UNIVERSITY OF PUERTO RICO AT MAYAGÜEZ

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Panda Code Review

A PROJECT PROPOSAL SUBMITTED AS A PARTIAL REQUIREMENT OF THE COMPUTER ENGINEERING PROJECT DESIGN COURSE ICOM-5047

by:

Nelián E. Colón Collazo - Project Manager
Samuel A. Rodríguez Martínez - Document Editor
Daniel A. Santiago Rivera

For: Professors Nayda Santiago and José Fernando Vega
Course: ICOM 5047
Date: August 27, 2013

Executive Summary

Table of Contents

1. Problem Statement

2. Project Antecedents

2.1 Previous Work Experience

The members of Team Aguacate have known each other for several years, many of which have been spent developing project for several courses and extracurricular activities. They have been together in programming competitions, hackathons and projects, such as the Microprossesor Interfacing course project last semester [1]. These previous experiences have allowed the team to build their teamwork abilities.

Since there are several online judges for programming competitions, such as UVa [2], and since they have been through the experience of having to submit code for programming labs, the team came up with the idea of using something similar to an online judge to facilitate not only their lifes by making an easier tool to turn in programming assignments and getting grades faster, but also the instructor's that have to grade hundreds of these.

2.2 Similar Projects

In 1994, University of Maryland presented Kassandra: The Automatic Grading System [3]. As the title suggests, Kassandra is an automatic grading system that is used for grading assignments in scientific computing. This system is used by students to check the correctness of his/her program assignments. This is achieved by comparing the program output with the expected result. A few years ago, a teaching asssitant (TA) for the Data Structures course and former student at our University, José Santuche, developed a small script that would checkout his students' code, run some tests, compare the output and send an email to the student with the results.

2.3 Our Approach

From the aforementioned projects, Panda Code Review (PCR) integrates correctness checking and privacy awareness. PCR differs from the previous efforts because it is web based instead of a desktop application. PCR aims to provide a complete grading tool that, in addition of correctness checking, it will include code quality checking, in-line commenting capabilities for the TA to put comments if needed, an easy way to upload code, among other distinctive features.

2.4   Project Importance

As stated by previous and current TAs from our University, such as José Santuche, it is important to have an automatic grading tool because they get tired of having to grade the same thing over and over again, it is a slow and annoying process, especially when you have a hundred students. They start looking at all the details, but at some point they just check the output without looking at the code. From the students perspective, the process of submitting code and waiting for a grade is slow and annoying, too. PCR aims to tackle these problems by providing a centralized, web-based system in which students will be able to submit their assignments and it will automatically grade them based on test cases submitted by the TA or professor and the quality of the code. Our project will incorporate the use of repositories, a tool that is not much used in our University, so that it also helps students to learn how to use new technologies.

2.5   Standards and Regulations

Since our tool will manage student data, it needs to be secure and private.

3. Objectives

3.1   Objectives Outcomes and Metrics

To achieve the code review system, the team will accomplish the following objectives in the next 2 months:

- Create a web application front end interface.
- Create a testing framework.
- Create a code quality framework.
- Create an accounts and repository module.
- Create a Backend API for communication between the front end and the quality and testing frameworks.

3.2   Deliverables

The deliverables for this project will be a cloud based web application with the featured Code Review tool. TA and Student accounts will be able to be created by the client, and it will be able to be used immediately after launch.

4. Managerial Approach

4.1   Meetings and Work Hours

Team Aguacate will weekly stand-up meetings on Tuesdays from 3:00 pm to 4:00 pm to discuss progress and project details. In each meeting, each member will state their progress, any needs he/she might have and if their schedule has changed. Work hours on assigned tasks will occur every Monday, Wednesday, and Friday from 9:30 am to 11:20 am unless there is a seminar scheduled for that day. Other work hours will be every possible day from 6:00 pm to 9:00 pm, minimum. The team will work on sprints, so a sprint planning meeting will occur on Thursdays from 3:00 pm to 4:00 pm whenever a new sprint comes. Meeting agendas a minutes will be posted in our blog: `http://pandacodereview.wordpress.com/`.

4.2   Team Management

The meetings will be as described above and other meetings will be scheduled when needed. One of the purposes of these meetings is to make sure that each team member is aware of the other members' progress and concerns. Changes to these hours are to be discussed and decisions will depend on majority vote and team leader opinion. Each member will work in at least two modules. Each task will have a leader and an assistant. The leader of each task is responsible for it and the assistant will assist whenever the leader gets stuck.

4.3   Testing Restrictions

4.4   Documentation Standards

See Appendix C to see documentation standards.

5. Schedule

A Gantt chart showing the project schedule is included in Appendix A

6. Personnel

6.1 Skills Required

Table 1 shows a list of tasks for our project. Each task has a lead and and assist, which is also shown in that table. For a more detailed list of requirements and task distribution see Appendix E as well as the Gantt Chart included in Appendix A.

Table 1: Task Distribution

Task Title	Nelián	Samuel	Daniel
Project Management and Team Organization	Lead	Assist	
Web Frontend		Lead	Assist
Backend Server		Assist	Lead
Test Framework	Assist		Lead
Accounts & Repositories	Lead	Assist	

6.2 Training Needs

For the development of this project, the members of the team are responsible of learning about the new technologies they have to work on, self train themselves and ask for help when needed.

6.3 Consultancy Resources

- Front-End Web Development
  - Consultant Expert: César Andreu
- TA needs
  - Consultant Expert: Jesús E. Luzón
- Database Management and Web Development
  - Consultant Expert: Dr. Manuel Rodríguez

6.4   Legal Requirements and Conditions

For this project, there are no legal requirements or conditions related to personnel needed for the project.

7. Resource Requirements

7.1   Required Resources

Software Developers Computer Workstations (3 Minimum) Internet Connection Hosting servers for cloud infrastructure (Amazon EC2)

7.2   Resources Provided by UPRM

Software Developers Computer Workstations Internet Connection

8. Budget

Accurate estimates of cost is extremely important for ensuring that the team does not go over budget. Since this is a software project, the cost is very low as long as computer workstations and an internet connection is provided.

8.1   List of Components

- Workstations * 3

8.2   Project Cost

8.2.1   Human Resources

Table 2: Human Resources

Employee	Position	Annual Salary	Hourly Wage	Hours per Week	Working Weeks	Payment
Nelián	Project Manager and Software Engineer	$55,000	$26.44	20	15	$7,932.69
Samuel	Software Engineer	$45,000	$21.63	20	15	$6,490.38
Daniel	Software Engineer	$45,000	$21.63	20	15	$6,490.38
					Total	$20,913.46

9. Assessment Methods

To help manage the project and collect information on each member's individual progress on their tasks, the project manager decided to use Zoho Projects. This tool allows to divide tasks. It also helps to know which tasks are still to be completed, and lets each user specify how much they have progressed in a specific task. The team will also have a Git repository where all the code that has been written will be stored, so that progress can also be measured from the amount of code already written. Project reports will also reside in a Git repository. Our team will work in sprints and each task will have a weight according to their priority, which will be decided in the sprint planning meeting. Project progress can also be measured by the weight of the tasks done.

10. Risk Management

Table 3: Work Distribution Table

Risk	Probability	Impact	Actions
Loss of Data	Low	Low	Backup repository will be used to store code and data. Images of VMs will be on the cloud.
Developer's Workstation Breaks	Medium	Medium	University's computers will be used instead. If necessary and budget allows it, developer buys new workstation.

Risk	Probability	Impact	Actions
Hosting Infrastructures Goes Down	Low	High	Work will still be performed on local workstations and as soon as infrastructure is back online, deployment is done with never version.
Natural Disaster	Medium	Low	Using revisioned repository each developer can safely work remotely. If possible, online meetings will be held.
Team Member Gets Sick	Medium	Medium	If team member is unable to work, task distribution will be delegated considering tasks priorities and their ability to block other tasks.
Team Member Withdraws From Class	Low	High	Agreement has been reach that if team member withdraws from class they must still collaborate on the their respective project part. If unwilling to cooperate, task delegation will have to be performed. Higher working hours will be needed.
Out of Budget	Low	Medium	Funding will be needed from different source. Team's personal money will be used as last resort.

11. Impact

We aim to impact Educational Institutions, specifically Computer Science instructors that have to manually evaluate code submitted by students. We will impact such community by providing an easy to use solution that will save them time and money when evaluating students codes. In the long-term we will also increase the students skills in programming areas by giving recommendations on their codes referencing well proven standards and patterns. Moreover by making instructors save time they can be more engaging in other activities involving the students. From a different perspective, we will also decrease the chances of computer viruses being spread trough the old evaluations methods.

12. Market Overview

12.1   Potential Customers

12.2   Current or Potential Competition

12.3   Competitive Advantages

13. References

[1] A. Ildefonso, D. Santiago, N. Colón, and S. Rodríguez, "Wavesphere." `http://www.ece.uprm.edu/micro2/index.php/WaveSphere`, 2013.

[2] "Uva online judge." `http://onlinejudge.org`.

[3] urs von Matt, "Kassandra: the automatic grading system," in *ACM SIGCUE Outlook*, vol. 22, pp. 26–40, jan. 1994.

Appendices

A. Schedule

B. Team Aguacate Members Biographies

B.1 Nelián E. Colón Collazo

Nelián E. Colón Collazo was raised in Orocovis, Puerto Rico. She is a senior student currently pursuing her bachelor's degree in Computer Engineering at the University of Puerto Rico at Mayagüez. Nelián has a passion for programming, that's why she is currently specializing in Software and is always participating in programming competitions. She has been involved in undergraduate research both in her University and in the University of Texas at El Paso, and has done two summer internships at Honeywell Aerospace and Harris Corporation. Nelián also likes to be involved in leadership positions. She is currently the ACM-ECE's treasurer and the Tau Beta Pi - PR Alpha's Computer Engineering Representative. Appart from being a programmer, Nelián is also a musician. She plays the Puerto Rican Cuatro and Tiple with her well-known father, Edwin Colón Zayas.

B.2 Samuel A. Rodríguez Martínez

Samuel A. Rodríguez Martínez was born Chicago, IL, United States of America. He moved to San Juan, Puerto Rico when he was 2 years old. While at San Juan he developed his passion for software development, and enrolled for a Computer Engineering B.S. degree at the University of Puerto Rico at Mayagüez. While at the University he has been involved in undegraduate research, and was given the opportunity to perform an undegraduate research project at the University of California at Berkeley. He has also done two internships at Google Inc. in Mountain View, CA, and is currently finishing his final year at the University.

B.3 Daniel A. Santiago Rivera

Daniel Santiago is currently a computer engineering student at the University of Puerto Rico, Mayagüez. He is passionate about programming and interested in mobile, backend,

and web development. Daniel likes working with emerging technologies such as Node.js and MongoDB. In his free time, he enjoys cooking, running and assembling gaming computers.

C. Documentation Standards

C.1 Web Application

C.1.1 General Standards

Application must meet the following general standards:

- Must be easy and intuitive to use for the targeted audience.
- Must use styles that are consistent throughout the application and withing the associated website.
- Must function in a logical manner for the targeted audience.
- Must adhere to industry best practices.

C.2 Minimum Browser Standards

Web application must function and display properly in the x browser versions.

C.3 Application Testing

Web applications and sites must be thoroughly tested in all required browser versions. They must be thoroughly tested in screen resolutions of 800 x 600 and 1024 x 768.

C.4 Database Standards

?

D. Project Cost Details

E. Required Skills

Table 4: Task and Skills Matching

Task Title	Skills Required	Lead	Experience
Project Management and Team Organization	People skills and leadership	Nelián	Leadership positions in student organization, previous projects leader
Web Front-end	Knowledge of HTML, JavaScript, graphics and web standards	Samuel	Google internship experience in front-end web development
Back-end Server	Knowledge of HTTP and Restful API, MongoDB and Node.js	Daniel	Freelance projects, hackathons and past internship experiences exposure to emerging web technologies
Test Framework	Knowledge of test driven development with code standardization and Coverage, compilers, processes and threads	Daniel	Past internship experience was exposed to code quality and performance analysis
Accounts & Repositories	Knowledge of repositories and Data Bases	Nelián	Took Data Bases course and have use different repositories