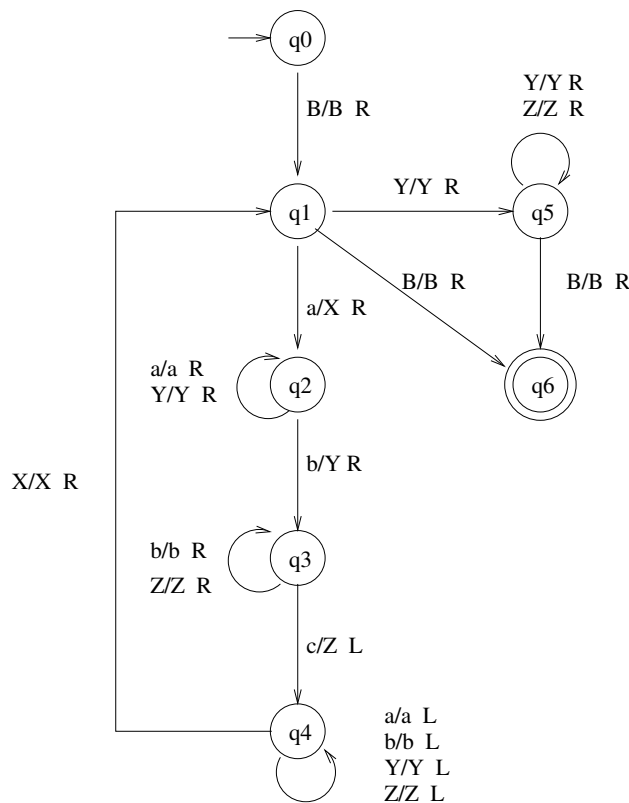


The answers must be the original work of the author. While discussion with others is permitted and encouraged, the final work should be done individually. You are not allowed to work in groups. You are allowed to build on the material supplied in the class. Any other source must be specified clearly.

1. (10 points) Let M be the TM in Example 8.2.2 on page 261 (the machine for $a^i b^j c^i$). Show the computation sequence for the strings abc and $aabc$.



2. (30 points) Construct TMs that accept the following languages. Write the high-level algorithm executed by the machine and label the sections.

- (a) The set of strings over $\{a, b, c\}$ that begin with a , contain exactly two b s, and end with cc .
- (b) $\{a^i b^j c^k \mid i + j = k\}$
- (c) $\{ww \mid w \in \{a, b\}^*\}$

Please turn the page over for additional questions.

3. (5 points) Convert 1362_{10} to binary using two different methods. Show your work (4 points).
4. (5 points) Convert 0.3_{10} to binary. Show the result in 4 bits of precision and 16 bits of precision for the decimal part. Show your work (4 points).
5. (5 points) Create your own example where the associative law fails due to limited precision.
6. (5 points) Create your own example where the distributive law fails due to limited precision.