Subject Curriculum Information Pack

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Curriculum Intent

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Pedmore High School Computer Science Curriculum Statement

The computer science GCSE is intended to give pupils an insight in to the inner workings of computers, develop computational thinking skills, and programming ability. It can be a foundation for later study in computing related fields, or stand-alone as support for many careers. As well as learning about factors affecting the performance and efficiency of major computer components they also gain an insight in to just how some computers actually operate in detail. Networking and the internet are also major factors in today's world so pupils gain a grounding in the basic principles and devices used to communicate across shared computer and network systems. The key computational thinking techniques of decomposition, abstraction and algorithmic thinking combine to provide practise and skills in breaking problems down, identifying what is and isn't important, and then developing a logically sound solution. Logical development of testing strategies, plus the iterative process in developing software, removing errors, improving efficiency and the functionality of programs and systems are skills that are useful in many careers, even if not the obvious programmer roles that may not be immediately though of when thinking of computer science. Above all else those that become adept at computer science tend to be those that show resilience and a "can do" attitude to not giving up as soon as the going gets tough. Demand continues to grow in careers related to computing and computer science is a good starting point on this path.

Year 10 Curriculum Assessment Map

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Curriculum Assessment Map: Year 10 J277 Computer Science

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Systems architecture. Memory and storage.	Memory and storage. How data is actually saved with zero and ones.	Computer networks, protocols and connections.	Computer networks, security, precautions and how systems are attacked.	More networking. System software, Operating Systems, Utility software etc	Ethical, legal and environmental issues. Text based adventure game.
Key Learning	• Introduction to the course • SLR 1.1 Systems architecture o 6 lessons • SLR 1.2 Memory and storage – Part 1 o 5 lessons • Plus 5 dedicated programming lessons	• SLR 1.2 Memory and storage – Part 1 o 2 lessons • SLR 1.2 Memory and storage (Part 2) o 12 lessons • Plus 6 dedicated programming lessons	• SLR 1.3 Computer networks, connections and protocols o 12 lessons • Plus 3 dedicated programming lessons	• SLR 1.3 Computer networks, connections and protocols o 2 lessons • SLR 1.4 Network security o 10 lessons • Plus 3 dedicated programming lessons	• SLR 1.4 Network seciurity. o 2 lessons • SLR 1.5 System software o 6 lessons • Plus 5 dedicated programming lessons	• SLR 1.6 Ethical, legal, cultural and environmental concerns o 9 lessons • 8 lesson text-based adventure game
Skills	To be able to explain how computers take commands and data in binary and use these to run programs. Explain how registers and units play their role in this process. Become familiar with primary storage and different types of memory.	Explain that digital computers use binary, how data is represented using 0 and 1 . Describe how a number of attributes of how data is represented affect quality and size of files. Detailed explanation of how computers use different sorts of storage for different jobs and situations.	Develop a fair understanding of how computes share resources and the various hardware techniques and software protocols needed to support this.	Further develop knowledge of how packets of data are passed around networks. Identify (and develop mitigation against) threats to the security of data on networks.	Complete measures to limit the security risk to networks. Identify and explain the purpose and role of system software including operating systems and utility software, as well as human computer interfaces.	Discuss the ethical , legal cultural and environmental impact of technology and it's use.

Curriculum Assessment Map: Year 10 J277 Computer Science

Year 10 End points	Be able to explain, in depth, how a computer processes data and commands, using registers and units. Explain how data is stored in memory and storage devices, and how memory management makes use of virtual memory. Have a thorough knowledge of how different components and configurations affect CPU performance. Have a sound knowledge of how binary is used to represent data, for logical comparisons and in mathematical calculations. Thorough knowledge of how images and sounds are stored. Be able to explain, in depth, how data can be compressed, lossy and lossless compression, and be able to recommend and justify which to use. Network components, topologies, LAN, WAN and how protocols control how data moves around networks. Explain how different types of component and network identifiers are used to transmit data across LAN and WAN networks. How networks are placed at risk, what the risks are and the mitigations to reducing the impact of threats. System software and it's role in running the computer, maintaining it, and providing secure and differentiated user experiences. Understand how different laws have an impact on how we might use computers. Understand that different groups of how software is developed, released and licenses can affect what users can and cannot do with it.					
Programming skills.	Programming skills. Installed Python on home computer. Be able to create simple programs that allow user input, process and output.	Programming skills. Write programs that use more complex selection for more than two outcomes. String manipulation. Casting between types.	Programming skills. Write moderately complex programs that perform basic file handling, and data manipulation.	Programming skills. Should now be using sub programs and developing a program library of standard functions.	Programming skills. Should be able to confidently code any moderately difficult challenge involving : All aspects of file handling, creating, reading, updating and deleting data.	Completion of the complete exam board issued programming challenges booklet.
Informal/formal assessment	End of unit test 1.1 In class GRIT tasks. Programming portfolio.	End of unit test 1.1 End of unit test 1.2.1 In class GRIT tasks. Programming portfolio.	End of unit test 1.2.2 In class GRIT tasks. Programming portfolio.	End of unit 1.3 test. In class GRIT tasks. Programming portfolio.	End of unit test 1.4 End of unit test 1.5 In class GRIT tasks. Programming portfolio.	End of unit test 1.6 Mock exam based on paper 1.

Year 11 Curriculum Assessment Map

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Curriculum Assessment Map: Year 11 J277 Computer Science

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Computational thinking principles.	Algorithms	Robust programming techniques.	Boolean logic and development of code.	Exam preparation.	Final examinations.
Key Learning	• SLR 2.2 Programming fundamentals 9 Lessons • SLR 2.1 Algorithms 5 Lessons Plus 3 paper 2 exam revision lessons	• SLR 2.1 Algorithms ○ 13 lessons Plus 7 paper 2 exam revision lessons	• SLR 2.3 Producing robust programs ○ 8 lessons Plus 7 paper 2 exam revision lessons	• SLR 2.4 Boolean logic ○ 5 lessons • SLR 2.5 Programming languages and IDEs ○ 6 lessons Plus 4 paper 2 exam revision lessons	Mock exams, revision lessons, filling in the gaps/	The computer science exams tend to occur very early in the exam period. They will usually have been completed by this half term.
Skills	Explore and practise the three main computational thinking principles of abstraction, decomposition and algorithmic thinking. Develop algorithmic thinking that seeks to apply these techniques and principles in to solving and understanding solutions to problems.	Application and understanding of key sorting and searching algorithms. The ability to analyse and understand the functionality of an algorithm.	Understand and apply techniques that prevent programs from failing where better design and an iterative testing and correction method would lower the chances of this happening. Development of effective and thorough testing strategies.	Investigating, and demonstrating an understanding of the logic mathematical Boolean algebraic principles. Develop knowledge of how programs are developed, how they are understood by a computer and the different features a development environment has.	Exam preparation.	Exam conduct.
End points that must be in place by the exams at the end of the year.	Practical application of computer programming basic techniques, Ability to use operators, both comparison and mathematical. Understand the different data types, their application and how to cast between them practically. Be able to SQL statements to select data from a table using simple queries. Describe and practically apply computational thinking basics. Understanding and practical application of algorithm basics including creating trace tables. Design and application of testing to ensure a thorough check of code has been made.					

Curriculum Assessment Map: Year 11 J277 Computer Science

	Thorough understanding of what needs testing and how. Understanding the basic logic gates, how they can be used to represent a logical problem. Creation or interpretation of truth tables to show the outcome from a logic design (and it's drawing with suitable symbols). Understanding of high- and low-level languages and the translators used between them.					
Programming skills.	By this point pupils should have all the skills they need to complete all of the portfolio of programming tasks in their programming challenges booklet.	Creating user friendly and "real world" quality interfaces.	Programs should be written to run in a commercial quality manner (e.g. thorough data cleansing etc).	Complete all challenges in the challenge's booklet, revisit those that need a more robust interface etc.	Revision	Revision
Knowledge Organiser Focus	TBA	TBA	TBA	TBA	TBA	TBA
Informal/formal assessment	Paper 2 Past paper and exam style revision questions. End of unit test.	Paper 2 Past paper and exam style revision questions. End of unit test.	Paper 2 Past paper and exam style revision questions. End of unit test.	Paper 2 Past paper and exam style revision questions. End of unit test.	Mock exam papers. Extensive exam paper 1 and 2 revision.	Tends to be an early exam. Revision.

Year 10 Curriculum Journey

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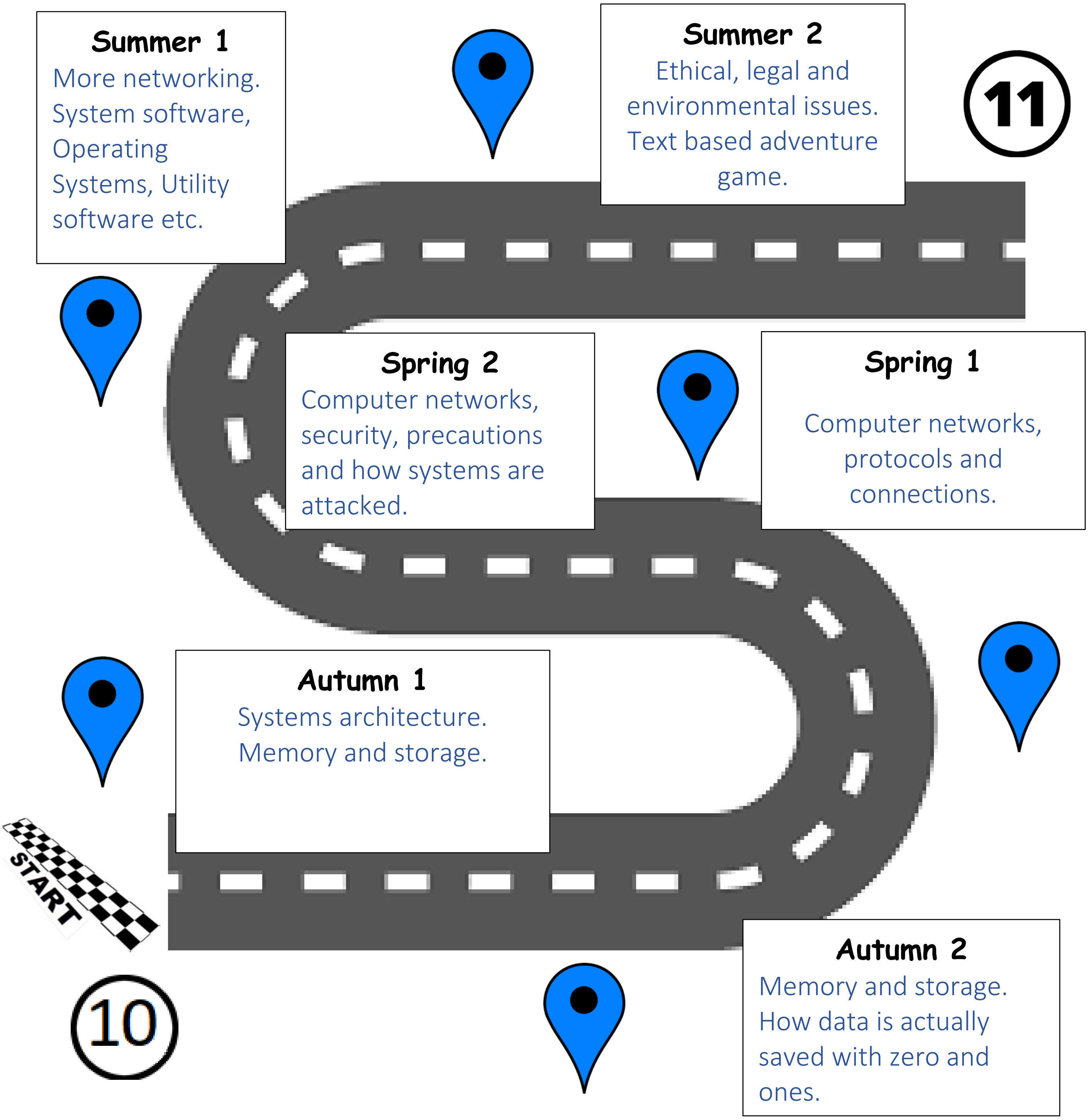
YEAR 10 Computer Science JOURNEY

In Computer Science, we want you to become competent and informed users of computers. Coding in Python is an ongoing skill intertwined with all topics. You will further develop key computational thinking skills, such as decomposition, abstraction and Algorithmic thinking. Problem solving skills are also a key transferable asset.



Autumn 1
Systems architecture.
Memory and storage.

Autumn 2
Memory and storage.
How data is actually saved with zero and ones.

Spring 1
Computer networks, protocols and connections.

Spring 2
Computer networks, security, precautions and how systems are attacked.

Summer 1
More networking.
System software, Operating Systems, Utility software etc.

Summer 2
Ethical, legal and environmental issues.
Text based adventure game.

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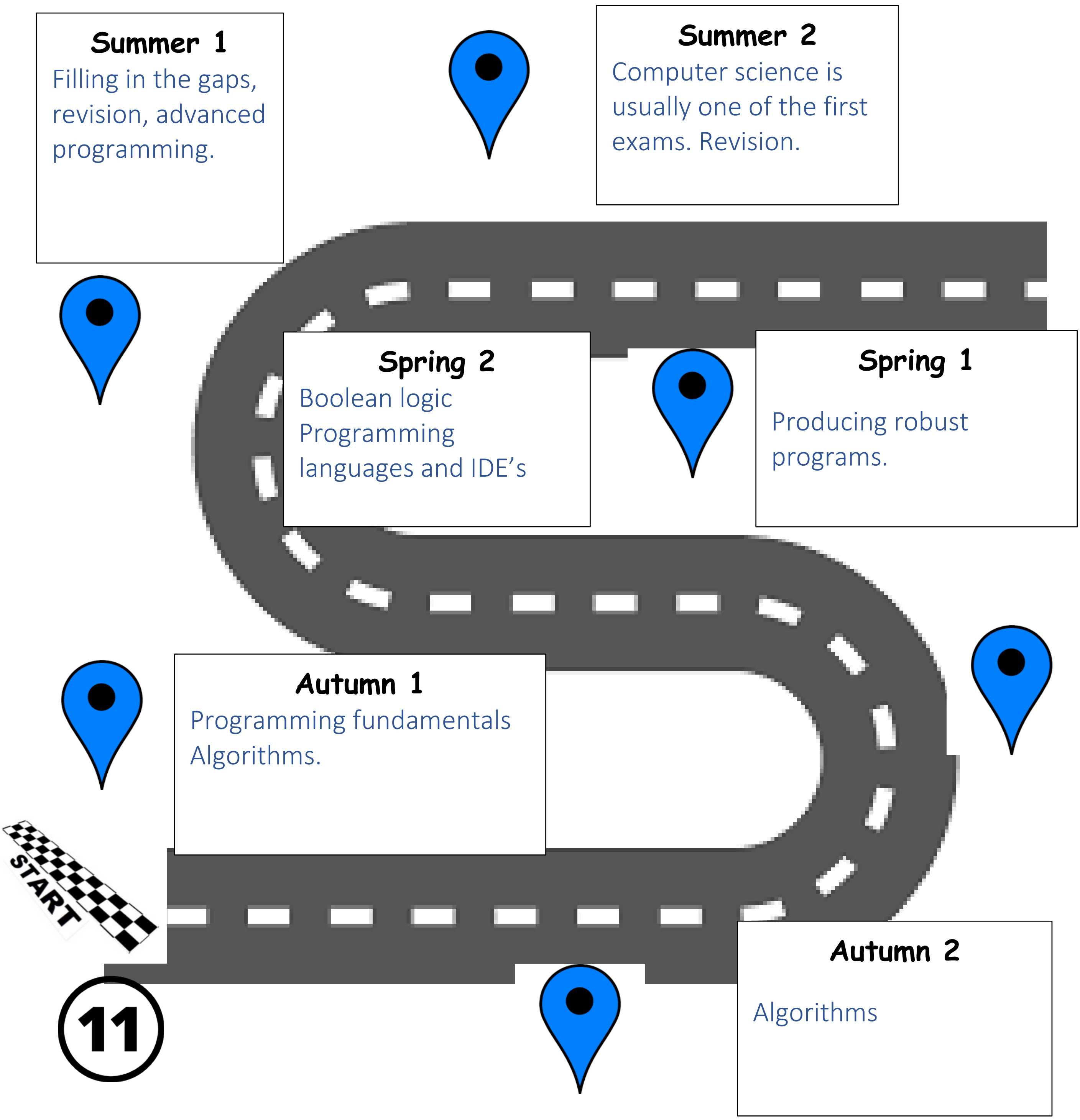

Autumn 1
Programming fundamentals
Algorithms.

Autumn 2

Algorithms

Spring 1

Producing robust programs.

Spring 2
Boolean logic
Programming languages and IDE’s

Summer 1
Filling in the gaps, revision, advanced programming.

Summer 2
Computer science is usually one of the first exams. Revision.

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