Computer Science Year 10 and Year 11 Roadmap

Subject Aim: Students will have 5 x 1 hour long lessons per fortnight. Students will be completing the OCR GCSE in Computer Science J277, first teaching from 2020. The Year 10 content is as practically based as possible with an emphasis on theoretical and practical skills development through PC building and Python Programming. The programming language 'Python' used is industry standard and widely used by major global organisations including Amazon, Microsoft and NASA. Students will be able to understand and apply the fundamental principles and concepts of Computer Science, analyse and solve problems as well as think creatively, logically and critically. Throughout the course students will understand the components that make up digital systems, understand the impacts of digital technology and apply mathematical and scientific skills relevant to Computer Science.

Contacts

Computing and IT Department: Mr Nicol (Subject Progress Leader), Mrs Puckey (Assistant Subject Progress Leader KS3), Mr Linworth. We are based in the Computing and IT Department A15, A16, H9. Student issues – please do not hesitate to ask for help. We also run "drop-in" sessions (open to students for any help/questions) in A15 on Monday-Friday during morning break or with individual teaching staff by prior arrangement.

OCR GCSE Computer Science Specification

If you would like to view the specification for the GCSE Computing course click here: visit **www.ocr.org.uk** and select Qualifications/GCSE Computing Science/ J277

J277/01 Computer Systems (Exam)	J277/02 Computational Thinking (Exam)
Assessment J277/01 • 1 hour 30 minute written examination • 80 marks • OCR set and marked • Exam assessment in June 2024 This will directly assess the learning outcomes titled as **"Be able to":** **Topic 1:** Systems Architecture **Topic 2:** Memory and Storage **Topic 3:** Computer Networks, Connections and Protocols **Topic 4:** Systems Software **Topic 5:** Ethical, Legal, Cultural and Environmental Impacts of Digital Technologies	Assessment J277/02 • 1 hour 30 minute written examination • 80 marks • OCR set and marked • Exam assessment in June 2024 This will directly assess the learning outcomes titled as **"Be able to":** **Topic 1:** Algorithms **Topic 2:** Programming Fundamentals **Topic 3:** Producing Robust Programs **Topic 4:** Boolean Logic **Topic 5:** Programming Languages and Integrated Development Environments

Topics (Year 10)	Assessment (Year 10 & Year 11)
AUTUMN TERM Students will learn about Data Representation and Computational Logic. The students will learn how data is manipulated by the Central Processing Unit (CPU). Students will learning about Systems Architecture to enable them to understand how the CPU processes data and instructions in order to run software. Students will learning how computers use Memory and Storage to understand how computers store programs in long term memory and store data and instructions in Random Access Memory (RAM). Students will learn the importance of Systems Software. Software that allows a computer to operate in an expected manner.	You will be regularly assessed in three ways: 1. **End of topic tests** – Once all activities for a topic are complete, you will have an online assessment during the lesson. Tests will consist of long, short, multiple choice and true/false questions. These will be model the format of the **J277/01** (exam). 2. **End of unit** mock examination based on OCR Exam builder or using Practice Papers from OCR. 3. **Homework:** Mostly involves research and lesson preparation, this includes completion of VIN notes and exam revision cards in preparation for tests/exams. Students may be directed to additional study using the department Virtual Learning Environment (VLE) or their revision guide, revision cards or knowledge organisers.

Topics (Year 10)	Homework (Year 10 & Year 11)
SPRING TERM Students will learn about Computer Networks learning how computers can be connected together and how data is shared between computers over different types of Networks. Students will learning about Systems Security (Cyber Security) to better understand the threats posed to a computer network and how to prevent threats. Students will learn standard search and sorting Algorithms that can be utilised by a computer program to search and sort data. Students will learn about Translators in order to understand how a computer program can be written in a high-level language and be interpreted into a low-level language to run on a computer processor.	Homework will be set regularly covering the key areas listed below: • Revision homework (topic specific) • **J277/01** Exam prep homework – making exam revision cards • Reviewing very important notes (VINs) • Educa8 VLE work – watching videos/research/extra targeted lessons

	Assessment Revision (Year 10 & Y11)
Summer Term	Full details of any assessment, how to revise for it and the revision materials available are accessible from the Educa8 Virtual Learning Environment (VLE)
	Enrichment (Year 10 & Year 11)
	Students are provided with many opportunities to enrich what they are taught in the classroom. This includes PC building, network design, educational visits to the national computing museum or Bletchley Park. Computer Club for Girls (CC4G). Games Development Club

Where next from Year 10 IT?

The course continues into Year 11, where you will continue to study the final units of study to complete the course in full. Students who did not achieve their target grade in the external examination will have the opportunity to resit this element of the course in May of Year 11.

Topics in Year 11

<table>
<tr><td rowspan="1">AUTUMN TERM</td><td>Students will continue to develop their basic knowledge and understanding of programming principles such as variables, Input/Output, Sequence, Selection, Iteration.

Students will work through a series of tasks designed to develop and practice basic programming principles in order to develop their confidence to work on more complex programs.</td><td>Students will be assessed in two ways.

1. Students will be assessed continually during lesson to ensure that they are able to progress through the practical programming tasks.

2. Students will be given a formal grade for completion on their 'practical project' tasks in lessons and/or at home.</td></tr>
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Topics in Year 11

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<tr><td rowspan="1">SPRING TERM</td><td>Students will continue to build upon the basic programming principles learnt during the previous term and learn more advanced programming techniques such as the use of arrays, basic file handling and functions as well as procedures.

Students will continue to complete structured tasks designed to develop and practice additional programming principles as well as being given longer tasks that require students to decompose the task and build solutions iteratively.</td><td>Students will usually receive a project-based homework per half term. The purpose of which is to draw together everything covered throughout each half term. This reinforces the opportunities given to students to undertake programming tasks.</td></tr>
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Topics in Year 11

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<tr><td rowspan="1">SUMMER TERM</td><td>Students will learn to build defensive design techniques into their programs in order to anticipate user misuse and validate user input. They will learn to test their programs that they build to determine how successful their programs are at fulfilling requirements.

Towards the end of the summer term students will spend the majority of their time focussed on revising gaps in the knowledge and understanding as well as going through walking, talking mocks or end of year mocks in preparation for their final external examinations.</td><td>Students are provided with many opportunities to enrich what they are taught in the classroom. This includes PC building, network design, educational visits to the national computing museum or Bletchley Park. Computer Club for Girls (CC4G). Games Development Club

To the future: VR/MR/AR development using Oculus Headsets.

Programming Drones using Python</td></tr>
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Where next from Year 11 IT?

At The Kimberley School 6th Form we offer students the opportunity to study the Cambridge Technicals L3 Introductory Diploma in IT or A Level Computing Science (Subject to Curriculum Development and Staffing) Both of which provide natural pathways to follow to this course. You can find out more about the L3 course by visiting the Kimberley school website: www.kimberleyschool.co.uk or by visiting the OCR A Level Computing Science or Cambridge Technicals homepage by clicking here: Cambridge Technicals - Information Technology - OCR