1.

1)

since $(u, v) \in E' \Leftrightarrow \exists x \in V, (u, x) \wedge (x, v) \in E$ and the graph is given in an adjacency list, we could loop through that list and for each vertex go to all its adacent vertices, and then all the verticies adjacent to those would be made adjacent to the original vertex in G'. sudo code would look like

```
for each v in verticies
  k = new vertex;
  for each i in v.adjacent
    for each j in i.adjacent
      k.adjacent.add(j);
  verticies_prime.add(k);
```

where |v.adjacent| + |i.adjacent| $\leq |E|$ so the max time bound would be $|V| \times |E| = O(mn)$

2)

```
for(var i = 0; i < matrix.length; i++){
  for(var j =0; j < matrix.length; j++){
    if(matrix[i][j]){
      for(var k = 0; k < matrix.length; k++){
        if(matrix[j][k] && k != i){
          new_matrix[i][k] = 1;
        }
      }
    }
  }
}
```

since if(matrix[i][j]) is true exactly $|E|$ times the total run time would be $|V|^2 + |E| \times |V|$ because the inner most loop will run $|E|$ times.

2.