Assignment

Lab Week1Day5

Q1.

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

Bubble Sort 1st iteration = { 8,34,51,32,21,64};

2nd iteration = {8,34,32,21,51,64};

3rd iteration = { 8,32,21,34,51,64};

4th iteration = { 8,21,32,34,51,64};

Sorted Array Arr= { 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 |

Selection Sort

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

1st iteration= {8,34,64,51,32,21};

2nd iteration= {8,21,64,51,32,34};

3rd iteration = { 8,21,32,51,64,34};

4th iteration= { 8,21,32,34,64,51};

5th iteration = { 8,21,32,34,51,64 };

Sorted Array Arr={ 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 |

Insertion Sort

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

1st iteration= { 8,34,64,51,32,21};

2nd iteration = { 8,34,51,64,32,21};

3rd iteration = { 8,32,34,51,64,21};

4th iteration = { 8,21, 32,34,51,64};

The Sorted Array Arr={ 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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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 | 24 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 |
|  |  |  |  |  |  |

1. What is the actual total cost? 1+3+1+6+1+12+1+1+1+1+24+1+1+1+1+1+1+1+1+48+1+1

=110

(b) What is the average actual cost? 110/23 = 4.78

(c) What is the amortized total cost? 7 \* 18 =126

(d) What is the average amortized cost? 126/18 = 7