Definitions and Concepts for CAIE Computer Science IGCSE

Topic 8: Programming

8.1 Programming concepts

Variable: A value stored in memory that can change during run-time.

Constant: A value that does not change while the program runs. Often given fully uppercase identifiers.

Variable/Constant Declaration: Creates a variable/constant (including the value's identifier, a label used to uniquely identify the memory location) to store data.

Assignment: Setting or updating a value in a variable.

Data Type: Defines the kind of data a variable or constant can hold. It tells the program how the data will be stored, processed, and displayed.

Integer: A data type representing whole numbers.

Real (Float): A data type representing numbers with fractional parts.

Boolean: A data type representing true or false values.

Character: A data type representing a single character.

String: A data type representing a sequence of characters.

Input: When a program receives data from a user.

Output: Displaying data to the user.

Sequence: Executing instructions one after the other, in the order they were written.

Selection: Using conditions to control the flow of a program (e.g., IF statements).

Iteration: Repeating a set of instructions (e.g., WHILE, FOR loops).

Count-controlled loop: A loop which repeats code a certain number of times (for loop).

Condition-controlled loop: A loop which repeats code until a condition is met.

Pre-condition loop: The condition is checked before the loop (while loop).

Post-condition loop: The condition is checked at the end of the loop (do…until loop).

Totalling: Keeping a running sum of numbers throughout a program or loop.

Counting: Keeping track of how many times an event has occurred.

String Handling: Operations which can be performed on strings.

Length: A string operation which returns the length of the string.

Substring: A string operation which can be used to split a string or copy a section of it.

Upper: A string operation that can be used to put the string in full-uppercase.

Lower: A string operation that can be used to put the string in full-lowercase.

Arithmetic Operation: Operators that perform calculations (e.g., +, -, *, /).

Relational Operation: Operators that compare values (e.g., ==, !=, >).

Logical Operation: AND, OR, NOT used in logical conditions.

Addition: An arithmetic operation.

Subtraction: An arithmetic operation.

Multiplication: An arithmetic operation.

Real Division: An arithmetic operation that produces a real number result.

Integer Division: An arithmetic operation that produces the integer quotient (whole part) of a division.

Remainder (Modular Arithmetic): The value left over when one integer is divided by another (e.g., 11 MOD 2 = 1).

Equal To (==): A relational operation used to check if two values are the same.

Not Equal To (< > or !=): A relational operation used to check if two values aren't the same.

Less Than (<): A relational operation used to check if one value is less than another.

Greater Than (>): A relational operation used to check if one value is greater than another.

Less Than Or Equal To (<=): A relational operation used to check if one value is less than, or equal to, another.

Greater Than Or Equal To (>=): A relational operation used to check if one value is greater than, or equal to, another.

NOT: A Boolean operation.

AND: A Boolean operation.

OR: A Boolean operation.

Nested Statement: Iteration and selection statements which are nested (indented) within each other to provide more complex decision-making or program flow.

Procedure: A subroutine which performs an action and does not return a value.

Function: A subroutine which performs an action and returns a value.

Parameter: A variable that allows data to be passed into a subroutine.

Local Variables: A variable that exists in memory only during the execution of a subroutine and cannot be accessed outside of that subroutine.

Global Variables: A variable that exists in memory throughout the execution of a program and can be accessed by any part of a program.

ROUND: A library routine that can be used to round numbers.

Random: A library routine that can be used to generate random numbers.

8.2 Arrays

Arrays: A data structure that stores a collection of items, typically of the same data type, accessed using an index.

1D Array: A single list of items of the same data type.

2D Array: An array of arrays, similar to a table or grid.

8.3 File handling

File Handling: Operations which allow for the reading of and writing to an external file containing permanently saved data.

Reading: Reading from an external file.

Writing: Writing to an external file.