Rainford High School
Year 6 into Year 7
Computer Science

Welcome to Rainford High School and welcome to the Computer Science Department!

We are looking forward to seeing you in September and have put this pack together for you to work through over the summer to help you prepare your move into Year 7.

Skills learnt from Computer Science:

- Digital Literacy Skills
- Problem-Solving Skills
- Creativity
- Critical-Thinking skills
- Resilience
- Teamwork

Careers (Jobs) with Computer Science:

- Computer Games Developer
- Mobile App Developer
- Website Developer
- IT Consultant
- Cyber Security Expert
- Database Administrator

Draw lines to the correct parts of the computer and try to find out what they do!
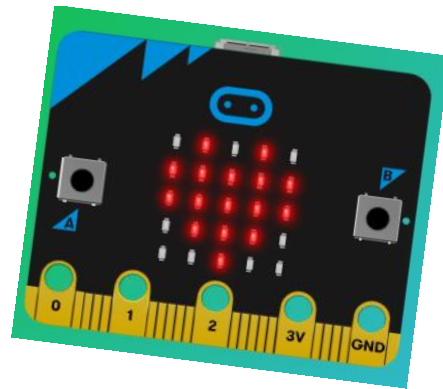
CPU

Motherboard

Graphics Card

Hard drive

Power Supply

RAM

Some great links you might want to have a look at and try some of the challenges!!!

www.microbit.org

Learn how to program and create code that will physically control a microbit computer. Create different patterns operated by buttons when clicked and even try to create a game.

www.code.org

Watch videos of how coding is used in jobs and the world, learn how games are developed and programmed and try to complete all of the challenges to fully complete each game.

www.idea.org.uk

Sign up and work your way through a variety of different challenges to gain as many badges as you can and learn a huge range of different digital skills.

https://www.bbc.co.uk/bitesize/subjects/zvc9q6f

View videos and information from what you will learn over the next few years.

This is a collection of our Year 7 Knowledge Organisers – what we will be covering in Year 7

Term 1

Year 7.1 Knowledge Organiser
Computer Science Department — RAINFORD HIGH

E-safety
E-safety refers to staying safe online, this includes the use of the internet, social media sites and gaming.

Top tips for staying safe online
1. Don't talk to strangers
2. Don't give out personal information
3. Make sure all social media accounts are set to private.
4. Don't meet anyone online.

Computer System
A basic, complete and functional computer.
It will include all the hardware and software required to make it functional

INPUT → PROCESS → OUTPUT

COMPUTATIONAL THINKING
- DECOMPOSITION — BREAK DOWN DATA AND PROBLEMS INTO SMALLER PARTS
- PATTERN RECOGNITION — OBSERVE PATTERNS AND TRENDS IN DATA
- ALGORITHMS — DETERMINE WHAT STEPS ARE NEEDED TO SOLVE A PROBLEM
- ABSTRACTION — REMOVE DETAILS AND EXTRACT RELEVANT INFORMATION

Memory
Random Access Memory (RAM)
- Temporary Memory
- Volatile – needs power to retain memory
- Stores the programs and data that is currently in use

Read Only Memory (ROM)
- Non Volatile – does not need power to retain memory
- Tells the computer how to start

Computer Components
- Motherboard
- Hard Disk Drive
- CPU (Central Processing Unit)
- Fan
- PSU (Power Supply Unit)

Central Processing Unit (CPU)
Is used for processing data (the brains of the computer)

Fetch, Execute, Decode

Fetch Decode Execute Cycle
1. Instruction is **fetched** from memory
2. Instruction is **decoded** by the CPU
3. Instruction is **executed** by the CPU
repeat

Start/ End, Input/Output, Process, Decision

Operating system
The part of the operating system we see on screen is know as the User Interface.
- Graphical User Interface (GUI) The most popular type of system. They combine menu driven interfaces with icons.
- Command Line Interface (CLI) User need to learn the commands to make it work.
- Menu Driven Interface A list of options organised under various headings or menus

Binary (Base 2)
The only thing that computers understand is Binary.

0101 = 5

1 = ON
0 = OFF

8	4	2	1
0	1	0	1

01011111 = 95

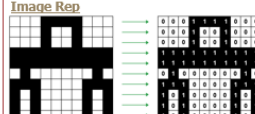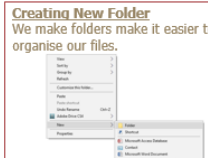| 128	64	32	16	8	4	2	1
0	1	0	1	1	1	1	1

ASCII
ASCII is a characters set that allows 128 different characters,

Every word is made up of symbols or characters. When you press a key on a keyboard, a number is generated that represents the symbol for that key.

A = 0100 0001

Image Rep

Term 2

Year 7.2 Knowledge Organiser
RAINFORD HIGH

Creating New Folder
We make folders make it easier to organise our files.

File Formats (File Extensions)
Tell the user how to open a file and within the correct program.

Images
.jpeg .jpg .png .gif

Writing
.doc

Photoshop
.psd

Word
Used for writing letters and reports.
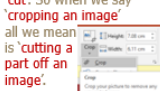
Publisher
Used for creating booklets, pamphlets, business cards and greeting cards.

PowerPoint
Used for creating presentations.

Systems/ Software Development Life Cycle
The cycle that you will follow when developing and creating software or computer systems.

SDLC — Software / System Development Life Cycle - SDLC
(Requirement Analysis, Design, Implementation, Testing, Evolution)

Artificial Intelligence
AI = Artificial Intelligence
Artificial = made or produced by human beings rather than occurring naturally.
Intelligence = the ability to acquire and apply knowledge and skills.

Crop
Cropping simply means 'cut'. So when we say 'cropping an image' all we mean is 'cutting a part off an image'.

Variable
A variable can store a value That can change inside the computers memory.

Scoring
By changing the value of the variable we can keep track of a score or a level.

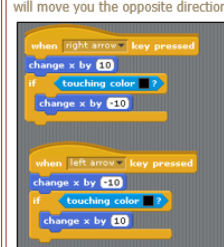We can reset the players position by sending the sprite to a position.

```
when [flag] clicked
forever if < touching color [ ]? >
change score by 1
go to x: -222 y: 140
```
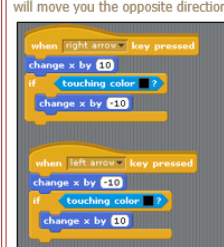
Event Driven Programming
When you press an arrow it will change x or y by either a positive or negative number (eg. -10 +10)

Collision Detection
IF you 'collide' or 'touch' a colour it will move you the opposite direction.

```
when right arrow key pressed
change x by -10
if < touching color [ ]? >
change x by +10
```

```
when left arrow key pressed
change x by +10
if < touching color [ ]? >
change x by -10
```
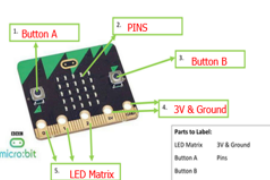

Term 3

Year 7.3 Knowledge Organiser
RAINFORD HIGH

Micro:bit
The Micro:bit is a handheld, fully programmable computer given to schools across the UK by the BBC to help with the learning of coding!

Flowchart Symbols
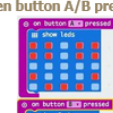- Start/Stop
- Process
- Decision
- Input/Output

Labelling the Micro:bit
- Button A
- PINS
- Button B
- 3V & Ground
- LED Matrix

Parts to Label:
LED Matrix, 3V & Ground, Button A, Pins, Button B

Using Variables in Micro:bit
A variable is a space in the computer's memory where we can store data such as a number or text. The value can be changed if required.

Controlling the Micro:bit
The Micro:bit can be programmed to display your program:

When button A/B pressed:

On shake:

Iteration
Iteration means repeating steps, or instructions, over and over again.

In programming terms it means being able to repeat or loop pieces of code.
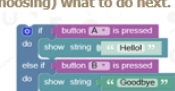
Selection – if statements
Selection means selecting (or choosing) what to do next.

When a decision needs to be made in a computer program selection is used, this is typically done using conditional statements.
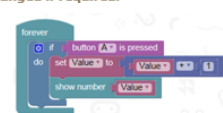
The most common conditional statements are:
- IF
- ELSE
- ELIF

Fun Facts

1. The first electronic computer ENIAC weighed more than 27 tons and took up 1800 square feet.
2. TYPEWRITER is the longest word that you can write using the letters only on one row of the keyboard of your computer.
3. Doug Engelbart invented the first computer mouse in around 1964 which was made of wood.
4. There are more than 5000 new computer viruses released every month.
5. If there was a computer as powerful as the human brain, it would be able to do 38 thousand trillion operations per second and hold more than 3580 terabytes of memory.
6. The password for the computer controls of nuclear tipped missiles of the U.S was 00000000 for eight years.
7. HP, Microsoft and Apple have one very interesting thing in common – they were all started in a garage.
8. The first 1GB hard disk drive was announced in 1980 which weighed about 550 pounds, and had a price tag of $40, 000.
9. The original name of windows was Interface Manager.
10. The first microprocessor created by Intel was the 4004. It was designed for a calculator, and in that time nobody imagined where it would lead

Questions to find answers to:

When was the first computer created?

Who is the founder of the Windows Operating System?

Why is a common keyboard referred to as a QWERTY keyboard?

What is an Input and Output Device? (List as many as you can)

What is the difference between the Internet and the Web?

What is binary?

What do different parts of the computer do?

What is a network?

Find as many different programming languages as possible.

Who was the founder of Apple computers?