

Homework #2 CS 351 (50 pts)

Date Due: Thursday 9/22

Question 1 (50 pts)

You are now familiar with the Ticket Dispensing System for Hogwarts. Design an architecture for this system. Use a UML **class** diagram. Make sure you include enough information to convey the idea of your design. Your design should fit in one sheet of paper. (Hint. Not all information provided in the requirements has to be part of the class diagram. Remember that a **UML class diagram** represents the structural aspects of a design, not the behavioral aspects (i.e. no algorithms)).

TRAIN TICKET DISPENSING SYSTEM FOR HOGWARTS

You are required to build a software system to handle the dispensing of tickets at a train station. In this case the ticket dispensing machine can hold only a finite number of coins and bills. The machine stores only information about trains that leave the station in which the machine is located. Each train makes a finite number of stops after leaving the station. These stops are called destinations. Each train has two types of cabins: first class and regular class. The maximum number of seats in each cabin varies across trains. A user of the ticket machine must enter a destination (as a selection), number of tickets required, and the type of cabin requested (only one type of cabin can be selected for the number of tickets ordered). The machine then checks whether a train that stops at the destination has available space in the type of cabin requested. If there is an available train, the system then reserves the required number of seats and displays the price to the user. The user must then enter payment (restrictions on type of payment are given below). After sufficient payment is entered the system dispenses the tickets. Each ticket contains the train identifier, the cabin type, and a seat number. If insufficient payment is entered the reservation is cancelled.

The machine operates under the following conditions:

- This machine accepts only cash. Only nickels, dimes, quarters, dollar bills and five dollar bills are to be accepted as valid contributions to a payment.
- All other objects are rejected (rejected objects are called slugs).
- The number of coins and bills that the machine can store is limited. Below are the limits:
 - Nickels: maxN
 - Dimes: maxD
 - Quarters: maxQ
 - Dollar bills (1 and 5 dollar bills combined): maxB
- A ticket can only be dispensed if it is available and the payment is sufficient.
- Payment can only be made after a reservation is made on an available train