**Task: Factory security system control application.**

There are 3 factory buildings secured by a central security system – workshop, warehouse, office. There are 2 kind of sensors used in the system – a window sensor and a door sensor. Each window and each door in these buildings has a sensor. Warehouse has 6 windows and 2 doors, office has one door and 1 window and workshop has 2 doors and 5 windows. Besides that, there is a manager’s room in a workshop that is secured separately and it has only one door.

We need to design and implement an application for a security guard, that will be able to turn on/off security system in each building and, if it’s on, polls all security sensors periodically with certain intervals and report back their statuses (log results to the screen).

**Requirements:**

Application must contain following components :

* Main console, where you can turn building’s security module ON/OFF and where logs are gathered.
* Building’s security module(s) that checks sensors’ state with certain intervals
* Logs/Settings storage solution

Application must be extendable – they should be able easily add another building that has the same sensor system under surveillance.

Application must be scalable – system should work with any number of windows in a building with a limited computer resources.

Building’s security module should poll sensors with different intervals:

- Workshop – if ON, check the sensors every 4 min.

- Warehouse – if ON, check the sensors every 5 min.

- Office - if ON, check the sensors every 2 min.

Security module should report back a structure that at least has:

* Check Date and time
* overall building security status (true/false). If at least one sensor failed, overall status should be set to false.
* each sensor status and its type(window/door) .

On-screen real-time log should show above structure in a readable form including a security system (building) where report came from every time a system reports back, something like “12/05/2008 15:25:30 Workshop Secured, all sensors are tested successfully” or “12/05/2008 15:25:30 Workshop Security Alert! Window sensor #2 failed.”

We are expecting from you at least detailed classes design (properties/methods declaration) with comments(what a property/method is for) for both security module(s) and main control app as well as suggestions of what to use as communication protocol between main app and modules as well as your recommendations of what to use as a log/settings storage.

Ideally, we would like to see a working prototype that will emulate sensor polling, sensor responses and will show on-screen log.

If you cannot provide working prototype because of a limited time frame, you should be able to answer questions about implementation details.

Also, even though we assume you will be considering Delphi as a development tool, it will be a big plus if you can apply .Net technologies here.

Good luck!