

WSU-TC CptS 322






Software Engineering Principles I
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Project Overview


Project Overview

- Project Overview means just that!
 - This is the “*initial client concept*” that must be refined via Requirement Analysis
 - Your Software Requirements Specification (SRS—a written artifact) must be complete
 - By definition the instructor is your client
 - Note: the written overview document takes precedent over this presentation
- Two project choices
 - Sensor Network (vehicle tracking)
 - Smart Home (temperature control)

Sensor Network

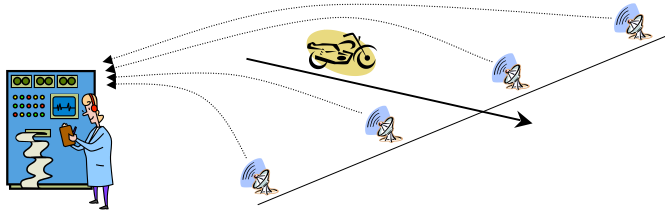
- Key entities
 - Sensor nodes 
 - Supervisory system 
 - Vehicles (small, medium, large) 

- Two deployment configurations
 - Border Control
 - Area Monitoring
- Hardware must be simulated in software 

Sensors & the Supervisory System

- Sensors
 - Battery operated (i.e., limited lifetime)
 - Subject to abuse (e.g., weather, tampering)
 - Transmit data at fixed time intervals
 - Data includes: location and sensor value
- Supervisory System 
 - Receives all node data
 - *Assumption*: no lost or corrupted messages
 - *Assumption*: moved sensors have been compromised
 - Reports all tracking events
 - Vehicle size, location, and speed & direction (if moving)

Border Control

- Monitor a border for vehicle crossings
 - Report vehicle size, location, and speed & direction (if moving)
 - Report border crossing events
- Sensors are placed at uniform distances



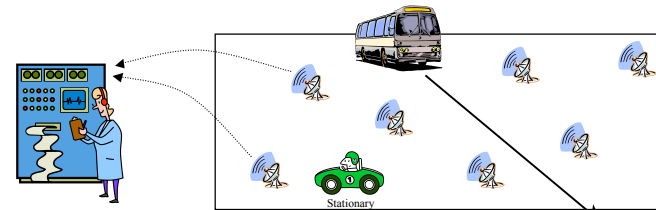
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Area Monitoring

- Monitor an area for vehicle movement
 - Report vehicle size, location, and speed & direction (if moving)
 - Report area entry & exit events
- Sensors are placed randomly within the area



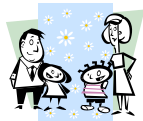
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Smart Home

- Key entities
 - Home occupants
 - Thermostats
 - Occupancy sensors
- Two configuration options
 - Heating (winter) vs. Cooling (summer)
 - Daytime vs. Nighttime (energy savings)
- Hardware must be simulated in software



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Smart Home Operation

- Each (monitored) room has:
 - Thermostat
 - Occupancy sensor
- The HVAC system heats/cooling all rooms uniformly
 - (i.e., constant temperature gain/loss per unit time)
- Individual rooms may cool-off or heat-up at different rates (e.g., cooking in the kitchen)
- Occupied rooms are given a *double* weighting in the heating/cooling calculations



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Smart Home Configuration

- A smart home has one or more rooms
- Heating and Cooling modes are mutually exclusive
- Daytime/Nighttime modes depend upon preset time-of-day criteria
- Temperature set points and tolerance limits are user configurable

Smart Home Example

- Current options:
 - Heating on
 - Set point: 72°, tolerance ±3°

 70° Oc.	 69°	 67°
 68°	 71° Oc.	 66°

- Computed temperature value:
 - $(70 * 2 + 69 + 67 + 68 + 71 * 2 + 66) / (6 + 2) = 69$
 - Within ±3°, no need to turn on the furnace