Purpose: Practice identifying and eliminating classes.

What to do: Read the following description of a software system, and identify a set of potential objects. List all objects/classes identified, and then show ones eliminated and write a brief rationale for eliminating the ones you took out. Keep in mind that the goal is to identify problem domain classes, and to avoid making decisions about how to implement the system.

Who: You may work in a group of three or less people, but each member of the group should submit their own report written in their own words.

What to submit: list of classes, with eliminations and rationales. List collaborators.

Description: As an employee of Keller & Minions Corp. you are developing a software system for baggage handling at a large metropolitan airport. The system is used by airline personnel; airport security, and maintenance personnel; and passengers. The system controls and tracks the movement of checked luggage through a system of conveyor belts. Carry-on baggage is not handled by the system.

An item of luggage can enter the system either at an airline check-in counter, or at the baggage handling area for each airline (having just come off of a flight), and can leave the system at an airline’s baggage handling area or baggage claim in the airport. At the check-in counter, an airline representative enters passenger identification and destination information into the airline’s computer system, which assigns a baggage id number to each piece of luggage, and prints a bar-coded tag to be placed on the item. The luggage is then placed on a conveyor belt to be moved to the airline’s baggage handling area by the baggage system. The barcode uniquely identifies the airline and the baggage id. Before the bag enters the main conveyor belt system it must pass through a security check, where the bag may be removed from the system if necessary. When a piece of luggage enters the system at the airline’s baggage handling area, it must have come from a flight, and will already have a bar-coded tag. The bag will just be placed in the conveyor system, and does not have to go through security. Note that the system is only concerned about routing the luggage from location to location in the airport, and is not concerned with the fact that some will ultimately arrive at other airports. It is assumed that each airline is responsible for determining the local destination of each bag within the airport.

A bag moves along a single conveyor belt until it reaches a junction. Each junction allows a bag to go in one of two directions. Just before the junction is a barcode scanner that scans the tag on the bags, and determines which direction the bag should be routed by getting local destination information from the airline’s computer system. The system then controls the direction of the junction so that the bag is routed properly. Local destinations can include the airline baggage handling area, or a particular carousel in the baggage claim. If the scanner cannot read the barcode, the bag is routed to the airport manual baggage handling area, where it can be identified and properly routed. Security personnel can change the local destination of a bag to a security access area.

The system keeps track of the last location of each bag in the system. Airport personnel in security or maintenance can find the exact location of a bag on the conveyor system, as can airline baggage handlers. A passenger can check which baggage carousel their luggage will be on by scanning their copy of the barcode at a terminal in the baggage claim. The system will not give other information to the passenger about a bag’s location.

If a particular route through the conveyor system is congested, or a belt or junction is not operating, the system should route the luggage a different way. The belts can be accessed to remove luggage that is stuck on belts that are not working. Maintenance workers who remove bags from non-operating segments of the belts scan the barcodes to indicate they have been moved to the manual handling area.

The system must be designed so that it is not affected by changes in the airport, the number of airlines, check-in desks, baggage handling areas, etc.