

OCR A Level Year 1 SOW 2017-2018

Three 100 Minute lessons each week.

Week No	Date	Lesson	Homework/Resources
1	04/09/2017	Introduction to computational thinking  What is an Algorithm Introduction to the course.  Introduction to programming in VB IDE. Learn to write pseudo code Introduction to the concept of variables, data types.	<a href="https://ed.ted.com/lessons/can-you-solve-the-bridge-riddle-alex-gendler">https://ed.ted.com/lessons/can-you-solve-the-bridge-riddle-alex-gendler</a>  <a href="https://ed.ted.com/lessons/can-you-solve-the-prisoner-hat-riddle-alex-gendler">https://ed.ted.com/lessons/can-you-solve-the-prisoner-hat-riddle-alex-gendler</a>  VB.Net programming exercises Homework: Programming exercises
2	11/09/2017	Programming  Sequence  Selection  Iteration For Loops  While Loop	VB.Net programming exercises Homework Pseudo code and programming exercises

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<b>3</b>	18/09/2017	Programming Week Introduction to Arrays Theory Computer system architecture: Introduction to RAM/ ROM/Input/Output	Exam style programming questions
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3 lessons of 100 minutes each. OCR As and A Level Computer Science

4	25/09/2017	<p>1.4.1(a) Primitive data types, integer, real/floating point, character, string and Boolean</p> <p>1.4.1(b) Represent positive integers in binary</p> <p>1.4.1(f) Convert positive integers between binary hexadecimal and denary</p> <p>1.4.1(d) Addition and subtraction of binary integers</p> <p>1.4.1(e) Represent positive integers in hexadecimal</p> <p>Programming arrays. Learn sequence and selection IF Then Else, Select Case statements</p>	<p><b>Binary numbers</b> Worksheets to help understand binary.</p> <p><a href="#">Data types - Delivery guide (PDF, 1MB)</a></p> <p>Activity: <a href="#">Binary numbers</a></p> <p><b>Denary to Hex conversion</b> Jigsaw that requires matching denary and hex numbers.</p> <p><a href="#">Data types - Delivery guide (PDF, 1MB)</a></p>
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<p><b>5</b></p>	<p>02/10/2017</p>	<p>1.4.1(c) Use of sign and magnitude and two's complement to represent negative numbers in binary</p> <p>1.4.1(g) Representation and normalisation of floating point numbers in binary</p>	<p><b>Binary numbers game</b> Flash game to convert between denary and binary.</p> <p><a href="#">Data types - Delivery guide (PDF, 1MB)</a></p> <p>Activity: <a href="#">Binary numbers game</a></p>
<p><b>6</b></p>	<p>9/10/2017</p>	<p>1.1.1(a) The Arithmetic and Logic Unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Buses: data, address and control: how this relates to assembly language programs</p>	<p><b>Activity 1 - Structure and function of the processor</b> Learners take it in turn to describe the different parts and functions of processors without using words.</p> <p><a href="#">Structure function processor - Delivery guide (PDF, 1MB)</a></p>

7	16/10/2017	<p>1.1.1(b) The Fetch-Decode-Execute Cycle; including its effects on registers</p> <p>1.1.1(c) The factors affecting the performance of the CPU: clock speed, number of cones, cache</p> <p>1.1.1(d) The use of pipelining in a processor to improve efficiency</p>	<p><b>Activity 2 - Fetch-Decode-Execute cycle</b></p> <p>Study the steps of the Fetch-Decode-Execute cycle.</p> <p><a href="#">Structure function processor - Delivery guide (PDF, 1MB)</a></p>
<b>Half Term</b>			
8	30/10/2017	<p>Programming Algorithms of searching Algorithms</p> <p>Linear Search</p> <p>Binary Search</p>	VB.Net programming exercises
9	06/11/2017	<p>Sorting Algorithms</p> <p>Insertion sort</p> <p>Bubble sort</p>	Sorting of numbers and text in VB.Net

<b>10</b>	13/11/2017	1.1.1(e) Von Neumann, Harvard and contemporary processor architecture	<b>Activity 1 - Structure and function of the processor</b> Learners take it in turn to describe the different parts and functions of processors without using words. <a href="#">Structure function processor - Delivery guide (PDF, 1MB)</a>
<b>11</b>	20/11/2017	1.4.2(b) The following data structures to store data:  2D arrays	<b>Data structure cards</b>  Worksheet to help visualise data structures.  <a href="#">Data structures - Delivery guide (PDF, 1MB)</a>
<b>12</b>	27/11/2017	1.4.2(c)  Records Tuples	<b>Program DS in Python or Visual Basic.net</b>  Use the pseudocode written to now develop programs.

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<b>13</b>	<b>04/12/2017</b>	1.4.2(b) The following structures to store data: Stacks Lists	<b>Tree traversal</b> Worksheet on data structures  <a href="#">Data structures - Delivery guide (PDF, 1MB)</a>
<b>14</b>	<b>11/12/2017</b>	Revision of what is covered so far and more programming exercises. Queues	
<b>XMAS HOLIDAYS</b>			
<b>15</b>	<b>03/01/2018</b>	Analysis Intro Discussion on coursework projects. Start writing up the analysis of the project Look at various coursework documentation.	Brainstorm project ideas
<b>16</b>	<b>10/01/2018</b>	1.4.2(b) The following structures to store data: hash table Coursework Lesson Introduction to Fact finding techniques and documenting them	What is hashing, collision and collision resolving strategies like open and closed hashing. Rehashing.

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17	16/01/2018	<p>Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application development. The relative merits and drawbacks of different methodologies and when they might be used.</p> <p>Writing and following algorithms.</p> <p>Different test strategies, including black and white box testing and alpha and beta testing</p> <p>Test programs that solve problems using suitable test data and end user feedback, justify a test strategy for a given situation.</p>	Homework exam style questions
18	23/01/2017	<p>Features that make a problem solvable by computational methods.</p> <p>Problem recognition.</p> <p>Problem decomposition.</p> <p>Use of divide and conquer.</p> <p>Use of abstraction.</p> <p>Learners should apply their knowledge of:</p> <ul style="list-style-type: none"> <li>• backtracking</li> <li>• data mining</li> <li>• heuristics</li> <li>• performance modelling</li> <li>• pipelining</li> <li>• visualisation to solve problems.</li> </ul>	Exam style questions
19	30/01/2017	<p>Measures and methods to determine the efficiency of different algorithms, Big O notation (constant, linear, polynomial, exponential and logarithmic complexity).</p>	<p><u>Topic Exploration Pack - Learner Activity: Activity 2 Program Code</u></p> <p><u>Topic Exploration Pack - Learner Activity: Activity 4 Program Code</u></p>
20	6/02/2017	<p>Comparison of the complexity of algorithms.</p> <p>Compare the suitability of different algorithms for a given task and data set.</p>	Exam style questions



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<b>HALF TERM</b>			
<b>21</b>	<b>20/02/2017</b>	The need for, function and purpose of operating systems. Memory Management (paging, segmentation and virtual memory). Interrupts, the role of interrupts and Interrupt Service Routines (ISR), role within the Fetch-Decode-Execute Cycle.	Exam style questions
<b>22</b>	<b>27/02/2017</b>	Scheduling: round robin, first come first served, multi-level feedback queues, shortest job first and shortest remaining time. Distributed, embedded, multi-tasking, multi-user and Real Time operating systems. BIOS. Device drivers.	Exam style questions
<b>23</b>	<b>6/03/2017</b>	Virtual machines, any instance where software is used to take on the function of a machine, including executing intermediate code or running an operating system within another.	Exam style questions
<b>24</b>	<b>13/03/2017</b>	The nature of applications, justifying suitable applications for a specific purpose. Utilities. Open source vs. closed source.	Exam style questions

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<b>25</b>	<b>20/03/2017</b>	Translators: Interpreters, compilers and assemblers. Stages of compilation (lexical analysis, syntax analysis, code generation and optimisation). Linkers and loaders and use of libraries.	Exam style questions
<b>EASTER HOLIDAYS</b>			
<b>26</b>	<b>18/04/2017</b>	The nature of abstraction. The need for abstraction. The differences between an abstraction and reality. Devise an abstract model for a variety of situations.	Exam style questions
<b>27</b>	<b>24/04/2017</b>	Coursework Revision	Past paper questions
<b>28</b>	<b>1/05/2017</b>	Coursework Revision	Past paper questions
<b>29</b>	<b>8/05/2017</b>	Coursework Revision	Past paper questions
<b>30</b>	<b>15/05/2017</b>	Coursework Exam	Past paper questions
<b>31</b>	<b>22/05/2017</b>	Coursework Exam	Past paper questions

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