

Prob. 1	Prob. 2

Team members: Küng, Pirelli, Schubert, Dousse, Vu

### Problem 1.

This is a simple DFA. The  $E$  states are reached with an even number of 0s while the  $O$  states are reached with an odd number of 0s. Only the  $E$  states are accepting. The first 1 in the input will switch from  $E_1/O_1$  to  $E_2/O_2$ , and the second one will go to  $F$ , which is the failure state since more than one 1 has been detected.

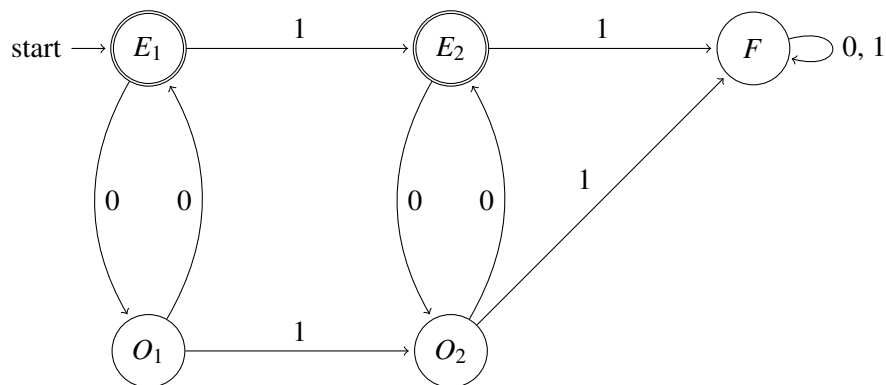


Figure 1: Problem 1 DFA

## Problem 2.

By using Observation 6 from the lecture notes we can deduce:

$$\forall x \in \Sigma^* : \hat{\delta}(q_0, x) \in F \Rightarrow \hat{\delta}(q_0, x) \notin \overline{F} \therefore x \in L(M) \rightarrow x \notin L(\overline{M}).$$

$$\forall y \in \Sigma^* : \hat{\delta}(q_0, y) \notin F \Rightarrow \hat{\delta}(q_0, y) \in \overline{F} \therefore y \notin L(M) \rightarrow y \in L(\overline{M}).$$

$$\text{Therefore, } L(\overline{M}) = \Sigma^* - L(M) = \overline{L(M)}$$