1. Prove that the recursive languages are closed under the following operations:
   - union
   - intersection
   - complement
   - concatenation

   Drawing a diagram is sufficient. For example to show recursive languages are closed under union, you simply need to draw a diagram showing how you'd use (always halting) TMs $M_1$ and $M_2$ for languages $L_1$ and $L_2$ to create a TM $M_{1∪2}$ that decides membership in $L_1 ∪ L_2$. Pseudocode would also be okay.

2. Prove that if $L_1$ and $L_2$ are recursive, then so is $\text{SHUFFLE}(L_1, L_2) = \{ w \mid w = α_1 β_1 α_2 β_2 … α_k β_k \text{ for some } k ≥ 0 \text{ and strings } α_1, …, α_k \text{ and } β_1, …, β_k, \text{ such that } α_1 α_2 … α_k ∈ L_1 \text{ and } β_1 β_2 … β_k ∈ L_2 \}$.

3. Show that if $L_1$ and $L_2$ are recursively enumerable, then so is $\text{SHUFFLE}(L_1, L_2)$.