

St John's Senior School



Subject: Computer Science
Teacher: Mr. Zampekos

Form: Lower 6th
Term: Autumn

WEEK	WEEK BEGINNING	TOPIC
1	7 th September	Algorithms and programs: Introduction-Flowcharts-Pseudocode
2	14 th September	Algorithms and programs: Variables and constants, Identifiers, Mathematical operations (including DIV and MOD), Logical operations
3	21 st September	Algorithms and programs: Introduction to python and IDLE Programming constructs
4	28 th September	Algorithms and programs: Application of concepts, operations and simple data constructs to complete simple programs and develop the confidence to experiment. Practical experience of programming
5	5th October	Algorithms and programs: Modular programming, Scope of variables, Parameters. Practical experience of programming. MINI TEST
6	12 th October	Data structures. Progression to a wider range of program tasks, including 1- and 2- dimensional arrays.
7	19 th October	Algorithms and programs: Searching and sorting algorithms. Practical experience of programming. Progression to a wider range of program tasks, including 1- and 2- dimensional arrays
HALF TERM		
8	2 nd November	Data structures: 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.
9	9 th November	Algorithms and programs: Compression algorithms. Testing algorithms. Practical experience of programming

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WEEK	WEEK BEGINNING	TOPIC
10	16 th November	Logical operations: Draw truth tables for Boolean expressions consisting of AND, OR, NOT, XOR, NAND and NOR logical operations. Apply logical operations to combinations of conditions in programming, including clearing registers, masking, and encryption
11	23 rd November	Algorithms and programs: Explain the use of recursion in algorithms and programs and consider the potential elegance of this approach
12	30 th November	Algorithms and programs: Sorting: Explain the need for a variety of sorting algorithms both recursive and non-recursive.
13	7 th December	Algorithms and programs: 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. 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.

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Term: Spring

WEEK	WEEK BEGINNING	TOPIC
1	4 th January	MOCK EXAMS
2	11 th January	Algorithms and programs: Searching: Explain and apply a shortest-path algorithm. Describe appropriate circumstances for the use of each searching technique. 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.
3	18 th January	Algorithms and programs: Compression algorithms. Testing algorithms. Practical experience of programming
4	25 th January	Algorithms and programs: Traversal of data structures: Write and interpret algorithms used in the traversal of data structures.
5	1 st February	Software engineering: Software tools. Practical experience of programming
6	8 th February	Data representation and data types: Representation of data as bit patterns
HALF TERM		
7	22 nd February	Data representation and data types: Storage of characters. Data types.
8	1 st March	Data representation and data types: Representation of numbers as bit patterns
9	8 th March	Design files and records appropriate for a particular application. Organisation and structure of data: Explain the purpose of files in data processing. Define a file in terms of records and fields. Describe how files may be created, organised, updated and processed by programs.

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		Explain fixed and variable length fields and records and give examples of the appropriate use of each type.
10	15 th March	Database systems.
11	22 nd March	Hardware and communication: Architecture

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WEEK	WEEK BEGINNING	TOPIC
1	19 th April	Hardware and communication: Fetch-execute cycle
2	26 th April	Hardware and communication: Input / output. Secondary storage. Data storage on disc.
3	3 rd May	Hardware and communication: Networking. Internet. Data transmission: Types and techniques. Communication networks.
4	10 th May	The operating system. Principles of programming.
5	17 th May	Principles of programming. Program construction.
6	24 th May	Systems analysis.
HALF TERM		
7	7 th June	The need for different types of software systems and their attributes.
8	14th June	END OF YEAR EXAM
9	21 st June	Algorithms and programs: 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.
10	28 th June	Principles of programming: Explain the nature and relative advantages of different programming paradigms and identify possible situations where they may be used.

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		<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>
11	5 th July	<p>Principles of programming: 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>