DATA REPRESENTATION

Data

5 types of data that computers can convert to binary:

1) Numbers
2) Images
3) Characters
4) Sound
5) Units

Characters

Character set: Characters available on a computer.

ASCII: The original standard character set, which assigned all characters a binary code and ASCII code value (using 8 bits = 256)

Unicode: New character set using 32 bits = 4 billion characters. Used to store characters, symbols and emoji's from different languages.

Converting between Binary and Denary

Example – 00010110

4. **Draw out the table below and place the binary value into the table.**

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

5. **Add up the values turned "on".**
   16 + 4 + 2 = 22

Converting between Denary and Binary

Example – 56

1. **Draw out the table below:**

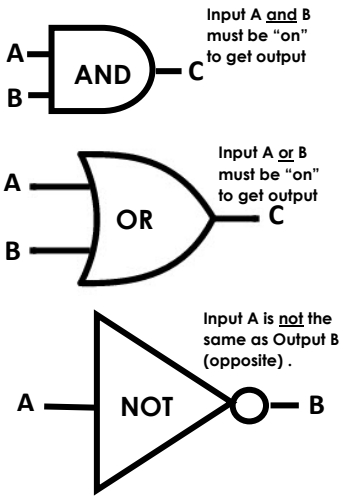
128	64	32	16	8	4	2	1

2. **Fill the table with 1's for values you want to use to make 56 and 0's with those you don't.**

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

3. **Check it (using Bin-Den method)**
   32 + 16 + 8 = 56 ✓

Logic Gates



Truth Tables

A	B	C
1	1	1
1	0	0
0	1	0
0	0	0

A	B	C
1	1	1
1	0	1
0	1	1
0	0	0

A	B
1	0
0	1

Hex to Binary

4E

1. **Split in half: 4 and E.**
2. **Use below table to calculate binary value of each:**

4 =

8	4	2	1
0	1	0	0

E = (11)

8	4	2	1
1	0	1	1

3. **Combine**

Answer: 01001011

Binary to Hex

0110 1110

1. **Split in half 0110 and 1110**
2. **Use below table to calculate hex value for each (follow denary rules)**

0110 =

8	4	2	1
0	1	1	0

= 6

1110 =

8	4	2	1
1	1	1	0

= 14 (E)

3. **Combine Answer: 6E**

Hex

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
										10	11	12	13	14	15

Uses a counting system of 16 values (0-15).
1 hex value = 4 bits of data (nibble).

Images

File Type	Description
Vector Image	Image made up of lines and shapes with properties e.g. fill colour, line style etc. (Used with basic graphics).
Bitmap Image	"Map of bits". – Image made using bits of data.
Resolution	The total number of pixels in the image. No of pixels across * no of pixels down
Pixel	A single point in an image.