AQA Computer Science AS-Level

3.2.1 Data structures and abstract data types

Intermediate Notes

Specification:

3.2.1.1 Data structures:

Be familiar with the concept of data structures.

3.2.1.2 Single- and multi-dimensional arrays (or equivalent):

Use arrays (or equivalent) in the design of solutions to simple problems.

3.2.1.3 Fields, records and files:

Be able to read/write from/to a text file.

Be able to read/write data from/to a binary (non-text) file.

Data structures

Data structures are used by computers as the containers within which information is stored. Different data structures exist and some are better suited to different types of data than others. When storing data, a programmer must decide which of the data structures available is the best to use.

Arrays

An array is a set of related elements. An array must have a fixed number of elements, must be indexed and must only contain elements with the same data type.

```
Array Names = {"George", "Sue", "Mo"}
```

The elements of an array are given an index, which often starts from zero. For example, with the array shown above, `Names(2)` would return `"Mo"` as the first item (`"George"`) is given the index `0`.

Synoptic Link

A **data type** is defined by the values it can take or the operations which can be performed on it.

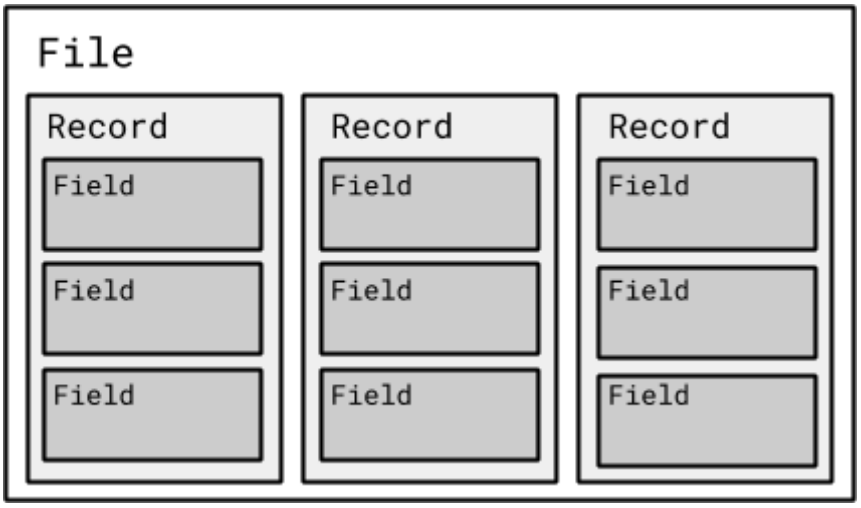
Data types are covered in the notes for **fundamentals of programming**.

The array shown above is a one-dimensional array which could be visualised with the following table:

0	1	2
"George"	"Sue"	"Mo"

Fields, records and files

Information is stored by computers as a series of files. Each file is made up of records which are composed of a number of fields.



It's important that you make sure you can write to and read from files in your chosen programming language.