Handwriting Assignment #3

Due to 2nd, Dec.

1. A table composed of N x M cells, each having a certain quantity of apples, is given. You start from the upper-left corner. At each step you can go down or right one cell. Write a function to find the maximum number of apples you can collect.
   To understand the problem, refer to the below example.

2	0	5	3
1	3	4	2
1	0	3	8
8	**5**	3	1
1	**4**	**5**	**5**

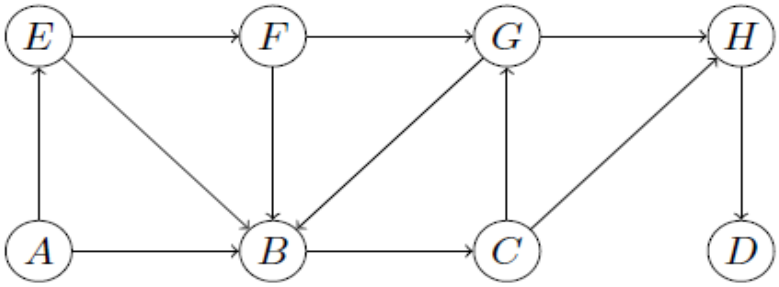
Max sum = 31

solution) C language function

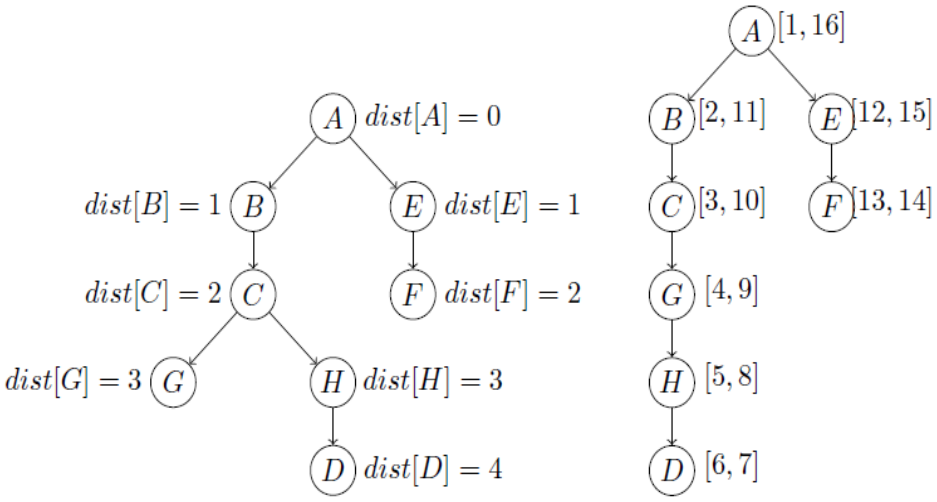
```
//Apple table array is A

int  GetMaxSum()  {
    for i=1 to N-1
        for j=1 to M-1
            A[i][j] += A[i][j-1] > A[i-1][j] ? A[i][j-1] : A[i-1][j];
    return A[N-1][M-1];
}
```

Pseudocode is OK!

2. (a) Run BFS algorithm on the directed graph below, using vertex A as the source. Show all distances and the BFS tree.
   (b) Run DFS algorithm on the directed graph below, using vertex A as the source. Compute the start time and the finish time of each vertex and draw the DFS tree.

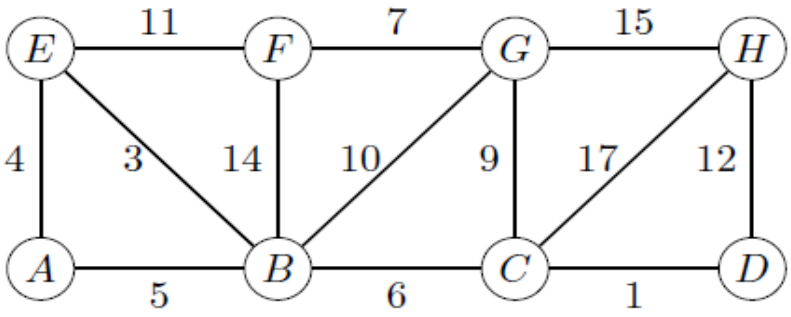


Solution)



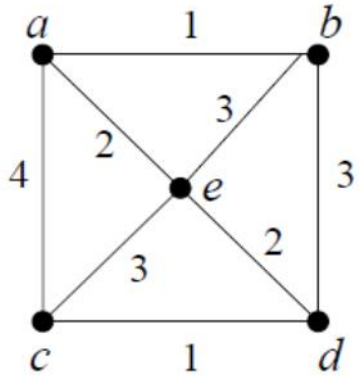
(a) BFS tree. (b) DFS tree

3. (a) Consider the weighted graph below. Run Prim's algorithm starting from vertex A. Write the edges in the order which they are added to the minimum spanning tree.
(b) Consider the weighted graph below. Run Kruskal's algorithm starting from vertex A. Write the edges in the order which they are added to the minimum spanning tree.



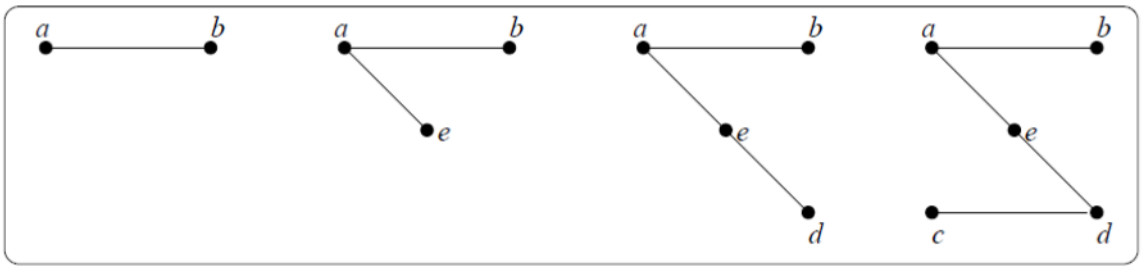
Solution) a) (AE, BE, BC, CD, CG, FG, DH)
b) (CD, BE, AE, BC, FG, CG, DH)

4. The following weighted graph is given.



a) Draw the progression of Prim's algorithm to find an MST.
b) Draw the progression of Kruskal's algorithm to find an MST.
(assume that vertex *a* is starting vertex)
solution

Prim



Kruskal