DSA Project Spring 2012

Icy Road Early Warning System

Georgios Stoumpos
Gaël Wittorski
Enrico Bacis
Dimitrios Politis
Stefan Spasov

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Introduction

Icy Road Early Warning System is a distributed system to check the temperature and the humidity by collecting data from sensor placed in different locations. The system can support infinite temperature/humidity sensors, a monitor to gather the data from the sensors, a server connected to a database and a web server also connected to the database. The code has been written to be deployed on different machines, so we have a main class for every part of code that should be run on a device.

In order not to have to start all the different main methods in different virtual machines every time, we developed a class *DeviceSimulator* based on *ProcessBuilder*. We prepared a demonstration environment (*EnvironmentDemo.java* in *sdu.dsa.demo*) that can be run to start a fully functional environment (except the website that needs to be started from its project).

The device simulators are starting in different virtual machines but they are redirecting the output and the errors to the EnvironmentDemo console.

Starting the Project

The project is made of two different parts: the program itself and the website. Both the parts are written in Java.

To start the application you need to:

- Initialize your MySQL database (see next section)
- Change the username and the password for the database connection in the class *DSA-Project→src→sdu.dsa.database→DBManager.java*
- Run the *EnvironmentDemo.java* in the package *sdu.dsa.demo*
- At this point the console should start to show the different devices producing their output.

After you have managed to set up and run the application you can start the website. To start it you need to:

- Change the username and the password for the database connection in the class *DSA-Website→src→sdu.dsa.website→DBManager.java*
- Start the Tomcat server
- Run the servlet HomeServlet.java on the server
- At this point a web browser should appear with the home servlet. You can enter the details page of every sensor clicking on its ID in the table.

Database Initialization

Type the following commands in the MySQL console to inizialize the database.

```
CREATE DATABASE IF NOT EXISTS DSA;
USE DSA;

CREATE TABLE sensor (
id INT NOT NULL PRIMARY KEY,
sleeptime BIGINT NOT NULL,
description VARCHAR(100) DEFAULT '',
changed BOOLEAN DEFAULT FALSE
);

CREATE TABLE record (
sensorID INT NOT NULL,
timestamp BIGINT NOT NULL,
temperature FLOAT NOT NULL,
humidity FLOAT NOT NULL,
FOREIGN KEY (sensorID) REFERENCES sensor(id),
PRIMARY KEY (sensorID, timestamp)
);

INSERT INTO sensor (id, sleeptime, description) VALUES
(1, 60000, 'Sensor1'),
(2, 45000, 'Sensor2'),
(3, 120000, 'Sensor3');
```