

## INF1343, Winter 2012, Week 4 Exercises

M is a head of a secret intelligence service of a West European country. Through his agents, M combats terrorism and communism around the world. M's agents have been very successful — in part thanks to a variety of gadgets that they have had available to them, such as cars with missile launchers or watches that can receive video signal over the air. Such gadgets, however, are quite expensive and have an unfortunate tendency to get destroyed or otherwise lost during operations. And now that Ernst Blofeld's SPECTRE network has been successfully dismantled, the government has been eager to find ways to reduce M's budget. This means better accounting for the gadgets.

M would like to build a database that would help him keep track of the gadgets. In particular, the database should be allow M to get the following information at any point:

- The list of gadgets currently in possession of a particular agent (and in particular, certain "Agent 007").
- The total value (in £s) of gadgets currently in possession of a particular agent.
- The list of gadgets that have been lost, showing when they were lost, by which agent, and in the course of which operation.
- The total value of gadgets lost in a particular operation.
- The total value of gadgets lost in all operations involving a particular enemy (e.g., in all operations involving SPECTRE).
- The agent's written explanation for every lost gadget costing over £100.
- The total number of units of a particular gadget (e.g., X-ray glasses) held by all agents, the total number available in stock, the total number that was lost in the last year.
- The list of gadgets that have been requested by the agents, with the agents' explanation of why a particular gadget is needed, how many units, and the time period during which it would be needed.

### Part 1

Design an ER diagram for M's database. Hint: your ER diagram should have 6-8 entities.

### Part 2

Implement the database and insert the following information into it:

James Bond, code name "007," has taken a jet pack on May 1, 2010, and five pairs of X-ray glasses on May 5, 2010. The jet pack costs £250,000 while each pair of X-ray glasses costs £39,999. The first pair of glasses was lost on May 7, 2010 in the course of operation "Caribbean Moon," which targeted SPECTRE. Bond's explanation for the loss says "I stepped on them." Two pairs were lost on Oct. 19, 2011, in the course of operation "Mighty Sharks," which targeted Dr. Maybe. The explanation for the loss says "The glasses were chewed up by a shark." The loss of the forth pair did not involve any operation and the Bond's explanation just says "Oops!" It's unclear when it was lost, but the loss was discovered on Jan. 5, 2012. The fifth pair of glasses is still with Bond, and so is the jet pack. Bond is requesting *another* pair of X-ray glasses, knowing that the current one isn't going to last him long. He is also asking for a second jet pack (just in case!) and for two digital watches. He is providing the same explanation for why he needs each gadget: "To fight the enemies of Her Majesty!"

*Make sure that your implementation properly declares all primary and foreign keys.*