



4.9.4.10 Client-Server & Thin vs Thick Clients

1) The list below contains four statements about the principles of CRUD and REST.

- A. CRUD is an acronym for Create, Retrieve, Update, Delete.
- B. REST allows JavaScript to communicate with the server using the HTTP protocol.
- C. The database is connected to the web browser using REST.
- D. The REST API will be created and run on the client computer.

State which of the statements **A-D** is false.

[1 mark]

- **D**

2) **Figure 1** shows two different representations of data received by a client from a database server.

Figure 1

Representation 1	Representation 2
<pre>{ "Customers": [{ "Name": "Eric Turner", "Age": 32, "Address": "15 Acorn Drive", "Postcode": "PF3 2KJ" }, { "Name": "Jessica Ashford", "Age": 41, "Address": "17 Green Avenue", "Postcode": "RO3 2SW" },]}</pre>	<pre><Customers> <Customer> <Name>Eric Turner</Name> <Age>32</Age> <Address>15 Acorn Drive</Address> <Postcode>PF3 2KJ</Postcode> </Customer> <Customer> <Name>Jessica Ashford</Name> <Age>41</Age> <Address>17 Green Avenue</Address> <Postcode>RO3 2SW</Postcode> </Customer> </Customers></pre>

a) What encoding has been used in **Representation 2**.

[1 mark]

- **XML**





b) State **two** reasons why it could be argued that JSON is better than XML.

[2 marks]

- More compact
 - Quicker to parse
 - Can be directly manipulated by JavaScript
 - Easier for humans to read
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3) Describe what thin-client computing is **and** explain **two** reasons why a thin-client system might be chosen in preference to a thick-client system.

[3 marks]

What it is (1 mark)

- Processing is carried out/programs are run on an application server

Why selected (2 marks)

- Clients are cheaper // can have lower specifications
 - Less configuration needed for clients
 - Simpler installation / updating of software
 - It can be easier to prevent unauthorised software from being installed because software can be controlled centrally
 - Workstations consume less power
 - Licensing can be cheap as license not needed per client
 - Workstation fail less often / need less maintenance
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4) Compare the hardware requirements of thin-client and thick-client computing systems.

[3 marks]

Network (max 1 mark)

- Higher bandwidth connection required for a thin-client

Client (max 2 marks)

- More powerful processor need for a thick-client // less for thin-client
- Reduced RAM needed for a thin-client // increased for thick-client
- No/less secondary storage needed for a thin-client

Server for a thin client (max 2 marks)

- Multiple processors needed / processor with many cores / high clock speed
- A lot of RAM needed
- Many secondary storage drives needed





5) A booking system can be accessed through a website which use CRUD and REST.

a) Describe what Uniform Resource Locator (URLs) are used for in a RESTful application.

[1 mark]

- Each resource is represented by a URL;
- Entering a URL causes the server to use CRUD to retrieve the data;
- URLs are sent using HTTP between the client and the server;

b) State which letters A to E indicates how REST enables CRUD to be mapped to database functions using SQL.

A	GET → FETCH	POST → CREATE	DELETE → DELETE	PUT → UPDATE
B	GET → SELECT	POST → INSERT	DELETE → DELETE	PUT → UPDATE
C	GET → SELECT	POST → INSERT	DELETE → DELETE	PUT → CREATE
D	GET → SELECT	POST → UPDATE	DELETE → DELETE	PUT → INSERT
E	GET → UPDATE	POST → SELECT	DELETE → DELETE	PUT → CREATE

[1 mark]

- B

6) The web server and the web browser on a client computer use the Websocket protocol when they communicate with each other.

State which letter A to E indicates which of these statements about the Websocket protocol is true.

- A All messages sent using the protocol encode data using XML.
- B All messages sent using the protocol have a digital signature.
- C Messages sent using the protocol can only originate from the web server.
- D The protocol establishes a full-duplex communication channel.
- E The protocol operates at the network layer of the TCP/IP stack

[1 mark]

- D

