Unit 1 · What Is a Computer?

ANSWER KEY · FOR TEACHERS

Full marks 33

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. computer
2. data
3. program
4. hardware
5. software
6. app
7. operating system
8. embedded computer

K · 4

Each carries 0.5 mark.

2 Label the diagram

1. Speaker
2. UPS
3. Monitor
4. Keyboard
5. System unit
6. Mouse

K · 3

Each carries 0.5 mark.

3 Multiple choice

i. **c.** a machine that takes in data, processes it by following a program, gives out results and can store data — K · 1

A fan uses electricity but follows no program. Many computers, such as the one in a rice cooker, have no keyboard and no screen. And computers work on pictures, sounds and much more, not only sums.

ii. **c.** a speaker — K · 1

A speaker sends sound out of the computer. The microphone, fingerprint reader and keyboard all bring data in.

iii. **a.** input — U · 1

A sensor takes in data about the world, here the pot's temperature, and passes it to the computer: input. The heater, which the computer switches on and off, is output.

iv. **b.** The battery is hardware: it is a part you can touch. Software is the programs. — U · 1

Whether something is hardware or software doesn't depend on how much the phone needs it. Can you touch it? Then it is hardware. Is it a set of instructions? Then it is software. (A battery stores electricity, not data, so it isn't the computer's storage either.)

v. **c.** It stores numbers, but it can't process them: the person using it decides every move. — U · 1

A computer follows a program by itself. An abacus only holds the number its user sets; all the processing happens in the user's head.

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4 Match the dates

K · 3

1. 1642 → **e.** Pascal builds a calculating machine with gears
2. 1804 → **c.** Jacquard's loom follows punched cards
3. 1843 → **g.** Ada Lovelace publishes the first program
4. 1945 → **a.** ENIAC, an electronic computer, is finished
5. 1971 → **f.** the first microprocessor; Nepal's first computer
6. 1989 → **b.** Tim Berners-Lee invents the World Wide Web

Each carries 0.5 mark.

5 Short answers

a. MARKING SCHEME — U · 3

- ✓ Input devices: keyboard, microphone, camera, mouse.
- ✓ Output devices: printer, screen, speaker.
- ✓ Storage: memory card, pen drive.

b. MARKING SCHEME — K · 3

- ✓ Hardware is the parts of a computer you can touch; software is the programs, the instructions that tell the hardware what to do.
- ✓ Three examples of hardware, such as the screen, the keyboard, the processor (also the battery, the mouse, the printer).
- ✓ Three examples of software, such as a calculator app, a game, the operating system (also a web browser, a camera app).

c. MARKING SCHEME — U · 2

- ✓ Output: it shows pictures and text.
- ✓ Input: it feels where your finger touches.

d. MARKING SCHEME — A · 2

- ✓ The one with buttons and a display: it follows a program (soak, heat hard, heat gently, keep warm), with buttons and a temperature sensor as input and the heater and display as output.
- ✓ The plain one has only a thermostat switch whose one rule is built into its parts; it follows no program and stores nothing.

e. MARKING SCHEME — U · 2

- ✓ One person, such as Ada Lovelace (the first published program), Pascal or Tim Berners-Lee, can have a new idea and work it out in detail.
- ✓ A community, such as the volunteers who write the Nepali Wikipedia or free software, shares its work freely with everyone, without being paid.

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6 Long answer

ANSWER **A · 4**

i. **Input:** the card slot, which reads the card, and the keypad (or touchscreen and the buttons beside the screen), for the PIN and the amount.
ii. **Processing:** the ATM's processor, with the bank's computers, which check the PIN and the money in the account and send back an answer.
iii. **Output:** the screen, the cash slot, the receipt printer and the speaker's beeps.
iv. **Storage:** the ATM's program, and a record of every withdrawal, kept in the ATM and in the bank's computers.

MARKING SCHEME

✓ Input: the card slot and the keypad (or touchscreen).
✓ Processing: the ATM's processor, with the bank's computers checking the PIN and the balance.
✓ Output: any two of the screen, the cash slot, the receipt printer, the speaker.
✓ Storage: the program and the record of the withdrawal, in the ATM and the bank's computers.

7 Think

ANSWER **HA · 2**

Pascal's machine was small enough for one clever person to build, with a craftsman's help. ENIAC filled a large room, weighed about 27 tonnes and used about 18,000 glass valves: it needed a large team of engineers and a great deal of money, more than any one person had. It was also built for a job the government needed done in a war, working out tables for gunners.

MARKING SCHEME

✓ ENIAC was huge and costly: thousands of parts, a large team and more money than one person had.
✓ It was built for a job the government needed (the gunners' tables in the war), while Pascal's small machine was one person's idea, built to help his father.

8 Activity: A computer hunt

(not marked)

WHAT STUDENTS SHOULD FIND

Any machine that follows a program has all four jobs. For example, a mobile phone: input the touchscreen, microphone and camera; processing which app to open, what a tap means; output the screen and speaker; storage the apps, photos and contacts. A digital watch: input its buttons; it decides the time and when the alarm goes; output the display and the beep; it keeps the alarm time. A traffic light controller: input the crossing button and sensors; output the lamps; it stores how long the green lasts. A ceiling fan with a plain speed knob, or a plain electric rice cooker, has no computer: the knob only lets more or less electricity through, and the cooker's thermostat switch has one rule built into its parts. Nothing follows a list of instructions.

Marks by level	Knowledge	Understanding	Application	Higher ability	**Total**
Marks	15	10	6	2	**33**

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