Searching and sorting songs

Task 1 . Song names

Idris has been collecting information about popular songs in the UK during 2019. Idris now wants to organise the song names in ascending order to make searching for a song easier.

A sample of the data is shown in **Figure 1**.

| Shallow | Location | Sunflower | Giant | Wow. | Senorita | Bad guy |
| --- | --- | --- | --- | --- | --- | --- |

**Figure 1**

Can you use linear search to find if a particular song is in the data sample in **Figure 1**? Justify your answer.

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Can you use binary search to find a song in the data sample in **Figure 1**? Justify your answer.

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Carry out a bubble sort on the data shown in **Figure 1** by filling in the table below. Each row should show one pass of the algorithm and any swaps that have been made.

The original data and the first and last pass have been filled in for you.

| **pass** | **data** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Shallow | Location | Sunflower | Giant | Wow. | Senorita | Bad guy |
| 1 | Location | Shallow | Giant | Sunflower | Senorita | Bad guy | Wow. |
| 2 |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |
| 6 | Bad guy | Giant | Location | Senorita | Shallow | Sunflower | Wow. |

**List** the songs that will be compared to the song “Shallow” when performing a binary search on the data from pass 6 in the table above.

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**List** the songs that will be compared to the song “I don’t care” when performing a binary search on the data from pass 6 in the table above.

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**Explain** whether linear search or binary search would be the most preferential algorithm to use when searching for a song from the data in pass 6 of the table above.

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Task 2 . Merging songs

Perform a merge sort on the data shown in **Figure 1** by filling in the table below. A single row should show each pair of lists that have been merged together.

The first stages of splitting each item into a list of its own has already been done for you.

| Giant |  | Bad guy |  | Senorita |  | Location |  | Sunflower |  | Wow. |  | Shallow |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

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| --- | --- | --- | --- | --- | --- | --- | --- |

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Task 3 . Comparing bubble sort and merge sort

**Describe** how a bubble sort works.

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**Describe** how a merge sort works.

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Explorer .

**Explain** one advantage of using a merge sort to order data compared to bubble sort.

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