Linear and binary searches - Solution

Task 1 . Searching for a planet

Izaz has created a program that stores the planets in our solar system.

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

| **Element** | Earth | Jupiter | Mars | Mercury | Neptune | Saturn | Uranus | Venus |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Figure 1**

**State** the total number of elements shown in **Figure 1**.

| 8 |
| --- |

**List** the planets that will be compared to the planet “Neptune” when Izaz performs a linear search on the data shown in **Figure 1**.

| Earth, Jupiter, Mars, Mercury, Neptune |
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**List** the planets that will be compared to the planet “Neptune” when Izaz performs a binary search on the data shown in **Figure 1**.

| Mercury, Saturn. Neptune |
| --- |

**State** the planet and number of comparisons that would incur the worst-case scenario (highest number of comparisons) for linear search on the data shown in **Figure 1**.

| Venus - 8 comparisons |
| --- |

**State** the planet and number of comparisons that would incur the worst-case scenario (highest number of comparisons) for binary search on the data shown in **Figure 1**.

| Venus - 4 comparisons |
| --- |

**Explain** which search algorithm is most appropriate for finding a planet in **Figure 1**.

| Binary search would generally be faster at finding a planet in this list than linear search because the planets are sorted in order. The worst-case scenario for linear search is 8 comparisons whilst the worst-case scenario for binary search is 4 comparisons. |
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