

8.1 Programming concepts

Name: _____ Class: _____ Date: _____

Total: 15 marks

Objective

Build the skills to answer exam questions on **programming concepts** 编程概念—variables, data types, the three control structures (**sequence**, **selection**, **iteration** 顺序、选择、迭代), operators, and procedures/functions.

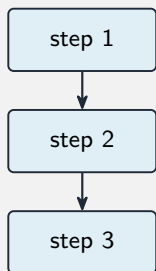
You must be able to:

- declare variables/constants and use the five data types
- use sequence, selection (IF/CASE) and iteration (FOR/WHILE/REPEAT)
- use operators (MOD, DIV) and write procedures/functions

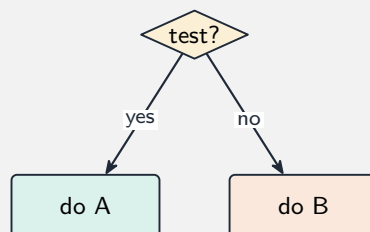
1 Worked examples

■ Control structures

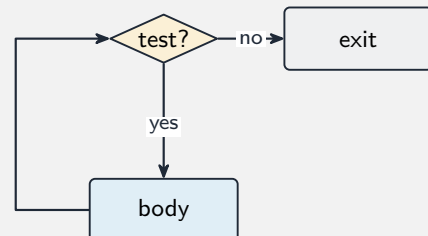
Sequence



Selection

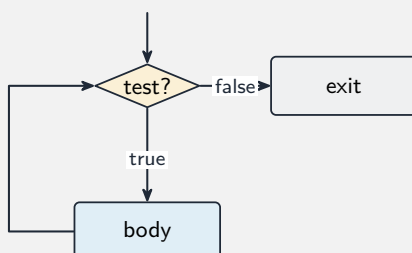


Iteration

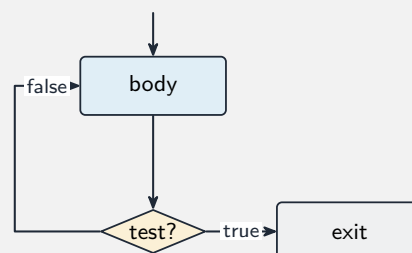


Sequence runs steps in order; selection chooses a branch; iteration repeats a body

WHILE (pre-condition)



REPEAT (post-condition)



- $17 \text{ MOD } 5 = 2$ (remainder); $17 \text{ DIV } 5 = 3$ (whole part).

2 Practice

2.1 State the difference between a variable and a constant. [2]

2.2 Give the value of $23 \text{ MOD } 4$. [1]

3 Exam-style questions

3.1 A loop that always runs **at least once** is a: [1]

- **A** FOR loop
- **B** WHILE (pre-condition) loop
- **C** REPEAT (post-condition) loop
- **D** CASE statement

3.2 A program reads 10 marks and outputs their total.

(a) State which control structure repeats the input 10 times. [1]

(b) Write pseudocode using a count-controlled loop to total 10 input marks. [4]

3.3 State the difference between a procedure and a function. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **8.1 Programming concepts** past-paper sheet in the Library, or try these in **Practice mode**:

- 0478/21 N25 —Q3 (programming concepts)
- 0478/22 N25 —Q1 (control structures)

Solutions

2.1 a variable's value can change while the program runs; a constant's value is fixed.

2.2 3.

3.1 C. A REPEAT (post-condition) loop runs at least once.

3.2 (a) iteration (a count-controlled / FOR loop).

(b) `total ← 0; FOR i ← 1 TO 10; INPUT mark then total ← total + mark; NEXT i`
then `OUTPUT total`.

3.3 a function returns a value to where it was called; a procedure does a task but returns no value.