1. (20 points) Let $M$ be the TM in Example 8.2.2 on page 261 (the machine for $a^i b^i c^i$). Show the computation sequence for the strings $abc$ and $aabc$. 

There are additional questions on the next page.
2. (40 points) Construct a TM that takes an input consisting of a sequence of $a$’s followed by fewer or equal number of $b$’s; and outputs a string where the number of $b$’s is the same as the original number of $a$’s.

The input format is: $\{a^i b^j | i, j \geq 0 \text{ and } i \geq j\}$

The output format is: $\{a^i b^i | i \geq 0\}$

For example:
If the input is ‘BaaaabbbB’, the output should be ‘BaaaabbbB’.
If the input is ‘BaaabbB’, the output should stay the same: ‘BaaabbB’.

You may assume that the input will be in the desired format. There is no need to check for errors.

Write the high-level algorithm executed by the machine and label the sections (5 points).

3. (40 points) Construct a TM that accepts the following language.
Write the high-level algorithm executed by the machine and label the sections (5 points).

$\{a^i b^i c^k | i + j = k\}$