



Subject	Year	Term
Computer Science	13	1
Topic		
Networks, Algorithms coursework		
Content (Intent)		
Prior Learning (Topic)	Exchanging data, Coursework, programming	
Networks. Structure of the Internet including DNS and IP addressing. Local Area, the role of packet switching and routers in the TCP/IP protocol stack. Network threats and various methods of prevention. HTML and CSS web forms and JavaScript. Search engine indexing and Google’s PageRank algorithm alongside client- and server-side processing in the final topics. The main algorithms to sort and search data, and the Big O of them in both space and time. How to calculate Big O for a given algorithm. Use algorithms to traverse binary trees, trees and graphs. Why different traversal methods are necessary in different circumstances, e.g to compile code, to output data in order or in hierarchy. The use of queues and stacks to accomplish different traversals. Apply heuristic methods and dijkstra algorithms to find shortest route/best route and its application to wide range of contexts such as internet, satnav, CPUs Completion of coursework		
Future Learning (Topic)	Legal, ethical, moral, and algorithms	
What Knowledge and Skills will be taught (Implementation)	How will your understanding be assessed & recorded (Impact)	
The main algorithms for sorting and searching, big O complexity, traversing and searching trees and linked list, dijkstra and A*. How the use of heuristic techniques such as A* can help improve performance of algorithms.	Coursework to be completed by half term. Worksheets and homework sheets sourced form PG-online, in the style of exam questions. End of unit assessment.	
Transmission of data across networks. TCP/IP, benefits of client-side processing (javascript) server-side processing across a network. Network hardware, encryption, compression, hashing, sockets, protocols.	Worksheets and homework sheets sourced form PG-online, in the style of exam questions. End of unit assessment. Regular assessment to test previous learning through the use of past papers	
How can parents help at home?		
Ensure homework is completed and that students revise for class tests. Also ensure that they are doing the remainder of coursework, which means access to internet forums on Python programming.		
Helpful further reading/discussion (including Reading and Vocabulary Lists)		
Reading Course textbook ISBN 978-1910523056 OCR AS and A Level Computer Science, by Heathcote and Heathcote PG online unit resources 5 and 12	Vocabulary Lists Trees & Graphs Dijkstra & A* Traversal in order post order pre-order DNS	Objects LMC. heuristics Big O Linear & binary search Bubble Insertion Merge & quick sort TCP/IP Protocols IP