Variables, constants and types

Ref Pseudocode

The five data types

0478 pseudocode has exactly **five** data types . Learn the list – naming a type that is not on it loses the mark.

Type	Holds	Example
`INTEGER`	a whole number	`42`, `-7`
`REAL`	a number that may have a fractional part	`3.14`, `-0.5`
`CHAR`	a single character	`'A'`
`STRING`	a sequence of characters	`"Hello"`
`BOOLEAN`	`TRUE` or `FALSE`	`TRUE`

```
DECLARE Age : INTEGER
DECLARE Price : REAL
DECLARE Grade : CHAR
DECLARE Name : STRING
DECLARE Passed : BOOLEAN
Age ← 17
Price ← 2.50
Grade ← 'A'
Name ← "Mei"
Passed ← TRUE
OUTPUT Name, " is ", Age, " and passed: ", Passed
```

- A `STRING` is written in **double** quotes, a `CHAR` in **single** quotes.
- `TRUE` and `FALSE` are keywords, so they are upper case and carry no quotes.

Common mistakes

- Writing `FLOAT`, `DOUBLE` or `BOOL`. Those are real languages, not this syllabus.
- `'Hello'` for a string – single quotes hold one character only.

The five data types: INTEGER, REAL, CHAR, STRING and BOOLEAN

DECLARE

`DECLARE` names a variable and fixes its type before you use it.

```
DECLARE <identifier> : <data type>
```

```
DECLARE Counter : INTEGER
DECLARE TotalToPay : REAL
Counter ← 1
TotalToPay ← 19.99
OUTPUT "Item ", Counter, " costs ", TotalToPay
```

Several names of one type go on a single line, separated by commas:

```
DECLARE RoomLength, Width, Area : INTEGER
RoomLength ← 6
Width ← 4
Area ← RoomLength * Width
OUTPUT "Area = ", Area
```

- Declare a variable **before** its first use, near the top of the algorithm.
- A variable keeps its type for the whole algorithm – an `INTEGER` never holds `"Mei"`.

Common mistakes

- Leaving out the colon: `DECLARE Counter INTEGER`.
- Using a variable that was never declared. The exam expects the declaration.

DECLARE names a variable and fixes the type of value it can hold

CONSTANT

A **constant** is a value that is fixed for the whole algorithm – a tax rate, π, the size of a class. Naming it once means a change is made in one place.

```
CONSTANT <identifier> ← <value>
```

```
CONSTANT TaxRate ← 0.20
DECLARE Price, Tax : REAL
Price ← 50.00
Tax ← Price * TaxRate
OUTPUT "Tax to pay: ", Tax
```

- In **0478 the arrow is used**, exactly as for an assignment.
- The value must be a **literal** – a number, a string, `TRUE` – never a calculation and never another variable.
- A constant can never be given a new value later. That is the whole point of it.

Common mistakes

- `CONSTANT TaxRate = 0.20`. The `=` form is the A-Level 9618 spelling – see topic 11.
- Assigning to a constant further down the algorithm.