COMPUTING AT SCHOOL
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# SWITCHEDON

COMPUTING AT SCHOOL NEWSLETTER SUMMER 2010

# ABRACADABRA
## THE MAGIC OF COMPUTER SCIENCE

A little bit of magic came to Graveney School last November, when more than 350 students from across South London packed the hall to witness a succession of conjuring tricks with a difference. Paul Curzon and Jonathan Black from Queen Mary College were performing their "Magic of Computer Science" show. Students were enthralled as Paul and Jonathan amazed and entertained in equal measure, performing a medley of magical marvels, ranging from card tricks to a surreal 'out of body' experience. But this wasn't simple sorcery. It's purpose was not mere entertainment, but real education. Each act was designed to illuminate key concepts in computing. Behind great magic there often lies some interesting maths or computer science, buried in the secret of how the trick works.

Schools bought students from a range of year groups, the show being accessible to pupils from year 9 up to year 13 A Level Computing students. The response from the audience throughout the performance was amazing. We were left with a mass of encouraging comments and enthusiastic feedback. It was even featured in the local press. In short the show did a great deal towards promoting computer science, stressing how developments in many fields have a foundation in computing.

Paul and Jonathan are part of the cs4fn team, which has been popularising computer science through outreach work, magazines, resources and a fantastic website aimed at school students. See the back page for more details about their free resources. The show at Graveney was the launch event for a London Computing At School Hub— a group of enthusiasts swapping ideas, share tips and inspiring each other. CAS hubs are taking off. Find out how to get involved inside.

## INCREASING NUMBERS GETTING SWITCHEDON

Welcome to the second issue of the Computing At School newsletter. A lot has happened since our last issue and inside you'll read about some exciting developments in our quest to establish a Computing Teachers Association.

The word is out - computing is one of the most exciting subjects around. Increasing numbers of schools are using resources such as Scratch to introduce pupils to the challenges of programming. More and more teachers are finding their students rising to that challenge and demanding more. This issue puts the spotlight on a number of other resources available to stretch and challenge their young minds. There has never been a better time to try to introduce computing to your classroom. Many wonderful resources exist and as more teachers start using them so the debate about how best students learn develops.

Of course, computing it not just about programming. It's an amazing mix of maths, science and engineering built around fundamental principles. Inside you'll find pointers to many resources that can help students explore these concepts in fun and engaging ways. The summer term beckons, and with it the chance to experiment with new ideas. If you're new to computing there couldn't be a better time to get SWITCHEDON

## A COMPUTING TEACHERS ASSOCIATION TAKES SHAPE

Good news! One of the primary objectives of the Computing at School Working Group is to create a teacher's association for specialist computing teachers in the UK. Nearly every other curriculum subject has an active association which acts as a key partner in supporting teachers in their ongoing learning and classroom practice. The role that such associations have in building communities to share new practices, strategies and resources is highly valued by their membership.

In January we circulated a consultation paper to the members of CAS inviting their views on the proposal that CAS form a partnership with the British Computer Society (BCS) to create a Computing Teacher's Association (CTA). The reaction was overwhelmingly positive. Clearly much remains to be done; more consultation will be sought and discussions will be had, so that we can create an association that supports the teachers that it seeks to serve and will thrive for years to come.

More immediately we can announce that since March Simon Humphreys has been working for BCS as Coordinator of the CTA project, for one day a week. This commitment will rise from September to two days a week. The post will be supported by a full-time member of staff from within BCS. All this is in addition to the existing support of Microsoft Research UK.

Further, we are delighted that Vital (a DCSF funded programme run by the Open University and eSkills, to provide CPD for ICT and Computing teachers) will be providing substantial sponsorship for CAS and BCS to establish the Association. There is a clear common interest between CAS, BCS and Vital. Their sponsorship will enable us to be more ambitious in the first year of the CTA's development, so we can do more, sooner. It is a very exciting development. In the coming months we will be looking for CAS volunteers to work with Simon and the BCS Academy to flesh out what the CTA will do, how it will be organised, and so on. Please help wherever possible. Onward and upward!

*Simon Peyton Jones & Bill Mitchell (BCS)*

# CAS INITIATIVES TAKE OFF AS MEMBERS SPREAD THE WORD

**Across the country teachers and CAS supporters are getting organised and making things happen. It's been a hectic six months for the CAS working group, pushing forward with projects to support teachers, develop an association and seek influence at institutional levels.**

National Science Week (12-20 March) has usually been a bit quiet with regard to Computing. This year CAS had some input into this excellent event. As we went to press a number of conferences for sixth form students were being held in Manchester, Croydon, Somerset, Sunderland and Cockermouth under the title 'Inventing the Future'. The local organisers threw open the doors of their schools and universities and presented students with a number of talks and activities designed to inspire and challenge. Hundreds of students were set to attend and engage in topics ranging from 'If my washing machine could talk to my fridge - what would it say?' to 'How to look after your health with open source software' to 'Computing with Cells and Molecules'.

A full report of these events will follow in the next issue but on behalf of CAS I wish to thank the local organisers (Adrian Jackson, John Stout, Mandi Banks, Eliot Williams, Lynne Dagg, Andrew Tringham, Andrew Tuson and Wendy Bowe) for all their hard work in making these events possible. How are you fixed for next year?? Other colleagues will be running similar events later in the year, keep an eye on the Events page of the CAS website for details as they are published.

The BCS stall at BETT, the annual educational technology show held at Olympia in January, helped distribute the CAS Newsletter and information cards. CAS members Miles Berry, Zoe Ross and Ian Lynch were also busy giving presentations at the Open Source Café. Miles delivered a seminar with Ian Utting (Kent University) on Scratch and Greenfoot to a receptive audience and followed this with an input at the Friday night Teachmeet. CAS will be looking to increase it's presence next year so if you attend BETT and could spare some time please get in touch.


CAS Teacher Conference 2010 will take place on July 9th at the University of Birmingham. This is the second CAS teacher conference, following the success of our inaugural event last year. Come and meet colleagues, share in the discussions, get ideas for the classroom, hear from some great speakers. You are encouraged to book early as places are limited and it's first come first served. The registration link is: http://casconf2010.eventbrite.com

*Simon Humphreys*

# BRINGING COLLEAGUES TOGETHER VIA LOCAL COMPUTING HUBS

**One of the primary aims of the CAS group is to directly support teachers in the classroom. One of the ways of doing this has been to create a number of local teacher 'hubs'. It's often an isolated job being a computing teacher and hubs are proving a popular way for like minded colleagues to share their tips.**

The initial pilot scheme was set up in Cambridgeshire and with a great deal of interest shown from teachers across the border in Essex an independent hub was set up there as well. Since then hubs have been started in Kent, West Berkshire and Buckinghamshire with expressions of interest from Nottinghamshire, Warwickshire and Manchester.

Perhaps disparagingly referred to a 'self-help' groups, they have been an important mechanism for bringing teachers together to share ideas, chat about what they have used in the classroom and also to receive training on using particular technologies.

In March the Cambridgeshire hub had a lively discussion about A Level Computing, in particular the new AQA syllabus. Kevin Bond, one of our CAS working members, chaired the discussion and his helpful guidance was appreciated by all. The Essex hub got a chance to play with some toys! Kate Sim, chair of Robocup UK, brought some Lego robots to a warm spring evening at Shenfield High School where we were tasked with the challenge of programming a robot (in teams) to run a short race. First past the post won the prize!

At time of writing the Kent hub are planning meetings on April 27th and June 8th (Greenfoot training). The North East have a Teachmeet organised for late May. Another hub is planned for Nottinghamshire, date to be confirmed whilst planning in other areas is underway. All hub events are listed on the CAS website under the Events tab. If there isn't a hub near you, why not consider setting one up? Contact CAS if you would like help getting presenters.

# HUB LEADERS TRAINING DAY

A very successful 'training day' for colleagues interested in forming local hubs was held at the end of February. Thirty members of the CAS working group met at the University of Warwick to consider ways in which the local teacher networks - hubs - could be developed. Ideas were swapped, discussions were had and training was received.

Participants were able to get a taste of Teachmeet at their Friday night un-Conference. These are informal evenings that have rapidly grown in popularity. A traditional Teachmeet is in a funky venue, with an informal setup and time for networking. You can sign up to present for either 7 minutes or a 2 minute nano-presentation. Speakers are encouraged to talk about something they have done in the classroom. Participants are chosen at random to speak. Commercial presentations are not allowed and powerpoints discouraged. Described as "the most effective form of CPD", it is a lot of fun, fast paced and inspirational. Why not try a local event? Newcastle have one planned for the summer term.

Running a hub is not a huge commitment and can be immensely rewarding, making links with those close by. See the full report of the whole event for more ideas or contact CAS for help. See the web supplement for the links to the report and the materials shared in the Teachmeet session.

*Daniel Needlestone*

## MATHS & COMPUTING SPECIALIST SCHOOLS

The specialist schools and academies trust [SSAT] supports the development of the specialist in schools in England to raise standards. With the 395 Maths and Computing specialist schools this involves raising attainment in both Maths and ICT/Computing subjects, enhancing their provision for enrichment opportunities and working with their partner schools and the community. The specialism accounts for 13% of specialist schools and is a popular option undertaken as a second specialism by high performing schools.

The issue of computing or ICT has been debated on many occasions as these schools have to choose a Key stage 4 target for ICT/ Computing, obviously this has been ICT in the past due to the lack of a computing qualification. It is an opportunity to have a group such as CAS created to provide clarity and direction to the issue of computing in schools. The SSAT has begun working with CAS in a number of ways where there is a common purpose, namely:

- Providing regional meetings for the specialist schools to share practice and ideas. [The next round of 9 SSAT regional meetings for M&C schools is in October 2010]
- Promoting opportunities for students to attend events
- Promoting curriculum opportunities for teachers
- Promoting school organised computing events.
- Highlighting the ways in which computing can enable schools to work towards the STEM agenda

If you are interesting in contacting the SSAT about developing computing opportunities, email alec.titterton@ssatrust.org.uk, the National Network Coordinator for Maths and Computing Colleges.

## CONTROL TECHNOLOGY IN THE FOUNDATION STAGE

In the Early Years Foundation Stage (EYFS) there's a recognition that ICT includes more than desktop computers, with digital cameras, flip cameras, dictaphones and even photocopiers giving children a strong sense of the ubiquitous nature of stored program devices. The statutory Early Learning Goals state that by the end of EYFS, children should: "find out about and identify the uses of everyday technology and use information and communication technology and programmable toys to support their learning." This lays a foundation on which much could later be built.

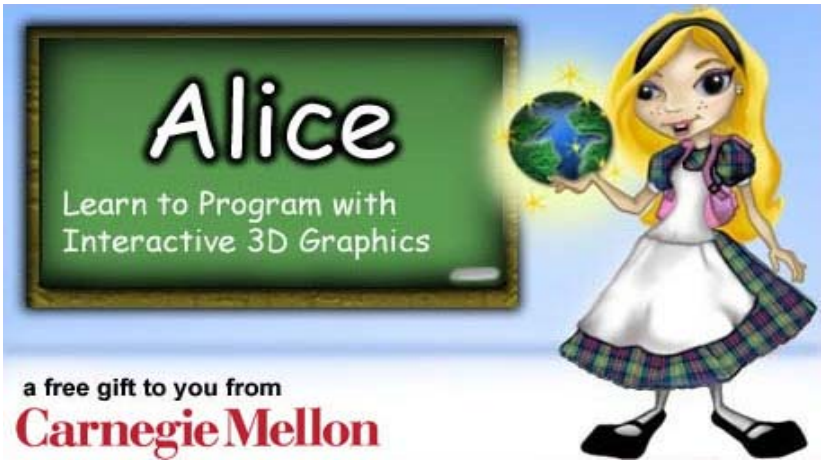
The programmable toy which has, more than any other, captured the imagination is a smiley, yellow and black plastic robot, called appropriately enough, the Bee-Bot. Very young children can to learn to program a Bee-Bot through play and experimentation, an approach advocated in EYFS guidance, inspired by Piaget's and Papert's pedagogies, and not far removed from how we learn new languages ourselves. Input consists of seven keys: forward and back, left and right turns, pause, clear and a round, green 'go' button. Bee-Bots are quite happy working one instruction at a time, trundling around any number of mats, numberlines, grids or pictures; they're also small and light enough to be picked up, turned and positioned, providing a degree of analogue interactivity!

As children become familiar, practitioners will encourage and challenge them to build more complex instructions; to play the role of a postman, visiting lots of flowers, perform geometric dances and so on. A little tail allows a pencil to be attached with a blob of Blu-Tac. Whilst these don't have the flexibility of a traditional floor turtle, they make up for this through the simplicity of their interface. Have a glance on You Tube to see what these fun, simple robots can do. *Miles Berry*

# GETTING PUPILS TO THINK IN ICT AT KEY STAGE 3

**Ofsted suggest pupils find many tasks in KS3 ICT mundane and repetitive. Zoe Ross suggests using Alice, free software designed to introduce students to programming as a way to fire their imagination and creativity.**

My first foray into Computing, two years ago at the Grange School in Cheshire was using Scratch with Year 7. As an introduction to visual programming it was, and continues to be, a great success bringing increased challenge and rigour to the curriculum. I now use Scratch, Alice and GameMaker at KS3 to encourage their creativity and foster independent learning.




Alice, a 3D object-oriented environment was introduced last year to build on the skills developed through Scratch. Developed by Carnegie Mellon University it is free to download. The ease with which my Computer Club picked up Alice prompted the introduction of a four week project for Year 9. Once introduced to the key concepts of starting their world, adding objects and methods, students can 'play' with the software, needing little guidance and demonstrating to each other the skills they learn. Alice lends itself to such collaborative learning. In subsequent lessons pupils develop simple animations, starting with a storyboard to enable them to plan the process. All have entered the Animation10! Competition, some using very basic methods, whilst others have moved on to using conditional loops, arrays and variables. Although we've encountered a few foibles the students have thoroughly enjoyed the experience. One commented; "Alice is easy to use when you get the hang of it! I'm really interested and have downloaded it at home!" There are many resources for mastering Alice, the tutorials being an excellent starting point. Further resources can be found in the web supplement. *Zoe Ross*

## DEVELOPING MIXED AGE COLLABORATIVE PROJECTS

**St Christopher's International School (Bahrain) are developing an innovative project using Scratch. Year 6 and 7 students will work together to produce maths games for Year 1. Year 11 pupils will act as mentors and Year 12 students as co-ordinators. The Year 1 users will feedback to the developers in a pseudo-RAD development style. We hope to provide an opportunity to involve children from 5 to 17 in a project to develop computational thinking and collaborative program development.** ***Brian Steene***

# SCHOOLS SIGN UP FOR THE OCR PILOT GCSE COMPUTING

**The accreditation of OCR's Computing GCSE marks a significant step forward for computing teaching. For the first time in over twenty years pupils now have a chance to gain an initial qualification in this exciting discipline.**

The new qualification is timely, coming amid growing concern about declining numbers studying Computer Science in higher education despite increasing demand for graduates in this area. Not to be confused with ICT, GCSE Computing focuses on problem solving, programming and the principles of computer design and communication. In short, it attempts to get 'under the hood' of digital technology. Although there is some overlap, since it differs significantly from ICT pupils can opt to study both, should they so wish.

The 3 units involved are complementary elements. At its heart is a strong programming element, each assessment comprising 3 tasks of increasing difficulty. The initial task in each assessment can be tackled using software such as Scratch, recognising many students will have little previous exposure to writing code. There are several free resources which introduce programming visually, through assembling blocks of commands, thus avoiding the syntax problems that often haunt beginners. Assessment criteria differentiate between working, effective and efficient code, thus promoting good practice from the outset. The course has a practical, inclusive orientation, catering for the F/G grade candidate whilst allowing talented pupils to embark on extensive investigation. The overall grade is calculated from an exam, 'Computer systems and programming' (40%), independent investigation, 'Current trends in computing' (30%) and the programming project (30%).

Research conducted by Edge last July, found 22% of GCSE students polled wanted the opportunity to learn programming, topping the wish list of unavailable subjects. The new GCSE will provide impetus for developing computing strands within ICT at KS3, as a foretaste for a qualification pupils could later opt for. And whilst it provides coherent progression for those going on to further study at A level, it also offers broad educational benefits in its own right. As Nicolas Negroponte (architect of the OLPC project) has commented, "Computer programming is a powerful tool for children to 'learn learning,' that is, to learn the skills of thinking and problem-solving… Children who engage in programming transfer that kind of learning to other things."

Although the initial pilot is restricted to around 80 schools others will be able to offer it as an option for 2011. OCR will be providing launch events this term and there is an online community for teachers to discuss and share ideas. Links to the specification and support resources can be found in the web supplement. *Roger Davies*

## CAS WIKI STARTS COLLATING TEACHING RESOURCES

**There are lots of teaching resources freely available on the web to help you teach computing, whether at Key Stage 3, the new GCSE or A Level. CAS members are using their Google Group to collate a rapidly growing list. The links are grouped in broad categories with brief comments about the suitable age group. In time it should build into a comprehensive list of material available. Other wiki pages being developed point to inspirational material and important reference papers. See the website for details of how to get involved with CAS and share in this collective knowledge.**

## TRAINEE TEACHERS INVESTIGATE PEDAGOGY

As a trainee IT and computing teacher at Southampton University my next assignment is "An Exploration of the results of Computer Situated Collaborative Learning (CSCL) using student peer mentoring in teaching and learning Scratch". I hope to investigate how approaches to introducing programming can impact on pupils' logical, thinking and learning skills.

A common maxim; "we learn 10% of what we read, 20% of what we hear, 30%, what we see, 50%,what we see and hear, 70%, what we say or write and 90% of what we teach" is based on Edgar Dale's "Cone of Experience". Such ideas are proposed in Situated Learning Theory which also incorporates the idea of communities of practice; group members learning from each other whilst working together regardless of ability. My work will explore the effects collaborative learning has on students of differing abilities working together learning Scratch.

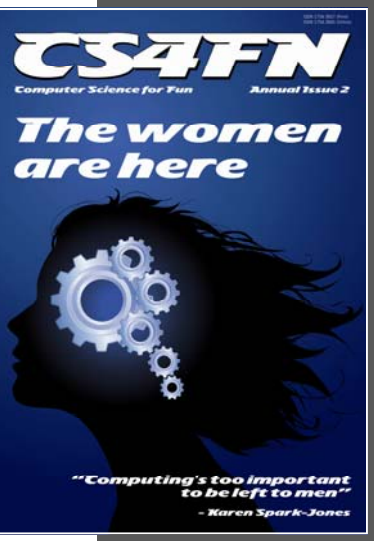
Two groups of Year 9 will be taught a topic and tested. The first group will introduce the topic to a mentee using the same materials. All will be tested and results compared between mentor / mentee and mentor first and second tests.

By comparison, two classes will be taught the topic in a traditional way. One will work in pairs, the other as individuals. Students will be paired using an adapted Kolb questionnaire, pairing those with similar learning styles as mentor and mentee. The paired control class will self select, the questionnaire used to see whether their choices are exclusively social or include an element of learning style compatibility. I will be pleased to share the results with CAS in June. *Mo Hall*

## WHERE ARE THE GIRLS? CHALLENGING STEREOTYPES

A special issue of Computer Science for Fun magazine (cs4fn), about the contribution of women to computer science, is being released at Easter. It's filled with exciting research done by women, stories about significant women in the history of computer science and interviews with women who work in computer science research.

The women's issue is being released as part of the continuing effort by cs4fn to highlight the contributions women make to computer science, and to address the erroneous but persistent stereotype that CS as a subject is more suited to males. There has long been a problem in recruiting women on to computer science and electronic engineering courses, despite leading players in the field being women.




In addition to highlighting the contribution of women to CS, the issue uses the usual cs4fn format of writing about real research in a fun and exciting way. Students will learn about computing principles and see how they relate to real life. We highlight interdisciplinary links between computing and other areas of science. Our stories aren't limited to science though – the women's issue includes stories relating to film, the arts, history, love and lots more.

A copy will be sent to schools across the UK, and if you already subscribe to cs4fn, you'll receive the women's issue automatically as well. However, if you don't currently subscribe, or want to make sure you have a copy of your own, sign up to receive it by visiting www.cs4fn.org and following the link to receive a free copy of our magazine. When you fill in the form, let us know that you're specifically interested in the women's issue and we'll send one to you.

*Jonathan Black*

# BUILD YOUR OWN GAMES WITH A NEW FREE RESOURCE

**Kodu is a new visual programming language made specifically for creating games. It is designed to be accessible for young children. The programming environment runs on the Xbox using only a game controller for input.**

The core of the Kodu project is the user interface. The language is simple and entirely icon-based. Programs are composed of pages, which are broken down into rules, which are further divided into conditions and actions. Conditions are evaluated simultaneously. A simple page is shown below.


In development for over three years in Microsoft's research labs, Kodu has been designed specifically for making game development accessible without specialist programming knowledge. Programs are expressed in everyday physical terms, using concepts like vision, hearing, and time to control the behaviour of some twenty different characters. The 3D worlds can be edited easily and new ones easily created. It's clearly not a replacement for general-purpose programming languages, but it allows children to develop game concepts in a simple, intuitive manner using an input device with which they are very familiar.

Teachers will be pleased to hear that a PC version is also available free to educational institutions.. This can use a keyboard and mouse for input although a game controller is preferable. If your school doesn't have a stock of these consider asking the pupils to bring their own—guaranteed to add the wow factor to any computer club!

Watch out for a full review in the next issue, but better still, come along to Computing At School's second annual teachers conference in July where you can meet and hear project developer Matthew McLaurin talk about the research behind visual programming, the Kodu project and get a live demonstration.

## INTRODUCING COMPUTING AFTER SCHOOL

**You don't have to be a teacher to get involved in developing computing at school. Matthew C. Applegate, better known as renowned chip tune musician Pixelh8 has been running an after school programming club at Hollywells High School in Ipswich. He uses Processing, an open source language chosen partly because Mobile Processing is used to develop apps on mobile devices. Read, and be inspired by, his experiences on his blog. Details of this and more Processing links in the web supplement.**

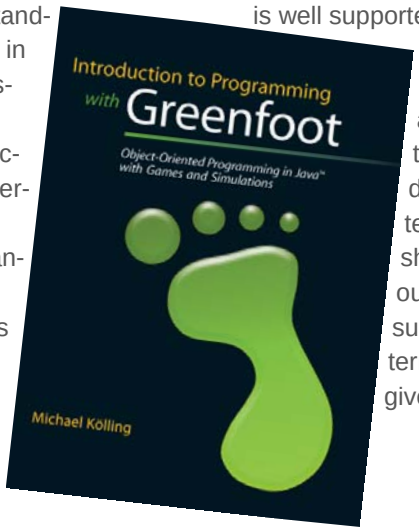
# INTRODUCING OBJECTS FIRST: HAVING FUN WITH GREENFOOT

**Teaching object-oriented programming at school level? In Java? And students having fun and enjoying it while they are learning to program? Is that possible? Yes it is, argues Michael Kolling, thanks to Greenfoot.**

Greenfoot is designed to achieve two major goals: To support teaching the concepts of object orientation, and to motivate students by developing animated graphical projects, such as simple games, very quickly. In fact, within the first day of programming students can have a game-like project on screen – written by themselves.

Teaching object-oriented programming (OOP) in general, and Java in particular, is highly attractive. Object orientation is currently the dominant style of programming, both in industry and in academia, and is sure to remain so for some time to come. And Java is the most popular language within this paradigm. The problem in the past has been that Java was quite hard to teach. The technical infrastructure can be overwhelming, and the concepts of OOP – classes, objects, methods, behaviour, state – are difficult to illustrate to beginners.

That's where Greenfoot helps. Developed specifically for school age learners it makes using Java much easier by removing the technical overhead not needed for understanding the fundamental concepts. Learners use objects right from the start. Students can create creatures – crabs, ants, space ships, whatever they like – and program them to move and act in interesting ways. Understanding object orientation in purely text-based systems is known to be very hard. By introducing the concept of interacting objects early and in a concrete manner, learning these important foundations becomes easy and feels natural.




Other systems exist with similar aims, using languages other than Java. Most successful are the two systems Scratch and Alice. Both use a language represented by pre-fabricated blocks. Programs are written by dragging and dropping the blocks, sticking them together in a Lego-like fashion. This interaction has advantages: No syntax errors are possible, and starting is quick and easy. They also have several disadvantages: Once students get more ambitious and aim to create games of the kind they see and play, such systems cannot keep up. They become cumbersome to program and slow to execute. Their toy-like nature becomes apparent.

Greenfoot is different. Being based on Java (and programming through textual input), the start is not as easy as with Scratch or Alice. On the other hand, students learn an established language that they can use for many years to come. While Scratch and Alice are easily usable for Year 6 or 7, Greenfoot aims at learners from 14 upwards. But the concepts learnt transfer directly to programming in other environments once students are ready to move on to more professional tools. Greenfoot lets them expand into any area programming has to offer.

Developed at the University of Kent, it is well supported: There are free tutorials (both text and video), a full textbook, a forum for users and the "Greenroom", a dedicated forum for teachers to talk and share resources. Check out the links in the web supplement. Summer term is an ideal time to give it a go.

## ENGAGE PUPILS WITH LOCAL COMPETITIONS

Now in its 3rd year, the UK Schools Animation competition, Animation10! is breaking its own records. With 500 schools registered and over 1200 submissions Easter will be a busy time for the judges. Awards Day on 9 July will be at The Lowry, Salford Quays, featuring Computer Science workshops and a talk by Professor Steve Furber.

But it's not just national events that can engage pupils in computing. In Coventry, the BCS has just completed its 3rd bi-annual competition, offering prizes of IT equipment to schools and individual prizes for winning students. With over 20 schools participating in this years challenge to design a website, the initiative has proved popular with girls as well as boys. Moreover, the competition has helped cement a collaborative network involving the BCS, the local LEA's, schools and Warwick and Coventry Universities through workshops supporting the competition. A similar event is now being planned by the BCS in Wiltshire.

The quality of web pages created by 11 year olds amazed Andrew Cheadle at Avignon College, Switzerland. They happily embedded animations created in Pivot and Scratch but all the coding was written in raw html. Maybe the OLPC laptop prize was the key! With another year using Greenfoot he expects an even bigger response next year.

School based competitions don't need big prizes though. At QES in Cumbria their was fierce competition across all year groups in their LightBot Challenge. Organised in the run up to Xmas, a first prize of a chocolate Santa saw some 60 pupils battle to reach the highest level using the lowest number of commands.

## A PAUSE FOR THOUGHT

Project Euler is a growing collection of maths problems to solve using computer programs. The website was started by Colin Hughes in 2001. There are currently over 280 problems of varying difficulty, each solvable in less than a minute using an efficient algorithm on a modestly powered computer.

The first Project Euler problem is: If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23. Find the sum of all the multiples of 3 or 5 below 1000.

Though this problem is much simpler than subsequent ones, it illustrates the difference an efficient algorithm makes. A brute force algorithm examines every natural number less than 1000 and keeps a running sum of those meeting the criteria. This method is relatively simple to implement. Can you find a more elegant solution?

Answers and links to Project Euler (which is free to register) can be found in the web supplement on the website.

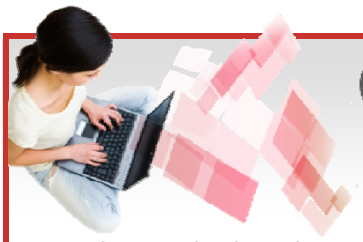
# A MAGICAL OFFER FROM CS4FN


**Two volumes of magic tricks are now available from the CS4Fn website. Learn the secrets, pick up tips about delivery but most of all see how magic can be used to illuminate the concepts of computer science.**

These two volumes will provide you with lots of inspirational ways to bring computing to life in the classroom. They are available to download free, see the link in the web supplement. The CS4Fn website is a treasure trove for teachers. Regularly updated with new articles about developments in computing written in a style aimed at school students. There's also a wealth of information about the fundamentals of the discipline, interactive resources to demonstrate concepts and engage pupils plus links to other support materials. CS4Fn explores how computer science is about people, solving puzzles, creativity, changing the future and, most of all, having fun.

## THE NEW MACHINE INTELLIGENCE TURING LECTURE

**Readers who ordered the free DVD from the last issue be familiar with Chris Bishop's ability to convey complex ideas in an accessible way. Chris recently presented the annual BCS / IET Turing Lecture. Computers are traditionally viewed as logical machines which follow precise, deterministic instructions. The real world in which they operate, however, is full of complexity, ambiguity, and uncertainty. Chris looks at the field of machine learning and explores future potential for this technology. The lecture, ideal for students can be viewed online. Link in the web supplement.**



## COMPUTING AT SCHOOL

EDUCATE · ENGAGE · ENCOURAGE

Computing at School was born out of our excitement with the discipline, combined with a serious concern that students are being turned off computing by a combination of factors. SWITCHEDON is published each term. We welcome comments, suggestions and items for inclusion in future issues. Our goal is to put the fun back into computing at school. Will you help us?

Send contributions to **newsletter@computingatschool.co.uk**

**Many thanks to the following for help and information in this issue:** *Matthew Applegate, Miles Berry, Chris Bishop, Jonathan Black, Andrew Cheadle, Mark Clarkson, Paul Curzon, Roger Davies, Irene Glendinning, Mo Hall, Toby Howard, Simon Humphreys, Michael Kolling, Jack Lang, Margaret Low, Bill Mitchell, Daniel Needlestone, Simon Peyton-Jones, Zoe Ross, Shahneila Saeed, Brian Steene, Alec Titterton, John Woollard. BeeBot photo: Antony Evans.*

**SWITCHEDON WEB SUPPLEMENT: LINKS & EXTRA INFORMATION**

www.computingatschool.org.uk / newsletter

## COMPUTING THE NEXT GENERATION

**Computing At School**

**Second Annual Teacher Conference**

**BIRMINGHAM UNIVERSITY**

Friday 9th July

*A day packed with meetings, discussions and activities guaranteed to inspire, educate and bring computing to life. Numbers are strictly limited so book your place as soon as possible.*

**http://casconf2010.eventbrite.com**

**LET'S PUT THE EXCITEMENT BACK!**