Development of a Distributed System Applied to Teaching and Learnig

Erik Ramos
Universidad Tecnológica de la Mixteca
Oaxaca, México

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Introduction

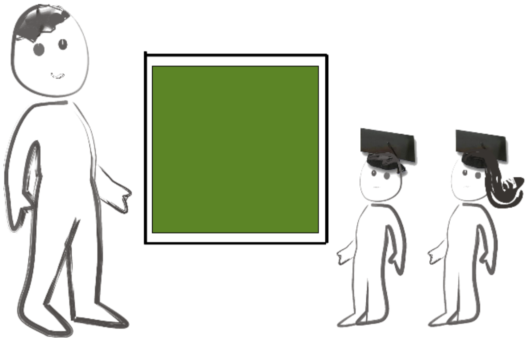
This presentation is about how erlang helps us to build a Teaching and Learning application

Introduction

In real world are a lot of parallel activities

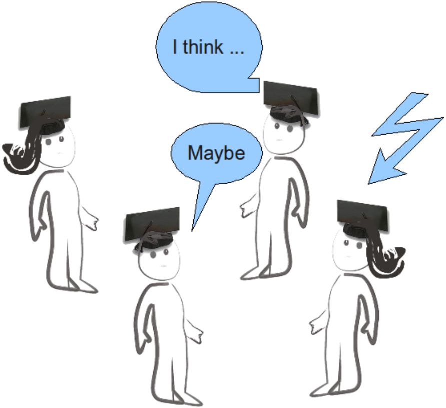
1. House
2. School
3. Office Work

Teaching and learning

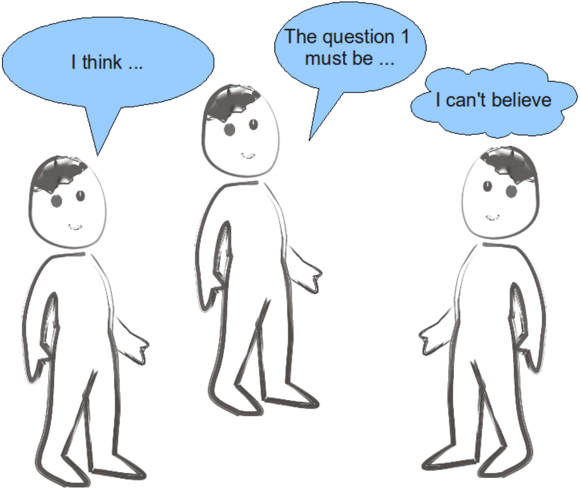


In classrooms are many concurrent tasks

Students meet for do homework

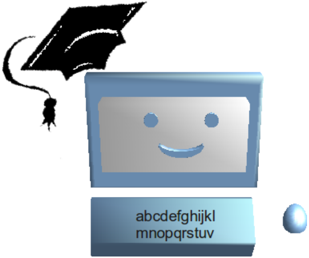


Teachers meet for do a test



Teaching and learning system

The system complements the traditional classroom environment (support some of the concurrent task)



Extreme programming

Why??

- Our customers are our teachers and students
- We can help us with our knowledge and experience
- Rapid prototyping
- We can share ideas in every stage of implementation
- We write only necesary documentation

Declarative Programming

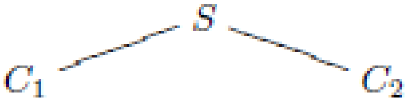
Why??

- Erlang code is close to specification
- Is a good complement to formulate rapid prototyping

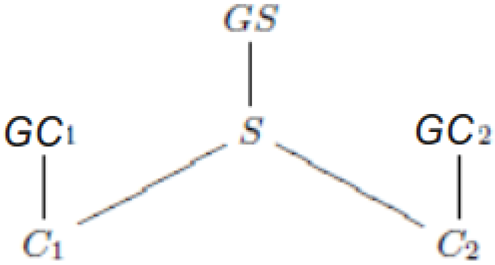
Architecture

- A centralized distributed System
- server is a process in execution from a node
- client is a process requiring the services or resources from the server

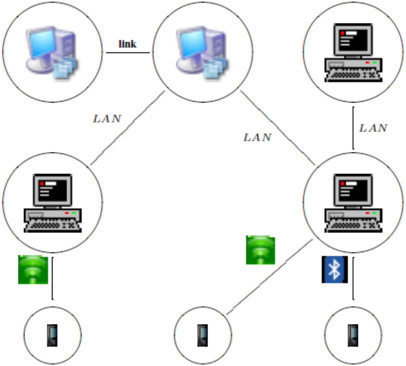
Architecture



Architecture



Architecture



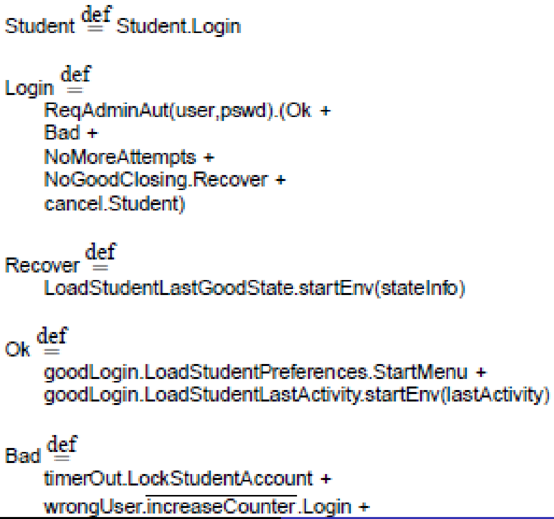
Internal Level

- Useful to characterize the internal flow of actions
- We use CCS Calculus of Communicating System
- We model three special processes: Admin, Student and Teacher
- This approach takes into account the Erlang capacity to generate processes (message-passing)

Internal Level

- Admin: coordinates the overall system by allowing or blocking other processes
- Student and Teacher interact with a human

Internal Level



Student $\overset{\text{def}}{=}$ Student.Login

Login $\overset{\text{def}}{=}$
ReqAdminAut(user,pswd).(Ok +
Bad +
NoMoreAttempts +
NoGoodClosing.Recover +
cancel.Student)

Recover $\overset{\text{def}}{=}$
LoadStudentLastGoodState.startEnv(stateInfo)

Ok $\overset{\text{def}}{=}$
goodLogin.LoadStudentPreferences.StartMenu +
goodLogin.LoadStudentLastActivity.startEnv(lastActivity)

Bad $\overset{\text{def}}{=}$
timerOut.LockStudentAccount +
wrongUser.$\overline{\text{increaseCounter}}$.Login +

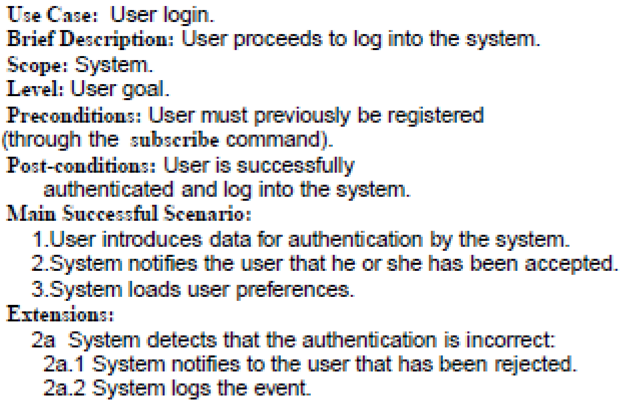
External Level

To specify the system behavior from the external point of view, we use use-case model of the UML

This model represents the interaction among distincs actors (students, teachers or admin)

With use-case we can identify unusual behavior of system and give answer to this behavior

Internal Level



Use Case: User login.
Brief Description: User proceeds to log into the system.
Scope: System.
Level: User goal.
Preconditions: User must previously be registered
(through the **subscribe** command).
Post-conditions: User is successfully
authenticated and log into the system.
Main Successful Scenario:
1.User introduces data for authentication by the system.
2.System notifies the user that he or she has been accepted.
3.System loads user preferences.
Extensions:
2a System detects that the authentication is incorrect:
2a.1 System notifies to the user that has been rejected.
2a.2 System logs the event.

Designing test

- questionSA(question,answer,levelbloom)
- questionTF(question,answer,levelbloom)
- questionMO(question,answer,dis1,dis2,dis3,levelbloom)

Designing test

```
question(Question,optionsN(Options)),sol(Solution).
testTemplateServer() − >
   testExample(comics,
   [
   question(”Which is the color of Homer Simpson?”,
      option3(”Yellow”,”Green”,”Blue”),sol(1)),
   question(”What animal is Donald?”),
      option4(”Mouse”,”Duck”,”Dog”,”Pig”),sol(2)),
   question(”What is the favourite meal of Bugs Bunny?”),
      option2(”Flowers”,”Carriots”),sol(2)),
   ]).
```