MA2C03 Assignment 2
Remarks

General remarks:

- When demonstrating that a set of production rules or a finite state acceptor produce a particular language, it isn't enough to give examples of strings which are generated and strings which aren't. While a complete proof wasn't necessesary, you should at least give some argument for why each string of the language is generated, and why only those strings are generated.

Question 1:

- A grammar which isn't regular can produce a regular language. For example, the language from the second question is regular and can be generated by the following irregular production rules:

  (1) $< S > \to 10 < A >$,

  (2) $< A > \to 00 < A >$,

  (3) $< A > \to 1$.

  In this way, it's not possible to show that a grammar is regular by showing that the corresponding language is regular.

- The converse of the Pumping Lemma isn't true. That is, if a language satisfies the conclusions of the pumping lemma, it isn't necessarily regular. An counterexample can be found on the Wikipedia article. Because of this, we can't use the Pumping Lemma to that show a language is regular.

Question 3:

- To show that the lanuage doesn't satisfy the conclusions of the Pumping Lemma, we need to show that for each $p \geq 0$ and each $w \in M$ with $|w| \geq p$, there is no decomposition $w = xuy$ such that

  1. $|u| \geq 0$,
  2. $|xu| \leq p$,
  3. $xu^n y \in M$ for each $n \geq 0$.

  It isn't enough to consider a single vaule of p, or to look at just a few decompositions of w.

Question 4:

- When giving an example of a regular subgraph, many forgot to specify either the set of edges or the set of vertices. Both are needed to determine a subgraph.