Client-server networks 1

Practice 1

In a client-server network, systems are designated as "clients" or "servers".

From the following options, select all examples of "clients".

- [ ] A web browser
- [ ] An end user
- [ ] A mobile phone
- [ ] An email app on a mobile phone
- [ ] A software process

Raspberry Pi Foundation

Client-side processing

Challenge 1

LLM marked question

A web developer is creating an interactive webpage for an online shopping platform. To improve the user experience, they want the page to respond quickly when users add items to their cart, apply discount codes, or filter products by category.

Describe two advantages of using client-side processing.

[2 marks]

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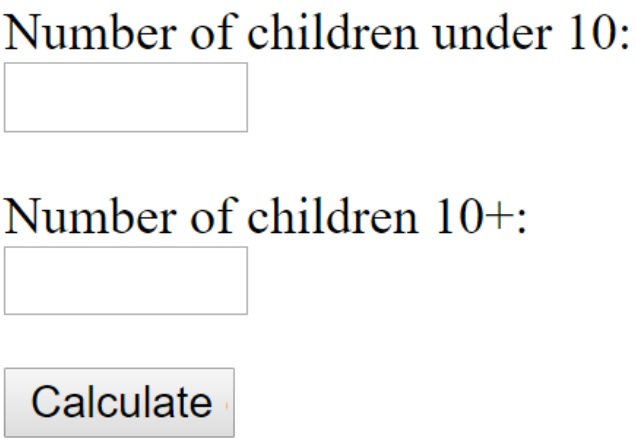
Complete JavaScript program

Challenge 1

Jodie is making a website for her dance studio which runs dance classes for young people aged 5–18.

- She charges £5 per session for under 10s
- She charges £6.50 per session for children aged 10 and above
- If you book more than one child into the same class, there is a 10% discount on the total price.

Jodie enjoys coding as a hobby and she has written some JavaScript code to use on her website so that people can calculate the cost of attendance. Her page contains a form which looks like this:



Jodie's input form

The data from this form is sent to a JavaScript subroutine to be processed, and the code for this subroutine is below. The subroutine triggers a pop-up box to inform the user how much they need to pay.

Lines 2 and 3 gather the number typed into the text boxes on the form, and convert each number into a real or 'floating point' number.

Line 9 formats the total to two decimal places, so that it formats properly as currency, e.g. 5.00

On line 10, the `.toString()` method converts the total into a string so that it can be concatenated. It is the JavaScript equivalent to `str()`

```
1  function calculate_price(){
2     var under_10s = parseFloat(document.getElementById("u10").value);
3     var tenplus = parseFloat(document.getElementById("10plus").value);
4     var total = (under_10s * 5) + (              );
5     var num_kids = under_10s + tenplus;
6     if(              ){
7       total =              * 0.9;
```

```
8     }
9     total = total.toFixed(2);
10    [          ]("You will pay £" + total.toString());
11 }
```

Drag and drop the code snippets provided to correctly complete Jodie's code. Note: you do not have to use all of the code snippets provided

Items:

print | document.write | window.alert | num_kids > 1 | num_kids == 2 | return | total | tenplus * 6.5

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JSON vs XML

Practice 1

The figure below shows a fragment of a JSON file.

```
"quiz": {
    "arithmetic": {
        "q1": {
            "question": "60 x 3 = ?",
            "options": [
                "180",
                "63",
                "20",
                "57"
            ],
            "answer": "180"
        },
        "q2": {
            "question": "12 x 8 = ?",
            "options": [
                "20",
                "96",
                "1.5",
                "4"
            ],
            "answer": "96"
        }
    }
}
```

Select the **three** advantages of using JSON files over XML as a method for exchanging data.

- [ ] Objects use a simple "key" → "value" mapping
- [ ] You can include a schema that provides constraints on the file contents
- [ ] The files are quicker to parse
- [ ] The file size will be smaller

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REST operations and HTTP methods

Practice 1

REST (Representational State Transfer) is an architecture style for developing web services that specify the use of distinct Hypertext Transfer Protocols for all four CRUD (Create/Retrieve/Update/Delete) operations. In the table below, specify the HTTP methods that will complete the mapping.

Drag and drop the methods into the correct position in the table.

REST operation	**SQL**	**HTTP method**
Create	INSERT	
Retrieve	SELECT	
Update	UPDATE	
Delete	DELETE	

Items:

GET PUT DELETE POST

Quiz:
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Search engines: Crawling and indexing process

Practice 1

Reorder the following steps to show how a search engine discovers and organises information.

Available items

- Indexing algorithms evaluate the importance and quality of the page.
- The software scans page content, including visible text and hidden metadata.
- Results are organised so the most useful sites appear at the top for the user.
- Web crawlers continuously follow links from one webpage to another.

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Search engines: PageRank description

Practice 1

Complete the following paragraph regarding how search engines calculate the importance of webpages using the PageRank algorithm.

The PageRank of a webpage is considered a [ ] problem because to calculate the rank of one page, you must already know the rank of the pages that link to it. Because these values are interlinked, search engine providers run the algorithm through several [ ]. During the first pass, the software may use a default value for pages that do not yet have a rank. With each subsequent pass, the values become more accurate until they eventually [ ], meaning further calculations no longer produce a significant change.

Items:

stabilise | dampen | recursive | sequences | linear | iterations

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Search engines: PageRank factors

Practice 1

According to the 'Random Surfer' model, what factor is used to represent the probability (typically 0.85) that a user will continue clicking links rather than jumping to a random, unrelated page?

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Search engines: PageRank graph of pages

Practice 1

A directed graph of web pages A to F is shown in **Figure 1**. Each arrow represents a link from one page to another.

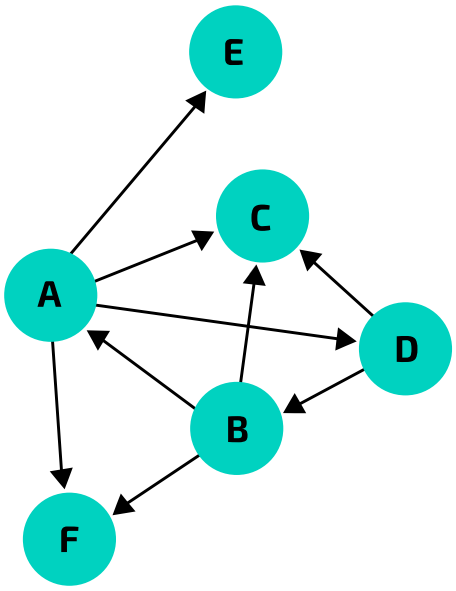

Figure 1: A directed graph showing 6 pages labelled from A to F detailing links between pages.

Part A

Match the description to the correct node based on its link structure.

Description	Node
This node has the highest initial rank because it has the most incoming links.	
This node has the most outgoing links but only one incoming link.	
This node links to A, C, and F, thus distributing its rank equally among them.	

Part B

If page B has a calculated PageRank of 1.0 and has 3 outgoing links (to pages A, C, and F), how much rank does it pass to page A during a single iteration?

- 0.50
- 0.33 (or $1/3$)
- 0.85
- 1.0