KNOWLEDGE ORGANISER
BIG IDEA: Computer Science
TOPIC: Python & Data Representation

Key Word	Definition
Algorithm	A set of rules/instructions to be followed by a computer system
Sequence	Parts of the code that run in order and the pathway of the program reads and runs very line in order
Selection	Selects a pathways through the code based on whether a condition is true
Iteration	Code is repeated (looped), either while something is true or for a number of times
Variable	A value that will change whilst the program is executed. (eg. temperature, speed)
Data type	This indicates how the data will be stored. The most common data types are integer, string, and float/real
Syntax	The punctuation/way that code has to be written so that the computer can understand it. Each programming language has its own syntax.
Binary	The language of computers, made up of 0s and 1s
Pixel	The smallest part of an image
Sound sampling	The amplitude of the wave is measured at regular intervals which creates a digital representation of the wave.

Comparative Operators	
==	Equal to
!=	Not equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

Denary is the decimal number system that we are used to. It uses the numbers 0-9 and the column headings go up in powers of 10.

100 (Hundreds)	10 (Tens)	1 (Units)
2	3	8
2 lots of 100	3 lots of 10	8 lots of 1

Binary uses the numbers 0 and 2. The column headings go up in power of 2:

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

64 + 4 + 2 + 1 = 71

Images are made up of pixels
The colour of each pixel is represented by a binary number. If an image uses 1 bit to represent each colour then it will only have 2 colours:

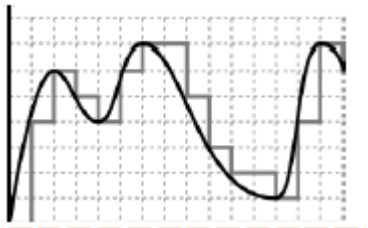
0	0	1	0	0
0	0	0	1	0
1	1	1	1	1
0	0	0	1	0
0	0	1	0	0

This is a 1-bit image so it uses 2 colours. 0=white and 1=black

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

This is a 2-bit images so it uses 4 colours.
00=white,
01=blue, 10=red,
11=black

The analogue wave is smoother and shows continuous data. The digital sampling shows the amplitude of the wave at different points.



Data Type	Definition
String	Text eg: "Hello"
Integer	Whole number eg: 32
Float/Real	Decimal number eg: 1.2
Boolean	Two values eg: true or false
Character	A single character eg: b

```
name = input("Enter Name")  #A
age = 14                    #B
users = ["John","Jane"]     #C
length = len(users)         #D
valid = False               #E
                            #F
for i in range(length):     #G
    if name == users[i]     #H
        valid = True        #I

if valid == True:           #J
    print("Valid user")
else:                       #K
    print("Invalid user")
```

A: Stores user inputted text to a variable called name.
B: Stores an integer value 14 to a variable called age.
C: Creates a list which contains 2 string values. Stores to users.
D: Calculates the length (how many items are in) of users.
E: Stores the Boolean value False to variable valid.
F: Use of white space to make code clearer.
G: Creates a loop that will iterate for every element in users.
H: Use of selection to determine if the entered value match with any values from the list

This binary addition gives an overflow error as the total does not fit in 8 bits (a byte).

```
  1 0 0 1 0 1 0 1
+ 1 1 0 1 1 0 1 1
1 1 1 1 1 0 0 0 0
1     1 1 1 1
```