



**Computer Science**  
**Sorting Algorithms**  
Applicant Study Pack

Introduction	<p>Over the full two years, you will continually develop your programming ability in multiple languages, and as a result be a highly desirable candidate to potential universities and employers.</p> <p>You will begin with programming from the very first day and apply what you learn to more advanced programming concepts such as data structures and algorithms. This will be predominantly done within the first term, alongside learning about the fundamentals of computation.</p> <p>When you return after the first term, you will then be moving onto web development, databases and networks. What you learn here will also prepare you for your final year project during the second year of your course.</p> <p>The following term you will then learn about the fundamental low-level concepts of Computer Science, these include the system architecture such as processors and other hardware, and system software such as operating systems and memory management. After this point you will be able to explain exactly how a computer operates from the ground up.</p> <p><b>Recommended Skills and Interests</b></p> <ul style="list-style-type: none"> <li>• Programming and solving problems</li> <li>• Always wanting to know “how things work”</li> <li>• Mathematics, in particular “Maths for Computing”</li> <li>• Looking for a career within Computing i.e. Cyber Security, Artificial Intelligence, Software Development etc.</li> </ul> <p>You can be working on your programming ability right now in whatever language you choose! At Clarendon Sixth form you will use <b>Python, Swift</b> and <b>JavaScript</b>. If you have a strong ability in any of those languages coming into the course, you will hit the ground running.</p>										
Objectives	<p>Objectives:</p> <ul style="list-style-type: none"> <li>- Identify the purpose of sorting algorithms.</li> <li>- Successfully trace the bubble sort algorithm, the insertion sort algorithm and the merge sort algorithm.</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Literacy – Key Words</th> </tr> </thead> <tbody> <tr> <td>Algorithm</td> <td>- A set of steps/instructions needed to complete a software task.</td> </tr> <tr> <td>Bubble Sort</td> <td>- A method of sorting a set of data by repeatedly stepping through the dataset and swapping any pairs that are in the wrong order.</td> </tr> <tr> <td>Insertion Sort</td> <td>- A method of sorting a set of data by repeatedly comparing data items with previous items in a dataset, before inserting them into the correct position.</td> </tr> <tr> <td>Merge Sort</td> <td>- A method of sorting a set of data by splitting the dataset up into its individual items and then continually pairing items from the dataset in order until the entire dataset has been ordered.</td> </tr> </tbody> </table>	Literacy – Key Words		Algorithm	- A set of steps/instructions needed to complete a software task.	Bubble Sort	- A method of sorting a set of data by repeatedly stepping through the dataset and swapping any pairs that are in the wrong order.	Insertion Sort	- A method of sorting a set of data by repeatedly comparing data items with previous items in a dataset, before inserting them into the correct position.	Merge Sort	- A method of sorting a set of data by splitting the dataset up into its individual items and then continually pairing items from the dataset in order until the entire dataset has been ordered.
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Task 1	<p>Watch the following video then answer the questions below.</p> <p>Craig N Dave Bubble Sort  <a href="https://www.youtube.com/watch?v=5GqZ0Gueb0Q">https://www.youtube.com/watch?v=5GqZ0Gueb0Q</a></p> <ol style="list-style-type: none"> <li>1) What is the purpose of the Bubble Sort Algorithm?</li> <li>2) What does the term 'pass' mean, when discussing Bubble Sort Algorithms?</li> <li>3) Describe how the Bubble Sort works.</li> </ol>
Task 2	<p>Now that you understand what a sorting algorithm is and have seen one in action, watch the following videos on Insertion Sort and Merge Sort. Once you have watched them, describe how each one works.</p> <p>Craig N Dave Insertion Sort  <a href="https://www.youtube.com/watch?v=ZV3Gd2wZBro">https://www.youtube.com/watch?v=ZV3Gd2wZBro</a></p> <p>Craig N Dave Merge Sort  <a href="https://www.youtube.com/watch?v=TcNNPUIRqI8">https://www.youtube.com/watch?v=TcNNPUIRqI8</a></p>
Further reading / links	<p>Common Algorithms – BBC Bitesize  <a href="https://www.bbc.co.uk/bitesize/guides/zjdkw6f/revision/1">https://www.bbc.co.uk/bitesize/guides/zjdkw6f/revision/1</a></p> <p>Isaac Computer Science – Bubble Sort  <a href="https://isaacomputerscience.org/concepts/dsa_search_bubble">https://isaacomputerscience.org/concepts/dsa_search_bubble</a></p> <p>Isaac Computer Science – Insertion Sort  <a href="https://isaacomputerscience.org/concepts/dsa_search_insertion">https://isaacomputerscience.org/concepts/dsa_search_insertion</a></p> <p>Isaac Computer Science – Merge Sort  <a href="https://isaacomputerscience.org/concepts/dsa_search_merge">https://isaacomputerscience.org/concepts/dsa_search_merge</a></p>
Call to action	<p>Visit our website – <a href="http://www.clarendon.ac.uk">www.clarendon.ac.uk</a> for more information.</p> <p>Attend our New Student Day</p> <p>Join us for enrolment in August. Letters will be sent to all applicants at the end of July with more details.</p>