Maths for Computing
Assignment 6

1. *(5 marks)* Construct a DFA for $L = \{w \mid w$ contains equal number of occurrences of 01 and 10 as substring of $w\}$ over $\{0,1\}$. For instance, $010 \in L$, $0110 \in L$, $0111 \notin L$, $10110 \notin L$. Justify with a casual proof why the constructed DFA is deciding L.

2. *(5 marks)* Prove or disprove that $L = \{0^n \mid n$ is a perfect square$\}$ over $\{0,1\}$ is a regular language.

3. *(5 marks)* Construct a CFG for $L = \{a^i b^j c^k \mid i \neq j$ or $j \neq k,$ where $i, j, k \in \mathbb{Z}^+\}$ over $\{a, b, c\}$.