

GCSE Computer Science – Data Structures

Literacy / Key terms

Data structures allow us to store multiple pieces of data that are stored in programs.

The main data types are:

Arrays

An array is a collection of something: for example students in a class.

Only one type of data can be stored in an array – **if you want to use a mix you would have to use a list.**

There are two types of array, one dimensional and two dimensional.

Records

A record is a single instance in an array. **For example a single students information within a class would be a record.**

A record is used to hold different pieces of information about one item.

One dimensional array

A single list such as red, orange, yellow etc.

In a one dimensional array you can access any one of the contents by identifying its position within the array (remembering the numbers start at 0)

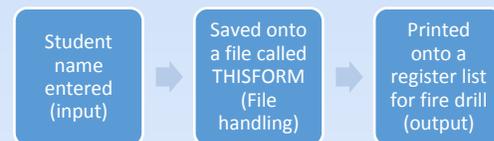
Example:
Score = [2,4,6,8,10]
Output Score [2]

This will return 6 because 2 is in position 0, 4 is in 1 and 6 is in position 2

Input/output and file handling

This is a technical way of describing what happens in most programs: some data is input, something happens, and the result is output.

Example:



String Handling

A string is a sequence of characters in memory, just like a piece of string.

Handling strings refers to groups of characters. There are a range of operations that you might need to perform on strings.

- Length – number of characters
- Position – the location of a specified substring
- Substring – any sequence of characters within a string that is likely to affect other characters within that string.
- Concatenation – the joining of strings end to end.

Example: A program that is required to count the number of times “A” appears in an inputted block of text

```

SET a_counter TO 0
RECEIVE user_text (STRING) FROM Keyboard

REPEAT WITH loop_counter FROM 1 TO LENGTH(user_text)
  IF MID(user_text, loop_counter, 1) = "A" THEN
    SET a_counter TO a_counter + 1
  END IF
END REPEAT

SEND "The number of A's is " & a_counter TO DISPLAY
  
```

Two dimensional array

In two dimensional array you can also access items specifically or navigate across the whole array.

Example:

On a chess board the array would be defined a BOARD [8,8] because there are 8 spaces in each row and 8 rows.

This means you can identify where each piece would be by identifying its row and column.

Example: BookScore [0] [2] = 5

This would update the record for Khrisha rating of Jayne Eyre to 5

		0	1	2	3
		Alex	Bailey	Khrishna	Jamie
0	Jane Eyre	5	6	5	1
1	Of mice and men	6	4	5	3
2	Hannibal	9	5	5	1