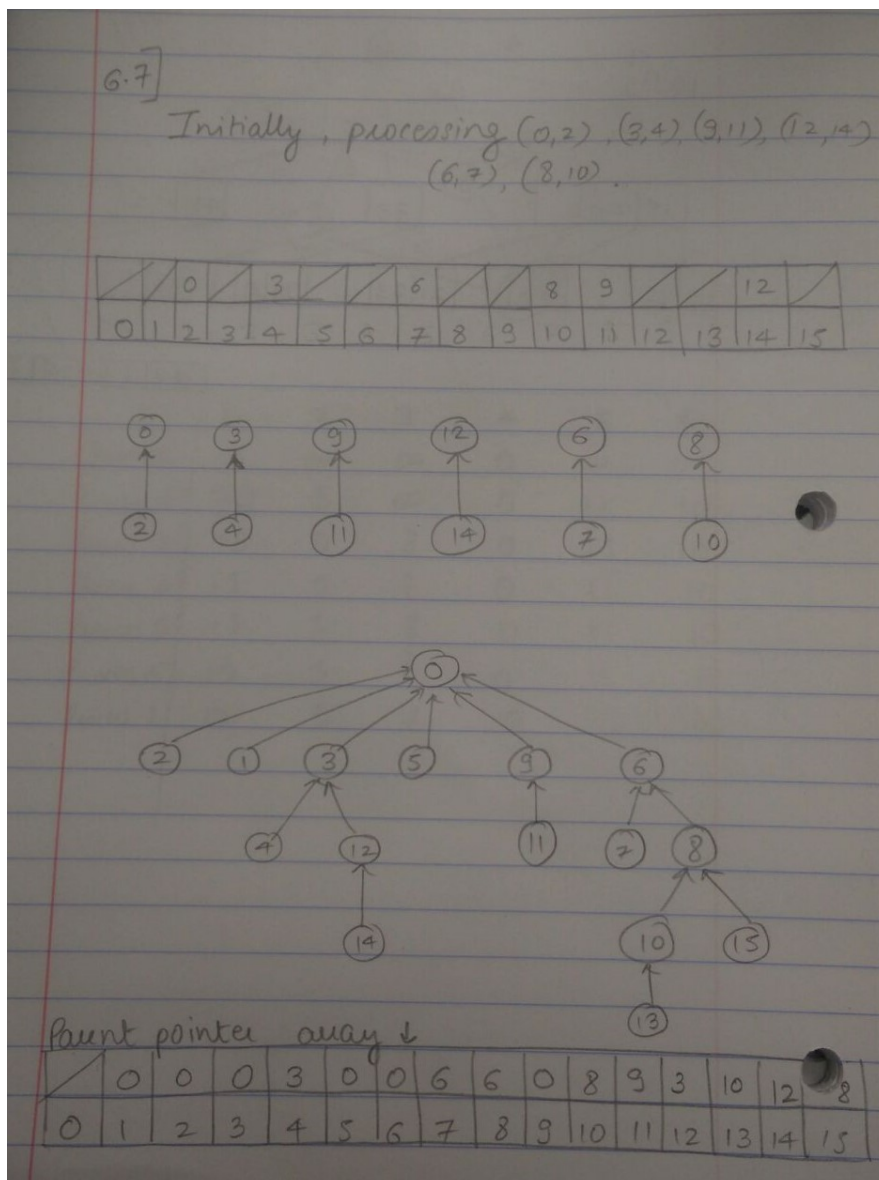


# C343/A594 Homework 5

## Mgalvank

6.7 Using the weighted union rule and path compression, show the array for the parent pointer implementation that results from the following series of equivalences on a set of objects indexed by the values 0 through 15. Initially, each element in the set should be in a separate equivalence class. When two trees to be merged are the same size, make the root with greater index value be the child of the root with lesser index value.

(0, 2) (1, 2) (3, 4) (3, 1) (3, 5) (9, 11) (12, 14) (3, 9) (4, 14) (6, 7) (8, 10) (8, 7)  
(7, 0) (10, 15) (10, 13)



10.11 Show the result of inserting the value 55 into the B-tree of Figure 10.17.

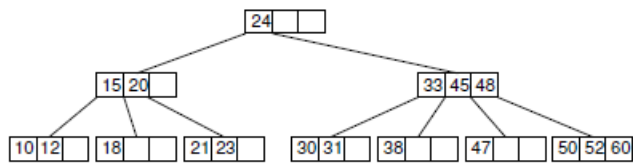
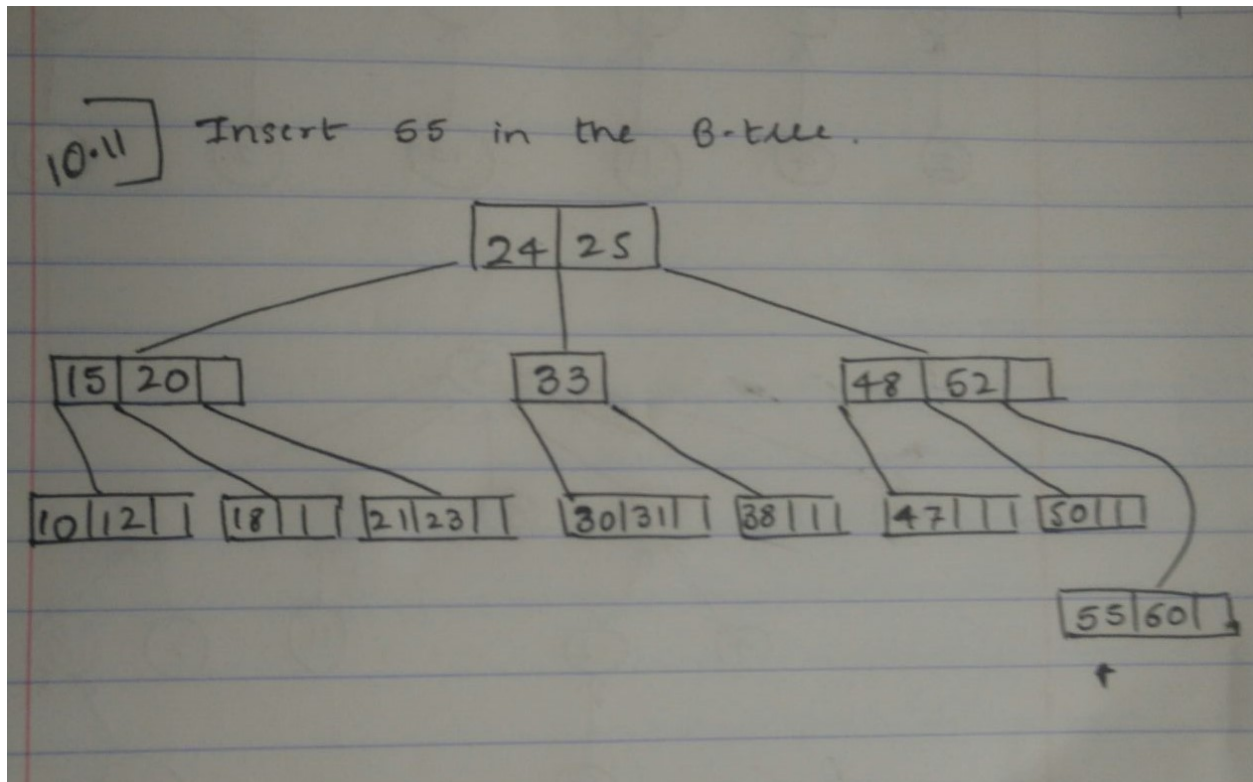


Figure 10.17 A B-tree of order four



- 11.3 (a) Draw the adjacency matrix representation for the graph of Figure 11.26.  
 (b) Draw the adjacency list representation for the same graph.

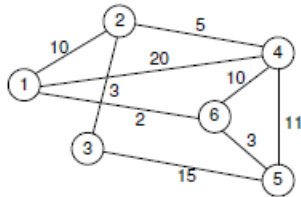


Figure 11.26 Example graph for Chapter 11 exercises.

11.3

a) Adjacency matrix

	1	2	3	4	5	6
1	0	10	0	20	0	2
2	10	0	3	5	0	0
3	0	3	0	0	15	0
4	20	5	0	0	11	10
5	0	0	15	11	0	3
6	2	0	0	10	3	0

b) Adjacency list -

1 → 2 → 4 → 6 → null

2 → 1 → 3 → 4 → null

3 → 2 → 5 → null.

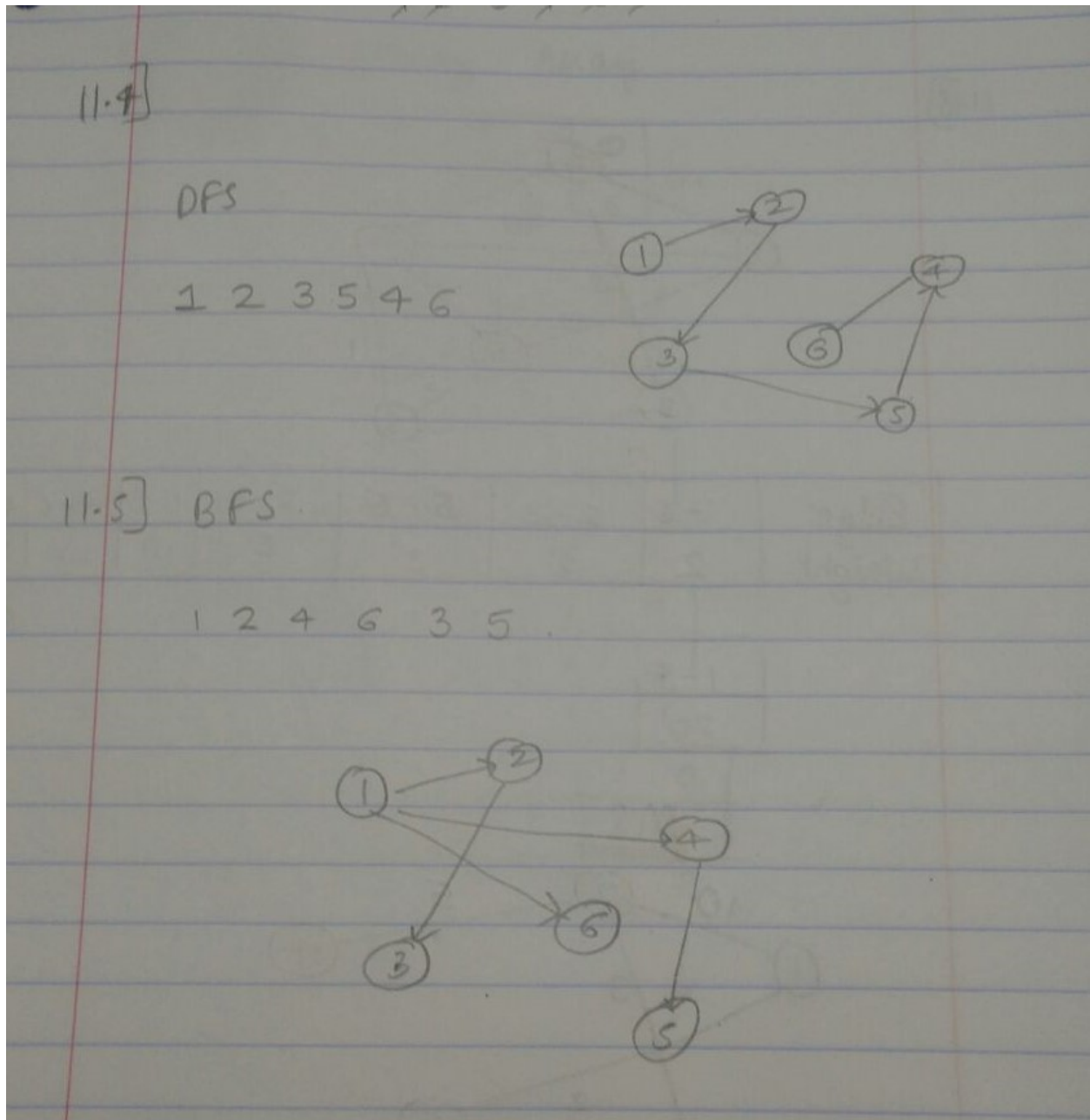
4 → 1 → 2 → 5 → 6 → null.

5 → 3 → 4 → 6 → null.

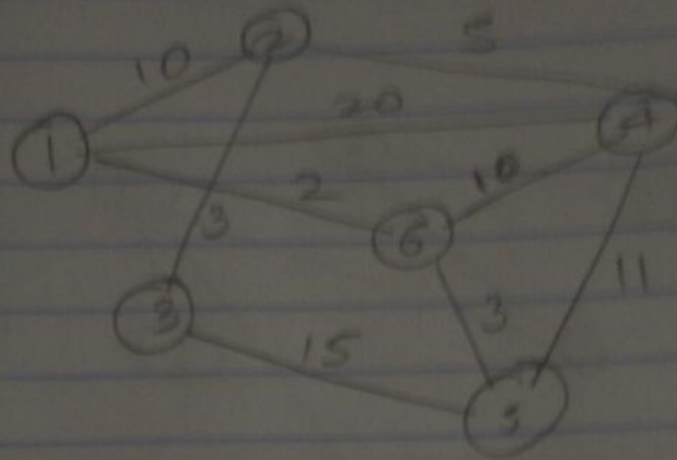
6 → 1 → 4 → 5 → null.

11.4 Show the DFS tree for the graph of Figure 11.26, starting at Vertex 1.

11.6 Show the BFS tree for the graph of Figure 11.26, starting at Vertex 1.



11.10 Show the shortest paths generated by running Dijkstra's shortest-paths algorithm on the graph of Figure 11.26, beginning at Vertex 4. Show the D values as each vertex is processed, as in Figure 11.19.



	1	2	3	4	5	6
Initial	$\infty$	$\infty$	$\infty$	0	$\infty$	$\infty$
Process 4	20	5	$\infty$	0	11	10
Process 2	15	5	8	0	11	10
Process 3	15	5	8	0	11	10
Process 5	15	5	8	0	11	10
Process 6	12	5	8	0	11	10
Process 1	12	5	8	0	11	10



11.18 List the order in which the edges of the graph in Figure 11.26 are visited when running Kruskal's MST algorithm. Each time an edge is added to the MST, show the result on the equivalence array, (e.g., show the array as in Figure 6.7).

