



Year 13 Computer Science Learning Journey

When?	Understanding	Knowledge	Assessment
AUTUMN Term – FIRST HALF	2.1 Elements of Computational Thinking 2.1.1 Thinking Abstractly	<ul style="list-style-type: none"> • The nature of abstraction. • The need for abstraction. • The differences between an abstraction and reality. • Devise an abstract model for a variety of situations. 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions
	2.1 Elements of Computational Thinking 2.1.2 Thinking Ahead	<ul style="list-style-type: none"> • Identify the inputs and outputs for a given situation. • Determine the preconditions for devising a solution to a problem. • The nature, benefits and drawbacks of caching. • The need for reusable program components. 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions
	2.1 Elements of Computational Thinking 2.1.3 Thinking Procedurally	<ul style="list-style-type: none"> • Identify the components of a problem. • Identify the components of a solution to a problem. • Determine the order of the steps needed to solve a problem. • Identify sub-procedures necessary to solve a problem. 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions
	3.4 Evaluation 3.4.1 Testing to Inform Evaluation	<ul style="list-style-type: none"> • Provide annotated evidence of testing the solution of robustness at the end of the development process. • Provide annotated evidence of usability testing (user feedback). 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions

When?	Understanding	Knowledge	Assessment
AUTUMN Term – SECOND HALF	2.1 Elements of Computational Thinking 2.1.4 Thinking Logically	<ul style="list-style-type: none"> Identify the points in a solution where a decision has to be taken. Determine the logical conditions that affect the outcome of a decision. Determine how decisions affect flow through a program. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	2.1 Elements of Computational Thinking 2.1.5 Thinking Concurrently	<ul style="list-style-type: none"> Determine the parts of a problem that can be tackled at the same time. Outline the benefits and trade offs that might result from concurrent processing in a particular situation. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	2.2 Problem Solving & Programming 2.2.1 Programming Techniques	<ul style="list-style-type: none"> Programming constructs: sequence, iteration, branching. Recursion, how it can be used and compares to an iterative approach. Global and local variables. Modularity, functions and procedures, parameter passing by value and by reference. Use of an IDE to develop/debug a program. Use of object oriented techniques. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.4 Evaluation 3.4.2 Success of the Solution	<ul style="list-style-type: none"> Use the test evidence from the development and post development process to evaluate the solution against the success criteria from the analysis. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions

When?	Understanding	Knowledge	Assessment
SPRING Term – FIRST HALF	2.2 Problem Solving & Programming 2.2.2 Computational Methods	<ul style="list-style-type: none"> • Features that make a problem solvable by computational methods. • Problem recognition. • Problem decomposition. • Use of divide and conquer. • Use of abstraction. • Learners should apply their knowledge of: <ul style="list-style-type: none"> • backtracking • data mining • heuristics • performance modelling • pipelining • visualisation to solve problems. 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions
	2.3 Algorithms 2.3.1 Algorithms	<ul style="list-style-type: none"> • Analysis and design of algorithms for a given situation. • The suitability of different algorithms for a given task and data set, in terms of execution time and space. • Measures and methods to determine the efficiency of different algorithms, Big O notation (constant, linear, polynomial, exponential and logarithmic complexity). • Comparison of the complexity of algorithms. • Algorithms for the main data structures, (stacks, queues, trees, linked lists, depth-first (post-order) and breadth-first traversal of trees). • Standard algorithms (bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithm, binary search and linear search). 	<ul style="list-style-type: none"> • Homework Tasks • Classwork Tasks • Peer & Self-Assessment Tasks • End of Topic Tests • Exam Questions

When?	Understanding	Knowledge	Assessment
SPRING Term – SECOND HALF	3.1. Analysis of the Problem 3.1.1 Problem Identification	<ul style="list-style-type: none"> Describe and justify the features that make the problem solvable by computational methods. Explain why the problem is amenable to a computational approach. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.1. Analysis of the Problem 3.1.2 Stakeholders	<ul style="list-style-type: none"> Identify and describe those who will have an interest in the solution explaining how the solution is appropriate to their needs (this may be named individuals, groups or persona that describes the target end user). 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.1. Analysis of the Problem 3.1.3 Research the Problem	<ul style="list-style-type: none"> Research the problem and solutions to similar problems to identify and justify suitable approaches to a solution. Describe the essential features of a computational solution explaining these choices. Explain the limitations of the proposed solution. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.4 Evaluation 3.4.3 Describe the Final Product	<ul style="list-style-type: none"> Provide annotated evidence of the usability features from the design, commenting on their effectiveness. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions

When?	Understanding	Knowledge	Assessment
SUMMER Term – FIRST HALF	3.1. Analysis of the Problem 3.1.4 Specify the Proposed Solution	<ul style="list-style-type: none"> Specify and justify the solution requirements including hardware and software configuration (if appropriate). Identify and justify measurable success criteria for the proposed solution. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.2 Design of the Solution 3.2.1 Decompose the Problem	<ul style="list-style-type: none"> Break down the problem into smaller parts suitable for computational solutions justifying any decisions made. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.2 Design of the Solution 3.2.2 Describe the Solution	<ul style="list-style-type: none"> Explain and justify the structure of the solution. Describe the parts of the solution using algorithms justifying how these algorithms form a complete solution to the problem. Describe usability features to be included in the solution. Identify key variables / data structures / classes justifying choices and any necessary validation. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions

When?	Understanding	Knowledge	Assessment
SUMMER Term – SECOND HALF	3.2 Design of the Solution 3.2.3 Describe the Approach to Testing	<ul style="list-style-type: none"> Identify the test data to be used during the iterative development and post development phases and justify the choice of this test data. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.3 Developing the Solution 3.3.1 Iterative Development Process	<ul style="list-style-type: none"> Provide annotated evidence of each stage of the iterative development process justifying any decision made. Provide annotated evidence of prototype solutions justifying any decision made. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.3 Developing the Solution 3.3.2 Testing to Inform Development	<ul style="list-style-type: none"> Provide annotated evidence for testing at each stage justifying the reason for the test. Provide annotated evidence of any remedial actions taken justifying the decision made. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions
	3.4 Evaluation 3.4.4 Maintenance & Development	<ul style="list-style-type: none"> Discuss the maintainability of the solution. Discuss potential further development of the solution. 	<ul style="list-style-type: none"> Homework Tasks Classwork Tasks Peer & Self-Assessment Tasks End of Topic Tests Exam Questions