

CSC 225 Assignment 4

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Question 1:

a) Selection Sort

Steps	Result of steps									
(0) Initial Array	<table><tr><td>1</td><td>6</td><td>2</td><td>4</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	6	2	4	3	0	7	5	
1	6	2	4	3	0	7	5			
(1) Swap: 0 ↔ 1	<table><tr><td>0</td><td>6</td><td>2</td><td>4</td><td>3</td><td>1</td><td>7</td><td>5</td></tr></table>	0	6	2	4	3	1	7	5	
0	6	2	4	3	1	7	5			
(2) Swap: 6 ↔ 1	<table><tr><td>0</td><td>1</td><td>2</td><td>4</td><td>3</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	4	3	6	7	5	
0	1	2	4	3	6	7	5			
(3) No change since 2 is already in order	<table><tr><td>0</td><td>1</td><td>2</td><td>4</td><td>3</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	4	3	6	7	5	(1)
0	1	2	4	3	6	7	5			
(4) Swap: 4 ↔ 3	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	3	4	6	7	5	
0	1	2	3	4	6	7	5			
(5) No change since 4 is already in order	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	3	4	6	7	5	
0	1	2	3	4	6	7	5			
(6) Swap: 5 ↔ 6	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>7</td><td>6</td></tr></table>	0	1	2	3	4	5	7	6	
0	1	2	3	4	5	7	6			
(7) Swap: 7 ↔ 6	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	0	1	2	3	4	5	6	7	
0	1	2	3	4	5	6	7			
	Array is Sorted									

(b) Bubble Sort

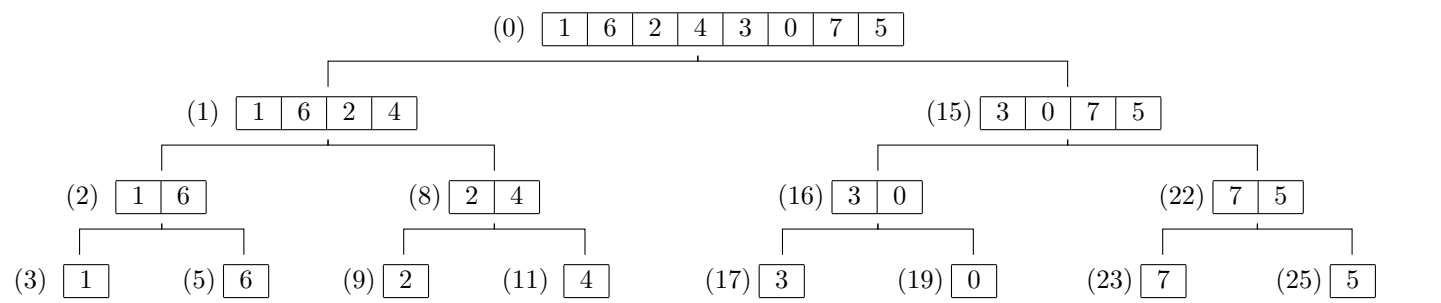
Steps	Result of steps								
(0) Initial Array	<table><tr><td>1</td><td>6</td><td>2</td><td>4</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	6	2	4	3	0	7	5
1	6	2	4	3	0	7	5		
(1) Swap 6 ↔ 2, 6 ↔ 4, 6 ↔ 3, 6 ↔ 0, 7 ↔ 5	<table><tr><td>1</td><td>2</td><td>4</td><td>3</td><td>0</td><td>6</td><td>5</td><td>7</td></tr></table>	1	2	4	3	0	6	5	7
1	2	4	3	0	6	5	7		
(2) Swap 4 ↔ 3, 4 ↔ 0, 6 ↔ 5	<table><tr><td>1</td><td>2</td><td>3</td><td>0</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	0	4	5	6	7
1	2	3	0	4	5	6	7		
(3) Swap 3 ↔ 0	<table><tr><td>1</td><td>2</td><td>0</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	0	3	4	5	6	7
1	2	0	3	4	5	6	7		
(4) Swap 2 ↔ 0	<table><tr><td>1</td><td>0</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	0	2	3	4	5	6	7
1	0	2	3	4	5	6	7		
(5) Swap 1 ↔ 0	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	0	1	2	3	4	5	6	7
0	1	2	3	4	5	6	7		
(6) Check Array is Sorted	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	0	1	2	3	4	5	6	7
0	1	2	3	4	5	6	7		
	Array is Sorted								

(c) Insertion Sort

Steps	Result of steps									
(0) Initial Array	<table><tr><td>1</td><td>6</td><td>2</td><td>4</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	6	2	4	3	0	7	5	
1	6	2	4	3	0	7	5			
(1) No change since 6 is larger than one	<table><tr><td>1</td><td>6</td><td>2</td><td>4</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	6	2	4	3	0	7	5	
1	6	2	4	3	0	7	5			
(2) Insert 2 at index 1	<table><tr><td>1</td><td>2</td><td>6</td><td>4</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	2	6	4	3	0	7	5	
1	2	6	4	3	0	7	5			
(3) Insert 4 at index 2	<table><tr><td>1</td><td>2</td><td>4</td><td>6</td><td>3</td><td>0</td><td>7</td><td>5</td></tr></table>	1	2	4	6	3	0	7	5	(3)
1	2	4	6	3	0	7	5			
(4) Insert 3 at index 2	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>0</td><td>7</td><td>5</td></tr></table>	1	2	3	4	6	0	7	5	
1	2	3	4	6	0	7	5			
(5) Insert 0 at index 0	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	3	4	6	7	5	
0	1	2	3	4	6	7	5			
(6) No change since 7 is larger than 6	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td><td>5</td></tr></table>	0	1	2	3	4	6	7	5	
0	1	2	3	4	6	7	5			
(6) Insert 5 at index 5	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	0	1	2	3	4	5	6	7	
0	1	2	3	4	5	6	7			
	Array is Sorted									

d) Merge Sort

Divide:



Merge:

