Problem1:

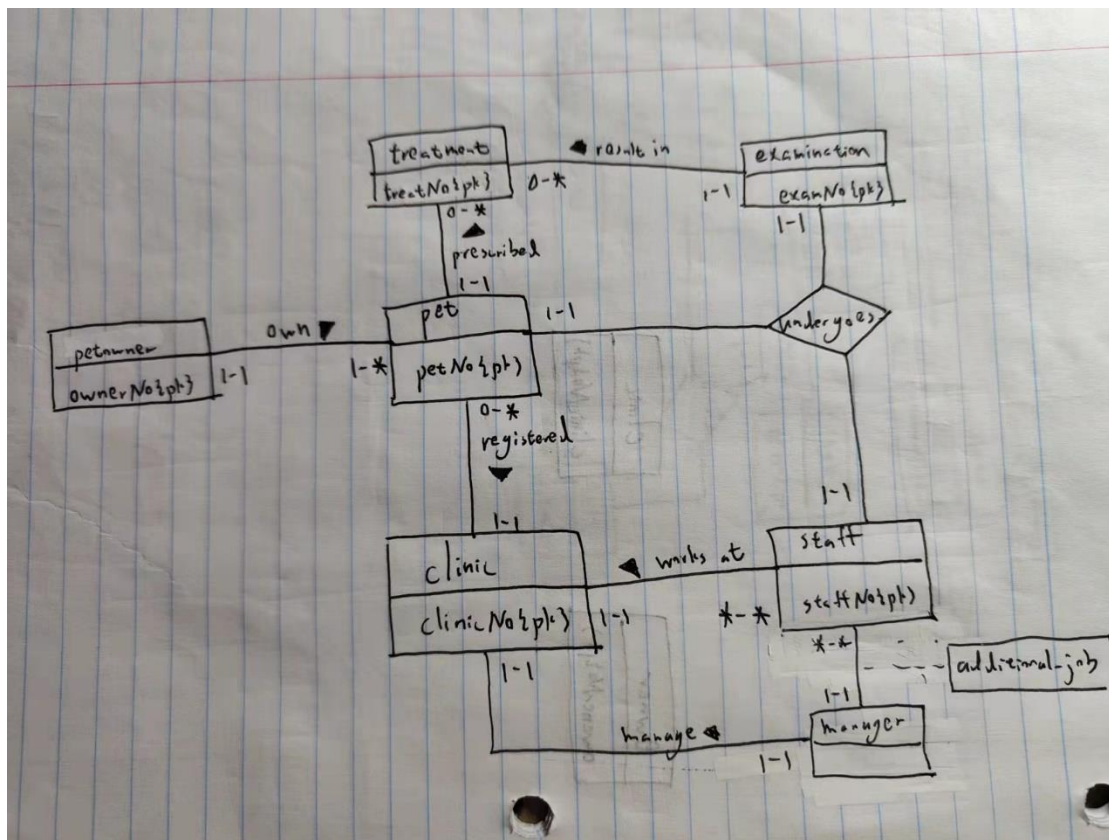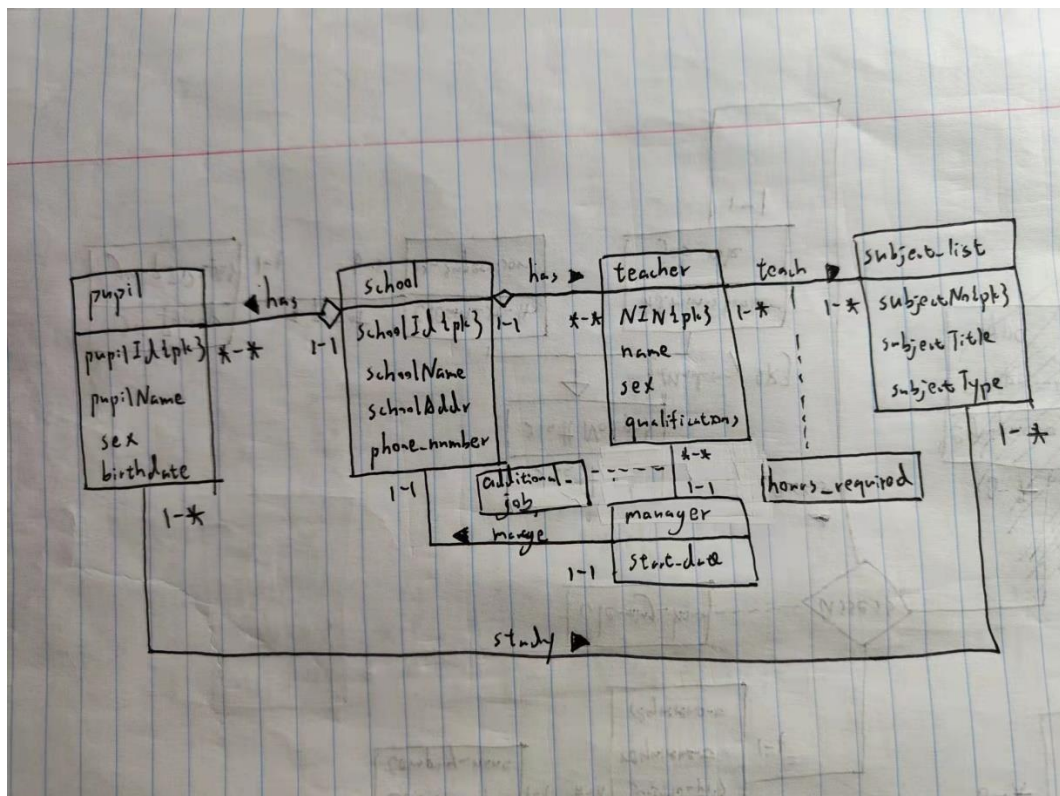## Problem2:

Problem3: