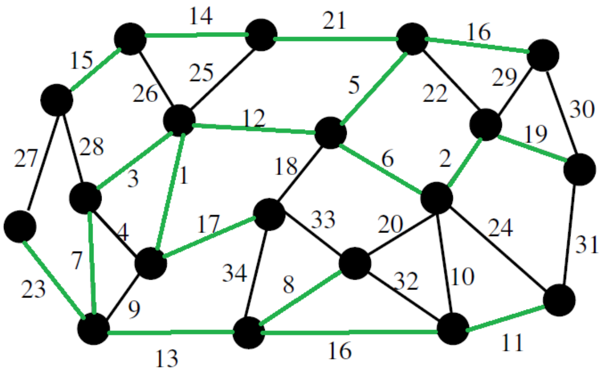
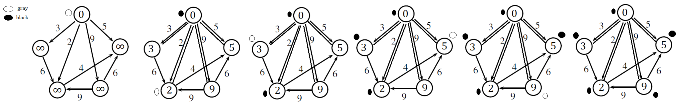
1. 

2. 

3.
```
int[][] tc = all 0s
void transitiveClosure()
{
    for (int i = 0; i < V; i++)
        DFS(i, i); //modified depth-first search

    for (int i = 0; i < V; i++)
    {
        for (int j = 0; j < V; j++)
            print(tc[i][j] + " ");
        println();
    }
}
void DFS(int a, int b)
{
    tc[a][b] = 1;

    // find all vertices reachable through b
    for each int i in adj[b] {
        if (tc[a][i] == 0)
            DFS(a, i);
    }
}
```

4. I'm assuming 0-based indexing:

$$D^{(1)} = \begin{pmatrix} 0 & 5 & \infty & 3 \\ \infty & 0 & -1 & \infty \\ 6 & \infty & 0 & \infty \\ 2 & 2 & 1 & 0 \end{pmatrix}$$

$$D^{(2)} = \begin{pmatrix} 0 & 5 & \infty & 3 \\ 5 & 0 & -1 & \infty \\ 6 & \infty & 0 & \infty \\ 2 & 2 & 1 & 0 \end{pmatrix}$$

$$D^{(3)} = \begin{pmatrix} 0 & 5 & 4 & 3 \\ 5 & 0 & -1 & \infty \\ 6 & \infty & 0 & \infty \\ 2 & 2 & 1 & 0 \end{pmatrix}$$

$$D^{(4)} = D^{(3)}$$