CS 2200 Homework 6, Spring 2023

Remember: The "blank" tape character, "␣" or □ in JFLAP, is not allowed in the input alphabet Σ.
Design a Turing Machine to recogize the following languages:

1. (10 points) $\Sigma = \{a, b\}$ and $A = \{w|w = a^+\}$
2. (10 points) $\Sigma = \{a, b\}$ and $B = \{w|w$ **contains exactly five characters**$\}$
3. (10 points) $\Sigma = \{a, b\}$ and $B = \{w|w$ **starts and ends with the same character.**$\}$ **NOTE: The empty string is not in the language.**
4. (10 points) $\Sigma = \{0, 1\}$ and $B = \{w|w$ **is an even binary number.**$\}$ **NOTE: The empty string is not in the language.**
5. (10 points) $\Sigma = \{a, b\}$ and $B = \{w|w = (a^n b^{n+1})\}$ **NOTE: The empty string is not in the language.**
6. (10 points) $\Sigma = \{a, b\}$ and $B = \{w|w =$ **every even numbered character is "b"**$\}$ **NOTE: The empty string is not in the language because ε is not a "b".**
7. (10 points) The language $\emptyset^*$