THE BRITISH SCHOOL OF NANJING
A NORD ANGLIA EDUCATION SCHOOL

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Computer Science Curriculum Overview

Key Stage 3- Year 9

Data representation – binary and hexadecimals, including:

- bits and bytes review
- number system overview (base systems)
- importance of binary numbers in computing
- how text, images and sound are represented in binary
- conversion of binary to denary and vice versa
- importance of hexadecimal numbers in computing
- conversion of hexadecimal to denary, binary and vice versa
- conversion of 1 byte (8 bits) to 2-digit hexadecimal
- ASCII and Unicode keyboard character mapping

Boolean Logic (BL) – principles and applications, including:

- development of BL by George Boole
- description of AND, OR and NOT operations with Venn diagrams
- use of BL in search engines
- logic gates – including AND, OR, NOT, NOR and NAND, with exclusive gates as extension
- drawing simple logic circuits and their truth tables
- interpreting Boolean Logic statements
- operation of transistors
- extension - applying BL in control structures in JavaScript and Python

Digital citizenship - Internet safety and social media, including:

- security risks – hacking, viruses, phishing, pharming, malware
- digital footprints
- the impact of social media
- 'big data', Artificial Intelligence and the future of work

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Textural programming with Python, including:

- basic use of an integrated development environment (IDE) and online editors to work with code and organise projects
- assigning variables
- data types – string, integer, decimal float, Boolean and lists (arrays)
- interacting with the user by capturing user input and outputting via print statements
- converting user input to different data types
- performing basic mathematical operations
- performing comparisons and using conditional statements
- using iteration – 'while' and 'for' loops
- using functions to simplify algorithms
- using lists and dictionaries to hold multiple values for a single variable assignment

Computer architecture and how computers work, including:

- an overview of the Von Neumann architecture
- an overview of the fetch-execute-cycle
- the basic architecture and function of the CPU and GPU
- memory types - registers, cache, RAM and ROM
- CPU's communication with input and output devices

Hardware and Software application, including:

- programming an Arduino using a graphical (Snap) and textural language (C^{++})
- introduction to basic electrical circuits
- introduction to digital and analogue signals
- introduction to the concept of control systems through the use of sensors, microprocessors and actuators