**Assessment Task 2**

**Outcome Covered 2**

Using the array data set and algorithm below, show the steps involved in performing a bubble sort on the data set stored in an array.

**Data Set**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| Bob | Ali | Ann | Tom | Dot | Eva | Guy | Ian | Jak | Jim | Joe | Kay | Ron | Kim | Roy | Tim |

**Algorithm**

SET swapMade TO TRUE

SET numComparisons TO sizeOfList – 1

WHILE swapMade

SET swapMade TO FALSE

FOR i = 0 TO numComparisons -1

IF listElement[i] > listElement[i+1] THEN

SWAP listElement[i] value with listElement[i + 1]

SET swapMade TO TRUE

END IF

END FOR

DECREMENT numComparisons

END WHILE

**PASS 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| i | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|  | Bob | Ali | Ann | Tom | Dot | Eva | Guy | Ian | Jak | Jim | Joe | Kay | Ron | Kim | Roy | Tim |
| 0 | Ali | Bob |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 |  | Ann | Bob |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  | Bob | Tom |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  | Dot | Tom |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  | Eva | Tom |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  | Guy | Tom |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  | Ian | Tom |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  | Jak | Tom |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  | Jim | Tom |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  | Joe | Tom |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  | Kay | Tom |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  | Ron | Tom |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  | Kim | Tom |  |  |
| 13 |  |  |  |  |  |  |  |  |  |  |  |  |  | Roy | Tom |  |
| 14 | Ali | Ann | Bob | Dot | Eva | Guy | Ian | Jak | Jim | Joe | Kay | Ron | Kim | Roy | Tim | Tom |

|  |  |
| --- | --- |
| **Number of Comparisons** | 15 |
| **Number of swaps** | 14 |

**PASS 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| i | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|  | Ali | Ann | Bob | Dot | Eva | Guy | Ian | Jak | Jim | Joe | Kay | Ron | Kim | Roy | Tim | Tom |
| 0 | Ali | Ann |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 |  | Ann | Bob |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  | Bob | Dot |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  | Dot | Eva |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  | Eva | Guy |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  | Guy | Ian |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  | Ian | Jak |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  | Jak | Jim |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  | Jim | Joe |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  | Joe | Kay |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  | Kay | Ron |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  | Kim | Ron |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  | Ron | Roy |  |  |
| 13 |  |  |  |  |  |  |  |  |  |  |  |  |  | Roy | Tim |  |

|  |  |
| --- | --- |
| **Number of Comparisons** | 14 |
| **Number of swaps** | 1 |