2021/2022 EE4483/IM4483 Homework 1

1. Are the following applications of Artificial Intelligence? Briefly justify your answer.
   a) Fingerprint touch ID on mobile phones
   b) Speech translation from one language to another
   c) Barcode scanners
   d) Web search engines based on key words only
   e) GPS navigation device adaptive to traffic conditions

2. A man has to cross a river with his fox, goose and a sack of peas. Each trip, his boat can only carry himself or himself together with one of his possessions. Assume that at any time an unguarded fox eats the goose; and an unguarded goose eats the peas. One needs to design a state space problem solving system to simulate how the man can cross the river eventually with all his possessions.

   Assume:
   - each state is denoted in the form of (L, R), where L denotes list of items on left bank; R denotes list of items on right bank.
   - the man and his possessions start their journal from the **left** bank.
   - the items, may be included in L or R, are: Man (M); Goose(G); Fox (F); Peas(P).

   (i) Write down the initial state; the goal state using above given notations and assumptions for the Cross-River problem.
   (ii) Give a list of required operators/actions of the system with above constraints.
   (iii) Develop the partial state space to solve the problem by state space search. Show the search tree for any one possible solution, indicate the operator applied on each edge.

3. Suppose start node *A* and goal node *I*. Provide the search order for the nodes shown in the figure below, for Depth First Search (DFS), Breadth First Search(BFS), Iterative Deepening Search(IDS) (starting depth=1). Show the updates in *open* and *closed* lists at each step.