Tutorial Sheet 2

1. Prove that any finite language is recognizable by a Turing machine.

2. Consider a Turing machine model where there is a *set* of possible accepting states - the machine is considered to accept if it reaches any of these states. Show that any language recognizable in such a model is recognizable by a Turing machine with just one accepting state.

3. (a) Consider a modified notion of a Turing machine, where the state set Q is allowed to be infinite, but the alphabet sizes remain finite. Show that *any* language is recognizable in this model.

   (b) Now let the state set be finite, but the tape alphabet be infinite. Show again that any language is recognizable in this model.

4. Write a RAM program which checks if the first element of its input stream is prime or not.

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