Homework lecture1

1. 2,1,10,6,3,8,7,13,20.

* Selection sort:

1,2,10,6,3,8,7,13,20

1,2,3,6,10,8,7,13,20

1,2,3,6,7,8,10,13,20

* Insertion sort:

1,2,10,6,3,8,7,13,20

1,2,6,10,3,8,7,13,20

1,2,3,6,10,8,7,13,20

1,2,3,6,8,10,7,13,20

1,2,3,6,7,8,10,13,20

* Bubble sort

1,2,6,3,8,7,10,13,20

1,2,3,6,7,8,10,13,20

* Merge sort

2,1,10,6,3 8,7,13,20

2,1,10 6,3 8,7 13,20

2,1 10 6 3 8 7 13 20

2 1

1,2

1,2,10 3,6 7,8 13,20

1,2,3,6,10 7,8,13,20

1,2,3,6,7,8,13,20

* Quick sort

2,1,10,6,3,8,7,13 20

2,1,10,6,3,8,7 13

2,1,3,6 7 10,8

2,1,3 6 8 10

2,1 3

1 2

=>1,2,3,6,7,8,10,13,20;

* Heap sort

building heap tree:

2

1. 10

6 3 8 7

13 20

Create max heap:

2

1 10

20 3 8 7

13 6

2

1 10

20 3 8 7

13 6

2

20 10

13 3 8 7

1 6

20

13 10

6 3 8 7

1 2

Max heap:

20

13 10

6 3 8 7

1 2

Sort:

20

13

6 10

2 3 8 7

1

13,20

10

6 8

2 3 1 7

10,13,20

8

6 7

2 3 1

8,10,13,20

7

6 1

2 3

7,8,10,13,20

6

3 1

2

6,7,8,10,13,20

2 1

3,6,7,8,10,13,20

2

1

2,3,6,7,8,10,13,20

1

1,2,3,6,7,8,10,13,20

* Radix sort

10,20,1,2,3,13,6,7,8

=>1,2,3,6,7,8,10,13,20

2)

* 1, 2, 3, 4, 5, 6, 7, 8, 9
* Selection sort

1,2,3,4,5,6,7,8,9

* Insertion sort

1,2,3,4,5,6,7,8,9

* Bubble sort

1,2,3,4,5,6,7,8,9

* Merge sort

1,2,3,4,5 6,7,8,9

1,2,3 4,5 6,7 8,9

1,2 3 4 5 6 7 8 9

1. 2

1,2

1,2,3 4,5 6,7 8,9

1,2,3,4,5,6,7,8,9

* Quick sort

1,2,3,4,5,6,7,8 9

1,2,3,4,5,6,7 8

1,2,3,4,5,6 7

1,2,3,4,5 6

1,2,3,4 5

1,2,3 4

1,2 3

1 2

* Heap sort

Max heap tree:

10

9 7

8 5 6 3

1 4 2

Sort:

10

9

8 7

4 5 6 3

1 2

9,10

8

5 7

4 2 6 3

1

8,9,10

7

5 6

4 2 1 3

7,8,9,10

6

5 3

4 2 1

6,7,8,9,10

5

4 3

1 2

5,6,7,8,9,10

4

2 3

1

4,5,6,7,8,9,10

3

2 1

3,4,5,6,7,8,9,10

2

1

2,3,4,5,6,7,8,9,10

1

1,2,3,4,5,6,7,8,9,10

* Radix sort

1,2,3,4,5,6,7,8,9

* 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
* Selection sort

1,9,8,7,6,5,4,3,2,10

1,2,8,7,6,5,4,3,9,10

1,2,3,7,6,5,4,8,9,10

1,2,3,4,6,5,7,8,9,10

1,2,3,4,5,6,7,8,9,10

* Insertion sort

9,10,8,7,6,5,4,3,2,1

8,9,10,7,6,5,4,3,2,1

7,8,9,10,6,5,4,3,2,1

6,7,8,9,10,5,4,3,2,1

5,6,7,8,9,10,4,3,2,1

4,5,6,7,8,9,10,3,2,1

3,4,5,6,7,8,9,10,2,1

2,3,4,5,6,7,8,9,10,1

1,2,3,4,5,6,7,8,9,10

* Bubble sort

9,8,7,6,5,4,3,2,1,10

8,7,6,5,4,3,2,1,9,10

7,6,5,4,3,2,1,8,9,10

6,5,4,3,2,1,7,8,9,10

5,4,3,2,1,6,7,8,9,10

4,3,2,1,5,6,7,8,9,10

3,2,1,4,5,6,7,8,9,10

2,1,3,4,5,6,7,8,9,10

1,2,3,4,5,6,7,8,9,10

* Merge sort

10,9,8,7,6 5,4,3,2,1

10,9,8 7,6 5,4,3 2,1

10,9 8 7 6 5,4 3 2 1

10 9 5 4

9,10 4,5

8,9,10 6,7 3,4,5 1,2

6,7,8,9,10 1,2,3,4,5

1,2,3,4,5,6,7,8,9,10

* Quick sort

1 10,9,8,7,6,5,4,3,2

2 10,9,8,7,6,5,4,3

3 10,9,8,7,6,5,4

4 10,9,8,7,6,5

5 10,9,8,7,6

6 10,9,8,7

7 10,9,8

8 10,9

9 10

=>1,2,3,4,5,6,7,8,9,10

* Heap sort

Max heap tree:

10

9 8

7 6 5 4

3 2 1

10

9

7 8

3 6 5 4

1 2

9,10

8

7 5

3 6 2 4

1

8,9,10

7

6 5

3 1 2 4

7,8,9,10

6

4 5

3 1 2

6,7,8,9,10

5

4 2

3 1

5,6,7,8,9,10

4

3 2

1

4,5,6,7,8,9,10

3

1 2

3,4,5,6,7,8,9,10

2

1

2,3,4,5,6,7,8,9,10

1

1,2,3,4,5,6,7,8,9,10

* Radix sort

10,1,2,3,4,5,6,7,8,9

1,2,3,4,5,6,7,8,9,10

* 9, 10, 1, 2, 3, 4, 5, 6, 7, 8
* Selection sort

1,10,9,2,3,4,5,6,7,8

1,2,9,10,3,4,5,6,7,8

1,2,3,10,9,4,5,6,7,8

1,2,3,4,9,10,5,6,7,8

1,2,3,4,5,10,9,6,7,8

1,2,3,4,5,6,9,10,7,8

1,2,3,4,5,6,7,10,9,8

1,2,3,4,5,6,7,8,9,10

* Insertion sort

1,9,10,2,3,4,5,6,7,8

1,2,9,10,3,4,5,6,7,8

1,2,3,9,10,4,5,6,7,8

1,2,3,4,9,10,5,6,7,8

1,2,3,4,5,9,10,6,7,8

1,2,3,4,5,6,9,10,7,8

1,2,3,4,5,6,7,9,10,8

1,2,3,4,5,6,7,8,9,10

* Buble sort

9,1,2,3,4,5,6,7,8,10

1,2,3,4,5,6,7,8,9,10

* Merge sort

9,10,1,2,3 4,5,6,7,8

9,10,1 2,3 4,5,6 7,8

9,10 1 2 3 4,5 6 7 8

9 10 4 5

9,10 4,5

1,9,10 2,3 4,5,6 7,8 1,2,3,9,10 4,5,6,7,8

1,2,3,4,5,6,7,8,9,10

* Quick sort

9,1,2,3,4,5,6,7,8 10

1,2,3,4,5,6,7 8 9

1,2,3,4,5,6 7

1,2,3,4,5 6

1,2,3,4 5

1,2,3 4

1,2 3

1 2

* Heap sort

Max heap tree:

10

9 5

7 8 4 1

6 2 3

Sorting:

10

9

8 5

7 3 4 1

6 2

9,10

8

7 5

6 3 4 1

2

8,9,10

7

6 5

2 3 4 1

7,8,9,10

6

3 5

2 1 4

6,7,8,9,10

5

3 4

2 1

5,6,7,8,9,10

4

3 1

2

4,5,6,7,8,9,10

3

2 1

3,4,5,6,7,8,9,10

2

1

2,3,4,5,6,7,8,9,10

1

1,2,3,4,5,6,7,8,9,10

* Radix sort

10,1,2,3,4,5,6,7,8,9

1,2,3,4,5,6,7,8,9,10

* 3, 4, 5, 6, 7, 8, 9, 10, 1, 2
* Selection sort

1,4,5,6,7,8,9,10,3,2

1,2,5,6,7,8,9,10,3,4

1,2,3,6,7,8,9,10,5,4

1,2,3,4,7,8,9,10,5,6

1,2,3,4,5,8,9,10,7,6

1,2,3,4,5,6,9,10,7,8

1,2,3,4,5,6,7,10,9,8

1,2,3,4,5,6,7,8,9,10

* Insertion sort

1,3,4,5,6,7,8,9,10,2

1,2,3,4,5,6,7,8,9,10

* Bubble sort

3,4,5,6,7,8,9,1,2,10

3,4,5,6,7,8,1,2,9,10

3,4,5,6,7,1,2,8,9,10

3,4,5,6,1,2,7,8,9,10

3,4,5,1,2,6,7,8,9,10

3,4,1,2,5,6,7,8,9,10

3,1,2,4,5,6,7,8,9,10

1,2,3,4,5,6,7,8,9,10

* Quick sort

3,4,5,6,7,8,9,10,1,2

1 2 3,4,5,6,7,8,9,10

3,4,5,6,7,8,9 10

3,4,5,6,7,8 9

3,4,5,6,7 8

3,4,5,6 7

3,4,5 6

3,4 5

=>1,2,3,4,5,6,7,8,9,10

* Merge sort

3,4,5,6,7 8,9,10,1,2

3,4,5 6,7 8,9,10 1,2

3,4 5 6 7 8,9 10 1 2

3 4 8 9

3,4 6,7 8,9 1,2

3,4,5 6,7 8,9,10 1,2

3,4,5,6,7 1,2,8,9,10

1,2,3,4,5,6,7,8,9,10

* Heap sort

Max heap tree

10

7 9

6 3 8 5

4 1 2

Sort:

10

9

7 8

6 3 2 5

4 1

9,10

8

7 5

6 3 2 1

4

8,9,10

7

6 5

4 3 2 1

7,8,9,10

6

4 5

1 3 2

6,7,8,9,10

5

4 2

1 3

5,6,7,8,9,10

4

3 2

1

4,5,6,7,8,9,10

3

1. 2

3,4,5,6,7,8,9,10

2

1

2,3,4,5,6,7,8,9,10

1

=>1,2,3,4,5,6,7,8,9,10

* + Radix sort

10,1,2,3,4,5,6,7,8,9

1,2,3,4,5,6,7,8,9,10