

## All Saints' Academy Computer Science Department KS4 Curriculum Overview - September 2023\_24

Aims and Learning Outcomes

OCR's GCSE (9–1) in Computer Science will encourage students to:

Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation Analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs Think creatively, innovatively, analytically, logically and critically Understand the components that make up digital systems, and how they communicate with one another and with other systems Understand the impacts of digital technology to the individual and to wider society Apply mathematical skills relevant to Computer Science.

| Assessment Overview                  |   |  |  |
|--------------------------------------|---|--|--|
| Written paper: 1 hour and 30 minutes | Written paper: 1 hour and 30 minutes                                |  |  |
| 50% of total GCSE                    | 50% of total GCSE 80 marks  |  |  |
| 80 marks                             | This is a non-calculator paper.                                     |  |  |
| This is a non-calculator paper.      |   |  |  |
|                                      | This paper has two sections: Section A and Section B. Students must |  |  |
|                                      | answer both sections  |  |  |

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| Cycle   | Year 11   |   | Enrichment  |  |
|---------|---|---|---|--|
| Careers | Software Developer/Engineer, Data Scientist, Cybersecurity Analyst, Web Developer, Systems Analyst, Network Administrator, Artificial Intelligence (AI) Engineer, UX/UI Designer, IT Project Manager, Database Administrator, Computer Programmer, IT Consultant & Game Developer   |   |   |  |
| 1       | Algorithms         Principles of computational thinking: o Abstraction o Decomposition o Algorithmic thinking Identify the inputs, processes, and outputs for a problem, Structure diagrams, Create, interpret, correct, complete, and refine algorithms using: <ul> <li>Pseudocode, Flowcharts, Reference language/high-level programming language Identify common errors " Trace tables</li> <li>Standard searching algorithms:                 <ul></ul></li></ul>   | <ul> <li>Practical use of the data types in a high-level language within the classroom</li> <li>Ability to choose suitable data types for data in a given scenario</li> <li>Understand that data types may be temporarily changed through casting, and where this may be useful</li> <li>Practical use of the additional programming techniques in a high-level language within the classroom</li> <li>Ability to manipulate strings, including:         <ul> <li>Concatenation, Slicing, Arrays as fixed length or static structures, Use of 2D arrays to emulate database tables of a collection of fields, and records</li> <li>The use of functions</li> <li>The use of functions where to use functions and procedures effectively</li> <li>The use of the following within functions and procedures:                 <ul> <li>local variables/constants</li> <li>global variables/constants</li> <li>arrays (passing and returning)</li> </ul> </li> </ul> </li> <li>SQL commands:         <ul> <li>SELECT, FROM, WHERE</li> <li>Be able to create and use random numbers in a program</li> </ul> </li> </ul> | Coding Workshops – GCHQ link  |  |
| Careers | Digital Marketing Specialist, Cloud Architect, Mobile App Developer, Computer Systems Analyst, Information Security Analyst, IT Support Specialist & Technology Teacher/Instructor  |   |   |  |
| 2       | Producing Robust Programs         Defensive design considerations:         •       Anticipating misuse, Authentication         •       Input validation         •       Maintainability:         •       Use of sub programs, Naming convention, Indentation, Commenting         The purpose of testing       •         •       Iterative, Final/terminal         •       Identify syntax and logic errors         •       Selecting and using suitable test data:         •       Normal         •       Invalid/Erroneous         •       Refining algorithms                                       | Boolean Logic         Knowledge of the truth tables for each logic gate, Recognition of each gate symbol, understanding of how to create, complete or edit logic diagrams and truth tables for given scenarios.         Ability to work with more than one gate in a logic diagram  | Tech Entrepreneurship Challenges<br>Guest Speak: IOActive, Jean<br>Goulding Institute & Cyber First, QA<br>& Sopra Steria |  |
| 3       | Revision and Exam Preparation           https://teach-ict.com/2016/revision/flashcards_ocr/flashcards_ocr.html           https://teach-ict.com/2016/revision/multiple_choice/gcse_ocr_multiple_choice.html           https://teach-ict.com/2016/revision/exam_questions_ocr/gcse_ocr_exam_questions_bytopic.html           https://teach-ict.com/2016/revision/exam_questions_ocr/gcse_ocr_exam_questions_bytopic.html           https://teach-ict.com/2016/revision/exam_questions_ocr/gcse_ocr_exam_questions.html           https://teach-ict.com/2016/revision/pseudocode_ocr/pseudocode_ocr.html | ·   | The use of <b>SMART REVISE</b><br>throughout the year   |  |