

Exercise walk-through

3.5

Boolean Expressions

AP Computer Science Principles

Variables, expressions & strings

Variable

a named box;
assignment $\leftarrow$

Expressions

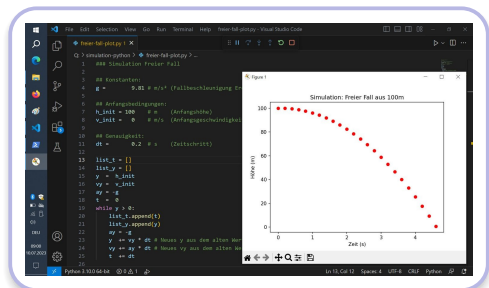
$\times \div$ before $+-$:
 $2+3\times 4 = 14$

Strings

ordered characters; index from 0

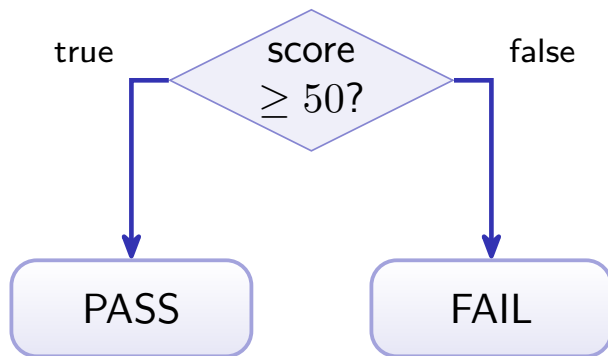
Data abstraction

groups many values under one name – a **list** –
so the same code works for any amount of data.



Programs use variables, expressions, and control flow

Boolean logic & conditionals



A **Boolean expression** is true or false.

■ **relational** : $>$, $<$, $=$, $\neq$

■ **logical** : AND, OR, NOT

A **conditional selection** runs one branch – . An **else-if** chain picks among three or more.

Exam tips

- Know a variable is a named store for a value and trace how **assignment** updates it step by step.
- Read the AP **pseudocode** carefully – `a <- expression` assigns, and lists are **1-indexed** on the exam reference sheet.
- Distinguish a variable from a **list** (a collection accessed by index) and use list operations correctly.
- Evaluate expressions with the right precedence and boolean logic (AND, OR, NOT).
- Pick clear, meaningful variable names – the written tasks reward readable code.

Exercises 2.1-2.3

2.1 State what a Boolean expression evaluates to.

[1]

2.2 Evaluate $(7 > 2)$ AND $(4 > 9)$.

[2]

2.3 State what the NOT operator does.

[1]

Exercises 2.1-2.3

2.1 State what a Boolean expression evaluates to.

[1]

2.1

- either true or false

2.2 Evaluate $(7 > 2) \text{ AND } (4 > 9)$.

[2]

2.2

- $7 > 2$ is true; $4 > 9$ is false; true AND false = **false**

2.3 State what the NOT operator does.

[1]

2.3

- it reverses a Boolean value (true becomes false and vice versa)

Exercises 3.1-3.2

3.1 A Boolean expression evaluates to

[1]

☐

A a number

B a string

C true or false

D a list

☐

A true

B false

C undefined

D 3

3.2 The expression $(3 > 1)$ OR $(5 < 2)$ is

[1]

Exercises 3.1-3.2

3.1 A Boolean expression evaluates to

[1]

☐

- A a number
- B a string
- C true or false
- D a list

3.1 C

- true or false.

3.2 The expression $(3 > 1)$ OR $(5 < 2)$ is

[1]

☐

- A true
- B false
- C undefined
- D 3

3.2 A

- the first part is true, so OR is true

Exercise 3.3 (a)

3.3 Given $a = 5$ and $b = 8$:

(a) evaluate $a < b$.

[1]

Exercise 3.3 (a)

3.3 Given $a = 5$ and $b = 8$:

(a) evaluate $a < b$.

[1]

(a)

- true

Exercise 3.3 (b)

3.3 Given $a = 5$ and $b = 8$:

(b) evaluate $(a < b)$ AND $(b < 10)$.

[1]

Exercise 3.3 (b)

3.3 Given $a = 5$ and $b = 8$:

(b) evaluate $(a < b)$ AND $(b < 10)$.

[1]

(b)

- true (both parts true)

Exercise 3.3 (c)

3.3 Given $a = 5$ and $b = 8$:

(c) evaluate NOT ($a < b$).

[1]

Exercise 3.3 (c)

3.3 Given $a = 5$ and $b = 8$:

(c) evaluate NOT ($a < b$).

[1]

(c)

- false

Exercise 3.4

3.4 A rule is `(score >= 60) AND NOT absent`. For `score = 60` and `absent = true`, evaluate both components and the final result. Then state the result if `absent = false` while `score` stays 60.

[4]

Exercise 3.4

3.4 A rule is `(score >= 60) AND NOT absent`. For `score 60` and `absent = true`, evaluate both components and the final result. Then state the result if `absent = false` while `score` stays 60. [4]

3.4

`score >= 60` is true; `NOT absent` is false; true AND false is false; with `absent = false`, both required conditions are true and the result is true.