1. Abstraction means:

   ☐ testing every possible input

   ☐ keeping the essential features and ignoring irrelevant detail

   ☐ breaking a problem into smaller parts

   ☐ writing the program in machine code

2. An algorithm is "deterministic". This means:

   ☐ each step has several meanings

   ☐ the same input always produces the same output

   ☐ it runs forever

   ☐ it needs no input

3. In a flowchart, which shape represents a decision?

   ☐ a parallelogram

   ☐ a diamond

   ☐ a rounded rectangle

   ☐ a plain rectangle

4. A train map that keeps the stations and lines but drops the real geography is an example of abstraction.

   ☐ True ☐ False

5. In an identifier table, the data type for a value such as 12.67 (a cost) is _____.

   _____

6. In the averaging algorithm, the FOR loop that adds each number to the total is an example of the _____ construct.

   _____

7. Select **all** the statements that are benefits of abstraction.

   ☐ The program is smaller and quicker to write and test.

   ☐ The problem is easier to understand and to program.

   ☐ Every detail of the real system is kept.

   ☐ The same model can be reused for a similar problem.

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Tick every correct option.

8. In this pseudocode, which symbol means assignment (store a value)?

   ☐ :

   ☐ ==

   ☐ =

   ☐ ← (an arrow)

9. Stepwise refinement is the technique of:

   ☐ writing the whole program in one go, then fixing errors

   ☐ translating each line of high-level code into machine code

   ☐ testing every possible input until the program works

   ☐ starting with a high-level outline and expanding each step until it can be coded

10. The voucher-email module in the worked example needs which of these items? Select **all** that apply.

    ☐ home address

    ☐ email address

    ☐ date of last visit

    ☐ customer ID

    ☐ date of birth

Tick every correct option.

1. **keeping the essential features and ignoring irrelevant detail**

   Abstraction simplifies a problem to its essentials. Breaking into parts is decomposition.

2. **the same input always produces the same output**

   Deterministic = same input → same output every time. (Finite = the steps end; unambiguous = one meaning per step.)

3. **a diamond**

   A diamond is a decision; rounded rectangle = start/stop, parallelogram = input/output, rectangle = process.

4. **True**

   It keeps what matters (stations, connections) and discards the rest – exactly what abstraction does.

5. **REAL**

   A number with a decimal part is a **REAL**. INTEGER is for whole numbers, STRING for text, BOOLEAN for TRUE/FALSE and DATE for a date.

6. **iteration**

   Repeating a block for each number is iteration. The assignment inside it stores the running total.

7. **The program is smaller and quicker to write and test.; The problem is easier to understand and to program.; The same model can be reused for a similar problem.**

   Abstraction **drops** detail, so keeping every detail is the opposite of it, and it says nothing about hardware. The three real benefits are understanding, size/speed of development, and reuse.

8. **← (an arrow)**

   Assignment uses '←' (e.g. 'x ← 5'); '=' is reserved for comparison.

9. **starting with a high-level outline and expanding each step until it can be coded**

   You refine a high-level outline level by level, adding detail while keeping the structure.

10. **email address; date of last visit; customer ID**

    Email to send to, date of last visit to choose who qualifies, and the ID to look the customer up. The postal address and birthday play no part in an email voucher, so an abstract model of this module leaves them out.

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