

3. Use a multitape machine to recognize the language:

$$L = \{w \mid w \in \{a,b\}^* \text{ and } n_a(w) = n_b(w)\}.$$

Begin with a high level plan. Following this with a detailed plan. Finally, define $TM_{\text{multitape}}$.

4. What is the relation between Turing recognizable languages and languages recognizable by a multitape Turing machine? Prove your answer.