

This test contains 4 questions. Total of points is 20.

You may use your notes from the previous classes, but not the Internet on your mobile devices. Please use the provided space only for your final answer. If there is not enough space, use an extra page and indicate where I should find your solution. Good luck!

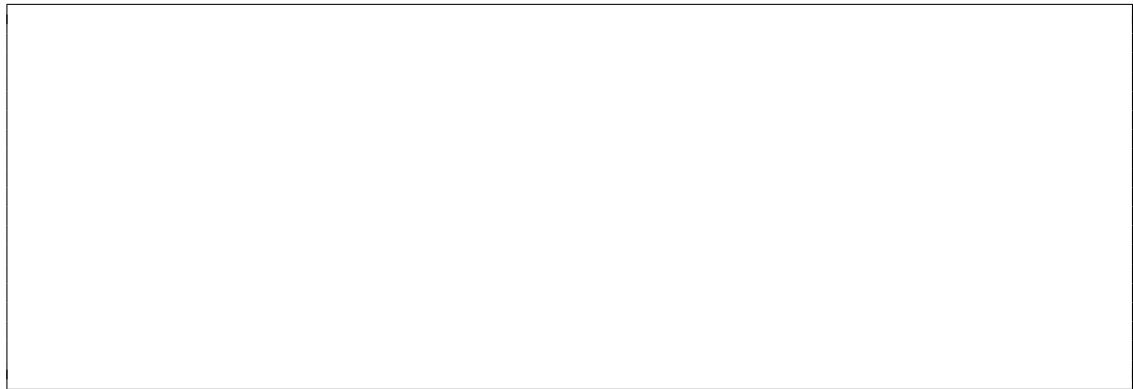
Grade Table (for instructor use only)

Question	Points	Score
1	4	
2	8	
3	2	
4	6	
Total:	20	

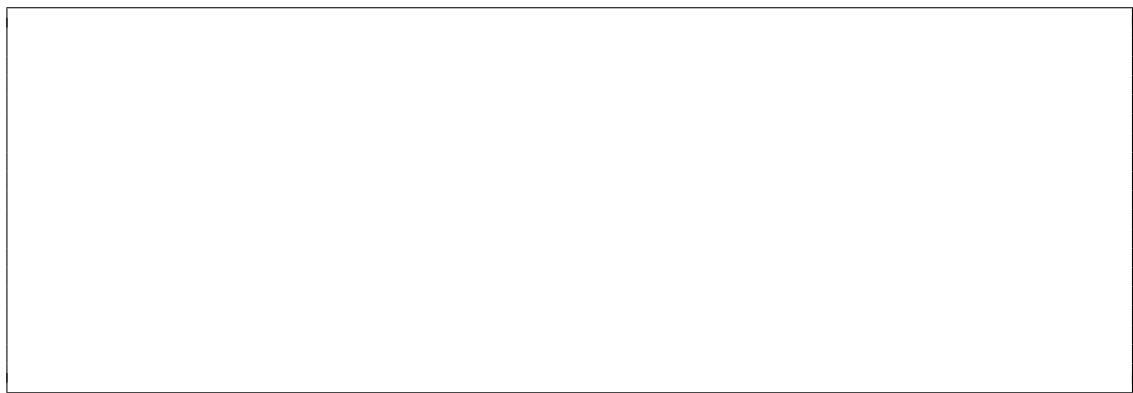
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1. (4 points) Build a deterministic finite-state automaton ( $\Sigma = \{0, 1\}$ ) that accepts all strings ending with 11010.

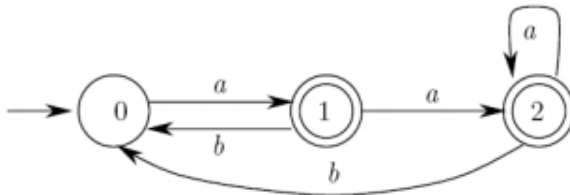
2. (8 points) Build an automaton that recognizes numbers that can be divided by 25 ( $\Sigma = \{0, \dots, 1\}$ , the number is entered from the last symbol).
- (a) (3 points) Build a non-deterministic automaton.



(b) (5 points) Build a deterministic automaton.



3. (2 points) Which regular language does the following automaton recognize?



4. (6 points) Build a (simplified) non-deterministic finite-state transducer that creates plural forms of English nouns ( $\Sigma = \{a, \dots, z, \$\}$ ). It should do the following:

- consider every string that ends with \$ a valid noun (no \$ inside!);
- if the noun ends on *-o*, *-ch*, *-sh*, *-ss*, *-x*, plural is formed with adding *es*;
- if the noun ends on *-y*, it changes into *-i* and *-es* is added;
- leaf  $\rightarrow$  leaves;
- foot  $\rightarrow$  feet;
- to all the other nouns, just *-s* is added.