CS583 Project Proposal

Shane McKee (932-467-626), Minfeng Wen (932-108-037)

Design Plan:

We want to implement a simple Domain-Specific Language for a land-roving robot. This language would allow programmers to control the robot by sending it missions to complete. This may include movement, energy usage, data collection (photographs, weather reports, sensor data, etc), and data analysis. To our knowledge, there are not any languages that solve this narrow set of requirements.

Objects and Concepts

- **Robot**
  - This is the main object.
- **Position**
  - This is a GPS coordinate that will be used in carrying out missions.
- **Sensor**
  - A super class that more specific sensors will subclass.
  - **Camera**
    - A sensor to capture visual data.
  - **Thermometer**
    - A sensor to measure temperature.
  - **Barometer**
    - A sensor to measure the atmospheric pressure.
- **Battery**
  - The battery of the robot. This will include information about how much power is left and how much is being used.
- **Schedule**
  - A list of tasks for the robot to complete. There should be an option to optimize the schedule for time or energy efficiency, if the programmer desires it.

- **Task**
  - An operation that the robot should carry out.

The most interesting parts in our implementation might be robot movement, collection of sensor data, setting an appropriate schedule according to the demand. If possible, we also want to deal with combining two missions together, and we want to try to find the most fuel-efficient or time-efficient paths between targets.

Concepts from Introduction slide 5 that we want to apply to our project:

- Type-directed programming
- Refactoring
- Type classes
- Functional data structures
- … and more?