Computer Science 4602
Fall 2020
Quiz 2

Answer all of the questions. **Check your work**.

1. Draw a state transition diagram of a FSM that decides language $A = \{"ab"\}$ over alphabet $\{a, b\}$. There is only one string in language A. Be sure to mark the start state and accepting states. Be sure there is a transition out of every state for every symbol in the alphabet.

2. Draw a state transition diagram of a FSM that decides language $B = \{x \in \{a, b\}^* \mid |x| \geq 2$ and the next to last symbol of x is $a\}$. Some of the strings in B are $"aa"$, $"bab"$, $"bbaab"$ and $"abaaa"$. Be sure to mark the start state and accepting states.

    Hint. Have a state for each pair of symbols that might be the last two in a string. The state for strings ending on bb can serve as a start state.

3. Prove that language $C = \{a^n b^{2n} \mid n > 0\}$ over alphabet $\{a, b\}$ is not regular. Make your proof clear and readable, but not verbose. Do not expect the reader to guess what you are doing.