

Worth: 2%**Due:** Before 10pm on Tuesday 27 March 2012.

Remember to write your full name and student number prominently on your submission.

Please read and understand the policy on Collaboration given on the Course Information Sheet. Then, to protect yourself, list on the front of your submission **every** source of information you used to complete this homework (other than your own lecture and tutorial notes, and materials available directly on the course webpage). For example, indicate clearly the **name** of every student with whom you had discussions, the **title** of every additional textbook you consulted, the **source** of every additional web document you used, etc.

For each question, please write up detailed answers carefully. Make sure that you use notation and terminology correctly, and that you explain and justify what you are doing. Marks **will** be deducted for incorrect or ambiguous use of notation and terminology, and for making incorrect, unjustified, ambiguous, or vague claims in your solutions.

For each language L below, give a DFA A that accepts L (i.e., such that $L = L(A)$). Justify briefly that each of your DFAs is correct — do **not** write formal proofs; instead, explain which strings end up at each state and use this to justify that your DFA accepts every string in L but no string outside of L .

1. $L_1 = \{s \in \{0, 1\}^* : \text{the integer value represented by } s \text{ in binary is a multiple of } 4\}$.
2. $L_2 = \{s \in \{a, b, c\}^* : s \text{ does not begin with "abc"}\}$.
3. $L_3 = \{s \in \{\triangle, \square\}^* : s \text{ contains both "}\triangle\triangle\text{" and "}\square\square\text{" as substrings}\}$.