

10. Data Types and Structures

Starter Quiz · 课前小测

A-Level Computer Science

Name: _____ Score: _____

1. Which data type best stores a yes/no flag like "in stock"?
 - ☐ BOOLEAN
 - ☐ STRING
 - ☐ REAL
 - ☐ DATE
2. An array stores:
 - ☐ many items of the same type, reached by an index
 - ☐ several fields of different types
 - ☐ a single value
 - ☐ only text
3. Why does a program write data to a file rather than keeping it in a variable?
 - ☐ variables in RAM are lost when the program ends; a file persists
 - ☐ files are always faster than RAM
 - ☐ variables cannot hold numbers
 - ☐ files use no storage
4. An Abstract Data Type (ADT) is defined by:
 - ☐ what operations it offers, hiding how the data is stored
 - ☐ the exact memory addresses it uses
 - ☐ the programming language only
 - ☐ the size of the screen
5. Pushing an item onto a stack that is already full causes a stack _____.

6. A real (floating-point) type should be used to store a measurement such as a temperature.
 - ☐ True ☐ False
7. An array is a data structure holding many values of the _____ type under one name.

8. To add lines to the end of an existing file without losing its contents, open it FOR _____.

9. A stack works in which order?
 - ☐ LIFO — last in, first out
 - ☐ FIFO — first in, first out
 - ☐ random order
 - ☐ sorted order
10. Which belong in the declaration and initialisation of an array-based stack? Select **all** that apply.
 - ☐ an array with its size and element type
 - ☐ a top-of-stack pointer initialised to 0
 - ☐ a MaxSize the push operation compares against
 - ☐ a front pointer for the next item to leave

Tick every correct option.

1. **BOOLEAN**

A flag has two states, so BOOLEAN (TRUE/FALSE) is the precise choice — not the strings "yes"/"no".

2. **many items of the same type, reached by an index**

An array is an ordered collection of same-type items accessed by index. (A record groups different types.)

3. **variables in RAM are lost when the program ends; a file persists**

RAM is volatile, so data is lost on exit. A file on secondary storage persists between runs.

4. **what operations it offers, hiding how the data is stored**

An ADT specifies the operations (the interface); the implementation is hidden and can change freely.

5. **overflow**

Overflow = push when $\text{Top} = \text{MaxSize}$; popping from an empty stack ($\text{Top} = 0$) is underflow.

6. **True**

Whole counts use integers; measurements use reals.

7. **same**

Each value is reached by its index.

8. **APPEND**

WRITE would start the file empty. APPEND keeps what is there and writes after it.

9. **LIFO — last in, first out**

A stack is LIFO: the most recently pushed item is the first to be popped.

10. **an array with its size and element type; a top-of-stack pointer initialised to 0; a MaxSize the push operation compares against**

A stack needs one pointer, Top. A front pointer belongs to a queue.