19D070052 – Sheel Shah

a. What are pattern databases? What is their connection with admissible heuristics?

-> Pattern databases are essentially look up tables (hash maps) that map every state of the state space to a number. PDBs are used to represent heuristic functions (like Manhattan distance to goal state) in an easy to access form. Since theoretical guarantees of finding the optimal solution hold only for admissible heuristic, PDBs usually store/represent admissible heuristics. (admissible heuristics always underestimate the actual cost of transitioning from current state to goal state)

b. What particular challenge related to pattern databases is addressed by Felner et al.? How is the challenge addressed?

-> The main problem with PDBs is that their size (in memory) is really large. Since the size is directly proportional to the number of states, the size tends to grow exponentially when the size of the problem increases. (Eg. Going from 4x4 to 5x5 in the sliding tile puzzle). In order to solve this proplem, Felner et al. Propose a method to compress PDBs by performing grouping on similar states. Hence some sort of generalization is being done to compress the heuristic, implying the heuristic value of similar states is the same. This value will be the minimum uncompressed heuristic value among all states of this group.