

A local company (Stuff in Boxes) does profitable business in acting as a fulfilment center for external companies. When dealing with large mailing or shipping campaigns, it is neither convenient nor cost effective for companies to handle this internally, and so they outsource the responsibility for this to Stuff in Boxes. They send a shipment of goods to the Stuff in Boxes warehouse, along with distribution details, and Stuff in Boxes handles the rest. The external organization also provides a manifest outlining what they will be sending, and in what quantities, and how it can be assessed to make sure it has arrived safely.

This, as might be expected, is a task that requires a lot of information tracking. Up until now, a paper-based system has been appropriate, but this has become unmanageable. You have been commissioned by Stuff in Boxes to design and implement a system that would permit the effective management of this process. The system you design must have the following key features:

- When a new request for fulfilment comes in, record the name, address, and manifest details for the organization along with whether it has been received or not.
- Allow the users to mark a new shipment from an external organization as being received, and if it has been received whether it has been inspected to ensure it meets the acceptance criteria of the center.
- Allow the users to create a mailing list from the details provided by the external company, and allocate specific units in the manifest for delivery to specific customers. For billing purposes, this needs to track the geographical location and apply shipping costs based on location
- Allow the users to 'chunk' up distribution of packages based on a set shipment size to particular locations. This may span across several manifests – for example, the users may wish to chunk up a shipment into 1000 units to Germany, and those 1000 units may be made up three or four different manifests. Units should be preferentially allocated to this based on how long they've been in the warehouse. The output for this is a shipping log that shows which packages and the customer to which they are to be sent.
- Allow the user to run queries on the data within the application to see how long shipments have been waiting, how many are left to be sent to particular countries, and the overall bill that is to be charged to the client at the end of the process.
- Calculate an estimate of cost based on fixed figures per geographical location (this should be configurable by the user) and an estimated time to fulfil based on averages derived from historical data in the application. It should also generate an estimate of the cost to Stuff in Boxes based on another configurable value set by geographic location.

Your application then needs to provide the following functionality:

- Allows for users to add, modify and delete manifests.
- Allows for users to add, modify and delete companies.
- Allows the user to create a shipment based on geographical destination and unit count.
- Allows the user to set two configurable shipping values per geographical location – cost to Stuff in Boxes and cost to the customer.
- Calculates the customer an internal cost of a fully fulfilled manifest.
- Chunks shipments based on geographic destination and prioritized by the time packages have been in the warehouse.
- Allows the user to run queries on the data to show the current state of the warehouses.
- Permits users to track the state of incoming shipments and record that they have been fully assessed for correctness.