

Solutions

Each answer shows the steps, then the **result**.

2.1

- AI is computers behaving in ways that look intelligent
- the **simulation of human intelligence by computer systems**

2.2

- any **one** of: expert system / natural language processing / self-driving car

2.3

- output 1 only when both inputs are 1: $A \cdot B$ (AND)
- output 1 when the inputs are different: $A \oplus B$ (XOR)

2.4

- each input has two values, so 2^4 combinations
- **16 rows**

2.5

- output is 1 unless both inputs are 1
- **NAND**

3.1 A

- a program that can do only one task is **narrow AI**
- B and C are general/strong AI; D is not the AI classification

3.2

(a)

- any **two** of: collect data and rules / reason / draw conclusions / learn / adapt

(b)

- **narrow AI** can do only one (or a few) tasks
- **general AI** could do any task a human can do

3.3

(a)

- alarm when (T AND window closed) OR water low
- $X = (T \cdot \overline{W}) + L$

(b)

T	W	L	$\overline{W}$	$T \cdot \overline{W}$	X
0	0	0	1	0	0
0	0	1	1	0	1
0	1	0	0	0	0
0	1	1	0	0	1
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	0	0	0
1	1	1	0	0	1

- $\overline{W}$ column; $T \cdot \overline{W}$ column; **X** column

(c)

- row $T = 1, W = 1, L = 0$ gives $X = 0$
- the alarm does not sound, because an open window already lets the heat escape

(d)

- **NAND**
- output is 1 unless both of its inputs are 1

(e)

- **XOR**
- $X = T \oplus W$