**School for Computer Science and Information Technology**

**M**achines and their languages (G51MAL) Spring 2004

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**3rd Coursework**

16/2/2004

**Deadline:** 20/3/2004 - 15:30 (A39)

1. For $\Sigma = \{\mathtt{a}, \mathtt{b}, \mathtt{c}\}$ give regular expressions defining the following languages:
   (a) Words which contain a `b`.
   (b) Words which do not contain a `b`.
   (c) Words where all `a`s appear before all the `c`s.
   (d) Words s.t. the number of `a`s plus the number of `b`s is odd.
   (e) Words which contain the sequence `aa`.
   (f) Words which do not contain the sequence `aa`.
2. Construct the NFA $N((\mathtt{ab} + \mathtt{ba})^*)$ following the construction in the notes.
3. Apply the subset construction to the result of 2. to obtain a DFA, i.e. construct the reachable part of $D(N((\mathtt{ab} + \mathtt{ba})^*))$.