Problem 5.20

```
for i in 1:n
    for z in i+1:n
        if state[i].acceptance == state[z].acceptance
            Merge(state, i, z)
        elif state[i].input(0) == state[z].input(0)
            Merge(state, i, z)
        elif state[i].input(1) == state[z].input(1)
            Merge(state, i, z)
```

Problem 2

By definition of a undirected grpah, each edge E is incident to exactly two vertices $\implies d_i = 2$

$$\sum_{i=1}^{n} d_i = 2m$$

Problem 3

$\forall v_i,\ i \in [1..n]$

let x_i be out-degree of v_i and y_i be the in-degree of v_i

$$\begin{aligned}
\sum_{i=1}^{n} x_i^2 - y_i^2 &= \sum_{i=1}^{n} (x_i + y_i)(x_i - y_i) \\
x_i + y_i &= n - 1 \\
\sum_{i=1}^{n} x_i^2 - y_i^2 &= (n-1)\sum_{i=1}^{n} (x_i - y_i) \\
\sum_{i=1}^{n} (x_i - y_i) &= 0
\end{aligned}$$

HW7 Theory

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