LABORATORIO DI INGEGNERIA DEI SISTEMI SOFTWARE

Introduction

Our motto: there is no code without a project, no project without problem analysis and no problem without requirements.

Requirements

Design and build a software system that makes a robot is able to walk along the boundary of a rectangular, empty room.

Requirement analysis

“robot” is a device connected to the network that can be controlled through specific instructions sent to the robot over the network. More details provided by the customer

By “walk” is meant the ability of the robot to move using its wheels/robotic feet etc..

“room” is a rectangular space delimited by 4 walls/fences etc. (i.e., the boundary).

In order to test the correctness of the software I can count how many seconds the robot takes to hit the obstacle (i.e., the boundary) in front of it, then turn left/right, then again count the seconds to the next hit.

User Story

As a user, I place the robot on the HOME cell facing south, then I activate a system which sends to the robot movement instructions.
As a user, I can not break the execution: the system must terminate autonomously when it finished the execution.

At the end of the execution I expect that the robot walked round the room.

Problem analysis

Data is sent in the body of the http post method, such data is formatted in an understandable way for the robot (data format specified on the file VirtualRobot2021). The robot’s response contains data that indicates what happened. This aspect of the problem implies that we must use a library

that implements the http protocol (port 8090) or websocket (port 8091) . The implementation is usually already provided and we can import such library thus in this case the abstraction gap is very small. The robot uses json as data format response.we will use nodejs server-side.

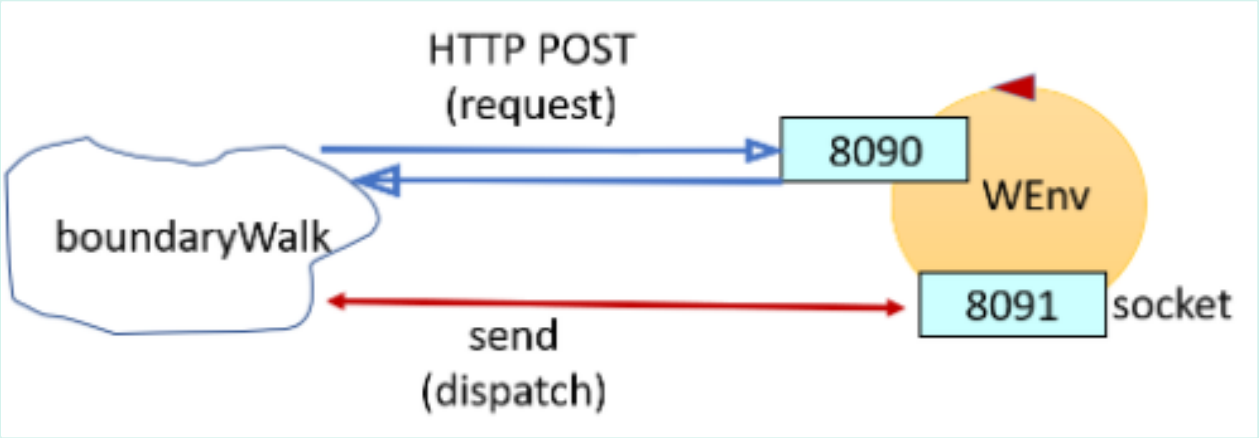
There is a conceptual abstraction gap: there are 2 possible technologies for the communication. Anyway a request-response interaction is OK.

The costumer has already given to us the virtual environment inside which we can test the software.

A first prototype of the application can be realized in one working day (8 hrs).

After each turn and counted seconds, we must repeat it for 4 times. If the recorded seconds follow the pattern t1,t2,t1,t2 then the software is correct. This test is based on the very famous formula s=v*t and it is valid if and only if v is costant (dv/dt=0).

Logic Architecture



The HTTP protocol seems suitable for the resolution of this problem. The using of websocket instead of the HTTP protocol may result more flexible and efficient.

Test plans

Project

Testing

Deployment

Maintenance

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