](#) together have produced activities in encryption, cryptography, and [zero knowledge protocols](#) for the classroom at the locations below:
 1. [Keeping secrets secret](#)
 2. [Zero-knowledge games](#)

See also, games and tryouts related to these lectures at interactive website at <http://www.rigb.org/christmaslectures08/>

- A couple of applets that demonstrate concepts in Cryptography are at <http://www.math.ucsd.edu/~crypto/programs.html>
- [David J. Malan](#) offers the following supplementary materials to go along with his lectures in computer security:
 1. Desktop Firewalls. Learn how to protect yourself with a desktop firewall! Available in [Flash](#) and [QuickTime](#) formats.
 2. Disinfecting a PC: Ad-Aware. Learn how to protect yourself against adware with Ad-Aware! Available in [Flash](#) and [QuickTime](#) formats.
 3. Disinfecting a PC: AVG Anti-Virus. Learn how to protect yourself against viruses with AVG Anti-Virus! Available in [Flash](#) and [QuickTime](#) formats.
 4. Disinfecting a PC: Spybot. Learn how to protect yourself against spyware with Spybot! Available in [Flash](#) and [QuickTime](#) formats.
 5. Creating a Boot Disk. Learn how to create a boot disk! Available in [Flash](#) and [QuickTime](#) formats.
 6. Dan's Soapbox: Safe Computing. Learn how to practice safe computing! Available in [Flash](#) and [QuickTime](#) formats.
 7. Phishing Trips. Learn how to avoid phishing scams! Available in [Flash](#) and [QuickTime](#) formats.
 8. Wiping a Disk. Learn how to wipe a disk (and securely delete files)! Available in [Flash](#) and [QuickTime](#) formats.
- [The Ceaser Cipher](#) activity sheet by Simon Singh is at <http://www.simonsingh.net/file/The%20Caesar%20Cipher%20-%20Worksheets.doc>
- [Tadayoshi Kohno](#) has a presentation on Cryptography along with exercises and solutions to some common cryptograms developed for high school teachers:
 1. [Presentation on Cryptography](#)
 2. [Cipher reference sheet](#)
 3. [Sample cryptograms](#)
 4. [Cryptogram solutions](#)

Downloads

- [CryptBench](#) is a great learning tool for teaching codes such as ASCII, Hex, Decimal, and also encryption and decryption can be easily demonstrated using this.

Videos

- [CS Unplugged Activity 17](#) – Cryptographic Protocols [YouTube](#) video
- [CS Unplugged Activity 18](#) – Public Key Encryption [YouTube](#) video
- [Bruce Schneier of BT Counterpane](#) talks about [The Future of the Security Industry: IT is Rapidly Becoming a Commodity](#) , OWASP Minneapolis-St. Paul, August 24, 2009
- [Bruce Schneier of BT Counterpane](#) talks about [Face-off: Assessing Cloud Computing Risks](#), Information Security, May 5, 2009
- [Bruce Schneier on Cloud Security](#), vnunet.com, April 21, 2009
- [Security Experts Bruce Schneier and Ray Stanton on the Human Side of Security](#), ComputerWeekly, April 30, 2008
- [Bruce Schneier on Security](#): A ten-minute interview with Bruce on various aspects of security, June 18, 2007
- [Schneier on Identity Theft](#), IT Security Summit 2007, Johannesburg, May 22, 2007
- [Research Channel](#) has a complete collection of up to date security videos submitted by various authors to a competition below:
 1. [Back Up Your Box](#)
 2. [Internet Relationships](#)
 3. [Phishing Internet Security PSA](#)
 4. [Cyber Security Awareness](#)
 5. [10 Most Common Passwords](#)
 6. [Z-bay](#)
 7. [Got Anti-Virus](#)
 8. [Securing your Computer Simply](#)
 9. [Vanished Erased Gone](#)
 10. [Icon Ninjas](#)
- Sci-Tech correspondent Daniel Sieberg explains to CBSNews.com's Dan Farber what "[Denial of Service](#) " means for Twitter users at http://video.techrepublic.com.com/2422-13792_11-329422.html

- See a [Dailymotion](http://www.dailymotion.com/video/x9sx8z_what-is-a-trojan-horse-virus_tech) video on 'What is a Trojan Horse Virus' at http://www.dailymotion.com/video/x9sx8z_what-is-a-trojan-horse-virus_tech
- ISIQ2007 has an entertaining presentation on 'Passwords and the Protection of Wireless Networks' at <http://www.youtube.com/watch?v=xTM9zJjL9w>
- Tutorials from [butterscotch](http://www.butterscotch.com/tutorial/What-Is-A-Firewall) has one on 'What is a Firewall?' at <http://www.butterscotch.com/tutorial/What-Is-A-Firewall>
- metacafe.com has videos on [Steganography](#) at locations below:
 1. [Steganography by Nick Jossendal and Dana Williams](#)
 2. [Fox News article on Steganography](#)

Podcasts

- [Risky Business](#): In this podcast you'll hear a Q&A with [Bruce Schneier of BT Counterpane](#), as moderated by Risky Business host Patrick Gray at the recent GovCERT Symposium in Rotterdam, Netherlands. Topics covered include cloud computing, privacy, software manufacturer liability for defects, two factor authentication and more! (From November 13, 2009)
- [Schneier on Security](#), Radio interview with Paul Harris, WLS/Chicago, February 1, 2009

Online Guides

- There are several tutorials on Encryption by different developers from University of Saskatchewan. Links and author information are below:
 1. [Encryption tutorial 1](#) by [a group of developers](#): covers history of encryption, cipher systems and methods of building a public key.
 2. [Encryption tutorial 2](#) by [a group of developers](#): this tutorial is especially developed for high school student level in the US and covers theory and applications of encryption.
- See Encryption explained at http://www.teach-ict.com/technology_explained/encryption/encryption.html
- A comprehensive collection of tutorials, lesson plans, exercises and demos on Cryptography can be found at <http://www.teach-ict.com/ks3/year9/cryptography/cryptography.htm>
- [FBI](#) has a section on Cyber Investigations where they explain how to protect your computer at http://www.fbi.gov/cyberinvest/protect_online.htm

- [INTOSAI](http://www.intosaiitaudit.org/intoit_articles/19_03_Hacking.pdf) has an article 'the hacker' at http://www.intosaiitaudit.org/intoit_articles/19_03_Hacking.pdf
- [IEEE Computer Society](http://dsonline.computer.org/portal/cms_docs_computer/computer/homepage/Aug07/COM_016-019.pdf) has a magazine article 'Protecting Networks by Controlling Access' at http://dsonline.computer.org/portal/cms_docs_computer/computer/homepage/Aug07/COM_016-019.pdf
- [Computer World](http://www.computerworld.com/s/article/9037321/How_to_protect_your_wireless_network) has an article 'How to protect your wireless network' at http://www.computerworld.com/s/article/9037321/How_to_protect_your_wireless_network
- A detailed section on protecting computer systems and computer crime is at http://www.teach-ict.com/as_a2_ict_new/ocr/AS_G061/317_role_impact_ict/ict_crime/miniweb/index.htm
- National Security Agency (NSA) has a site for children to try out different games and activities online in computer security at <http://www.nsa.gov/kids/home.shtml>
- Articles related to Computer Security can be viewed at a channel dedicated to this topic at [howstuffworks.com](http://www.howstuffworks.com)
- A tutorial on firewalls and network security by [developers from University of Saskatchewan](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_6/website/website.html) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_6/website/website.html
- A tutorial on 'Personal Internet Security' by [developers from University of Saskatchewan](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_4/tutorial/index.html) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_4/tutorial/index.html
- [BBC-GCSE Bitesize](http://www.bbc.co.uk/1/learning/technology/gcse/gcse_bitesize/) has resources (revisions and review tests) on the following:
 1. [Data validation and verification, Test](#)
 2. [Data security, Test](#)
- [David J. Malan](http://www.davidjmalan.com/) offers lectures in the following areas of computer and internet security:

Threats to privacy: cookies, forms, logs, and data recovery. Security risks: packet sniffing, passwords, phishing, hacking, viruses and worms, spyware, and zombies. Piracy: WaReZ and cracking. Available in [Flash](#), [MP3](#) and [QuickTime](#) formats, along with [jargon](#), [slides](#), and [transcript](#) in PDF.

Defences: scrubbing, firewalls, proxy servers, Virtual Private Networks, cryptography, virus scanners, product registration and activation. Available in [Flash](#), [MP3](#) and [QuickTime](#) formats, along with [jargon](#), [slides](#), and [transcript](#) in PDF.

Problem Set 6: Security. Reinforce your understanding of security! Available in [PDF](#).

- [Jeff Tyson](#) explains 'How Encryption works' on howstuffworks.com at <http://www.howstuffworks.com/encryption.htm>
- [Ben Schafer](#) has a presentation for preview purposes used his in outreach activities to introduce concepts of [steganography](#) (hiding messages inside of media files). It begins with a magic trick where the presenter guesses the student's "secret number" through what later turns out to be the use of binary. This introduction to binary leads into a discussion about storing data on the computer in number format, then as characters (ASCII code), then as picture files. Finally, about using this knowledge to hide messages inside of picture files. Download [here](#).
- Speakers ([Josh Benaloh](#), [Brian LaMacchia](#), [John Manferdelli](#)) at University of Washington presents Modern Cryptography with full free lecture notes, webcasts and podcasts at <http://www.cs.washington.edu/education/courses/csep590/06wi/lectures/>
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- [Lidija Davis](#) has an article 'Is Your PC Part of a Botnet?' at http://www.readwriteweb.com/archives/is_your_pc_part_of_a_botnet.php
- Wikipedia has a section on [Denial of Service](#) attacks
- Computer World has an article 'China warns about return of destructive Panda virus' at http://www.computerworld.com/s/article/9141539/China_warns_about_return_of_destructive_Panda_virus?taxonomyId=142
- Lecture slides by [Evangelos Kranakis](#) in Information theory and cryptography can be downloaded from <http://williamstallings.com/Extras/Security-Notes/CryptLect.html>
- See descriptions of Honeypot at locations below
 1. [http://en.wikipedia.org/wiki/Honeypot_\(computing\)](http://en.wikipedia.org/wiki/Honeypot_(computing))
 2. <http://www.webopedia.com/TERM/h/honeypot.html>
- See descriptions of the different security frameworks at locations below:
 1. [ISO2007](#)
 2. [CobIT](#)
 3. [SABSA](#), see also <http://www.sabsa.org/the-sabsa-method.aspx>

- Information Warfare topic RMA is explained at http://en.wikipedia.org/wiki/Revolution_in_Military_Affairs

Databases

Classroom Activities & Games

- A good task in relational databases (runs in Internet Explorer only) from Advanced Computing section of A2 Computing developed by [King George V School](#) covering queries and SQL at <http://www.kgv.net/ict-ks5/AS/MtoMRelationship.htm>
- A complete task and case study in developing a complete RDBMS by [Ritchie King](#) can be downloaded at http://www.teach-ict.com/contributors/Ritchie_King/RDBMS.ppt

If and when students are producing a solution to a database problem in a piece of coursework, this presentation along with the ones on the [Systems Life Cycle](#) and [Data Flow Diagrams](#) work very well with each other to give the students all the tools they need to document a project correctly and ensure that they have included all that is expected of them.

Videos

- [ICT Cover Lessons](#) has a set of tutorial videos (created using [Camtasia](#)) for “A fun filled video extravaganza with those whacky Nintendo characters to teach you relational databases” at http://www.ictcoverlessons.com/cover_lessons/databases/mario/mariohome.html
Please be aware that the above exercise requires a Nintendo Wii and accessories as mentioned.
- View the video lectures by [Larry Snyder](#) and [Mel Oyler](#) on Relational Databases and SQL at the following locations:
 1. [Introduction to Relational Databases](#)
 2. [An Introduction to Structured Query Language \(SQL\)](#)
- MySQL Tutorial created by [Demo Source and Support](#) is at <http://www.java2s.com/Tutorial/MySQL/CatalogMySQL.htm>
- ‘A Gentle Introduction to SQL’ is at <http://sqlzoo.net/>. This site offers an interactive tutorial to SQL and has separate sections for ‘how to’, exercises, and answers.

- [ICT Cover Lessons](http://www.ictcoverlessons.com/ocr/unit%201/database/database.html) has a set of introductory database tutorial videos at <http://www.ictcoverlessons.com/ocr/unit%201/database/database.html>
- [ICT Cover Lessons](http://www.ictcoverlessons.com/ocr/databaseunit/databasehome.html) has an set of advanced database tutorial videos at <http://www.ictcoverlessons.com/ocr/databaseunit/databasehome.html>

Online Guides

- A complete course in advanced databases (runs in Internet Explorer only) developed by [King George V School](http://www.kgv.net/ict-ks5/Access/advanced_databases1.htm) at http://www.kgv.net/ict-ks5/Access/advanced_databases1.htm

Important: Even though its not mentioned, please be aware the above course might be copyrighted material. You will need to check with igc@kgv.edu.hk before using the materials.

- [Dan Suciu's](http://www.cs.washington.edu/education/courses/444/06au/Calendar.htm) lecture notes in Introduction to Database Systems are available at <http://www.cs.washington.edu/education/courses/444/06au/Calendar.htm>
- A course in creating a Microsoft Access (2007) Database with VBA (Visual Basic for Applications) developed by [FunctionX](http://www.functionx.com/vbaccess/index.htm) is at <http://www.functionx.com/vbaccess/index.htm>

For an earlier version of the above using Microsoft Access 2003, see <http://www.functionx.com/vbaccess2003/index.htm>

- [KIDware Software](http://www.kidwaresoftware.com/vb2005db.htm) has a **Visual Basic and Databases** tutorial CD-ROM that can be purchased online either via download or post at <http://www.kidwaresoftware.com/vb2005db.htm>. At the time of writing this, the price was US\$25 (Credit card or [Paypal](https://www.paypal.com) account required for making payment). There is a free trial version of the tutorial which can be downloaded at <http://www.kidwaresoftware.com/downloads/vb2005db.zip>.

The tutorial provides a detailed introduction to using Visual Basic for accessing and maintaining databases for desktop applications. Topics covered include: database structure, database design, Visual Basic project building, ADO .NET data objects (connection, data adapter, command, data table), data bound controls, proper interface design, structured query language (SQL), creating databases using Access, SQL Server and ADOX, and database reports. Actual projects developed include a books tracking system, a sales invoicing program, a home inventory system and a daily weather monitor ([Project Screen Shots](#)).

- A tutorial in SQL developed by [FunctionX](http://www.functionx.com/sql/index.htm) is at <http://www.functionx.com/sql/index.htm>

- A complete course in web applications incorporating PHP and MySQL (runs in Internet Explorer only) developed by [King George V School](http://www.kgv.net/ict-ks5/web_applications.htm) at http://www.kgv.net/ict-ks5/web_applications.htm

Important: Even though its not mentioned, please be aware the above course might be copyrighted material. You will need to check with igc@kgv.edu.hk before using the materials.

- [Teach ICT](http://www.teach-ict.com/key_skills/database_home.htm) provides free teaching materials and tutorials to teach databases using Microsoft Access at http://www.teach-ict.com/key_skills/database_home.htm
- A primer on introducing databases to younger children can be found at <http://www.teachingideas.co.uk/ict/contents01ssdb.htm>
- Several concepts in databases such as E-R Modelling, Normalisation, Cardinality etc are explained using animation at <http://aces.shu.ac.uk/dblearn/>
- An online presentation (runs in Internet Explorer only) from Advanced Computing section of A2 Computing developed by [King George V School](http://www.kgv.net/ict-ks5/A2/Normalisation_files/frame.htm) introduces Normalisation at http://www.kgv.net/ict-ks5/A2/Normalisation_files/frame.htm
- A case study (runs in Internet Explorer only) called “Yangtze Mail Order Books” for developing a relational database with explanation of the concepts from Advanced Computing section of AS Computing developed by [King George V School](http://www.kgv.net/ict-ks5/AS/Basics_files/frame.htm) at http://www.kgv.net/ict-ks5/AS/Basics_files/frame.htm

The company background needed for this case study is at <http://www.kgv.net/ict-ks5/AS/YangtzeBackground.htm>

- A Database and SQL tutorial by several [developers from University of Saskatchewan](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2000_12/Tutorial/index.html) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2000_12/Tutorial/index.html. This tutorial will give you a general knowledge of databases and teach you how to write simple SQL commands.
- [BBC-GCSE Bitesize](http://www.bbc.co.uk/1/learning/ks2/ict/gcse/bitesize/) has resources (revisions and review tests) on the following:
 1. [Data, information and knowledge, Test](#)
 2. [Database types, Test](#)
 3. [Databases and data capture, Test](#)
 4. [Searching databases, Test](#)
- [Revision World](http://www.revisionworld.co.uk/gcse/ict/databases) (requires registration) offers revision resources on databases at <http://www.revisionworld.co.uk/gcse/ict/databases>

- www.theteacher.info has a few free chapters from their textbook in [A Level Computing](#) with some online tests for the modules at locations below:
 1. Introduction to Database Design Chapter [PDF Download](#)
 2. [Entity Relationship Diagrams](#)
Available tests: [Test 1](#), [Test 2](#), [Test 3](#), [Test 4](#), [Test 5](#), [Test 6](#), [Test 7](#)
- [Mark Tippins](#) has presentation on normalisation, with examples to illustrate the main points of normalising a database at <http://tre.ngfl.gov.uk/uploads/materials/19168/Normalisation.ppt>

See also the following resources related to system analysis:

[DFD's and ER's](#) - Data Flow Diagrams and ER Diagrams

[Systems Flowcharts and Program Flowcharts](#) - Exercise on Systems Flowcharts and Program Flowcharts

[Normalisation of Data to 3NF](#) - Normalising Data

- [Puzzles, Maths & More](#) site has a complete website dedicated to introducing databases covering most of the basic concepts, and is easily navigable with illustrations and practical exercises at <http://websedge.googlepages.com/dbp0.html>

Textbooks

- A chapter on Conceptual Data Modelling, Database design and SQL is in Chapter 5 'Databases of AQA Computing A2 by Kevin Bond and Sylvia Langfield

This book costs can be purchased for \$62 from fishpond.co.nz at

http://www.fishpond.co.nz/Books/Computers/Computer_Science/General/product_info/13666426

Graphics and Visual Computing

Classroom Activities & Games

- [CS Unplugged Activity 2](#): Image Representation
- [MaTHmaniaCS Lesson 3](#): Images
- [Computing Science Inside Workshop](#) (Requires Registration) – In the Picture
- [Computing Science Inside Workshop](#) (Requires Registration) – Painting by Numbers

Online Guides

- A tutorial on [texture mapping](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_8/tutorial/html/index.html) by [developers from University of Saskatchewan](#) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_8/tutorial/html/index.html. This tutorial can be used for visual demonstration of concepts in computer graphics.
- An introductory lecture in Computer Graphics by [James O'Brien](#) is at <http://www-inst.eecs.berkeley.edu/~cs184/fa09/lectures/01-Introduction.key.pdf>
- See the introductory lectures from [Linda Shapiro](#) in Computer Vision at the locations below:
 1. Introduction to Computer Vision and Imaging: [PPT](#), [PDF](#)
 2. Basics of Computer Vision: [PPT](#), [PDF](#)
 3. Readings for the above sessions: [S&S Ch. 1](#); [S&S Ch. 2](#); [S&S Ch. 3](#)
 4. Complete Lectures available [here](#)

Visual Simulations & Demonstrations

- [Face recognition](#) systems are on the rise for recognising people in photos and on the web. To demonstrate this concept, [Pittsburgh Pattern Recognition](#) has developed software and has online demos for their software. You can try these at <http://demo.pittpatt.com/>

If you have a webcam, you can also download their webcam face tracking software at <http://demo.pittpatt.com/downloads/Webcam%20Face%20Tracker%20Installer.msi>
- Demonstrations of various applications of computer vision and HCI developed by [idiap research institute](#) for the following technologies:
 1. [Automatic Face Finding \(Online Face Detection\)](#)
 2. [Google Portrait](#) for searching for famous celebrity faces
 3. [KeyLemon.com](#) application for face recognition as password protection
 4. [Videos of Mobile Face Recognition](#)
 5. [Facial Feature Detection](#)
 6. [Videos of hand gesture recognition](#)
 7. [Videos of head pose recognition](#)
 8. [Smooovee](#): technology to reduce shakes in hand held movie cameras
 9. [Object recognition and tracking](#): This demonstration gives more insight about how a computer can learn to track an object shown to a camera. The training process will take you through three successive steps, before the computer being able to track the moving object.
 10. [Videos on tracking people](#)

Downloads

- A really good application that can be downloaded and used for demonstration is the IKEA furniture chain's [home planner software](#) website which has instructions on download and installation. The three available versions are [Kitchen Planner](#), [Bedroom Planner](#), and [Office Planner](#).
- Another good graphics application that incorporates Global Positioning System is [Google Earth](#) which can illustrate the power of computer graphics in geographical applications

Videos

- [CS Unplugged Activity 2](#): Image Representation [YouTube](#) video

Human Computer Interaction (HCI)

Online Guides

- A clear introduction to HCI by [Clive Morley](#) can be downloaded as a word document at http://www.geocities.com/clive_edu/A2_ICT_HCI.doc
- [ComputingStudents](#) has a section on the introduction to HCI and Interactive Systems at http://www.computingstudents.com/notes/interactive_systems/index.php

Classroom Activities & Games

- [CS Unplugged Activity 19](#): Human Interface Design
- [CS4FN](#) has the following online activities/articles that demonstrates concepts HCI:
 1. [The Emotional Robot](#) activity
 2. [HCI Fundamentals](#) with activities
- [Robokits](#) is a New Zealand online shop that sources and sells robot kits from various suppliers. For all your enquiries you can write to them at <http://www.robokits.co.nz/contact>
- A great activity in Robotics which can be incorporated in the classroom using the LEGO MINDSTORMS kit. This activity including complete instructions for the teacher can be downloaded from http://myclubmylife.com/Arts_Tech/Pages/RoboTech.aspx

This LEGO MINDSTORMS NXT 2.0 kit costs around \$460 and can be purchased from <http://www.iqtoys.co.nz/site/page=item/item=3804/>

See a tutorial from University of Washington's [LEGO MINDSTORMS Robot Workshop](#)

Videos

- [CS Unplugged Activity 19](#): Human Interface Design [YouTube](#) video
- A great video showing some of the applications of HCI can be found at <http://www.youtube.com/watch?v=ukYBAa89kT0>
- Watch the [CS4FN](#) video related to their [The Emotional Robot](#) activity at <http://www.cs4fn.org/teachers/activities/emotionalrobot/emotionalrobot.mpeg>
- [Next Generation Learning UK](#) has produced videos to demonstrate teaching and learning opportunities by using HCI in the following areas:
 1. [Robosapien](#), from simple control technology to more complex programming.
 2. [Interactive Whiteboards](#), involving children more using this technology.
- Another great video about [Surface Computing](#) which is a great application of HCI can be viewed at http://www.youtube.com/watch?v=DqZ_X75LfCw
- Here is a [TeacherTube](#) video on the use of robotic arms in CNC (Computer Numerical Controlled) machine tools in a Computer Integrated Manufacturing workshop
- This TeacherTube video from '[Trenton Computer Festival 2008 Robotics Contest](#)' shows a robot that can detect boundaries and stay on a surface without falling off and also pick up objects
- The following set of videos from [PBS](#) and [Scientific American Frontiers](#) demonstrate applications of machine learning and Artificial Intelligence:
 1. [Cars that Think](#) (PBS, Scientific American Frontiers)
 2. [The Intimate Machine](#) (PBS, Scientific American Frontiers)
 3. [Robot Pals](#) (PBS, Scientific American Frontiers)
 4. [Games Machines Play](#) (PBS, Scientific American Frontiers)
 5. [Robots](#) (PBS, Scientific American Frontiers)
 6. [Miscellaneous](#) (PBS, Scientific American Frontiers)
- Kismet is a robot developed at [MIT](#) that can socialise with humans imitating human expressions. See videos of Kismet at <http://www.ai.mit.edu/projects/sociable/videos.html>
- Advancements in technology of HCI have lead to controlling computers using human thoughts alone which is called [Brain-Computer Interfacing](#) (BCI). View an article and YouTube video demo from University of Southampton here

http://www.soton.ac.uk/mediacentre/news/2009/oct/09_135.shtml

- An introductory YouTube video lecture on [Brain-Computer Interfacing](#) (BCI) by user [StanfordUniversity](#) given by Krishna Shenoy is at http://www.youtube.com/watch?v=I7lmJe_EXEU

Online Guides

- A collection of resources covering the design of appropriate interfaces for human-computer interaction and more can be accessed at http://www.teach-ict.com/as_a2/topics/human_computer_interface/hci.htm
-

Information Management

Videos

- Information Management is explained in a fairy tale fashion in the YouTube video [Platon - Information Management Fairy Tale](#) provided by Erasmus (<http://www.youtube.com/user/Erasmusb>)
- Another video presents certain facts from the past and present in '[Is Information Management just another hype?](#)' provided by Erasmus (<http://www.youtube.com/user/Erasmusb>)

Online Guides

- A presentation on 'Effective Management of Information' can be downloaded at http://www.teach-ict.com/as_a2/topics/management_of_info/info_management.htm .

This presentation also has two essay questions that be used to test students' knowledge on the topic.

- A presentation on 'Use of information in decision making and strategic planning' can be downloaded at http://www.teach-ict.com/as_a2/topics/info_decisionmaking/info_decisionmaking.htm
- A big collection of resources in data, information and knowledge can be found at http://www.teach-ict.com/as_a2/topics/data_info_know/data_info.htm .

This collection includes theory, activities, quizzes, and presentations.

<http://www.cosc.canterbury.ac.nz/tim.bell/dt/>

10 December 2009

- A comprehensive collection of resources on information viewed as a commodity can be found at http://www.teach-ict.com/as_a2/topics/info_commodity/information_asa_commodity.htm
- Several resources on the characteristics of the information systems and managing them are at http://www.teach-ict.com/as_a2/topics/information_systems/information_systems.htm

Intelligent Systems

Classroom Activities & Games

- [CS Unplugged Activity 20 – Turing Test](#)
- [Computing Science Inside Workshop](#) (Requires Registration) – Predictive Text and Machine Learning
- [The Royal Institution UK](#) and [Microsoft Research](#) together have produced an activities in Machine Learning for the classroom at locations below:
 1. [Machine Learning: Using Trial and Error, Sweet Computer](#)
 2. [Computer Crime Fighter: Learning from Probabilities](#)

See also, games and tryouts related to these lectures at interactive website at <http://www.rigb.org/christmaslectures08/>

- [CS4FN](#) has the following online activities/articles that demonstrates concepts in Intelligent systems and Artificial Intelligence:
 1. [The Illusion of Intelligence](#)
 2. [Sodarace](#)
 3. [Winning at Nim: Computers outwitting Humans](#)
 4. [Noughts and Crosses](#) (see also [Winning at Noughts and Crosses](#) activity)
 5. [The Intelligent Piece of Paper](#) activity
 6. [The Brain-in-a-bag](#) activity
 7. [The Emotional Robot](#) activity
 8. [The Sweet Learning Computer](#) activity

Visual Simulations & Demonstrations

- [Eliza, the computer therapist](#) is an application of [Artificial Intelligence](#) that is capable of responding to questions and has conversations with a human.

- The animal game is another [AI](#) application called as an [Expert System](#) which is able to guess the animal you are thinking of by asking a series of questions. Try it at <http://www.animalgame.com/>
- <http://www.20q.net/> is another guessing game that works on principles of an [Expert System](#). There are versions here that appeal both to young children as well as older ones. It also gives them several [knowledge bases](#) to choose from.
- Akinator is an [expert system](#) that can identify the character you are thinking of using a [decision tree](#). Try it at <http://en.akinator.com/>
- [Pandorabots](#) has a demo chatbot which can reproduce the capabilities of the human brain with greater speed and accuracy at <http://demo.vhost.pandorabots.com/pandora/talk-oddcast?botid=8545e5ed5e35811a>
- [jabberwacky](#) has other bots that you can use for chatting at locations below. Some of these bots use video, voice and typing interfaces.
 1. [jabberwacky](#)
 2. [Cleverbot](#)
 3. [Joan](#) — an Artificially Intelligent, speaking, video centric Avatar
 4. [George](#) – an AI Avatar

Note: The above bots have been learning from internet users by asking questions and improving their power of speech or ability to communicate. The downside is that many users get angry when bots question them and therefore the above bots can get a little aggressive.

- An application of AI called an Expert System is a system that has great amounts of knowledge in a given field and is capable of behaving like a human expert. An expert system for disease diagnosis can be used at <http://www.yourdiagnosis.com/>

Please be aware that the above site requires you to sign up for membership and after verification, it is able to diagnose an illness or disease from the symptoms that you specify.

Online Guides

- [John McCarthy](#) at Stanford University has a paper on Artificial Intelligence at <http://www-formal.stanford.edu/jmc/whatisai/whatisai.html>

- The study of machine learning is concerned with the question of how to construct computers and computer programs that automatically improve with experience. A tutorial on Machine Learning which includes topics such as Decision Trees, Neural Networks and Genetic Learning by [developers from University of Saskatchewan](#) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_10/Tutorial/index.html.

Videos

- Watch the [CS4FN](#) video related to their [The Emotional Robot](#) activity at <http://www.cs4fn.org/teachers/activities/emotionalrobot/emotionalrobot.mpeg>
- See news videos/reports about AI Avatar called George developed by [jabberwacky](#) below:
 1. [Robot enjoys online chat](#) (BBC)
 2. [Meet George](#) (ABC)
- [The Royal Institution UK](#) and [Microsoft Research](#) together have a video on the concept 'Are you smarter than a computer?' at <http://www.rigb.org/christmaslectures08/html/under-the-surface.htm#lecture1>

See also, games and tryouts related to these lectures at interactive website at <http://www.rigb.org/christmaslectures08/>

Distributed Computing

Visual Simulations & Demonstrations

- NASA's SETI (Search for Extraterrestrial Intelligence) uses an application of distributed systems where several computers are connected together and conduct scientific experiments. You can download the application and install it on the computer and analyze radio telescope data at <http://setiathome.berkeley.edu/>
- A New York times article 'Wanted: Home computers to Join in Research on Artificial Life' at http://www.nytimes.com/2009/09/29/science/29grid.html?_r=1 is an example of researchers seeking signs of artificial life generated by high-performance computers want to use a network of small computers to analyze data.

Online Guides

- Distributed computing is a system that divides a job into smaller tasks with a goal of speeding up the execution time of the job. A tutorial 'Introduction to Distributed Computing' by [developers from University of Saskatchewan](#) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2002_7/static/tutorial/tutorialstart.html.

Classroom Activities & Games

- [Computing Science Inside Workshop](#) (Requires Registration) – One Problem 1000 Machines

Computer Networks

Online Guides

- A great introduction to the concepts of computer networking including quizzes can be found at http://www.myclubmylife.com/Arts_Tech/Pages/Improve_Computer_and_Network_Skills.aspx
- [Joe Carthy](#) offers a very clear explanation of computer networks and protocols at <http://www.csi.ucd.ie/staff/jcarthy/home/FirstYear/Comp1001-L10.pdf>
- [Do I.T.](#) has a free course in IT that covers introductory topics in networking at <http://doit.ort.org/course/networks.htm>

See also their section on Internet at <http://doit.ort.org/course/internet.htm>

- A mini website dedicated to networking components can be found at http://www.teach-ict.com/as_a2/topics/networks/network%20components/network_components/index.htm
- A tutorial 'Introduction to Networking' by [developers from University of Saskatchewan](#) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2001_6/website/network.html

- A very detailed guide 'An Educator's Guide to School Networks' is given at <http://fcit.coedu.usf.edu/network/default.htm>

The above guide can also be downloaded as a pdf document at <http://fcit.usf.edu//network/network.pdf>

- An online presentation (runs in Internet Explorer only) from Advanced Computing section of AS Computing developed by [King George V School](http://www.kgv.net/ict-ks5/AS/Networks_files/frame.htm) introduces networks and types at http://www.kgv.net/ict-ks5/AS/Networks_files/frame.htm
- A tutorial 'Virtual Private Networking (VPN)' by [developers from University of Saskatchewan](http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2002_8/tutorial/index.html) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2002_8/tutorial/index.html
- WindowsNetworking.com offers an article 'Networking Basics' which is a 20 part course covering the basics of networking. You can start viewing it here http://www.windowsnetworking.com/articles_tutorials/Networking-Basics-Part1.html
- A tutorial in Computer Networking with Microsoft Windows developed by [FunctionX](http://www.functionx.com/networking/index.htm) is at <http://www.functionx.com/networking/index.htm>.

This web site reviews the techniques you can use to set up and possibly manage a network for home or a small business.

- 4Tests.com offers a sample exam with questions in networking that students can use to review the topics at <http://www.4tests.com/exams/examdetail.asp?eid=10>
- [Arvind Krishnamurthy](http://www.cs.washington.edu/education/courses/461/07wi/lectures/index.html) has a course in 'Computer Communication and Networks' with lecture notes in networking at <http://www.cs.washington.edu/education/courses/461/07wi/lectures/index.html>
- [RAD Data Communications](http://www3.rad.com/networks/1997/nettut/mainmenu.html) has a resource for beginners in networks at <http://www3.rad.com/networks/1997/nettut/mainmenu.html>
- www.theteacher.info has a few free chapters from their textbook in [A Level Computing](#) with some online tests for the modules at locations below:

[Network Systems](#)

Available tests: [Test 1](#), [Test 2](#), [Test 3](#), [Test 4](#), [Test 5](#), [Test 6](#), [Test 7](#)

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Classroom Activities & Games

- A hands on activity for building a computer network that reinforces the concepts and promotes discussion is at http://www.teach-ict.com/as_a2/topics/networks/networkswf/NWB_SIM.swf
- Tammy VanDeGrift and Sarah Schwarm have developed a KLA activity to simulate the operation of a network (of routers) using note cards to represent packets and string to represent network links. View here at http://people.cs.ubc.ca/~kla/index.php?page=Network_Routing_on_Strings
- [CS4FN](#) has the following online activities/articles that demonstrates concepts in computer networks:
 1. [Pinky's Pipe Pickle](#) online activity
 2. [Even the dolphins use pocket switched networks!](#)

Operating Systems

Online Guides

- A good introduction to Operating Systems, how they work, the types, functions etc can be viewed at <http://computer.howstuffworks.com/operating-system.htm>
- A clear introductory presentation on OS can be downloaded from http://www.teach-ict.com/as_a2/topics/operating_systems/OS.ppt
- [Joe Carthy](#) offers a very clear explanation of software and operating systems at <http://www.csi.ucd.ie/staff/jcarthy/home/FirstYear/Comp1001-L12.pdf>
- [BBC-GCSE Bitesize](#) has a revision resource on operating systems at <http://www.bbc.co.uk/schools/gcsebitesize/ict/software/4operatingsystemsrev1.shtml>

An accompanying review test for operating systems is at <http://www.bbc.co.uk/apps/ifl/schools/gcsebitesize/ict/quizengine?quiz=operatingsystems;templateStyle=ict>

- An online presentation (runs in Internet Explorer only) from Advanced Computing section of A2 Computing developed by [King George V School](#)

introduces Operating Systems at http://www.kgv.net/ict-ks5/A2/OSforA2_files/frame.htm

- [Ed Lazowska's](http://www.cs.washington.edu/education/courses/451/07wi/lectures.htm) lecture notes in Operating Systems are available at <http://www.cs.washington.edu/education/courses/451/07wi/lectures.htm>
- View a good introduction to operating systems at [David Schmidt's](http://people.cis.ksu.edu/~schmidt/300s05/Lectures/OSNotes/os.html) course in Data Structures at <http://people.cis.ksu.edu/~schmidt/300s05/Lectures/OSNotes/os.html>
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- www.theteacher.info has a few free chapters from their textbook in [A Level Computing](#) with some online tests for the modules at locations below:

[Operating Systems in Detail](#)

Available tests: [Test 1](#), [Test 2](#), [Test 3](#), [Test 4](#), [Test 5](#), [Test 6](#), [Test 7](#), [Test 8](#), [Test 9](#)

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Programming Languages

Online Guides

- [Do I.T.](http://doit.ort.org/course/doc_frame.htm) has a free course in programming languages that covers the elements, generations, compilers and interpreters, and program development stages at http://doit.ort.org/course/doc_frame.htm

Classroom Activities & Games

Computer Ethics - Social and Professional Issues

Videos

- [ICT Cover Lessons](http://www.ictcoverlessons.com/ocr/unit%201/internet/intvid4copyright.html) has a video presentation on copyright issues at <http://www.ictcoverlessons.com/ocr/unit%201/internet/intvid4copyright.html>
- [ICT Cover Lessons](http://www.ictcoverlessons.com/ictgcse/theory/ICTGCSE_Barclays.wmv) has a video presentation on a case study in Phishing at http://www.ictcoverlessons.com/ictgcse/theory/ICTGCSE_Barclays.wmv
- [Next Generation Learning UK](#) has produced net safety videos where teachers talk about how to keep student safe on the Internet, copyright issues etc below:
 1. [Are they Safe?](#)
 2. [A Cut and Paste Generation...?](#)
 3. [E Safety - Know it all for Parents](#)

- Watch the following presentations from [Common Craft](#) in the following areas:
 1. [Social Media in Plain English](#), Download [Factsheet](#).
 2. [Social Networking in Plain English](#), Download [Factsheet](#).
 3. [Phishing Scams in Plain English](#), Download [Factsheet](#).
- A list of short videos in this area by various different contributors at [Next Vista for Learning](#) are below:
 1. [Cyberbullying](#)
 2. [Netiquette](#)
 3. [Internet Safety Rules](#)
 4. [Stay Safer Online](#)

Online Guides

- [ThinkQuest](#) has sections for teachers in the topics listed below, some of which have activities included:
 1. Computer Ethics ([Introduction](#), [Activity](#))
 2. Copyright and Licensing Issues ([Part 1](#), [Part 2](#), [Part 3](#))
 3. Censorship and the Internet ([Part 1](#), [Part 2](#), [Part 3](#), [Part 4](#))
 4. Information Privacy Issues ([Part 1](#), [Part 2](#), [Part 3](#))
 5. Ups and Downs Game ([Activity](#))
- Wikipedia entry on [Network Forensics](#)
- [ICT Cover Lessons](#) has web pages with links and resources that are dedicated to the following related topics:
 1. [Data Protection Act](#)
 2. [Computer Misuse Act](#)
 3. [Copyright Laws](#)
 4. [Ethical concerns](#)
 5. [Social issues](#)
 6. [Teleworking](#)
- [Media Education Lab](#) has teaching resources comprised of lesson plans and materials to help you teach about copyright and fair use below:
 1. [Lesson Plans: Teaching About Copyright and Fair Use for Media Literacy Education](#)
 2. [Powerpoint Slides on Copyright and Fair Use](#)
 3. Presentation on [Finally The End To Copyright Confusion Has Arrived](#)
 4. Presentation on [Copyright And Fair Use, Media Literacy, Educon Jan 2009](#)
- [Magdalena Balazinska's](#) lectures in the following topics concerning social Implications of computing
 1. [Societal Implications of Computing](#): discusses the use of [RFID](#)

2. [Contemporary Issues of Computing](#): discusses [Identity Theft](#)
 3. [Professional and ethical responsibility](#): includes a discussion scenario
 4. [Contemporary Issues of Computing Solutions](#): discusses [YouTube](#)
 - 5.
- [The Ten Commandments of Computer Ethics](#) by the Computer Ethics Institute, Washington, DC.
 - [Comberton Village College, UK](#) has the following short presentations, question banks and answer guides developed for [General Certificate of Secondary Education](#)(GCSE) ICT theory exam at locations below:
 1. [The Data Protection Act](#) (presentation), [Questions](#), [Answers](#)
 2. [Security and Integrity of Data](#) (presentation), [Questions](#), [Answers](#)
 3. [The Implications of IT](#) (presentation), [Questions](#), [Answers](#)

Some of the above presentations accompany exam questions and homework assignments you can administer with students. You can also download their revision guide to the whole exam [here](#).

- IEEE Code of Ethics can be downloaded as a pdf document at <http://www.ieee.org/portal/pages/iportals/aboutus/ethics/code.html>
- ACM Code of Ethics can be downloaded at <http://www.acm.org/about/code-of-ethics>
- A presentation 'The Web Browsing Basics' unit teaches students how to find information on the Internet and identify ethical issues involved in using information. See <http://www.learning.com/easytech/sample/35-sourcingethics.htm>
- Internet safety, responsibility and security are explained in detail at the [US Department of Justice](#)

See also [Identity Theft and Identity Fraud](#)

- [Webopedia](#) has a section on identity theft at http://www.webopedia.com/didyouknow/Internet/2006/identity_theft.asp
- [Emily Tan](#) has an article 'Facebookers Beware – Online Identity Theft on the Rise' at <http://www.lemondrop.com/2009/02/24/facebookers-beware-online-identity-theft/>
- [White Collar Fraud](#) has an article where A Former Fraudster Speaks Out About White Collar Crime at <http://www.whitecollarfraud.com/1338574.html>

- [Computer World](#) has an article on Protecting Data Becomes Top Security Priority for IT at http://www.computerworld.com/s/article/273246/Protecting_Data_Becomes_Top_Security_Priority_for_IT
- Wikipedia has a section on [Email Spam](#)
- [NETSAFE NZ](#) has a comprehensive website with activities and lesson plans in net safety which covers 3 main areas: ICT use for individuals and society, Cybersafety strategies for personal safety, Cybersafety guidelines for community safety. Please view at <http://www.thegrid.org.nz/>
- [Revision World](#) (requires registration) offers revision resources on following related topics:
 1. [The Data Protection Act](#)
 2. [Health & Safety](http://www.revisionworld.co.uk/gcse/ict/web-design-packages)<http://www.revisionworld.co.uk/gcse/ict/web-design-packages>
 3. [Computer Crime](#)
- [Becta UK](#) has a booklet that contains background information, advice and guidance for Secondary teachers relating to e-safety issues. It signposts appropriate opportunities to embed e-safety within the curriculum and free online teaching resources from a range of organisations to help support lessons. Download at <http://publications.becta.org.uk/download.cfm?resID=32424>
- [Next Generation Learning UK](#) has the following resources on net safety:
 1. [Download the Here's how to help your child use the internet responsibly](#)
 2. [Download the Here's how to teach your child to use online content responsibly](#)
 3. [Download the Here's how to evaluate information online](#)
 4. [Download the Here's how to make the most of online communities](#)
- A tutorial on web site issues covers ethics, legal, advertising, and e-commerce by [developers from University of Saskatchewan](#) is at http://www.cs.usask.ca/content/resources/tutorials/csconcepts/2002_1/tutorial/tut_index.html.
- A tutorial in ecommerce by several [developers from University of Saskatchewan](#) covers some concepts in security and legal issues below:
 1. [Strategies](#)
 2. [Elements](#)
 3. [Extras](#)

4. [Domain Registration](#)
 5. [Digital Signatures](#)
 6. [Server ID](#)
 7. [Site Certificates](#)
- [Smart Schools Program](#) has several articles on social networking etiquette below:
 1. [Guide to Social Networking Etiquette](#)
 2. [FAQs: Social Networking Etiquette](#)
 3. [Tips for Good Online Etiquette](#)
 4. [Social Networking and Online Learning](#)
 5. [Using Facebook in the Classroom](#)
 6. [Other Social Networks for the Classroom](#)
 7. [Social Networking 101](#)
 - [CS4FN](#) has a section on [Fundamentals of Computers and Society](#)
 - [BBC-GCSE Bitesize](#) has resources (revisions and review tests) on the following:
 1. [The Data Protection Act, Test](#)
 2. [Data and Computer Misuse, Test](#)
 3. [Copyright, Test](#)
 4. [Viruses, Test](#)
 5. [Moral and Social Issues, Test](#)

Classroom Activities & Games

- As an exercise to find out what your students really think about computer ethics, Teach ICT has several discussion topics that can be used. Please see the different ethical dilemma scenarios below:
 1. [Survey](#)
 2. [Internet Chat](#)
 3. [Email](#)
 4. [Email](#)
 5. [Software Piracy](#)
 6. [Copyright](#)
 7. [Identity](#)
- Web comic strip about a female network person and the challenges she deals with such as "Identity theft, password cracking, e-mail eavesdropping, network worms, computer sabotage, booby-trapped software, digital piracy, online kiddie-porn trafficking, cyber-stalking, revenge hacking, and cyber-crime cartels. Please see <http://www.planetheidi.com/index.html>

- Discovery Education has an activity called [Cyberspace](#) that discusses how the Internet creates ethical and aesthetic issues for the creative artist at <http://school.discoveryeducation.com/lessonplans/programs/cyberspace/>

Podcasts

- [Peter Jaszi's](#) talk [Teachers Teaching Teachers](#) podcast. This podcast helps teachers gain confidence in applying fair use to student-produced work.
- A Podcast on '[Teaching Students about Electronic Privacy](#)' by Florence Appel from St Xavier University. Medium: MP3, Listening Time: 9 min, Interview Location: ACM Sigcse 2008; Portland, OR, Interview Date: March 2008

Videos

- Watch the TeacherTube video '[Be CyberSmart! Cyber Ethics and Bullying](#)' that covers some of the current issues of children and young people being online and exposed to the world on the Internet.
- A short video on TeacherTube '[Freaky ID Thief](#)' presents some scenarios where your identity can be stolen easily this day and age with the help of simple technology
- [Investigate Life](#) videos presents a video where Investigators working the William McGuire murder case use computer forensics to mine incriminating evidence from the computer of McGuire's wife at <http://investigation.discovery.com/videos/solved-computer-forensics.html>
- [Google videos has a section on Computer Forensics](#)
- [Media Education Lab](#) has videos on teaching Copyright and Fair Use:
 1. [Video Overview](#)
 2. [What's Copyright? Music Video](#)
 3. [User Rights, Section 107 Music Video](#)
 4. [Case Study Video, Curriculum Materials Creation](#)
 5. [Case Study Video, Elementary](#)
 6. [Case Study Video, High School](#)
- See the [metacafe](#) video on cell phone spam at http://www.metacafe.com/watch/yt-l75jeFQzKZc/12_news_investigation_cell_phone_spam/. This video news article features Kent Wainscott who investigates how your cell phone could possibly get spam from pornographers.

- See another metacafe video 'tips and tricks to stop spam' at [http://www.metacafe.com/watch/1949558/tips and tricks to stop spam/](http://www.metacafe.com/watch/1949558/tips_and_tricks_to_stop_spam/). Learn more at <http://www.SaberHacer.com> - Computer guru's like Buying Computers for Dummies author Dan Gookin reveal ways you can stop that unwanted online junk mail that clogs up the inbox.

Multitasking/Scheduling

Classroom Activities & Games

- [Computing Science Inside Workshop](#) (Requires Registration) – Doing a million things at once
- [Discrete Math Project](#) has a scheduling activities that in [Graph Theory](#) below:
 1. [Checker Tournament](#) by [Anne Smelker](#)
 2. [Scheduling Classes](#) by [Jill Long](#)
 3. [Thanksgiving Dinner](#) by [Kim Kendrick](#)
 4. [Picking Up The Pieces](#) by [Liz Sansone](#)

Queuing Theory

Classroom Activities & Games

- [SwissEduc](#) has developed an application called QueueTraffic (requires Java installed) which interactively simulates everyday situations at a traffic intersection to experiment with the basic concepts of queuing theory with teaching materials at locations below:
 1. [Download QueueTraffic](#)
 2. Introductory presentation 'QueueTraffic and queuing theory' [PDF \[512 KB\]](#) [Powerpoint \[291 KB\]](#)
 3. Concepts of queuing theory and sample calculations [PDF \[151 KB\]](#) · [Word \[267 KB\]](#)
 4. Exercises to QueueTraffic [PDF \[18 KB\]](#) · [Word \[41 KB\]](#)
 5. Solutions to exercises to QueueTraffic [PDF \[257 KB\]](#) · [Word \[287 KB\]](#)

Information Retrieval

Classroom Activities & Games

- [Computing Science Inside Workshop](#) (Requires Registration) – Finding a needle in a Haystack

- [Computing Science Inside Workshop](#) (Requires Registration) – Getting onto the Right Page
- [putlearningfirst](#) has a mini project activity in information retrieval with guidance and a six step plan at <http://www.putlearningfirst.com/holiday/> to help plan a holiday.

Online Guides

- [Success in Teaching Teens to Search the Internet: Playing a New Google Game:](#) Tips on improving Internet search skills centred on a Google search activity.
- [Custom Search Engine Starter Guide:](#) Harness the power of Google search to create a tailored search experience that reflects your knowledge and expertise.
- [Nancy Blachman](#) has an online interactive tutorial and reference for experienced users, novices, and everyone in between. “I developed Google Guide because I wanted more information about Google's capabilities, features, and services than I found on Google's website” [GoogleGuide: Making Searching Even Easier](#)
- [Google Search in the Classroom](#) developed by [CUE](#) and [WestEd](#) explains how using Google, students and teachers are able to access a variety of information in many different languages: stock quotes, maps, news headlines, videos, images, books, and much more.
- [Build Your Own Search String](#) explains how the search that you create in Google is a reflection of how you think. Imagine your search as a unique work in progress! Start with a big vision and add more detail as your search continues.
- [Libraries and Google Book Search](#) explains how Google Book Search allows you to search the full text of books
- [Next Generation Learning UK](#) has a site dedicated to searching smartly for information at [Download the Here's how to search smartly for information](#)

Videos

- Watch the following presentations from [Common Craft](#) in the following areas:
 1. [Web Search Strategies in Plain English](#), Download [Factsheet](#).
 2. [Wikis in Plain English](#), Download [Factsheet](#).
 3. [Blogs in Plain English](#), Download [Factsheet](#).
 4. [Twitter in Plain English](#), Download [Factsheet](#).
 5. [Twitter Search in Plain English](#)

6. [Social Bookmarking in Plain English](#), Download [Factsheet](#).
 7. [RSS in Plain English](#), Download [Factsheet](#).
 8. [Podcasting in Plain English](#), Download [Factsheet](#).
 9. [Online Photo Sharing in Plain English](#), Download [Factsheet](#).
- [The Royal Institution UK](#) and [Microsoft Research](#) together have a video on the concept of search engines at <http://www.rigb.org/christmaslectures08/html/under-the-surface.htm#lecture1>

See also, games and tryouts related to these lectures at interactive website at <http://www.rigb.org/christmaslectures08/>

- [Marti Hearst](#) teaches a course in 'Search Engines: Technology, Society, and Business' with videos and podcasts at http://webcast.berkeley.edu/course_details.php?seriesid=1906978252
- [Intute](#) has a free online tutorial to help university students develop their Internet research skills at <http://www.vts.intute.ac.uk/tutorial/computerscience>

For research tutorials in other topics, you may visit <http://www.vts.intute.ac.uk/>

- [ICT Cover Lessons](#) has video presentations on the following related topics:
 1. [Searching the Internet with Boolean queries](#)
 2. [Trustworthiness of source data](#)

Data Communication

Classroom Activities & Games

- [Computing Science Inside Workshop](#) (Requires Registration) – Tablets of Stone
- An activity called 'Sunrise – Sunset' by Anne Germain from Houghtaling Elementary School, Ketchikan, USA gives students an opportunity to collect and exchange data with other classrooms. This activity provides opportunities for making comparisons, making predictions, and communicating electronically through computer networks. See http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Computer_Science/EDT0006.html
- [theBetterWorldCampaign](#) has a nice fun presentation on the history of data communication all done in cartoons however aimed for a younger audience at

[http://www.btbetterworld.com/pg/developing_skills/free_resources/From Caveman to Spaceman/home.ikml](http://www.btbetterworld.com/pg/developing_skills/free_resources/From_Caveman_to_Spaceman/home.ikml). Please see the [teachers notes](#) on the same page.

- www.theteacher.info has a few free online tests that accompanies their textbook in [A Level Computing](#) at locations below:
 1. [Bit rates and information](#)
 2. [Parity](#)
 3. [Packet and circuit switching](#)
 4. [Communication protocols](#)
 5. [Data communications](#)

Online Guides

- [ICT Cover Lessons](#) has a web page dedicated to data validation and verification at http://www.ictcoverlessons.com/ictgcse/theory/theory_valandver.html
- [Revision World](#) (requires registration) offers revision resources on following related topics:
 1. [Communication Technologies](#)
 2. [Networks and the Internet](#)
 3. [Computer Networks](#)<http://www.revisionworld.co.uk/gcse/ict/communication>
 4. [The Internet](#)
- [BBC-GCSE Bitesize](#) has resources (revisions and review tests) on the following:
 1. [The Internet, Test](#)
 2. [Electronic mail, Test](#)
 3. [Networks, Test](#)
 4. [Data validation and verification, Test](#)
- An online presentation (runs in Internet Explorer only) from Advanced Computing section of A2 Computing developed by [King George V School](#) introduces certain broader topics in Communications at http://www.kgv.net/ict-ks5/A2/Communications_files/frame.htm
- www.theteacher.info has a few free chapters from their textbook in [A Level Computing](#) with some online tests for the modules at locations below:

[Data Communications](#)
Available tests: [Test 1](#), [Test 2](#), [Test 3](#), [Test 4](#), [Test 5](#), [Test 6](#), [Test 7](#)
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[Web Computing](#)

Online Guides

- “What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software” by [Tim O'Reilly](#) gives a good introduction into web computing at <http://oreilly.com/web2/archive/what-is-web-20.html>
- A comprehensive list of Web 2.0 applications and tools can be viewed at <http://www.go2web20.net/>
- A Wiki set up for teachers called [Web 2.0 – Tools for Teachers](#) by [Peter McAsh](#)
- Wikiversity section on Web 2.0 is comprehensive and compares it with technologies of Web 1.0 at http://en.wikiversity.org/wiki/Web_2.0
- Wikipedia has page on Google products that fit the Web 2.0 philosophy here at http://en.wikipedia.org/wiki/List_of_Google_products
- [Mark Van Harmelen](#) has collated some presentations on Web 2.0 learning and teaching at [slideshare](#) locations below:
 1. [Learning, teaching and Web 2.0](#)
 2. [Web 2.0 in higher education](#)
 3. [Web 2.0 in learning and teaching](#)
 4. [Web 2.0 supporting a learning and teaching strategy](#)
- See an introduction to Cloud Computing presentation by Karthik T.S. at <http://www.slideshare.net/toryharis/cloud-computing-integration-introduction>
- Teach42 site dedicated to Web 2.0 that includes presentations, articles and videos by [Steve Dembo](#) at <http://www.teach42.com/>
- ‘Technology Integration: Meeting Students in their Digital World’ is another site on the applications of Web 2.0 by [Ryan McCallum](#) at <http://bhs.cc/tech/>

View also [Web Tools for Teachers](#), which is a directory of Web 2.0 tools organised by the subject area for secondary school teachers to use.

- [Chris Smith](#) has a site ‘Web 2.0 in Education’ with a long list of links to Web 2.0 applications and resources in Education at <http://www.shambles.net/pages/learning/ict/web2edu/>

- Web 2.0 in Education (UK) by [Darren Walker](#) is designed to provide teachers with a directory of free webtools along with some suggestions as to how they may be used in the classroom. "I have searched over 2000 websites and listed over 295 tools, that's almost 300 opportunities for you to use ICT in your classroom and all for free!" View at <http://web2educationuk.wetpaint.com/>
- The Education Project Asia site on Web 2.0 tools and applications at <http://www.shambles.net/web2/>
- WebTools4U2Use Wiki has a big collection of resources and tools for your school library media centre, but there is much more to learn and there are many places to learn online at <http://webtools4u2use.wikispaces.com/>
- [Smart Schools Program](#) has several articles on Web Applications and Web Computing below:
 1. [A Guide to Web Apps](#)
 2. [Why Web Apps?](#)
 3. [Educational Web-based Apps for the Classroom](#)
 4. [Education through Class Websites](#)
 5. [Creating a Classroom Website](#)
 6. [Multiply and Facebook for the Classroom](#)
 7. [Facebook and Education](#)
 8. [Facebook Apps for Education](#)
 9. [Guide to Facebook Apps](#)
 10. [Introduction to Google Docs and Apps](#)

Videos

- Watch a clear and simple presentation from [Common Craft](#) called 'Social Media in Plain English' at <http://www.youtube.com/watch?v=MpIOCIX1jPE>, Download [Factsheet](#).
- [The Flat Classroom Project](#) is a collaborative effort that utilizes Web 2.0 tools to foster communication, collaboration, and creativity between educators and students across the globe. [Click here](#) to see a BLIP.TV Video of this project.
- [Next Generation Learning UK](#) has produced videos to demonstrate teaching and learning opportunities by using web computing technologies:
 1. [Wikis](#): students using wikis to study poetry
 2. [Blogs](#): students produce school's own blog Newszine
- Here are some [Prezi](#) interactive presentations on Web 2.0 on the different applications of Web 2.0 and it also showcases various resources developed by it's free tools. View at locations below:
 1. [What is Web 2.0?](#) by [Darren Walker](#)

2. [Web 2.0 in the Classroom](#) by [Darren Walker](#)
 3. [Top 10 Web 2.0](#) by [Steve Dembo](#)
 4. [Top 10 Web 2.0 Tools for Educators](#) by [Steve Dembo](#)
- Introductory videos on Google Apps can be viewed at the following locations:
 1. [Google Docs](#)
 2. [Google Sites](#)
 3. [Google Video](#)
 4. [Gmail](#)
 5. [Google Talk](#)
 6. [Google Calendar](#)
 - 7.

Classroom Activities & Games

- Some activities that can be done with students using [Google Apps](#) are below:
 1. [A Place in Time with Google Tools](#) [PDF, Podcast, Video] – a project plan for studying history and landmark historical photos
 2. [A Candidate Watch with Google Tools](#) [PDF, Podcast, Video] - can be used for tracking presidential candidates with Google Earth, Docs, News Archives and Blogger
 3. [Spring Sojourn: A lesson in Civil Rights History and Geography](#) [Website] – a multimedia project to document a class trip on civil rights
 4. [Postcards from the Past with Google Tools](#) [PDF, Podcast, Video] – can use Google Earth and Google Pages to compare sites and how they look now and before.
 5. [Google Lit Trips](#) [Website] – using Google Earth so students can see the places mentioned in books and other literary works
 6. [Google Groups in the classroom](#)
 - 7.
- A complete list of resources and applications from Google that can be used in the classroom is at <http://www.thegoogleclassroom.com/>
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