Chapter 7

7.1 Consider the following elements and apply bubble sort. How many comparisons and swaps are required for bubble sort in this instance?

2 5 4 2 7 1

***Solution*:**

Pass1: compare 2 and 5 No swap

5 and 4 Swap

5 and 2 Swap

5 and 7 No Swap

7 and 1 Swap

Hence element 7 comes to the end of this list.

In Pass2: 5 would bubble to last but one position.

In Pass3: 4 would bubble to last but two positions.

In Pass4: 2 would bubble to last but third position.

In Pass5: 2 would bubble to last but fourth position.

In pass 1 and 2 and compared and no swap. The iteration would stop.

∴ The final list would be { 1, 2, 3, 4, 5, 7 }

7.2 Consider the following set of elements and apply selection sort : 23 56 77 88 99 135. How many comparisons and swaps are required?

***Solution*:**

$$\underset{\textit{Sorted list}}{23} \quad 56 \quad 72 \quad 88 \quad 99 \quad 135$$

$$\underbrace{23 \quad 56}_{\textit{Sorted list}} \quad 77 \quad 88 \quad 99 \quad 135$$

$$\underbrace{23 \quad 56 \quad 77}_{\textit{Sorted list}} \quad 88 \quad 99 \quad 135$$

$$\underbrace{23 \quad 56 \quad 77 \quad 88}_{\textit{Sorted list}} \quad 99 \quad 135$$

$$\underbrace{23 \quad 56 \quad 77 \quad 88 \quad 99}_{\textit{Sorted list}} \quad 135$$

Final sorted list would be 23 56 77 88 99 135.

7.3 Compute the Euclidean distance for the following set of points.

***Solution*:**

a) (0,0) and (7,8)

$$d(p,q) = \sqrt{(0-7)^2 + (0-8)^2}$$

$$= \sqrt{49+67} = \sqrt{113} = 10.63$$

b) (0,4) and (8,9)

$$d(p,q) = \sqrt{(0-8)^2 + (4-9)^2}$$

$$= \sqrt{64+35} = \sqrt{89} = 9.43$$

7.4 Consider the five tasks with lengths 3, 4, 5, 7, 2. Consider a single server model and calculate optimal turn around time.

***Solution*:**

Using the "Shortest job" first principle, the optimum schedule would be

{ 2, 3, 4, 5, 7 }

7.5 Consider three items with weights and profits as below.

Item	Weight	Profit
1	3	10
2	4	4
3	5	8

If the Knapsack capacity is 15, list out some of the possible sequences.

***Solution*:**

	Profit
{1}	10
{2}	4
{3}	8
{1,2}	14 with weight 7.
{1,3}	18 with weight 8.
{2,3}	12 with weight 9.
{1,2,3}	22 with weight 12 < 15.

∴ Maximum profit possible is 22.

7.6 Consider the following cost matrix for assigning three persons to three jobs. What is the possible optimal allotment?

	J_1	J_2	J_3
P_1	4	2	$\underline{6}$
P_2	7	$\underline{8}$	2
P_3	$\underline{1}$	1	3

***Solution*:**

J_1	J_2	J_3	Cost
1	2	3	4+8+2=14
1	3	2	4+2+8=14
2	1	3	2+4+3=9
2	3	1	2+2+1=5
3	1	2	6+7+1=14
3	2	1	6+8+1=15

∴ Maximum profit is 15.

∴ Optimal order { 3, 2, 1 }