GCSE Computer Science (9-1)

First teach 2016
Computer Science Community

• CS now firmly embedded in the curriculum
• CS now appearing in primary schools
• CAS really helping in supporting teachers
• Exciting new Codio resources
• Ebacc and the 4th Science
• None specialists and technical support
New GCSE in Computer Science

- Inline now with new A Level
- A new focus on algorithms and computational thinking
- New content!
- Use any relevant language, Python, C++, Java etc
- Project more refined and more focussed on coding
- Relevant and engaging
Course structure

• 2 papers
  – Computer Systems
  – Computational thinking, algorithms and programming

• 1 hour 30 minutes each

• 80 marks per paper

• 40% each

• Programming Project (20% NEA, 40 marks, 20 hours)
Computer Systems (Comp 1)

- Systems Architecture
- Memory
- Storage
- Wired and wireless networks
- Network topologies, protocols and layers
- System security
- System software
- Ethical, legal, cultural and environmental concerns
Level of response exercise:

Pick a news article or topic and dissect it using the following framework. This should form the base of a reasonable LOR answer.

<table>
<thead>
<tr>
<th>Stake holders:</th>
<th>Technology Involved:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Anybody involved either directly or indirectly</td>
<td>• Any technology and how it relates to the problem/topic</td>
</tr>
<tr>
<td>• How are they effected and to what extent</td>
<td>• Different technologies that are related</td>
</tr>
<tr>
<td></td>
<td>• How the technology works within the context</td>
</tr>
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<td></td>
<td>• Comparisons</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Moral/Social/Cultural/Legal Issues:</th>
<th>Solutions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How the issue relates to any moral, social or cultural context</td>
<td>• Any technological or other solution and how it solves the problem</td>
</tr>
<tr>
<td>• What are the legal issues?</td>
<td>• Analysis of solution and its effects</td>
</tr>
<tr>
<td>• How are the stakeholders effected?</td>
<td>• How it all fits together</td>
</tr>
<tr>
<td>• How does the technology relate?</td>
<td></td>
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</tbody>
</table>
Computational thinking, algorithms and programming (Comp 2)

- Algorithms
- Programming techniques
- Producing robust programs
- Computational logic
- Translators and facilities of languages
- Data representation
Algorithms and problem solving

• Elements of computational thinking
  – Thinking abstractly
  – Thinking ahead
  – Thinking procedurally
  – Thinking logically

• Problem solving (100 coding challenges)
  – Programming techniques
  – Computational thinking
Programming Project (Comp3 NEA)

- Programming techniques
- Analysis
- Design
- Development
- Testing and evaluation and conclusions
Programming Project (Comp3 NEA)

3 tasks:
• Linear task
• Semi-open task
• Open task (stretch)

• Allows more differentiation (9-1) and avoids malpractice issues.
Programming languages

- The project must be a coded solution, some languages are specified
  - Python
  - C family of languages (for example C# C++ etc.)
  - Java/JavaScript
  - Visual Basic/.Net
  - PHP
  - Delphi
  - SQL
  - BASH
Presentation

• A single narrative document is the most appropriate way to present the work.
• The single document approach demonstrates the candidate’s thinking and approach effectively.
• The report is a presentation of the process and their conclusions and there are marks available for the clarity of their approach to the practical investigation.
Process for success

• **Success criteria** (what will a successful solution be)
• **Planning and design** (flow charts and pseudocode)
• **Development** (narrative of the process with explanations of code)
• **Testing and remedial actions** (with narrative of changes made)
• **Evaluation** (clearly linked to success criteria)
NEA

• Teachers should prepare the background so that candidates can start the assessment
• Candidates may have access to various resources, including the internet, but must acknowledge all source material and it is their additional contribution that is assessed.
NEA

• It is the teacher’s responsibility to ensure the work is that of the candidate and that no plagiarism has taken place.
• It is important candidates are monitored to ensure they do not download or otherwise introduce and use solutions they have not prepared in class.
• Candidates must work on their own to produce the solutions, it is not a group exercise.
NEA

• Once the work is submitted:
  – Teachers **may not** provide feedback on the work for candidates to revisit and modify the work
  – The work may not be revisited and must be kept securely
‘Best fit’ – within mark bands

• Where the learner’s work **convincingly** meets the statement, the highest mark should be awarded.

• Where the learner’s work **adequately** meets the statement, the most appropriate mark in the middle range should be awarded.

• Where the learner’s work **just** meets the statement, the lowest mark should be awarded.
Malpractice examples

• **plagiarism**: off the internet or from other students, BUT, acknowledged quotes to support work are ok.
• **writing frames**: are NOT ok. Students must create their own responses.
• **Non-compliance with instructions**: e.g. using unapproved software or techniques
• **excessive help**: students should be prepared by being taught approaches / techniques, but must produce all the submitted material themselves. Individual feedback from the teacher after the task taking has commenced is not allowed. But, common problems can be addressed to the group by way of general hints and suggestions.
Malpractice

Teachers can:
• Explain the task
• Advise on how the task could be approached
• Advise on resources
• Alert the learner to key things that must be included in the final piece of work
• Interrogate learners on their work, to ensure test validity.

Teachers must not:
• Comment on or correct the work
• Practise the task with the learners
• Provide templates, model answers or feedback on drafts
• Produce templates or model answers and publish them online.
Developments

• MOOC V3 – www.codio.com
• Papers are different (coding) and implications in delivery/assessment
• Different approach to teaching
• Communicating change
• Teaching ‘Computational thinking’
• The ICT/CS divide
Teach the new Computing curriculum with confidence
What is Codio?

Codio is a uniquely differentiated web based platform for learning and teaching computing.

“The cloud coding and course content platform for teaching Computer Science in schools and universities.

**Computing**
A world-class, web based coding environment (IDE) usable by beginners and professionals alike with extraordinary features.

**Content**
A comprehensive portfolio of courses and modules designed for and mapped to the new Computing curriculum.

**Support**
Substantial teacher focused functionality for managing classes, integrated assessments, accessing student code and much more.
Addressing Teachers’ Pain Points

The community seems to be flooded with resources – how can I be sure resources map to the curriculum and support a scheme of work?, not just GCSE/A level but KS3 as well.

We have a local server and we’ve downloaded some software – but it’s not adequate and we can’t get it working on students’ own devices.

I can’t add another administrative burden of having to extract/copy/paste information from one system to our own VLE.

I’d like to be sure I can track and monitor student progress – against the curriculum and against learning objectives.

Textbooks alone aren’t cutting it – I need students’ to have the technology and tools to put theory into practice.

I need a platform that keeps student project work secure and version controlled.
Codio’s Schools Proposition

“The complete solution for teaching the new Computing curriculum”

Codio offers teachers a comprehensive set of benefits

1. Comprehensive curriculum- mapped course content.
2. Extensive teacher support for organising and tracking students.
3. Uniquely engaging teaching and student experience.
4. Accessible anywhere.
5. Savings on IT infrastructure costs, administration & set up time.
6. Unlimited project workspace and storage.
Making learning more engaging

Codio’s teaching and learning experience uniquely combines instructional resources with working code and a preview window.

The interface can be configured to a range of backgrounds including dyslexic support.

Content is structured in modules and units mapped to the curriculum – and bite sized to support lesson planning.
Extensive teacher support

Easily organise students into classes & track whole class progression.

See individual student progress via built-in assessments; auto-marked.

Wide variety of assessment types integrated or create your own.
How much does Codio cost?

Codio offers a “whole school” licence for a defined number of users, inclusive of content, teacher support and unlimited project workspace.

<table>
<thead>
<tr>
<th>Users</th>
<th>Price, £ p.a.</th>
<th>With 15% Introductory offer</th>
<th>Per User</th>
<th>Fully inclusive Annual Licence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>£12</td>
<td>n.a.</td>
<td>£12</td>
<td>All curriculum mapped content</td>
</tr>
<tr>
<td>50</td>
<td>£600</td>
<td>£510</td>
<td>£10.20</td>
<td>All new content during licence period</td>
</tr>
<tr>
<td>100</td>
<td>£960</td>
<td>£816</td>
<td>£8.16</td>
<td>Built in assessments</td>
</tr>
<tr>
<td>250</td>
<td>£1,950</td>
<td>£1,657.50</td>
<td>£6.63</td>
<td>Teacher dashboard for student progress tracking**</td>
</tr>
<tr>
<td>500</td>
<td>£3,000</td>
<td>£2,550</td>
<td>£5.10</td>
<td>Easy school set up; VLE/MIS integration**</td>
</tr>
<tr>
<td>1,000</td>
<td>£4,800</td>
<td>£4,080</td>
<td>£4.08</td>
<td>UK support</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Unlimited cloud computing space</td>
</tr>
</tbody>
</table>

** Available July 2015
Command words

• Command words will be used consistently in all assessment material and resources
• Makes assessment more transparent
• Allows easier teacher resource and exam preparation material creation
• Removes barrier to answering questions
• Makes mark schemes easier to work with
Submission of work

• Please:
  – Submit work as a single pdf document
  – Submit work electronically
  – Use the repository

• If not possible try to submit electronically on suitable media (CD/DVD/Memory stick)
Support

OCR will be providing a range of support materials including:

• A dedicated subject-specific telephone number/email
• Centre visits where needed and attendance at CAS hubs
• A Centre Report on the Assessment
• Coursework Consultancy – get it in quick!
• Individual feedback to each Centre on the moderation of coursework
• CPD
• Additional teacher guidance that includes:
  – Delivery guides
  – Lesson elements
  – Topic exploration packs
OCR Website – [www.ocr.org.uk](http://www.ocr.org.uk)

[@ocr_ict](https://twitter.com/ocr_ict) - tweet/follow me for resources

We're also on CAS and on Facebook

**Customer Contact Centre**
Tel: 01223 553998
Email: [computerscience@ocr.org.uk](mailto:computerscience@ocr.org.uk)

**Customer Contact Centre (Vocational)**
Tel: 024 7685 1509 Fax: 024 7642 1944
Email: [vocational.qualifications@ocr.org.uk](mailto:vocational.qualifications@ocr.org.uk)
Questions?

@ocr_ict