

# Kemnal Technology College – Computer Science Kemnal Key – Year 11 Term 3

Computers understand only two states: power on, or power off. This is represented by switches, and computers are essentially calculators made up of billions of switches

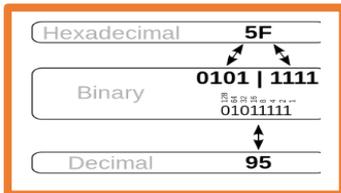
- Power on = 1
- Power off = 0



✓ 1 byte (8 bits) can represent the numbers between 0 (0000 0000) and 255 (1111 1111) =  $2^8 - 1 = 255$

- ✓ What is the largest number that can be held in 16 bits?
- ✓ What is the largest number that can be held in 32 bits?

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



## GCSE exam questions

1. Describe the difference between syntax error and logic error.
2. Convert the binary number 0100 1010 to hexadecimal.
3. What is the purpose for using encryption?
4. Describe the term Caesar cypher and give an example
5. What is meant by the character sets ASCII and Unicode?
6. Describe the term abstraction
7. State a reason why data is split into packets

<b>Number Bases</b>	<ul style="list-style-type: none"> <li>• Binary</li> <li>• Denary</li> <li>• Hexadecimal</li> </ul>
<b>Characters</b>	<ul style="list-style-type: none"> <li>• Character set.                             <ul style="list-style-type: none"> <li>○ Definition</li> <li>○ ASCII</li> <li>○ Unicode</li> </ul> </li> </ul>
<b>Sound</b>	<ul style="list-style-type: none"> <li>• Metadata</li> <li>• Sample rate                             <ul style="list-style-type: none"> <li>○ Quality of sound</li> <li>○ File size</li> </ul> </li> <li>• Sample interval</li> <li>• Bit rate</li> </ul>
<b>Binary Manipulation</b>	<ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> <li>• Logical Shifts</li> <li>• Sign and Magnitude</li> <li>• Arithmetic Shifts</li> </ul>
<b>Instructions</b>	<ul style="list-style-type: none"> <li>• Fetch-Execute cycle</li> <li>• Op-code</li> <li>• Operand</li> <li>• Accumulator</li> </ul>
<b>Compression</b>	Need for: <ul style="list-style-type: none"> <li>• Lossy</li> <li>• Lossless</li> </ul>
<b>Characters</b>	Character set. <ul style="list-style-type: none"> <li>• Definition                             <ul style="list-style-type: none"> <li>○ ASCII</li> <li>○ Unicode</li> </ul> </li> </ul>
<b>Hexadecimal (hex) numbers</b>	<ul style="list-style-type: none"> <li>• Hex – base 16</li> <li>• Converting between hex and denary.</li> <li>• Converting between hex and binary.</li> </ul>

## Programming techniques

- **Sequence**
- **Selection**
  - IF... ELSE...
- **Iteration**
  - For & While
- **Basic string manipulation**
- **file handling operations:**
  - open
  - read
  - write
  - close
- **the use of records to store data**
- **the use of SQL to search for data**

- **Arrays**
  - one dimensional arrays
  - two dimensional arrays

- **Sub programs**
  - Functions
  - Procedures

## Data types

- **Integer** e.g. 23
- **Real** e.g. 23.7
- **Character** e.g. A or 5
- **String** e.g. A546TH
- **Boolean** e.g. TRUE or FALSE.

## Misconceptions

- ✓ Binary place values double each time (they don't follow the 2 times table)
- ✓ The Caesar cypher is not just a wheel that moves, but you need to be able to describe what happens.
- ✓ Encryption isn't just used to stop people from seeing information. It is used to only allow