

St John's Senior School



Subject: Computer Science
Teacher: Mr. Zampekos

Form: Upper 6th
Term: Autumn

WEEK	WEEK BEGINNING	TOPIC
1	2 nd September	<p style="text-align: center;">Algorithms and programs:</p> <p>Revision (Application of concepts, operations and data constructs to complete programs.)</p>
2	9 th September	<p style="text-align: center;">Data structures:</p> <p>Describe, interpret and manipulate data structures including arrays (up to three dimensions), records, stacks, queues, trees, linked lists and hash tables. Select, identify and justify appropriate data structures for given situations.</p>
3	16 th September	<p style="text-align: center;">Algorithms and programs:</p> <p>Application of concepts, operations and data constructs to complete programs and develop the confidence to experiment</p>
4	23 rd September	<p style="text-align: center;">Logical operations:</p> <p>Draw truth tables for Boolean expressions consisting of AND, OR, NOT, XOR, NAND and NOR logical operations.</p> <p>Apply logical operations to combinations of conditions in programming, including clearing registers, masking, and encryption</p>
5	30 th September	<p style="text-align: center;">Algorithms and programs:</p> <p>Explain the use of recursion in algorithms and programs and consider the potential elegance of this approach</p>
6	7 th October	<p style="text-align: center;">Algorithms and programs:</p> <p>Sorting: Explain the need for a variety of sorting algorithms both recursive and non-recursive.</p> <p style="text-align: center;">MINI – TEST</p>
7	14 th October	<p style="text-align: center;">Algorithms and programs:</p> <p>Explain the effect of storage space required, number of comparisons of data items, number of exchanges needed and number of passes through the data on the efficiency of a sorting algorithm.</p> <p>Use Big O notation to determine the efficiency of different sorting algorithms in terms of their time and space requirements and to compare the efficiency of different sorting algorithms.</p>

St John's Senior School



HALF – TERM		
8	28 th October	<p style="text-align: center;">Algorithms and programs:</p> <p style="text-align: center;">Searching: Explain and apply a shortest-path algorithm.</p> <p>Describe appropriate circumstances for the use of each searching technique.</p> <p>Use Big O notation to determine the efficiency of linear and binary searches in terms of execution time and space requirements and to compare the efficiency of different searching algorithms.</p>
9	4 th November	<p style="text-align: center;">Algorithms and programs:</p> <p>Traversal of data structures: Write and interpret algorithms used in the traversal of data structures.</p>
10	11 th November	<p style="text-align: center;">Algorithms and programs:</p> <p>Comparing algorithms: Use Big O notation to determine the complexity and efficiency of given algorithms in terms of their execution time, their memory requirements and between algorithms that perform the same task.</p>
11	18 th November	<p style="text-align: center;">Principles of programming:</p> <p>Explain the nature and relative advantages of different programming paradigms, and identify possible situations where they may be used.</p> <p>Describe the distinguishing features of different types of programming paradigms, including procedural, event- driven, visual and mark-up languages.</p> <p>Describe the role of an object-oriented approach to programming and the relationship between object, class and method.</p>
12	25 th November	<p style="text-align: center;">Principles of programming:</p> <p>Describe the need for the standardisation of computer languages, and the potential difficulties involved in agreeing and implementing standards.</p> <p>Identify ambiguities in natural language and explain the need for computer languages to have an unambiguous syntax.</p> <p>Interpret and use formal methods of expressing language syntax: syntax diagrams and Backus-Naur form (extended Backus-Naur form is not to be used).</p>
13	2 nd December	<p style="text-align: center;">Organisation and structure of data:</p> <p>Explain the purpose of files in data processing.</p> <p>Define a file in terms of records and fields.</p> <p>Describe how files may be created, organised, updated and processed</p>

St John's Senior School



		<p>by programs.</p> <p>Explain fixed and variable length fields and records and give examples of the appropriate use of each type.</p> <p>Design files and records appropriate for a particular application.</p>
14	9 th December	Revision

St John's Senior School



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WEEK	WEEK BEGINNING	TOPIC
1	6 th January	MOCK EXAMS
2	13 th January	<p style="text-align: center;">Organisation and structure of data:</p> <p>File organisation: Distinguish between master and transaction files. Describe sequential, indexed sequential and direct (random) file access.</p> <p style="text-align: center;">Distinguish between the use of serial and sequential file access methods in computer applications.</p> <p>Describe and design algorithms and programs for sequential file access and update.</p> <p>Explain the purpose of, and be able to use, a hashing algorithm.</p>
3	20 th January	<p style="text-align: center;">Organisation and structure of data:</p> <p style="text-align: center;">File organisation: Compare different hashing algorithms. Explain the use of multi-level indexes.</p> <p>Explain the techniques used to manage overflow and the need for file re-organisation.</p> <p>Explain the need for file security, including file backup, generations of files and transaction logs.</p> <p style="text-align: center;">Describe the need for archiving files.</p>
4	27 th January	<p style="text-align: center;">Data security and integrity processes:</p> <p>Cryptography: Describe the need for and the purpose of cryptography. Describe techniques of cryptography and their role in protecting data.</p> <p style="text-align: center;">Follow algorithms and programs used in cryptography.</p> <p style="text-align: center;">Compare cryptographic methods and their relative strength.</p>
5	3 rd February	Revision
6	10 th February	Revision
HALF – TERM		
7	24 th February	Revision
8	2 nd March	Revision

St John's Senior School



9	9 th March	Revision
10	16 th March	Revision
11	23 rd March	Revision

St John's Senior School



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WEEK	WEEK BEGINNING	TOPIC
1	20 th April	Revision
2	27 th April	Study leave
3	4 th May	Study leave
4	11 th May	EXAMS
5	18 th May	-
HALF - TERM		
6	1 st June	-
7	8 th June	-
8	15 th June	-
9	22 nd June	-
10	29 th June	-
11	6 th July	-