CS 517
Due: Wednesday, 11 May

Homework #6

1. Show that if **S** has a primitive recursive acceptor then **S** has a primitive recursive recognizer.
   Show that if **S** has an exponential time acceptor then **S** has an exponential time recognizer.
   Give an example of a class which has acceptors, but does not have recognizers.

2. Do **Ex 8.1** from Hard Problem Notes.
   Hamiltonian Circuit $\leq$ Hamiltonian Path.

3. Do **Ex 8.2** from Hard Problem Notes.
   Hamiltonian Path $\leq$ Hamiltonian Circuit.

4. Do **Ex 8.3** from Hard Problem Notes.
   Find **TSP** tour.

5. Do **Ex 8.4** from Hard Problem Notes.
   YES/NO Towers of Hanoi.

6. Do **Ex 8.5** from Hard Problem Notes.
   Graph Isomorphism.

7. **Star Free Regular Expression Non-Equivalence**
   INPUT: Two star-free regular expressions, E_1 and E_2.
   QUESTION: Are the languages represented by E_1 and E_2 different (not equal)?
   A Star Free Regular Expression contains strings over a finite alphabet, the operators: $\vee$ (OR), $\wedge$ (Followed By),
   and parentheses to indicate the order of operations.
   The empty string represents the empty language.
   E and (E) represent the same language.
   The language consists of a single string, if the expression is E or (E) where E is a single string.
   If the expression has the form $R_1 \vee R_2$ then the corresponding language consists of the union of the languages corresponding to R_1 and R_2.
   If the expression has the form $R_1 \wedge R_2$ then the corresponding language consists of all strings which can be written as a string from the lannguage of R_1 followed by a string from the language of R_2.
   SHOW that Star Free Regular Expression Non-Equivalence is **NP-**complete.