



4.5.3 Units of Information

1) State what is meant by the term **bit** and the term **byte**.

[2 marks]

- A bit is a binary digit, either 0 or 1
 - A byte is a group of 8 bits
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2) A computer has 4 gibibytes of memory installed. How many kibibytes is this equivalent to?

[1 mark]

- 4,194,304 kibibytes
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3) Explain the difference between a kilobyte and a kibibyte.

[1 mark]

- A kilobyte is 1000 bytes. A kibibyte is 1024 bytes
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4) State how many mebibytes are in 1 gibibyte.

[1 mark]

- 1024 mebibytes
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5) A file takes up 5,000,000 bytes. How many megabytes in this?

[1 mark]

- 5 megabytes
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6) A USB drive has a memory capacity of 16GiB. If a song is 5MiB, how many songs can the drive hold?

[2 marks]

- $(16 \times 2^{30}) / (5 \times 2^{20})$
- 3276 songs





- 7) A computer has 8 gibibytes of RAM. A program requires 2,097,152 kibibytes. Will this program fit into the RAM?

[2 marks]

- $(8 \times 2^{30}) > (2,097,152 \times 2^{10})$
 - Yes the program will fit
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- 8) Why do computer scientists prefer to use binary prefixes (KiB, MiB, GiB) over decimal prefixes (kB, MB, GB) when calculating memory size.

[1 mark]

- Binary prefixes use powers of 2 and reflect the true binary multiples used in computer memory while decimal prefixes use powers of 10.
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- 9) A storage device is advertised as having a capacity of 64GB. A program reports the same device capacity in GiB. Explain why the reported value in GiB is lower than 64 and calculate the capacity to the nearest whole GiB.

[3 marks]

- 1 mark: GB uses powers of 1000, while GiB uses powers of 1024.
 - 1 mark: $64\text{GB} = 64,000,000,000$ bytes and $1\text{GiB} = 1,073,741,824$ bytes.
 - 1 mark: $64,000,000,000 \div 1,073,741,824 = 59.6\text{GiB}$, so the reported capacity is approximately 60GiB.
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