

# Automata and Formal Languages

## Homework Set 2

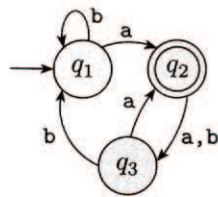
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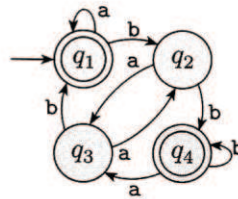
**Problem 1** Let  $A$  be a set with  $a$  elements. How many elements are there in the *power set* of  $A$ ? Note that the power set of  $A$  is the set of all subsets of  $A$ . Explain your answer.

### Problem 2

1.1 The following are the state diagrams of two DFAs,  $M_1$  and  $M_2$ . Answer the following questions about these machines.



$M_1$



$M_2$

- What is the start state of  $M_1$ ?
- What is the set of accept states of  $M_1$ ?
- What is the start state of  $M_2$ ?
- What is the set of accept states of  $M_2$ ?
- What sequence of states does  $M_1$  go through on input  $aabb$ ?
- Does  $M_1$  accept the string  $aabb$ ?
- Does  $M_2$  accept the string  $\epsilon$ ?

**Problem 3** Give state diagrams of DFAs recognizing the following languages. In all cases the alphabet is  $\{0, 1\}$ .

- $\{w \mid w \text{ begins with a 1 and ends with a 0}\}$ .
- $\{w \mid w \text{ contains at least three 1s}\}$ .