CSE 440: Artificial Intelligence
Assignment/Quiz 3, Fall 2022
North South University
Full Marks: 40 (4 X 10)

Problem 1.

Assume we have two predicates: **Parent(p, q)** which means "p is the parent of q" and **Female(p)** which means "p is a female". We also have constants **Fatima** and **Anwar**,

Express each of the following sentences in first-order logic. (You may use the abbreviation ∃1 to mean "there exists exactly one.")

    i.   Fatima has a daughter (possibly more than one, and possibly sons as well).
    ii.   Fatima has exactly one daughter (but may have sons as well).
    iii.   Fatima has exactly one child, a daughter.
    iv.   Fatima and Anwar have exactly one child together.
    v.   Fatima has at least one child with Anwar, and no children with anyone else.

Problem 2.

Consider the following map of the divisions of Bangladesh. Convert it to a suitable graph, and color them using four colors (Red, Green, Blue, Yellow) so that no two adjacent divisions have the same color. You can use Backtracking/ Forward checking.

Problem 3.

Consider the problem faced by an infant learning to speak and understand a language. Explain how this process fits into the machine learning model. Describe the percepts and actions of the infant, and the types of learning (supervised, unsupervised, reinforcement) the infant must do.

Problem 4.

Describe one problem faced by the residents of Dhaka city that you think can be solved using AI/Machine learning. Your solution must be specific, i.e., describe what data will be collected and how, what type of algorithm will be used, how your solution will be tested and deployed, what challenges you may face, etc.