COMP3721 Tutorial 2

1 Countability

1. Prove that $\mathbf{N} \times \mathbf{N}$ is countable.

2 Deterministic Finite Automata

1. Construct a DFA for accepting the language with regular expression $b^*a(a \cup b)^*$.
2. Construct a DFA for accepting each of the following languages.
   (a) $\{w \in \{a, b\}^* : w$ contains the string $abbab\}$.
   (b) $\{w \in \{a, b\}^* : w$ don't have abb as a substring$\}$.
   (c) $\{w \in \{a, b\}^* : w$ has a number of a's divisible by 3$\}$.
   (d) $\{w \in \{a, b\}^* : w$ has an odd number of a's and an even number of b's$\}$.