Stewards Academy

ICT KS3 Year 8 Spring 1 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)

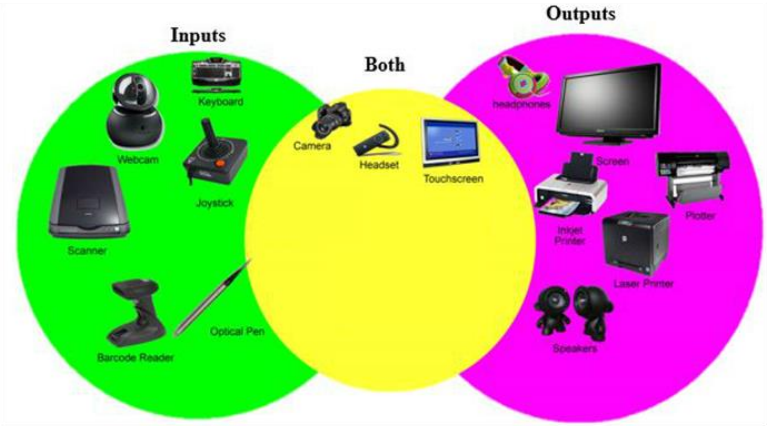
BINARY
IT'S AS
EASY AS
01 10 11

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

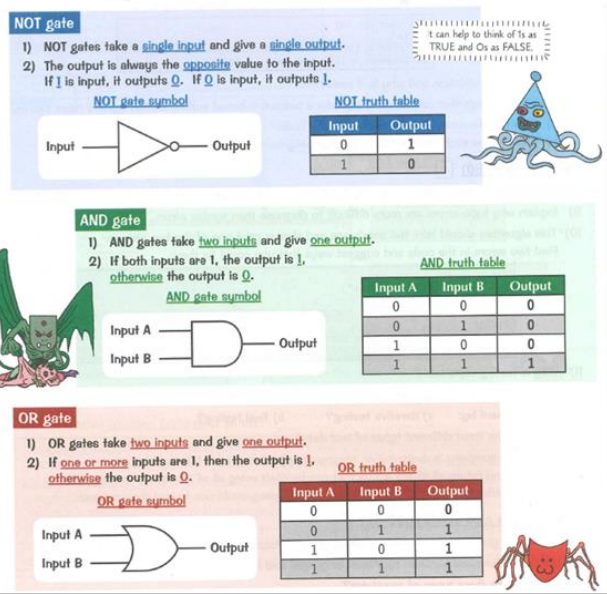


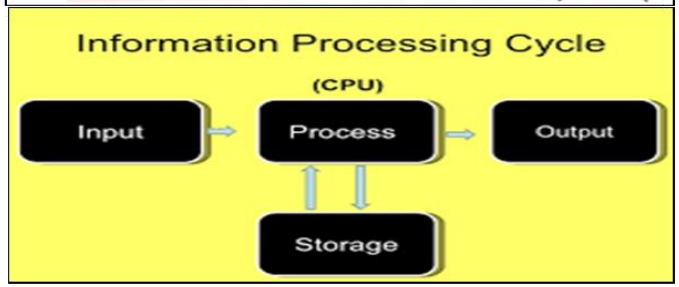
KS3 Knowledge Organiser - Computing

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: Understand how input and output devices are used in a computer system

LI: Understand how input and output devices can be used to support people with disabilities

Input and output

Input puts data into a device. Output sends data out of a device.

Input

Output

A touch screen can be input and output, because the 'touch' control is input whereas the 'screen' display is output.

Any technology which connects to a device to expand its functionality is called a **peripheral**.

Worked example

Trevor is creating a podcast. Choose **two** appropriate input and output devices he should use from those shown opposite. **(2 marks)**

Input = microphone
Output = speakers

Now try this

Which **one** of these is an input device? **(1 mark)**

A ☐ Projector B ☐ Speakers
C ☐ Microphone D ☐ Headphones

Input and output

1 Complete this diagram, which represents a technology device. Choose the correct **two** words from the word box. **(2 marks)**

decision	output	storage	peripheral	input

2 Which of these is an output device? **(1 mark)**

A ☐ Microphone **B** ☐ Scanner **C** ☐ Digital camera **D** ☐ Projector

3 A touch screen, such as on a smartphone, can be used for both input and output. Explain why this is. **(4 marks)**

.....

.....

.....

.....

4 Match the input and output devices to the technology systems. **(4 marks)**

Actuator	Video conferencing
Microphone	Games console
Sensor	Radio-controlled car
Force feedback	Car wash

Extension

Please research some input/ output devices which may help people with certain disabilities.

Write down some the devices you find. Can you explain how these work?

Lesson 2

LI: To learn the components inside a computer and how they work

Main components of a computer

Components are the parts inside a device.

You should be familiar with the components inside a PC – components inside other devices are similar.

Component	Name	Description
	Motherboard	• Allows communication between components • Is a PCB (Printed Circuit Board) where all the other system components plug in
	HDD (Hard Disk Drive) (storage device)	• Permanent memory for data storage See page 50 for more on memory
	RAM (Random Access Memory)	• Temporary memory • Makes processing more efficient See page 50 for more on memory
	PSU (Power Supply Unit)	• Takes power from mains and feeds into motherboard • Fan keeps it cool
	CPU (Central Processor Unit) + fan + heat sink	• Processes data • Fan and heat sink keep it cool See page 48 for inside the CPU
	Graphics card (expansion card)	• Boosts graphics capabilities of those built into motherboard
	Sound card (expansion card)	• Boosts sound capabilities of those built into motherboard.
	Optical drive	• Reads CDs and/or DVDs

Worked example

(a) Which **one** of these components uses a fan to keep them cool? **(1 mark)**

A ☐ Hard drive B ☐ RAM

C ☑ PSU D ☐ Motherboard

(b) A CPU uses a fan for cooling.

What cooling method is used on most CPUs in addition to a fan? **(1 mark)**

Heat sink

Now try this

Which **one** of these components is a type of memory? **(1 mark)**

A ☐ CPU B ☐ RAM C ☐ PSU D ☐ Motherboard

Think about what the initials stand for to help you answer this question!

Answer the questions below

1 Which of these **two** components need to be cooled when running? **(2 marks)**

- **A** ☐ RAM
- **B** ☐ HDD
- **C** ☐ CPU
- **D** ☐ PSU
- **E** ☐ ROM

2 **(a)** State the main role of the CPU. **(1 mark)**

.....

(b) State the main role of a Hard Disk Drive. **(1 mark)**

.....

3 Explain, using examples, what expansion cards are and what role they play in a PC. **(4 marks)**

Expansion cards can be for sound or .....

.....

.....

.....

.....

<u>Extension – Please complete in your home learning exercise books</u>

Draw the components needed for a computer to work in your exercise book. Write the name of the component next to your drawing. You could also research the costs of each of components using the internet.

Can you also research what ROM is? What is ROM responsible for in a computer?

Lesson 3

LI: to understand how AND, OR and NOT logic gates are used.

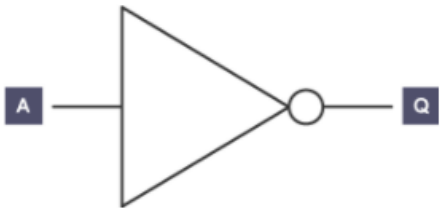
LI: understand how to complete a trace table based on logic gates.

Computers use logic gates to carry out operations. Each logic gate represents a Boolean operator NOT, AND and OR.

A gate takes binary data (1 or a 0), apply a Boolean expression (NOT, AND, and OR), then output a binary result (1 or a 0).

NOT gate

A NOT gate has just one input. The output of the circuit will be the opposite of the input. If 0 is input, then the output is 1. If 1 is input, then 0 is output.



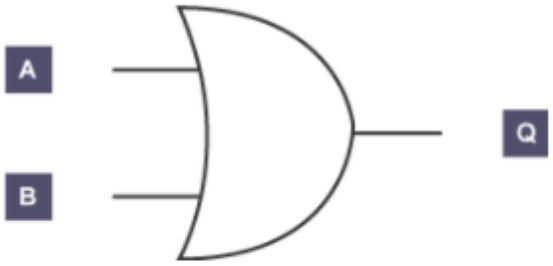
If A is the input and Q is the output, the truth table looks like this:

A	Q
1	0
0	1

The Boolean expression is written as **Q = NOT A**.

OR gate

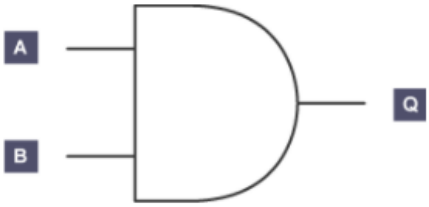
The OR gate has two inputs. One or both inputs must be 1 to output 1, otherwise it outputs 0.



The truth table would look like this:

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

The Boolean expression is written as **Q = A OR B.**



The truth table would look like this:

A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

The Boolean expression is written as **Q = A AND B.**

Please watch this YouTube video below on logic gates

https://www.youtube.com/watch?v=mdd90gXRWeY

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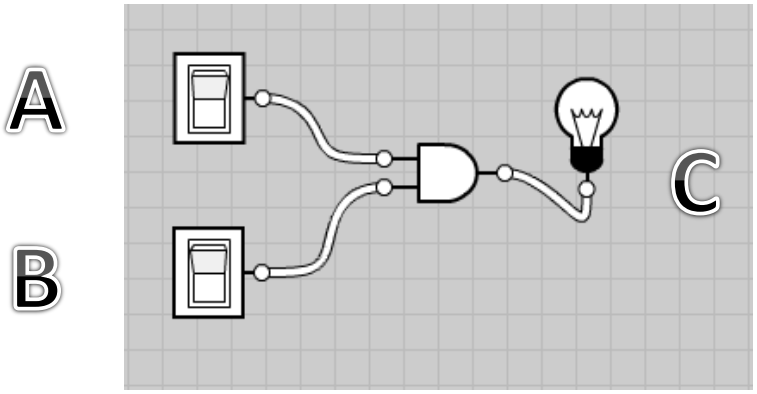
Using logic gates – Year 7

Please use the website http://www.neuroproductions.be/logic-lab/ to complete this task.

1. Set up a circuit by using 2 Switches, 1 light bulb connect through "And Gate"

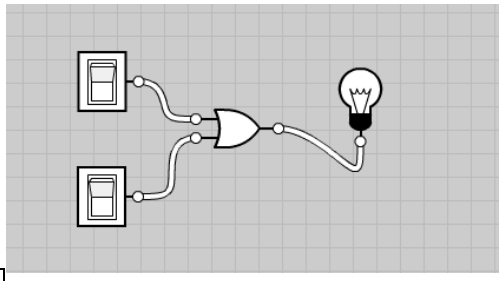


2. Investigate:- (Fill in whether the light bulb (c) is on or off)

Switch A		Switch B		Light Bulb C	
On	1	Off	0		
Off	0	On	1		
Off	0	Off	0		
On	1	On	1		

3. Can you put the correct 1 or 0 in the final column?

4. Now try the same by using an **"Or Gate"**

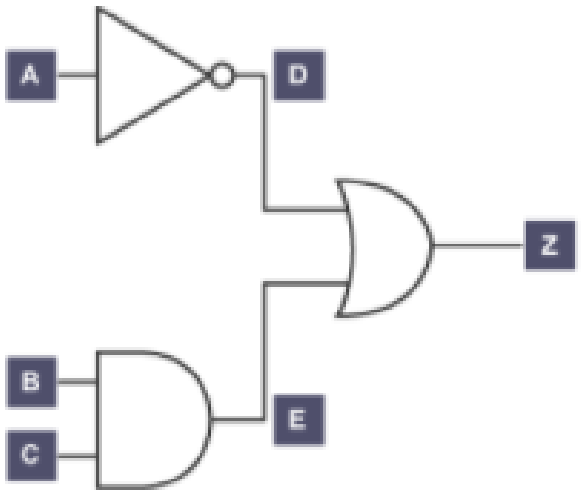


Switch A		Switch B		Light Bulb C	
On	1	Off	0		
Off	0	On	1		
Off	0	Off	0		
On	1	On	1		

5. Try making your own table and circuit using a **"Not Gate"** (note 1 connection)

Complex logic gates

Logic gates can be built up into chains of **logical decisions**. Some logic gates may have more than two inputs. The diagram below shows a **complex logic gate** combining three simple gates.



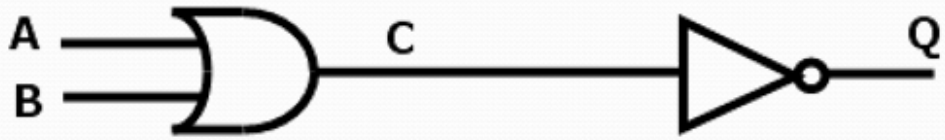
Altogether there are three inputs and eight possible outcomes. To solve the **truth table** below, first find D, then E and finally Z. Complete a whole columnn before moving on to the next column. D depends only on A, E depends on B and C, and Z depends on E or D.

This logic gate truth table is written as:

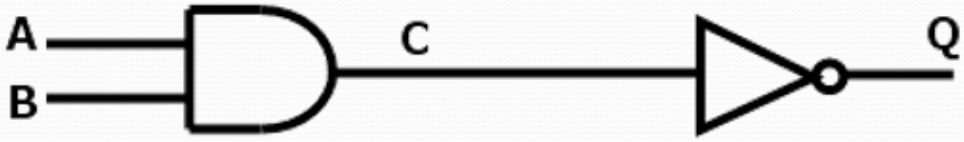
A	B	C	D = NOT A	E = B AND C	Z = D OR E
0	0	0	1	0	1
0	0	1	1	0	1
0	1	0	1	0	1
0	1	1	1	1	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	1	1

This circuit would be written as **Z = D OR E** or **Z = NOT A OR (B AND C)**.

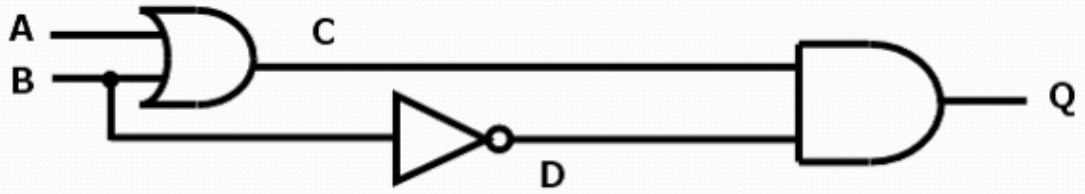
Have a go at trying to complete these truth tables based on the logic gates



Input A	Input B	C	Q
0	0	**0**	**1**
0	1	**1**	**0**
1	0	**1**	**0**
1	1	**1**	**0**

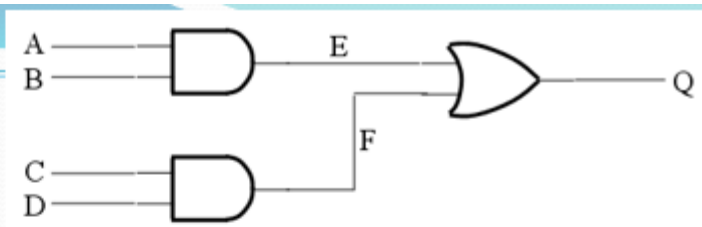


Input A	Input B	C	$\overline{Q}$
0	0		
0	1		
1	0		
1	1		



Input A	Input B	C	D	Q
0	0			
0	1			
1	0			
1	1			

Circuit 4



Input A	Input B	Input C	Input D	E	F	Q
0	0	0	0			
0	0	0	1			
0	0	1	0			
0	0	1	1			
0	1	0	0			
0	1	0	1			
0	1	1	0			
0	1	1	1			
1	0	0	0			
1	0	0	1			
1	0	1	0			
1	0	1	1			
1	1	0	0			
1	1	0	1			
1	1	1	0			
1	1	1	1			

Lesson 4

LI: To learn the rules of binary addition and apply them to do a calculation

Play on this game to see what score you can get.

http://forums.cisco.com/CertCom/game/binary_game_page.htm

Adding binary

When two numbers are added together in **denary**, we take the first number, add the second number to it and get an answer. For example, **1 + 2 = 3.**

When we add two **binary** numbers together the process is different.

There are four rules that need to be followed when adding two binary numbers. These are:

- 0 + 0 = 0
- 1 + 0 = 1
- 1 + 1 = 10 (said one zero and is binary for 2)
- 1 + 1 + 1 = 11 (said one one and is binary for 3)

Name:_____ Year & Class: _____

Binary Addition Revision Worksheet

1.	2.	3.	4.
11 + 10	111 + 101	111 +110	111 + 111

5.	6.	7.	8.
1111 +1000	1101 + 0111	1100 +1101	1001 +0111

9.	10.	11.	12.
1011 +0011	110101 +010001	001111 +101010	11111 +11111

13.	14.	15.	16.
0110 +0011	1001101 +1001010	1010000 +0010110	10111101 +01101010

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Lesson 5

LI: to learn how black and white images are stored in a computer

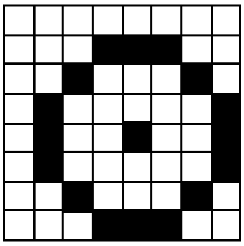
Please read the website below about how black and white images are stored inside a computer.

https://www.bbc.co.uk/bitesize/guides/zpfdwmn/revision/2

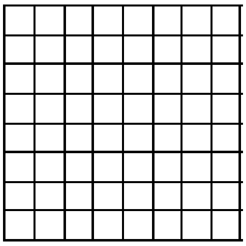
Have a go at the task below. You need to shade in the pixels to make your own image. (Please don't worry about filling in the Hex column. If you want to challenge yourself then have a go! Extra positive points will be awarded for working out the correct Hex values.

Bitmaps

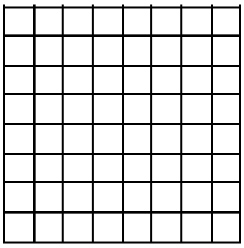
PART 1 Create your own 8x8 bitmaps on the grids below. Then convert your bitmap into binary as shown in the example – using a "0" to represent a white pixel and a "1" to represent a black pixel. Finally, convert the binary number into hexadecimal.



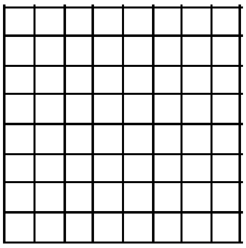
Binary	Hex
00000000	00
00011100	1c
00100010	22
01000001	41
01001001	49
01000001	41
00100010	22
00011100	1c



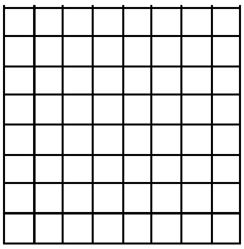
Binary Hex



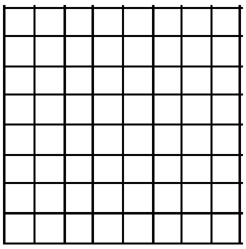
Binary Hex



Binary Hex



Binary Hex



Binary Hex