Stewards Academy

ICT KS3 Year 8 Spring 2 Blended Learning Booklet

Name:

Form:

Aim to complete one lesson each week. Write out the title and LI and then complete the tasks.

The Knowledge Organiser on page 4 and 5 have some key information and vocabulary to help you with this unit.

Upload all work onto ClassCharts for feedback.

Contents

Stewards Academy

Big Picture – Year 8 Overview
ICT Department

Next Year

Cloud storage
Students will learn about cloud storage and what advantages this brings.

Software
Students will learn about application and utility software.

Data representation sound
Students will learn how sound are represented inside a computer.

Data representation Black and white images
Students will learn how images are represented inside a computer.

Binary
Students will learn how to convert binary into denary and vice versa.

Components inside a PC
Students will learn the responsibilities of each component inside a computer.

Binary addition
Students will learn the rules of binary addition and use these to add binary numbers together.

UNIT 3 – Computing Theory
Students will learn the memory prefixes and be able to convert between these.
Bit
Byte
KB
MB
GB
TB

Summary of learning
Students will complete an end of term exam with a creative element.

Research Entrepreneurs
Students will learn about different entrepreneurs and the skills needed to succeed in business

Short and Long term finance
Students will learn different sources of finance and associate these as long or short term.

Cash flow Cash inflow Cash outflow Net cash flow
Students will learn about cash inflows and outflows of a business.

Cash Flow forecast
Students will learn how to create a cash flow forecast and make predictions on where sources of finance could be used

Farmer Bob Assessment
Students will complete an assessment by creating a cash flow forecast.

UNIT 2 – Introduction to Business
Students create their own timetable learning how to use the merge cell tool and conditional formatting.

Microsoft Excel Merge cells, Conditional formatting

Column Chart Bar Chart Line Chart Pie Chart
Students learn how to create different styles of charts in Microsoft Excel. The pupils will learn how to add titles onto the charts.

Maisey's sweet shop assessment
Students sit an assessment using Microsoft Excel.

Pseudocode
Learn how to use features in Microsoft Excel through different games

Translators, High level and Low level language
Learn how to use functions and formulas in Microsoft Excel

Testing
Learn how to use boarders and formatting techniques by creating your own timetable

Python Graphics

Iteration – FOR loop While Loop
Learn the assessment procedure using Microsoft PowerPoint

IF/ELSE statements Integer Float
Learn how to use Microsoft PowerPoint and apply new skills to a presentation

Syntax Variables strings
Learn basic python syntax to create a program.

UNIT 1 – Programming in Python
Learn to follow the ICT assessment procedure using Microsoft Excel

Year 8

KS3 Knowledge Organiser - Computing

Stewards Academy

Binary

As computers only understand 1s and 0s, all data must be converted into binary to be processed. Binary can be used to represent all numbers in our standard number system. (base 2)

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

128 + 0 + 0 + 16 + 8 + 0 + 2 + 1 = 155

Binary Numbers are easier to Convert using Tables

Drawing a table with binary place values in the first row makes binary to denary conversion easier.

EXAMPLE: Convert the 8-bit binary number 00110101 to a denary number.

1) Draw up a table with binary place values in the top row. Start with 1 at the right, then move left, doubling each time.
2) Write the binary number 00110101 into your table.
3) Add up all the numbers with a 1 in their column: 32 + 16 + 4 + 1 = 53

So 00110101 is 53 in denary.

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

Each column is just a power of 2. i.e. $2^7, 2^6, 2^5, 2^4, 2^3, 2^2, 2^1, 2^0$.

This works with all binary numbers — just draw as many columns as you need, doubling each time.

8-bit numbers can represent the denary numbers 0-255. 16-bit numbers can show the numbers 0-65535, and 32-bit can show the numbers 0-4294967295.

Convert Denary to Binary by Subtracting

When converting from denary to binary, it's easier to draw a table of binary place values, then subtract them from largest to smallest. Have a look at this example:

EXAMPLE: Convert the denary number 79 into an 8-bit binary number.

1) Draw an 8-bit table.
2) Move along the table, only subtracting the number in each column from your running total if it gives a positive answer.
3) Put a 1 in every column that gives a positive answer, and a 0 in the rest.

So 79 converted to an 8-bit binary number is 01001111.

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

79 − 128 = −49 (not positive)
79 − 64 = 15
15 − 32 = −17 (not positive)
15 − 16 = −1 (not positive)
15 − 8 = 7
7 − 4 = 3
3 − 2 = 1
1 − 1 = 0

There are other methods to convert denary to binary, so just choose the one you are most comfortable with.

Denary/ Decimal

Decimal is the number systems humans use. In our standard number system we have ten different digits. (0,1,2,3,4,5,6,7,8,9) (Base 10)

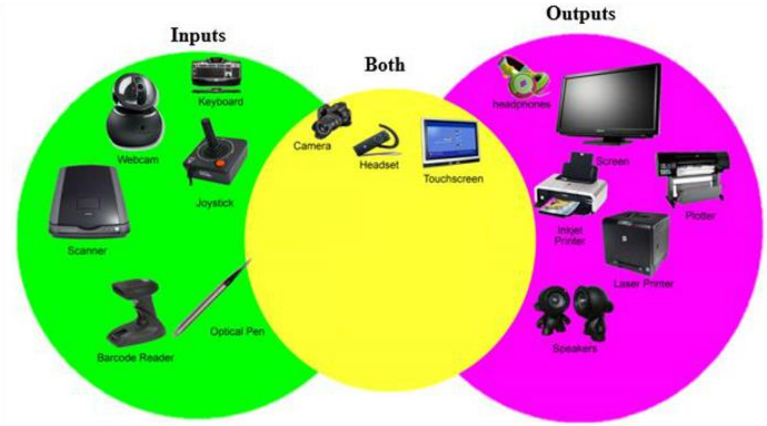
BINARY
IT'S AS
EASY AS
01 10 11

Hexadecimal Numbers

Hexadecimal is another number system used regularly in programming. Hex uses a combination of digits and letters in order to represent a number.

Denary	Hex	Binary	Denary	Hex	Binary
0	0	0000	8	8	1000
1	1	0001	9	9	1001
2	2	0010	10	A	1010
3	3	0011	11	B	1011
4	4	0100	12	C	1100
5	5	0101	13	D	1101
6	6	0110	14	E	1110
7	7	0111	15	F	1111

Input and Output Devices

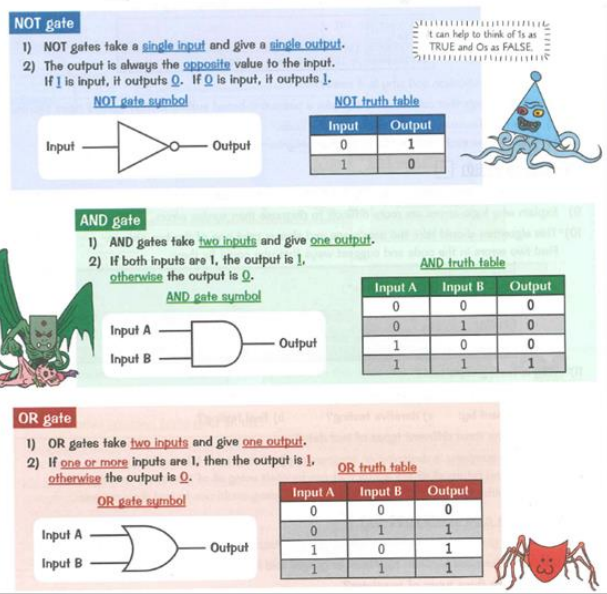


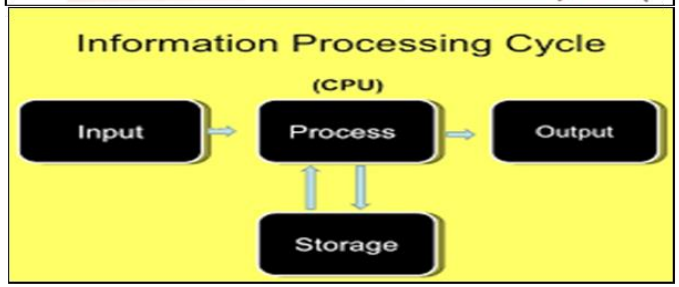
KS3 Knowledge Organiser - Computing

Logic Gates

Logic gates take binary information and give an output based on the Boolean operations (NOT, AND, OR)

- Logic gate a special circuits built onto computer chips
- Each Logic gates has a corresponding truth table





Cloud Computing

Hosting is where a business uses its servers to store files for another person or organisation.

A recent use of internet is for general storage of user files and also providing online software. This is cloud computing, or simply 'The Cloud'.

Cloud storage has some pros and cons.

Pros of the cloud

- Users can access files from any connected device.
- Easy to increase how much storage is available
- No need to buy expensive hardware to store data.
- No need to pay IT staff to manage the hardware.
- Cloud host provides security and back ups for you.
- Cloud software will be updated automatically.

Cons of the cloud

- Need connection to the Internet to access files.
- Dependent on host for security and back-ups.
- Data in the cloud can be vulnerable to hackers.
- Unclear who has ownership over cloud data.
- Subscription fees for using cloud storage and software may be expensive.

Components in a PC

Power Supply Unit(PSU): There is a PSU Inside every computer that provides its power.

Hard Drive: A hard disk is a magnetic storage device for digital data.

RAM: RAM is the memory to store computer programs whilst they are running.

CPU: A CPU (Central Processing Unit) is the core of every Personal Computer. Without it, no PC can function.

Motherboard: The Motherboard is the main printed circuit board in the computer.

ROM: Rome tells the CPU how to boot up.

Lesson 1

LI: to learn how to convert binary to denary

LI to learn how to convert denary to binary

Play the game - https://learningcontent.cisco.com/games/binary/index.html

DART

Binary Numbers

Computers only process binary data, which means that all data is stored, and calculations are done, just using 0s and 1s. But luckily, you can convert binary numbers into normal (decimal) numbers.

Counting in **Binary** is **Similar** to Counting in **Decimal**

Here, 'decimal' is talking about the number system, not a decimal number like 2.5.

1) Our standard number system has ten different digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). This is called decimal, denary or base-10.
2) The place values from right to left increase by powers of 10 (e.g. 1000, 100, 10, 1).
3) Binary only uses two different digits (0 and 1) — we call this base-2.
4) So in binary, the place values from right to left increase by powers of 2 (e.g. 8, 4, 2, 1).
5) The box on the right shows the decimal numbers 0-15 and their matching binary values.

0 = 0	8 = 1000
1 = 1	9 = 1001
2 = 10	10 = 1010
3 = 11	11 = 1011
4 = 100	12 = 1100
5 = 101	13 = 1101
6 = 110	14 = 1110
7 = 111	15 = 1111

Convert Binary Numbers to Decimal Using a Table

Using tables can help you quickly convert numbers from binary to decimal.

EXAMPLE: **Convert the 4-bit binary number 1001 into a decimal number.**

1) Draw a table with binary place values in the top row and the binary number in the bottom row.
2) Write down the powers of 2 that have a 1 in their column. In this case it's 8 and 1.
3) Add these values together to find the decimal number. 8 + 1 = **9**

8	4	2	1
1	0	0	1

For longer binary numbers, use the same method. You'll just need to add more columns.

EXAMPLE: **Convert the 8-bit binary number 01011001 into a decimal number.**

1) Draw up the table in the same way, but with 8 columns. Put powers of 2 in the top row and the binary number in the bottom row.
2) Write down the powers of 2 that have a 1 in their column: 64, 16, 8 and 1.
3) Add these values together to find the decimal number. 64 + 16 + 8 + 1 = **89**

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

Binary to Denary Workbook

In this workbook, you will be asked to calculate denary numbers from their binary equivalent. Fill out the missing boxes on each table.

The first row are the position values

The second row is where the binary number is entered

The third row is the calculation, where the two are multiplied together

The fourth is the result

The fifth is where you work out the denary equivalent of your starting binary number.

Example 1: binary number = 00000011

128	64	32	16	8	4	2	1
0	0	0	0	0	0	1	1
128 * 0	64 * 0	32 * 0	16 * 0	8 * 0	4 * 0	2 * 1	1 * 1
0	0	0	0	0	0	2	1
Answer	2 + 1 = **3**						

Example 2: binary number = 00001011

128	64	32	16	8	4	2	1
0	0	0	0	1	0	1	1
128 * 0	64 * 0	32 * 0	16 * 0	8 * 1	4 * 0	2 * 1	1 * 1
0	0	0	0	8	0	2	1
Answer	8 + 2 + 1 = **11**						

Task 1: binary number = 00001111

128	64	32	16	8	4	2	1
0	0	0	0	1	1	1	1
128 * 0	64 * 0	32 * 0	16 * 0	8 * 1	4 * 1	2 * 1	1 * 1
Answer							

Task 2: binary number = 00101010

128	64	32	16	8	4	2	1
0	0	1	0	1	0	1	0
128 * 0	64 * 0	32 * 1	16 * 0	8 * 1	4 * 0	2 * 1	1 * 0
Answer							

Task 3: binary number = 01011011

128	64	32	16	8	4	2	1
0	1	0	1	1	0	1	1
128 *	64 *	32 *	16 *	8 *	4 *	2 *	1 *
Answer							

Task 4: binary number = 00101101

128	64	32	16	8	4	2	1
Answer							

Task 5: binary number = 11001100

128	64	32	16	8	4	2	1
Answer							

Task 6: binary number = 11100010

128	64	32	16	8	4	2	1
Answer							

Binary Numbers

Now it's time to learn how to convert the other way — from decimal numbers to binary numbers.

Convert Decimal to Binary by Subtracting

The easiest way to learn the method here is to look at an example:

EXAMPLE:

Convert the decimal number 71 into an 8-bit binary number.

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

128 > 71 | 71 − 64 = 7 | 32 > 7 | 16 > 7 | 8 > 7 | 7 − 4 = 3 | 3 − 2 = 1 | 1 − 1 = 0

1) Draw a table with 8 columns. Put powers of 2 in the top row.
2) 71 is the running total that you subtract numbers from.
3) Starting from the left of the table, if the top row value is less than or equal to the running total, then subtract it from the running total. E.g. 128 > 71, so the running total stays at 71. In the next column, 64 < 71 so 71 − 64 = 7 is the new running total.
4) Put a 1 in any column where you subtracted from the running total.
5) Then read off the binary number from the bottom row of the table.

So 71 as a binary number is **01000111**.

Denary to Binary Workbook

Example:

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

Example	Denary = 3
Answer in binary	00000011
Calculation for answer	(1 * 1) + (2 * 1) = 3

Task 1:

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

Task 1	Denary = 6
Answer in binary	
Calculation for answer	(2*1) + (4*1) = 6

Task 2:

128	64	32	16	8	4	2	1

Task 2	Denary = 15
Answer in binary	
Calculation for answer	

Task 3:

128	64	32	16	8	4	2	1

Task 3	Denary = 21
Answer in binary	
Calculation for answer	

Task 4:

128	64	32	16	8	4	2	1

Task 4	Denary = 39
Answer in binary	
Calculation for answer	

Task 5:

128	64	32	16	8	4	2	1

Task 5	Denary = 54
Answer in binary	
Calculation for answer	

Task 6:

128	64	32	16	8	4	2	1

Task 6	Denary = 78
Answer in binary	
Calculation for answer	

Task 7:

128	64	32	16	8	4	2	1

Task 7	Denary = 99
Answer in binary	
Calculation for answer	

Lesson 2

L: to understand different types of software.

DART

Software

The term software is used to describe the programs that you run on your computer. There are different types of software, one of which helps your computer to run at it's best — utility software.

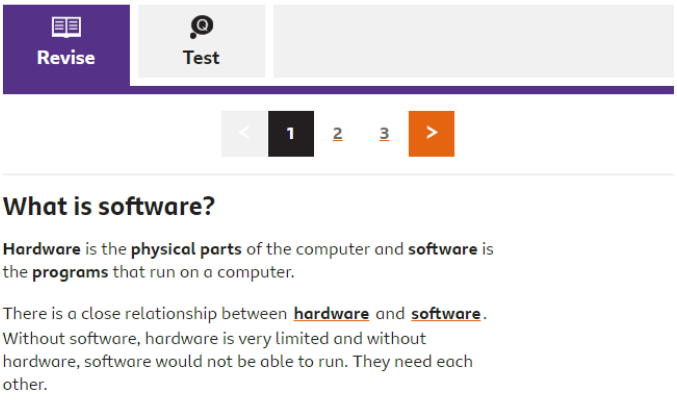
There are Two Main Types of Software

1) Application software is software that helps the user perform specific tasks.
2) Common types of application software are web browsers, word processors (see page 44), email clients and games.
3) System software helps to run, maintain and configure a computer.
4) The two main types of system software are utility software (see below) and the operating system (see next page).

Task

Read the information on the BBC Bitesize website. Click through all 3 pages and have a go at the test.

https://www.bbc.co.uk/bitesize/guides/zcxgr82/revision/1



Questions

- Now that you understand more about software. Can you list 5 examples of application software you have used before.

- Can you list 5 examples of utility software? (You may need to use the internet to research this.)

- Can you explain what two of those pieces of utility software do?

Extension (Challenging)

Research and explain the role disk defragmenter does in a computer? *Clue: it is something to do with a hard drive.*

Lesson 3

LI: To understand what cloud storage is

DART

You can Store Files in Cloud Storage over the Internet

1) Cloud storage is a service where someone can upload their files to a server over the Internet.
   The server might use HDDs or SSDs to store the data.
2) There are benefits of using cloud storage:
   - The files can be accessed by the user from anywhere with an Internet connection.
   - The user doesn't have to buy the expensive storage devices themselves.
3) However, there are also some negatives:
   - There is normally a fee to use the cloud storage (although some services are free).
   - If the user doesn't have an Internet connection, they cannot access their files.
4) The company providing the cloud storage has a responsibility to keep the data secure. Some users prefer this as they don't have to do anything themselves, though others dislike the fact that they have no control over the security of their data.

Can you list 5 companies that offer a cloud storage service?

1.

2.

3.

4.

5.

Task

Can you create a poster either on paper or on a computer, about the advantages and disadvantages of cloud storage over other storage devices?

The video below may help you identify some of these advantages and disadvantages.

https://www.youtube.com/watch?v=6fvofiYR-LE

Extension – GCSE question

Computer users will often store their data 'in the cloud'. State **three** reasons why you might want to use cloud storage rather than local storage.

_____

_____

_____

_____

_____

_____

_____

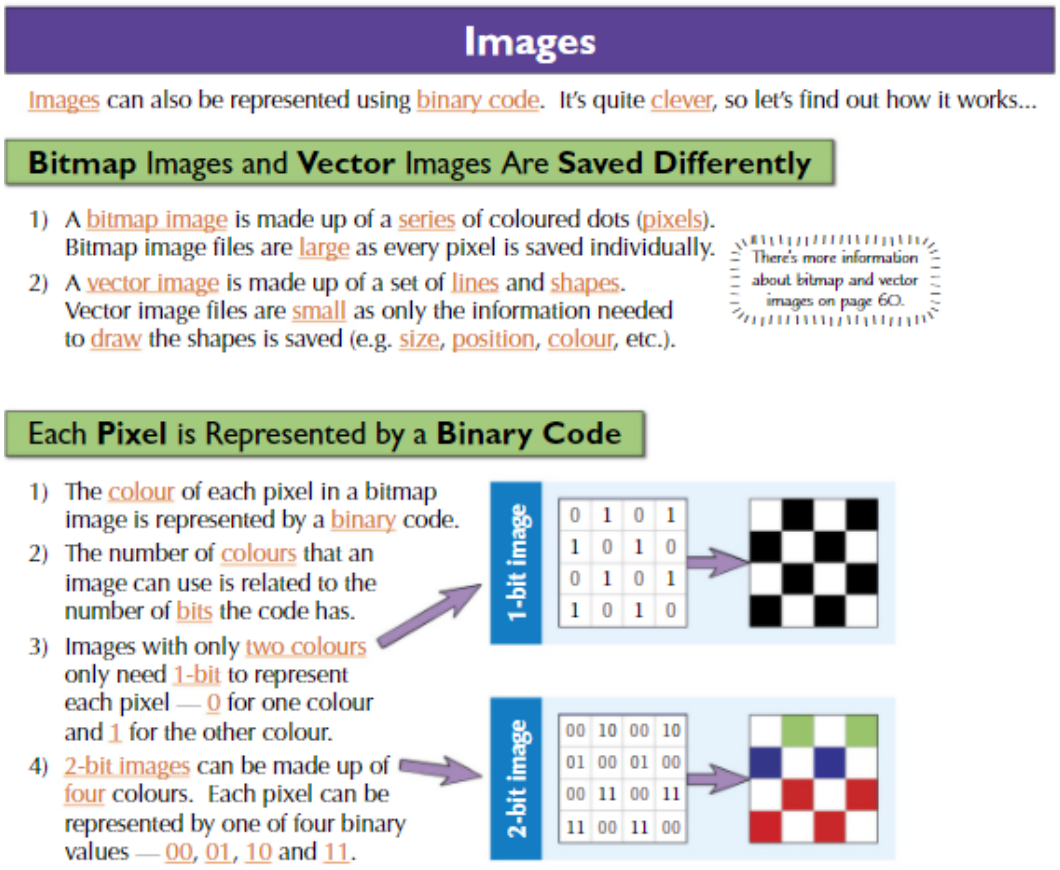
_____

(Total 3 marks)

Lesson 4

LI: to learn the difference between how bitmap images and vector images are stored differently in a computer.

DART



Images

Images can also be represented using binary code. It's quite clever, so let's find out how it works...

Bitmap Images and Vector Images Are Saved Differently

1) A bitmap image is made up of a series of coloured dots (pixels). Bitmap image files are large as every pixel is saved individually.
2) A vector image is made up of a set of lines and shapes. Vector image files are small as only the information needed to draw the shapes is saved (e.g. size, position, colour, etc.).

There's more information about bitmap and vector images on page 60.

Each Pixel is Represented by a Binary Code

1) The colour of each pixel in a bitmap image is represented by a binary code.
2) The number of colours that an image can use is related to the number of bits the code has.
3) Images with only two colours only need 1-bit to represent each pixel — 0 for one colour and 1 for the other colour.
4) 2-bit images can be made up of four colours. Each pixel can be represented by one of four binary values — 00, 01, 10 and 11.

1-bit image

0	1	0	1
1	0	1	0
0	1	0	1
1	0	1	0

2-bit image

00	10	00	10
01	00	01	00
00	11	00	11
11	00	11	00

You will need a login to the website "teach ict" this lesson.

Please see below

Your username is: **cm187nq**

The **student password** is: **python4**

Click on the link and type in the username and password

http://teach-ict.com/2016/ks3/sows/sow5/s_lesson3.php

Task

Start by watching the video.

Try to write down 10 words related to the topic of Bitmap and Vector images

Continue to read the information further down the page. Complete all activities.

Please upload picture s of your work to class charts.