Holy Family Catholic High School

Subject	Year	Term
Computer Science	13	Autumn

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	Legal, ethical, moral, and algorithms

What Knowledge and Skills will be Taught (Implementation)	How will your understanding be assessed and 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 PGonline, 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 PGonline, 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 on time. Class notes are being finished and summarised at home.

Holy Family Catholic High School

Helpful further reading and discussion (Including reading and Vocabulary List)	
Reading	**Vocabulary Lists**
<u>Theory textbook –</u>	Trees & Graphs
ISBN 978-1910523056	Dijkstra & A*
OCR AS and A Level Computer Science, by	Traversal
Heathcote and Heathcote	in order
	post order
<u>Programming Textbooks-</u>	pre-order
ISBN - 978-1910523193	DNS
Tackling A Level Projects in Computer Science for	Objects
OCR H446	LMC
ISBN - 978-1484260463	heuristics
Modern C++ for Absolute Beginners	Big O
ISBN - 978-1838648572	Linear & binary search
Beginning C++ Game Programming	Bubble & Insertion Sort
	Merge & quick sort
	TCP/IP
	Protocols
	IP