

## Subject Specific Vocabulary

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The following list provides definitions of key terms used in our GCSE Computer Science 8525 specification.

Students should be familiar with, and gain understanding from, all these terms.

### Variable declaration

Variables are defined as a space in memory, given a name, assigned a value that can be changed while a program is running. Once a variable is declared it is then assigned a value, this is called initialization.

```
Name ← "Bob Smith"
```

### Constant declaration

Constants are similar in definition to variables, the difference in definition being a space in memory, given a name, assigned a value that **cannot** be changed while a program is running. Constants are identified in their declaration and should be capitalized:

```
CONST PI ← 3.14
```

### Assignment

Assignment is a term used to show the setting of variables to values.

```
Answer ← Num1 + Num2
```

### Selection

Selection is a blanket term to refer to a programming statement that allows the changing of the flow of the program, based on a condition that is met.

```
IF Game = "won" THEN  
    PRINT("you have won the game")  
END IF
```

The above shows an example of nested selection, that shows if the first condition is met, then it checks the second selection statement.

### Iteration

Iteration is a blanket term to refer to a programming statement that repeats code (loops). This can be both count controlled or condition controlled.

## Count controlled loop

A loop that has a definite number of times to run, this can be known as definite iteration. A for loop is an example of a Count Controlled loop.

```
FOR i ← 1 TO 5
  ... Instructions here ...
ENDFOR
```

This can also be achieved with a WHILE loop, as long as the loop as a set number of iterations.

```
WHILE I <= 5
  ...instructions here...
  I = I + 1
END WHILE
```

## Condition controlled loop

Condition controlled loops are those in which the end of the loop is not known, it will continue indefinitely until the condition is met.

```
WHILE NotSolved
  ... Instructions here ...
ENDWHILE
```

The same effect can be achieved with a REPEAT...UNTIL loop, the benefit of which is that the program can enter the loop, gain an input then test the condition at the end, making it potentially more efficient.

```
REPEAT
  ... Instructions here ...
UNTIL Solved
```

## Nested structures

Nesting is the process of putting a statement inside of another. This can be achieved through both iteration and selection statements. An example of nested iteration would be:

```
WHILE NotSolved
  ... Instructions here ...
  FOR i ← 1 TO 5
    ... Instructions here ...
  ENDFOR
  ... Instructions here ...
ENDWHILE
```

An example of nested selection would be:

```
IF GameWon THEN
  ... Instructions here ...
  IF Score > HighScore THEN
    ... Instructions here ...
  ENDIF
  ... Instructions here ...
ENDIF
```

## Relational operator

Relational operators are those that are used to compare the relationship between 2 variables or values. This could be one of the following:

>, <, <=, >=, =, !=

eg IF I < 6 THEN

## Arithmetic operator

Arithmetic operators are those which are used in order to perform a mathematical function between 2 variables or values:

+, -, \*, /

eg X = Y + Z

## Boolean operators

Boolean operators are those which are used to test a true or false condition on variables and conditions in order to change the flow of a program:

eg WHILE X > 7 AND Y < 6

both conditions would have to be true in order for the program to continue to loop.

WHILE X > 7 OR Y < 6

One or both of these conditions would have to be true in order for the program to continue to loop.

## Dimensional arrays

An array is defined as multiple spaces in memory, under a single identifier in order to group elements together.

An example of defining an array is:

```
Trains ← [TrainA, TrainB, TrainC]
```

When referencing an array, this is done in the following way:

```
PRINT(Trains[0])
```

Arrays (unless referenced) start from 0.

An array of 2 Dimensions is usually referenced in a table format:

This is referenced in the following way:

```
PRINT(Trains[0,1])
```

This will identify the second record in the first row. Using the following diagram, trainB will be printed

	0	1	2
0	TrainA	TrainB	TrainC
1	TrainD	TrainE	TrainF

## Records

A record is a data structure that allows multiple data types to be referenced under a single identifier. An example of a record is:

```
RECORD Car
    make : String
    model : String
    reg : String
    price : Real
    noOfDoors : Integer
ENDRECORD
```

An element of a record can be referenced in the following format:

```
Car.Make ← "Ford"
PRINT(Car.Make)
```

This will display the make of the car.

## String functions

String functions are subroutines, built into the programming language in order to manipulate the string data type. There are many string functions that can be used within a language:

```
Name ← TOUPPER (Name)
```

This will turn the variable name into upper case.

## Random number generation

Random Numbers can be referenced with the following notation:

```
Num ← RANDOM_INT (2, 5)
```

This will display a random number between the numbers 2 and 5 and store it in the variable Num.

## Subroutine (procedure/function)

A subroutine is classed as a set of instructions in order to execute a commonly used task. Subroutines are broken into 2 areas: procedures and functions. The key difference between a procedure and a function is that a procedure does not return a value whereas a function does.

Procedure	Function
<pre>PROCEDURE Game (Value1, Value2) Statements... END PROCEDURE</pre>	<pre>FUNCTION Game (Value1, Value2) Statements... RETURN Value3 END Function</pre>

The values in the brackets signify the parameters (variables or values) passed to the function.