**Final Exam (Part I)**

**The following provides guidelines for the exam. Key questions to practice for the exam:**

1. **Given a graph list two valid sequences of topologically sorted nodes.**
2. Find a shortest path in a graph
3. Consider the DFA and BFA algorithms along with the Dijkastra shortest path and Prim’s algorithms. Explain how these four algorithms are similar and contrast that what distinguish them from each other.
4. Given a DAG, write a program that will construct a catalog all possible topologically sorted list of nodes. Assume the graph is connected and has at least one zero in-degree nodes.
5. Use the big-O notation to analyze the complexity of Prim’s algorithm. Consider each step and calculate the number of iterations for each step. Use upper bounds (worst-case) on each step.
6. Define what we mean by a Greedy algorithm. Explain your answer by using an example.
7. Given a regular expression, define a finite state machine.
8. What is the regular expression for the java comment that starts with “/\*” and ends with “\*/”? Define a finite state machine for it
9. How would you represent a finite state machine as a data structures
10. One question from the previous exam so review your answers to that exam.