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Lab W1D5 Solutions

Q1.Solution

Array A={34,8,64,51,32,21};

1. Bubble Sort

First iteration = { 8,34,51,32,21,64};

Second iteration = {8,34,32,21,51,64};

Third iteration = { 8,32,21,34,51,64};

Fourth iteration = { 8,21,32,34,51,64};

Sorted Array A= { 8,21,32,34,51,64};

|  |  |  |
| --- | --- | --- |
| Iteration | Inversions | # of inversions |
| 0 | (34,8),(34,32),(34,21),(64,51),(64,32),(64,21),(51,32),  (51,21), (32,21) | 9 |
| 1 | (34,32),(34,21) , (51,32),(51,21)(32,21) | 5 |
| 2 | (34,32),(34,21),(32,21) | 3 |
| 3 | (32,21) | 1 |
| 4 | --- | 0 |
| 5 | --- | 0 |
|  |  |  |

1. Selection Sort

A= {34,8,64,51,32,21};

First iteration= {8,34,64,51,32,21};

Second iteration= {8,21,64,51,32,34};

Third iteration = { 8,21,32,51,64,34};

Fourth iteration= { 8,21,32,34,64,51};

Fifth iteration = { 8,21,32,34,51,64 };

Sorted Array A={ 8,21,32,34,51,64 };

|  |  |  |
| --- | --- | --- |
| Iteration | Inversions | # of inversions |
| 0 | (34,8),(34,32),(34,21),(64,51),(64,32),(64,21),(51,32),  (51,21), (32,21) | 9 |
| 1 | (34,32),(34,21),(64,51),(64,32)(64,21),(51,32),(51,21),  (32,21) | 8 |
| 2 | (64,51),(64,32),(64,34),(51,32),(51,34) | 5 |
| 3 | (51,34),(64,34); | 2 |
| 4 | (64,51) | 1 |
| 5 |  | 0 |
|  |  |  |

1. Insert Sort

A={ 34,8,64,51,32,21};

First iteration= { 8,34,64,51,32,21};

Second iteration = = { 8,34,64,51,32,21};

Third iteration = { 8,34,51,64,32,21};

Fourth iteration = { 8,32,34,51,64,21};

Fifth iteration = { 8,21, 32,34,51,64};

The Sorted Array A={ 8,21, 32,34,51,64};

|  |  |  |
| --- | --- | --- |
| Iteration | Inversions | # of Inversions |
| 0 | (34,8),(34,32),(34,21),(64,51),(64,32),(64,21),(51,32),  (51,21), (32,21) | 9 |
| 1 | (34,32),(34,21),(64,51),(64,32),(64,21),(51,32),(51,21),  (32,21) | 8 |
| 2 | (34,32),(34,21),(64,51),(64,32),(64,21),(51,32),(51,21),(32,21) | 8 |
| 3 | (34,32),(34,21),( 51,32),(51,21),(32,21), (64,32),(64,21) | 7 |
| 4 | (32,21),(34,21),(51,21),(64,21) | 4 |
| 5 | --- | 0 |

Q2.Solution

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Item # | Operation | Cost for us | Customer paid | Profit | Balance |
| 1 | Add | We assume we start with 1 slot. We add 1 item at the cost of 1 | 7 | 6 | 6 |
| 2 | Add | 3 to resize (we have two slots) 1 to add | 7 | 6 | 3 9 |
| 3 | Add | 6 to resize (we have 4 slots) 1 to add | 7 | 6 | 3  9 |
| 4 | Add | 1 to add | 7 | 6 | 15 |
| 5 | Add | 12 to resize (we have 8 slots) 1 to add | 7 | 6 | 3  9 |
| 6 | Add | 1 to add | 7 | 6 | 15 |
| 7 | Add | 1 to add | 7 | 6 | 21 |
| 8 | Add | 1 to add | 7 | 6 | 27 |
| 9 | Add | 27 to resize ( we have 16 slots) and 1 to add | 7 | 6 | 3  9 |
| 10 | Add | 1 to add | 7 | 6 | 15 |
| 11 | Add | 1 to add | 7 | 6 | 21 |
| 12 | Add | 1 to add | 7 | 6 | 27 |
| 13 | Add | 1 to add | 7 | 6 | 33 |
| 14 | Add | 1 to add | 7 | 6 | 39 |
| 15 | Add | 1 to add | 7 | 6 | 45 |
| 16 | Add | 1 to add | 7 | 6 | 51 |
| 17 | Add | 48 to resize ( we have 32 slots) and 1 to add | 7 | 6 | 3  9 |
| 18 | Add | 1 to add | 7 | 6 | 15 |
|  |  |  |  |  |  |

The minimum balance is 6 which is at the beginning.