Example topic and project sequences: Years 9 and 10

How to use this resource

The following tables provide three teaching sequences with suggested projects covering two years. The sequences are distinguished by their varying emphases: general but comprehensive track, in-depth track for more able groups, and a computing science track. Each is accompanied by suggested Knowledge and Understanding content from Part 1 of the text. The tables provide a starting point for teachers in selecting projects that meet the needs of their students. The more challenging projects are positioned under Year 10. The companion Years 7 and 8 text provided 21 projects, many of which would also be suitable for Years 9 and 10. Any of these could be mixed and matched with those in the sequences suggested here.

Knowledge and understanding

Having established an understanding of digital systems, data and networks in the earlier book, Part 1 of this text builds on these concepts with an understanding of data compression, encryption and how a computer CPU actually works.

A chapter on wireless and mobile networks completes the networking topic begun in the Years 7 and 8 book, which focused on the theory of network transmission and wired networks.

Social, legal and ethical issues, project management and the importance of backup routines and documentation are other topics treated in Part 1.

Developing coding and computational thinking skills through projects

Students should gain experience and confidence in the teacher's chosen programming language(s) as early as possible. In addition to examples written in structured English, the companion Years 7 and 8 text provided worked examples using Python and a sequence suited to developing these skills. It also provided five programming projects graded in difficulty and beginning with a guided project in Chapter 3.

The Years 9 and 10 text now progresses through a sequence of programming projects of increasing sophistication including object oriented programming project, a project that introduces recursion and another that introduces the important skill of selecting an appropriate algorithm for a given problem. The principle of computational thinking is tightly integrated with a number of these projects.

Note that the Years 9 and 10 text provides two robotics projects covering more advanced aspects of programming, such as object-oriented programming and appropriate algorithm selection.

Further themes

Data analysis and visualisation, introduced in Years 7 and 8, is expanded to include SQL, pivot tables, relational databases, big data and emerging methods of data visualisation. Modelling and simulation applies computational methods to practical problems in three projects.

The knowledge and skills developed through the course are brought to life in three digital design projects that provide further opportunity for creative expression.

Term	Featured topic	Knowledge and understanding (Part 1 of text)	Projects (Part 2 of text)		
			General track Suggested projects	**In-depth track** Suggested projects	**Computing science track** Suggested projects
Year 9					
Term 1	**Data analysis**	Chapter 1: Understanding data compression	• Chapter 20: Project: Using SQL to query a database • Chapter 21: Project: Data analysis using pivot power!	• Chapter 19: Project: Building relational First Fleet database • Chapter 20: Project: Using SQL to query a database • Chapter 21: Project: Data analysis using pivot power!	• Chapter 19: Project: Building relational First Fleet database • Chapter 20: Project: Using SQL to query a database • Chapter 21: Project: Data analysis using pivot power!
Term 2	**Programming**	Chapter 3: Understanding how computers work (pp 19-22)	• Chapter 7: Project: Spaced out • Chapter 10: Project: Programming an object-oriented game	• Chapter 8: Project: Hailstone numbers • Chapter 10: Project: Programming an object-oriented game	• Chapter 11: Project: The game of Nim • Chapter 7: Project: Spaced out • Chapter 8: Project: Hailstone numbers • Chapter 10: Project: Programming an object-oriented game
Term 3	**Modelling and simulation**	Chapter 5: Understanding project management: Documentation and backups	• Chapter 13: project: Millionaire by 30? • Chapter 14: Project: Dance organiser	• Chapter 15: Project: Conway's the Game of Life	• Chapter 13: project: Millionaire by 30? • Chapter 15: Project: Conway's the Game of Life
Term 4	**Digital design**	Introduce application software related to selected projects as required	• Chapter 16: Project: A digital declaration of human rights	• Chapter 18: Guided project: Introducing HTML and CSS • Chapter 9: Project: programming an animated game	• Chapter 18: Guided project: Introducing HTML and CSS • Chapter 9: Project: Programming an animated game (require development of digital assets)

Term	Featured topic	Knowledge and understanding (Part 1 of text)	Projects (Part 2 of text)		
			General track Suggested projects	**In-depth track** Suggested projects	**Computing science track** Suggested projects
Year 10					
Term 1	**Data analysis** **Modelling and simulation**	• Chapter 4: Understanding issues • Chapter 2: Understanding encryption	• Chapter 19: Project: Building relational first fleet database • Chapter 22: Project: Analysing and visualising big data	• Chapter 22: Project: Analysing and visualising big data • Chapter 13: Project: Millionaire by 30?	Chapter 15: Project: Conway's Game of Life – extension task: program this game
Term 2	**Programming**	Chapter 3: Understanding how computers work (pages 23–8)	• Chapter 11: Project: The game of Nim • Chapter 23: Project: Designing and building an autonomous robot	• Chapter 12: Project: Choosing the best algorithm • Chapter 24: Project PID line follower robot	• Chapter 12: Project: Choosing the best algorithm • Chapter 24: Project PID line follower robot
Term 3	**Digital design**	Chapter 6: Understanding mobile devices and wireless networks	• Chapter 18: Guided project: Introducing HTML and CSS • Chapter 17: Project: Create your own augmented reality product	Chapter 17: Project: Create your own augmented reality product	*Combined project:* • Chapter 16: Project: A digital declaration of human rights *using the techniques suggested in:* • Chapter 17: Project: Create your own augmented reality product
Term 4	**Teacher selection of topic and project to suit class**	*Revision*	*Extension of a previous project*	*Extension of a previous project*	*Extension of a previous project*