

Due at the start of class Tuesday, September 20, 2005.

Problem 1. Draw the deterministic finite state machine for each of the following:

- (a) $\{w \in \{a, b\}^* : aa \text{ is not a substring}\}$.
- (b) $\{w \in \{a, b\}^* : \text{each } a \text{ is immediately preceded and immediately followed by a } b\}$.
- (c) $\{w \in \{a, b\}^* : \text{neither } aa \text{ nor } bb \text{ is a substring}\}$.
- (d) $\{w \in \{a, b\}^* : \text{both } aa \text{ and } bb \text{ are substrings}\}$.
- (e) $\{w \in \{a, b\}^* : \text{the number of } a\text{'s is divisible by 3 and the number of } b\text{'s is odd}\}$.

Give the full machine description for part (a) only.

Problem 2. Draw the nondeterministic finite state machine for

$$\{w \in \{a, b\}^* : \text{either } aa \text{ or } bb \text{ is a substring (or both are)}\}.$$

Give the full machine description.

Problem 3. Do Exercises 2.11(a) (page 58) and 2.11(c) (page 59) in Kinber and Smith.

Problem 4. Do Exercise 2.16 (page 60) in Kinber and Smith.

Problem 5. Do Exercise 2.20 (page 61) in Kinber and Smith.