Pseudocode Reference Guide for Pearson Edexcel International GCSE

Introduction

Pseudocode is a simple way of writing programming code in plain English. It is not a real programming language but uses the conventions of several languages to express algorithms. This guide is designed to help you understand the basics of pseudocode, specifically tailored for the Pearson Edexcel International GCSE specifications.

Basic Concepts

- Pseudocode: A way to describe how to accomplish tasks using basic steps like those a computer might perform.
- Algorithm: A list of steps to finish a task. Pseudocode is often used to write down these steps.

Pseudocode Command Set

The Pearson Edexcel International GCSE uses a specific set of commands in pseudocode. Here's an overview:

Data Types

- INTEGER: Whole numbers
- REAL: Decimal numbers
- BOOLEAN: True or False values
- CHARACTER: Single letters or characters

Constants

- Defined with the CONST keyword and can't be changed later.

Variables and Arrays

- Variables: Containers for storing data values.
- Arrays: A collection of elements (values or variables), each identified by an array index.

Basic Commands

- SET: Assigns a value to a variable.
- IF...THEN...ELSE: Conditional statements used for decision-making.
- WHILE: A loop that continues as long as the condition is true.
- REPEAT...UNTIL: A loop that runs until a condition is met.
- FOR: A loop that runs a set number of times.

Input and Output

- SEND <value> TO DISPLAY: Shows the output on the screen.
- RECEIVE <variable> FROM <device>: Gets input from the user.

Arithmetic Operators

- +, -, *, /: Basic arithmetic operations.
- MOD: Modulo operation, finding the remainder.

Relational Operators

- =, <>, >, >=, <, <=: For comparing values.

Logical Operators

- AND, OR, NOT: Logical operations.

Writing Basic Pseudocode

When writing pseudocode, remember these key points:

Be clear and concise.
Write one statement per line.
Use the correct pseudocode commands.
Indent to show loops or conditional blocks.

Example Pseudocodes

Example 1: Adding Two Numbers

```
RECEIVE num1 FROM (INTEGER) KEYBOARD
RECEIVE num2 FROM (INTEGER) KEYBOARD
SET sum TO num1 + num2
SEND sum TO DISPLAY
```

Example 2: Checking for a Prime Number

```
RECEIVE number FROM (INTEGER) KEYBOARD
SET isPrime TO TRUE
FOR i FROM 2 TO number-1 DO
 IF number MOD i = 0 THEN
 SET isPrime TO FALSE
 END IF
END FOR
IF isPrime THEN
 SEND number & ' is a prime number' TO DISPLAY
ELSE
 SEND number & ' is not a prime number' TO DISPLAY
END IF
```

Example 3: Calculating Factorial of a Number

```
RECEIVE num FROM (INTEGER) KEYBOARD
SET factorial TO 1
IF num < 0 THEN
 SEND "Factorial not defined for negative numbers" TO DISPLAY
ELSE
 FOR i FROM 1 TO num DO
 SET factorial TO factorial * i
 END FOR
 SEND "Factorial of " & num & " is " & factorial TO DISPLAY
END IF
```

Example 4: Finding the Largest Number in an Array

```
SET numbers TO [15, 22, 8, 19, 30]
SET max TO numbers[0]
FOR i FROM 1 TO LENGTH(numbers)-1 DO
 IF numbers[i] > max THEN
 SET max TO numbers[i]
 END IF
END FOR
SEND "The largest number is " & max TO DISPLAY
```

Example 5: Simple Calculator (Addition, Subtraction, Multiplication, Division)

```
RECEIVE num1 FROM (INTEGER) KEYBOARD
RECEIVE num2 FROM (INTEGER) KEYBOARD
RECEIVE operator FROM (CHARACTER) KEYBOARD
IF operator = '+' THEN
 SET result TO num1 + num2
ELSE IF operator = '-' THEN
 SET result TO num1 - num2
ELSE IF operator = '*' THEN
 SET result TO num1 * num2
ELSE IF operator = '/' THEN
 IF num2 = 0 THEN
 SEND "Cannot divide by zero" TO DISPLAY
 ELSE
 SET result TO num1 / num2
 END IF
ELSE
 SEND "Invalid operator" TO DISPLAY
END IF
SEND "Result: " & result TO DISPLAY
```

Example 6: Checking for Even or Odd Number

```
RECEIVE num FROM (INTEGER) KEYBOARD
IF num MOD 2 = 0 THEN
 SEND num & " is an even number" TO DISPLAY
ELSE
 SEND num & " is an odd number" TO DISPLAY
END IF
```

Example 7: Generating a Fibonacci Series up to Nth Term

```
RECEIVE n FROM (INTEGER) KEYBOARD
SET a TO 0
SET b TO 1
SEND "Fibonacci Series: " TO DISPLAY
FOR i FROM 1 TO n DO
 SEND a & " " TO DISPLAY
 SET nextTerm TO a + b
 SET a TO b
 SET b TO nextTerm
END FOR
```

These examples cover a range of basic algorithms and introduce students to various key concepts in programming, such as loops, conditionals, arrays, and arithmetic operations. They are designed to be understandable and executable in a pseudocode environment, aligning with the Pearson Edexcel International GCSE specifications.