University of Birmingham School Curriculum Outline: COMPUTER SCIENCE

Term ➔ Year ↓	Term 1a	Term 1b	Term 2a	Term 2b	Term 3a	Term 3b
12	**Theory** Hardware – Memory, storage devices and I/O. Data representation – Binary, hexadecimal, sign magnitude and two complement. Boolean algebra and Karnaugh maps. **Programming** Revise GCSE programming – An introduction to problem solving.	**Theory** Translators. Virtual memory. CPU architecture and FDE cycle. **Programming** Decomposition and developing larger projects – Connect 4. Reusable components – Developing a UI for connect 4.	**Theory** Encryption and compression. Systems lifecycle. **Programming** Space invaders – Developing larger programs. Functions and modular coding.	**Theory** Legal, moral and ethical impacts of CS – Extended writing practice. Floating point. Operating systems **Programming** Data structures – Stacks, Queues, arrays, records and tuples. Little man computer – Developing assembly code.	**Theory** Boolean algebra simplification. Networking. Device drivers and interrupts. **Programming** Problem solving – Computational thinking by developing Frogger.	**Theory** Adders and flip flops. Standard algorithms. Database normalisation. **Programming** Coursework - Analysis Object orientated programming.
13	**Theory** Computational methods. Recursion - Divide and conquer. SQL Data structures – Trees and graphs. **Programming** Coursework - Design	**Theory** Complexity theory. Standard algorithms – Dijkstra, A*, merge and quicksort. ACID – Managing transactions. Hashing – Linked lists and hash tables. **Programming** Coursework – Prototype 1 Local and global variables. Pass by reference and value.	**Theory** HTML, CSS and JavaScript. Thinking concurrently. Parallel processing. Virtual machines **Programming** Coursework – Prototype 2 and 3	**Theory** Compilers. Page rank algorithm. Revision. **Programming** Coursework – Evaluation.		