E-learning Tool for Basic Programming

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Brief Description of project background

◇ Learning how to code is becoming necessary day by day. Students are now more interested to learn programming than the past. Recently ICT has become a compulsory subject for high school students.

◇ Learning programming as a beginner can be tough. Programming is a whole new concept with which students get introduced. Amount of good tutors who are capable of teaching programming is negligible. This is the main area we cover by introducing the young stars with programming in a interesting manner.

◇ The required resources are often hard to find and learning them is not easy. Moreover, the typical tutorial videos seems to bore young minds.

◇ Lack of visualizing of what is happening in the program is one of main issue. Unlike other subjects, visualizing is quite important for the flow of programming.

◇ We need an interesting way to introduce the art of programming to the learners to have a head start on their long journey!

Project Objective

◇ Helping beginner programmers learn to code in a happy way.

◇ Making programming less frightening and easy.

◇ Creating an application where user can learn programming through writing code and playing with it.

◇ Developing a system for visualizing a program.

◇ Create a collection of programming resources.

◇ Compiling, testing and validating code.

◇ Simulating code on various tests and show the visualization to the user.

◇ Developing a system to show performance of the user and comparison with other users.

◇ Making this application the user's own personal programming tutor and tester.

Benefits of the project

◇ Beginning programmers would be able to learn programming in a easy way.

◇ Collection of tasks for which user can write program. These tasks will help the user learn and evaluate his programming skill.

◇ Open source system, means it can be further developed by others. It will have GPL license. GIT will be used for versioning control.

◇ Give the user a collection of resources for learning programming.

◇ A programming learning companion for the beginner programmers.

Project scope

The project scope covers:

◇ Collection of various programming resources.

◇ Collection of programming task, compiler and testing data.

◇ Implementation of the system

       a. Implementation of resource archive

       b. Implementation of a system to write code for specific tasks.

       c. Implementation of a system to visualize a program.

◇ Demonstration of the project.

Tools / Platforms

Front End

- HTML5
- CSS3 (Bootstrap)
- JavaScript
- jQuery
- Angular

Back End

- PHP5
- MySQL
- Amazon Web Service (AWS)

Tools / API

- Google API
- Facebook Graph API
- xTerminal
- Netbeans
- PHPStorm

Design Pattern

SRP
Single
Responsibility
Principle

OCP
Open
Closed
Principle

LSP
Liscov
Substitution
Principle

ISP
Interface
Segregattion
Principle

DIP
Dependency
Inversion
Principle

S.O.L.I.D. is a mnemonic acronym that stands for five basic principles of object-oriented programming and design. We choose **S.O.L.I.D.** to develop the application so that it is easy to maintain and extend over time.

Learning Outcome

◇ Understand modern approaches of human-computer interaction mythologies.

◇ Apply S.O.L.I.D. design pattern on practical applications.

◇ Design systems as a team with researches.

◇ Documenting and reporting as necessary.

◇ Achieve targets according to timeline using version controlling.

◇ Implement designs using programming languages in a precious way.

◇ Software components testing and integrating.

◇ Developing open source software and handling feedback.

◇ Face scalability, heterogeneity, failure handling and openness in real life applications.

Deliverables of the project

◇ Web Application (for all possible platforms)

◇ User manual

◇ Developers manual

◇ Documentation

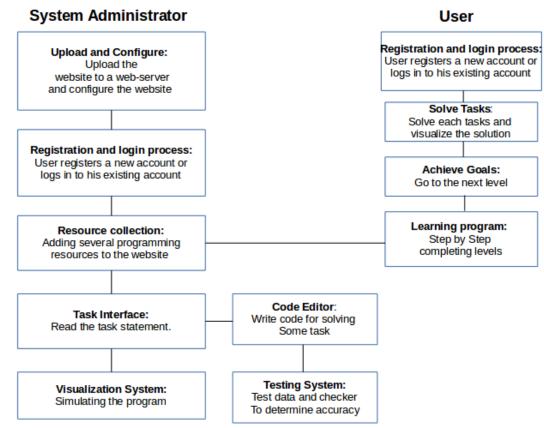◇ Publishing Source Code under the General Public License(GPL)

Test plan for the proposed project

Testing methods are carried out along the development period, especially after integration. The system should be totally debugged during the testing stage. The following testing areas should be carried out.

◇ Verification testing – Ensures that correct requirements are gathered and they are up to date.
◇ Unit Testing – Each and every module in isolation is tested. Ensures that each function is working properly, data structures are used correctly.
◇ Integration Testing – Top-down testing is carried out.
◇ System accuracy test – After the development of whole system, it is tested with data to check the speed of processing, accuracy and correctness of results.
◇ System stress testing – The stability and performance of the system will be tested and also detect bugs and errors which allowing system to fail. This ensures that system fail does not result in data corruption.
◇ User acceptance test – the system is given to selected users and allows them to use with real customer data for some period of time to ensure that users are able to use the system and find it useful.
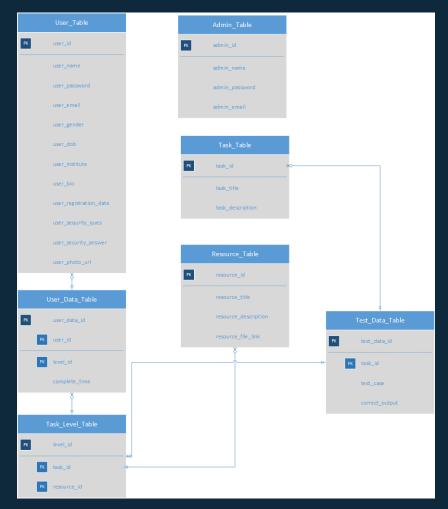
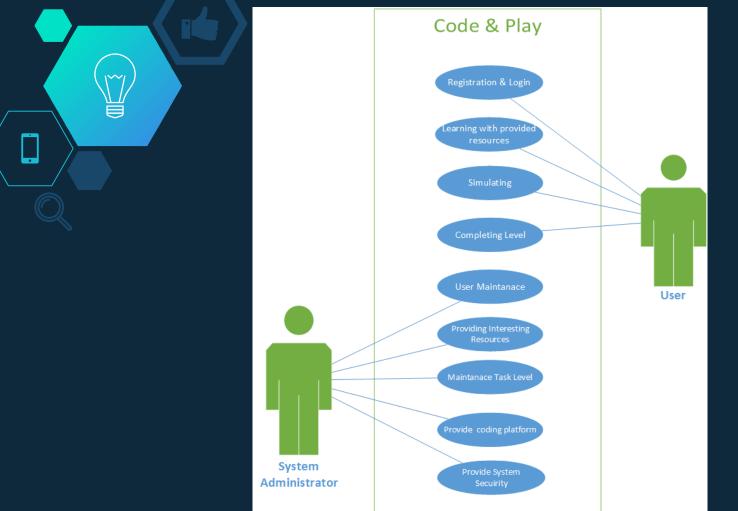Their satisfaction level and feedback will determine the result of the test.

System Overview

Database Class Diagram

Use Case Diagram

		Task Name	Start Date	End Date	Duration	Q1			Q2			Q3			Q4			Q1			
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1		Project Identification	01/05/15	01/14/15	8d	Project Identification															
2		Feasibility Study	01/10/15	01/20/15	8d	Feasibility Study															
3		Primary Research	01/21/15	02/27/15	28d		Primary Research														
4		Documentation	02/03/15	11/23/15	210d			Documentation													
5		Analysis and Design	02/11/15	05/13/15	66d			Analysis and Design													
6		Implementation	08/01/15	11/04/15	69d								Implementation								
7		Testing	09/09/15	11/27/15	58d									Testing							
8		Demonstration of Final Project	11/25/15	12/03/15	7d											Demonstration of Final Project					

Gantt Chart

Future Plan

◇ User chatting system

◇ User ranking

◇ Development of RESTful API

◇ Development of user role identifier

◇ Automation of discussion forum for every single tasks

Conclusion

◇ We develop open source application that can be modified or upgraded by anyone under General Public License (GPL).

◇ We follow S.O.L.I.D design pattern for enhancing modular methodology implementing the project.

◇ We use version controlling system GIT to make the developing more effective.

◇ The application will be highly scalable. We utilize cloud computing of Amazon Web Service to deploy the application.

References

Special thanks to all the people who made and released these awesome resources:

- ✓   https://aws.amazon.com/
- ✓   https://angularjs.org/
- ✓   http://sololearn.com/
- ✓   http://php.net/
- ✓   http://campus.codeschool.com/
- ✓   http://www.codecademy.com/

Thank You