Glossary

Algorithm
A solution to a problem which follows a sequence of steps or set of rules to be followed with calculations or other problem-solving operations.

American Standard Code for Information Interchange (ASCII)
If you were to expose and examine the innermost workings of a computer, they can only understand communication through numbers. An ASCII (pronounced ass-kee) code is the numerical representation of a character such as the letter "a" or a symbol "&".

App
A program or piece of software that is self-contained and designed to satisfy a particular purpose. Today we commonly associate apps with mobile devices, but they can refer to computer software as well.

Application Programming Interface (API)
An API is a set of routines, protocols and tools for building software applications. APIs allow programmers easier entry into another company's program or service.

Binary Code
A binary code represents text or computer processor instructions using the two digits 1 and 0, for example think: On/Off, Yes/No, True/False etc.

Bit
The smallest measure of computer memory which can be expressed as either 1 or 0. Its name is a portmanteau of binary digit.

Boolean
A coding function that results in either True or False.

Branching
Making a decision between one of two or more actions depending on sets of conditions and the data provided.

To create a real-world branching decision example, imagine going to the supermarket and deciding what you want to buy for breakfast (initial starting point). If you want cereal (one branching path) you will need to ensure you have bowls, milk and a spoon (these items are the results of your first branching decision). If you would rather have something cooked (a second branching path) you will need bacon, eggs, oil and a frying pan (these items are the results of the second branching path).

These options also have their own branching paths: do you need Full Cream or Skim Milk? Do you want caged or free-range eggs? Etc.

Bug

An error in a program's code which either causes unexpected results, or prevents the program from working entirely.

Byte
The next measure of computer memory which is made up of 8 bits. Larger amounts of memory are expressed as kilobytes (1,024 bytes), megabytes (1,048,576 bytes), gigabytes (1,073,741,824 bytes) and so on.

Cascading Style Sheets (CSS)
The supplementary programming language used in conjunction with HTML to style web pages.

If HTML is the scaffolding holding up a structure, CSS is the plaster and concrete which hides the scaffolding.

Closed Source
Computer software where the source code is owned wholly by the original creator and is not available to outside individuals or institutions unless licensed.

Comment
Any text in the source code which is not actually a part of the program's functions. Comments are used to explain the purposes of specific code to other developers, or even to remind the original programmer of what has been written.

Compile
Taking the software's source code and creating an executable program that a computer or digital device can understand and run without the need of the original programming software that was used to create it.

Components of complex systems
A complex system is a system that exhibits some (and sometimes all) of the following characteristics:
- Feedback loops
- Some degree of spontaneous order
- Robustness of the order
- Emergent organisation
- Numerosity
- Hierarchical organisation

Real-world examples of complex systems include the human brain, ecosystems, the Earth's global climate etc. The components of complex systems are quite simply identifying the smaller pieces that make up the system. For example, the components of an ecosystem include the typical weather, temperature, flora, fauna etc.

Computational Thinking
The thought processes involved in mapping out a problem and expressing any and all solutions in such a way that a computer can complete it. Useful skills in computational thinking are categorising and outlining procedures.

Conditionals
Statements in code which can only run under certain circumstances. For a real-world example, the condition of greeting another person with "Good Morning!" relies on the time being between sunrise and noon.

Data
Any and all information, often quantities, facts and statistics that are inputs and outputs for computer programs. Data may include characters (for example, alphabetic letters, numbers and symbols), images, sounds and/or instructions that, when represented by number codes, can be manipulated, stored and communicated by digital systems. For example, characters may be represented using ASCII code or images may be represented by a bitmap of numbers representing each 'dot' or pixel.

Database-driven websites
A website that collects some of its content from a connected database.

Data integrity
A fundamental component of information security. Broadly speaking, it refers to maintaining and assuring the accuracy and consistency of data over its entire life-cycle.

Data states
There are three different states of data:

> **Data at rest**
> A term that describes any data which is stored on a device or some form of backup medium in any form. Data at rest is inactive, and not currently being read, processed, or transmitted across a network.
>
> **Data in motion**
> Data that is currently sitting in a computer's Random Access Memory (RAM) ready to be read, updated or processed, or data that is currently being transmitted across a network.
>
> **Data in use**
> Data that is currently being processed by a computer, and not stored passively on a hard drive or some form of external media. Data classified as in use is being processed by one or more applications.

Debugging
The process of combing through software code to discover and fix the sources of bugs.

Decompose
In the context of the Digital Technologies curriculum, decompose is used as a synonym for deconstruct.

Digital Systems

Any system which handles discrete digital signals. This is technology that generates stores and processes data in terms of two states which are either positive or non-positive. This is where the binary system comes from.

File Transfer Protocol (FTP)
A network protocol which is used to transfer computer files between a client and server on a computer network.

Firmware
A type of software that provides control, monitoring and data manipulation of engineered products and systems. Common household devices which include firmware are smart phones, digital watches and television remote controls, amongst many, many others.

Float
A term used in various programming languages to define a variable with a fractional value. Numbers created with a float variable have digits on both sides of the decimal point, (32.5, 101.24, 3.14 etc.).

Function/Routine/Procedure
A group of instructions in a portion of code used by programming languages to return a single result or a set of results. These instructions can be executed anywhere in the program, for example saving a document in Microsoft Word is a function which is called when you click the Floppy disk icon.

Graphical User Interface (GUI)
A means to interact with a computer, digital device or software visually using items such as icons, windows and menus, as opposed to interacting via textual code.

Hexadecimal
A base 16 numeral system using the digits 0-9 to represent values of zero to nine, and the letters A, B, C, D, E and F to represent values of ten to fifteen.

Hypertext Mark-up Language (HTML)
The programming language used for building web pages.

Information Systems
Any system which is designed to collect, organise, store and communicate information digitally.

Input/Output Statement
A portion of a program which tells a computer how it should read and process certain information. It involves gathering information from one source (input) and delivering information to another source (output).

Iteration
A repetition of a process or set of instructions in computer programming where each repeated cycle builds on the previous one. In code, this typically uses a "for" loop command

that tells a program that as long as a certain variable meets a certain specific requirement, continue doing x, y or z until the variable is no longer true.

An example would be:
> For every red smartie in a bowl, eat 1 red smartie.

A person following this statement would continue eating red smarties until no more red smarties remained in the bowl.

Machine code
A set of binary or hexadecimal instructions which is executed directly by a computer's central processing unit, or CPU.

Mark-up
A coding system used to structure, index and link text files.

Model
A representation that describes, simplifies, clarifies or provides an explanation of the workings, structure or relationships within an object, system or idea.

Nesting
A term used to describe the placement of an object, function or protocol within another. This is usually done to limit the scope of the inner object, function or protocol and prevent it from reaching wider than is intended.

For a simple analogy, if a coffee mug is one function with the purpose of holding liquid, the liquid would be a separate function with its own properties (wet, hot/cold etc.) contained within the mug to stop it from spreading across the table.

Non-visual Programming Language
A formal computer language designed to communicate instructions to a machine or digital system. Common and popular programming languages used today in digital systems include:

Structure Query Language (SQL)
A special programming language that is primarily used for managing data in databases. Many mobile apps developed by Google, Skype and Drop Box use it.

Java
One of the most widely adopted programming languages worldwide, Java's popularity stems from its easy readability and simplicity. It is used to develop all native Android apps.

JavaScript
Not to be confused with Java as the two are completely unrelated, JavaScript is used by web developers to improve and expand web pages by adding effects, pop-up messages or interactivity.

Python
A general purpose programming language (named after Monty Python no less). Python is simple and incredibly easy to read since it closely resembles the English language. Python is the most popular language to learn for beginning programmers.

Hypertext Pre-processor (PHP)
PHP is a server-side scripting language which is primarily used for web development, but can also be used as a general-purpose programming language.

C
The predecessor to many common and more complex programming languages used today like Java and C#. By design, C maps efficiently to machine code and so today it is used for firmware and operating systems.

C# (pronounced as see-sharp)
A relatively new evolution of C designed in the year 2000 by Microsoft to work in conjunction with the Windows .NET framework. C# is an object-oriented programming language.

C++ (pronounced as see-plus-plus)
Another evolution of the earlier C programming language. Developed in 1983, C++ like C# is another object-oriented programming language.

Swift
A new programming language developed in 2014 by Apple for iOS and OS X.

Ruby
Another general purpose programming language much like Java and C, however it is best known for use in web programming.

Object-oriented programming
A programming language model based on the concept of "objects" rather than "actions" and data rather than logic.

Open-Source
Computer software where the source code is freely available and distributed for anyone to copy, modify and redistribute for their own or other's benefit.

Operating System
The low-level software that supports a computer's or other digital device's basic functions. Popular operating systems of today include:

Windows
The most popular operating system of choice for business and home PCs, developed and owned by Microsoft.

Mac OS X
The operating system used on all iMacs and MacBooks, developed by Apple.

iOS
Apple's operating system for all of their mobile devices, including the iPhone, iPad and iPod Touch.

Android
The operating system developed by Google to be used on mobile phones and tablets. The Android operating system has the largest market share of mobile devices.

Operator
In programming an operator is an object capable of manipulating a value. For example in "1 + 2" the plus symbol is the operator affecting the two digits.

Pivot tables
In data processing, a pivot table is a program or tool that allows you to organise and summarise data found in data visualisation programs such as spreadsheets or business intelligence software. A pivot table can automatically sort, count, total or give the average of data stored in one table or spreadsheet, displaying the results in a second table.

Protocols
A defined set of rules and regulations that determine how data is transmitted in computer networking.

Prototyping
The process by which new ideas are tested for their plausibility. In coding and digital terms, a prototype provides a simple framework by which a software program, app or video game can be tested before committing to building the product. Prototyping is used to discover and determine problems early in development. Initially these prototypes can be made with paper or other simple methods, while later in development these might be early iterations of the program that demonstrate basic functionality without finished graphics.

Pseudocode
A programming language which resembles plain English, but is not actually real code and cannot be compiled into a running program. It is generally used to practice programming syntax.

Simulation
A process that is run to reproduce the behaviour of an object or system. A simulation can be used to determine the potential effects of a certain process or idea before committing to finish it, or to recreate real events based on recorded data.

Software
Any and all programs that are used by a computer or other digital device.

Software Development Kit (SDK)
A collection of software tools and utilities that assist a programmer to develop applications for specific platforms.

Source Code
The straight text of all code which is compiled or assembled into executable computer software or apps.

Stages of Software Development
Broadly speaking software development has four development phases, these are:

Pre-alpha
All activities performed prior to testing, and can include analysis of requirements, design and development.

Alpha
The first phase to begin software testing. During the alpha phase the code is incomplete but at a stage where testing of features and functions can begin.

Beta
Software officially enters the beta phase when it is feature complete, meaning that all functions the software is designed to execute have been coded and completed. The Beta phase includes extensive testing and debugging.

Release
The version of the software which is known as the "stable release" and will be delivered to consumers. By nature of programming and complicated software design, it is simply not possible to release software with zero bugs, however the stable release is the version believed to be the most bug-free possible.

String
Information stored in a variable which is expressed as text and not as a number.

Subprograms
A set of instructions in a program's code designed to perform a frequently used operation within that program.

Sustainable
Supporting the needs of the present without compromising the ability of future generations to support their needs.

Syntax
The grammar and spelling rules for programming languages. Much like English and other languages, programming has rules which must be followed or else the computer will not understand the command it is issued.

User input
Something put into a system to activate or modify a process, specifically done by a user. On a smartphone for example, a user simplified and generalised input would be opening an SMS app (first input), and composing a message (second input) to a specific contact (third input).

User interface
The manner in which users interact with computer hardware or software. In software, this usually comprises of fields for text and number entry, mouse pointers, buttons and other graphical elements. In hardware, switches, dials and light-emitting diodes (LEDs) provide information about the interactions between a user and a machine.

Variable
A defined location in code which can store temporary data in a variety of different forms such as numbers or strings.

Visual Programming Language
Any programming language that allows the user to manipulate code graphically rather than textually. Some examples include:

Alice
An educational program that teaches students computer coding in a 3D environment, allowing the creation of simple animations and games.

Bubble
A tool designed to build web applications without code, instead relying on a point and click interface.

Scratch
A free programming language that enables learners to create simple animations using typical coding syntax built visually.

Touch Develop
An online programming network which includes a large range of tutorials and a point and click coding interface.