AEROENGINE CLOUD

Senior Project, Spring 2014

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Current System and Problem

- **General Problem Statement:**
  - International Aircraft Engine Association is formed as a global collaboration platform for manufacturers, operators, lessors, and maintenance providers.
  - IAEA's main focus is to integrate the industry on a single global e-commerce cloud platform to share information about every aspect of the business.
  - Individual elements and listings exist today at various sites in a more general aviation level and not aircraft engine specific.
- **TurbineEngine.org:**
  - The current system is very limited and lacks several key components found in today's aviation trading sector.
  - Database is not operational, therefore record keeping and control is practically impossible.
  - Aircraft Engine Marketplace exists but require members to contact the administrator directly.
  - Existing "Contact Admin" form is prone to constant spambot attacks.

Figure 1: Current TurbineEngine website.

Implementation

Figure 5: Developer tools.

- **Widely stable technologies used:**
  - jQuery: Simplifies client side scripting, great for handling events, animations and advanced effects. The contact member function was one of the most important functions developed using jquery, as I needed a way to send messages without refreshing the page.
  - Bootstrap: Twitter front-end framework for developing responsive applications; support most browsers (Chrome, Firefox, IE, Safari). Very customizable and compatible with HTML5/CSS3. Provides mobile support. The front end main layout, tables, buttons were created with this framework that allowed us to provide the users with a professional and sleek design.
  - Codeigniter: All scripting PHP code was developed with Codeigniter. It's a framework with a very small footprint; no installation necessary, fast performance. Works well with both PHP4/PHP5 and provides built in security tools.
  - Xampp: Cross platform developer package which installs vital web server parts like Apache server, PHP and MySQL all at once.

Screenshots

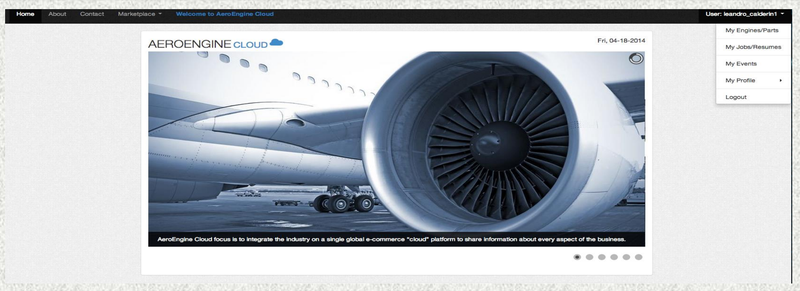

Figure 6: AeroEngine Homepage.

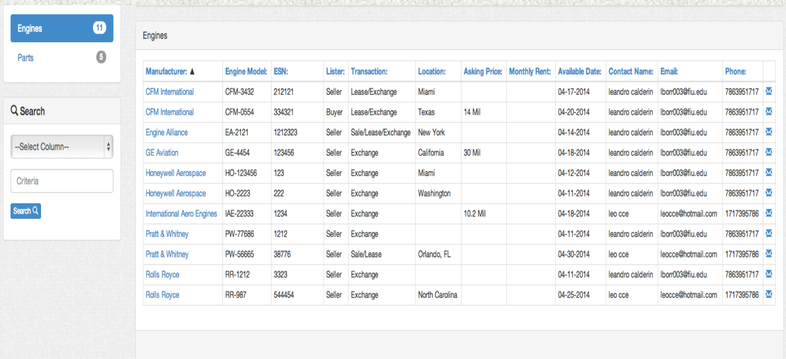

Figure 7: AeroEngine Engines/Parts Marketplace.

Requirements

- **Requirements as a web developer:**
  - Provide a fairly simple but professional graphical layout.
  - Provide a live CRUD (create, read, update, delete) listing system for engines and parts.
  - Provide a quick member-to-member and member-to-admin messaging system.
  - Provide a Marketplace system for members to browse and/or search engines and parts listings.
  - Provide a generate pdf function that will allow members to create their own newsletters.
  - Provide an upload function that will allow members to save documentation for a specific engine or part.
- **Use Cases related to engines and parts subsystem are:**
  - ECS-010 Add Engine
  - ECS-011 Delete Engine
  - ECS-012 Edit Engine
  - ECS-013 Contact Member for engine or part listing
  - ECS-014 Add Engine Part
  - ECS-015 Delete Engine Part
  - ECS-016 Edit Engine Part
  - ECS-017 Search For Part/Engine
  - ECS-018 Export Engine Listings

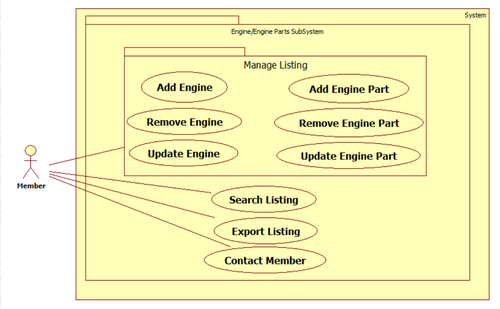

Figure 2: TurbineEngine use case diagram.

System Design

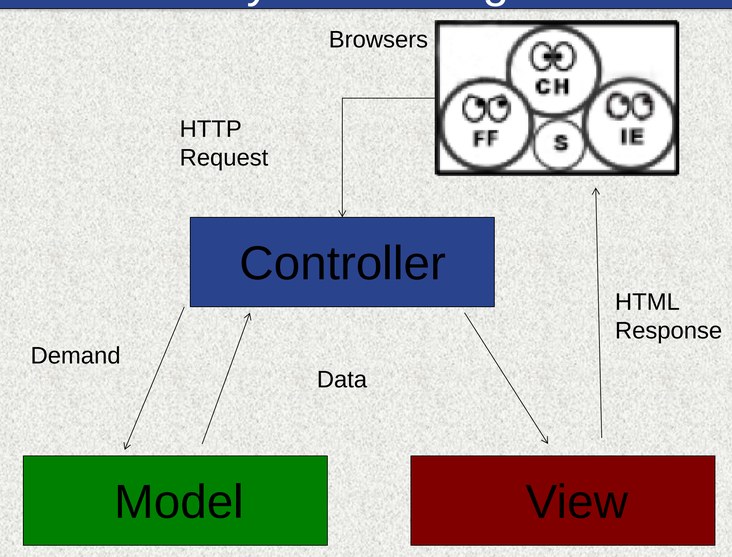

Figure 3: MVC pattern.

Object Design

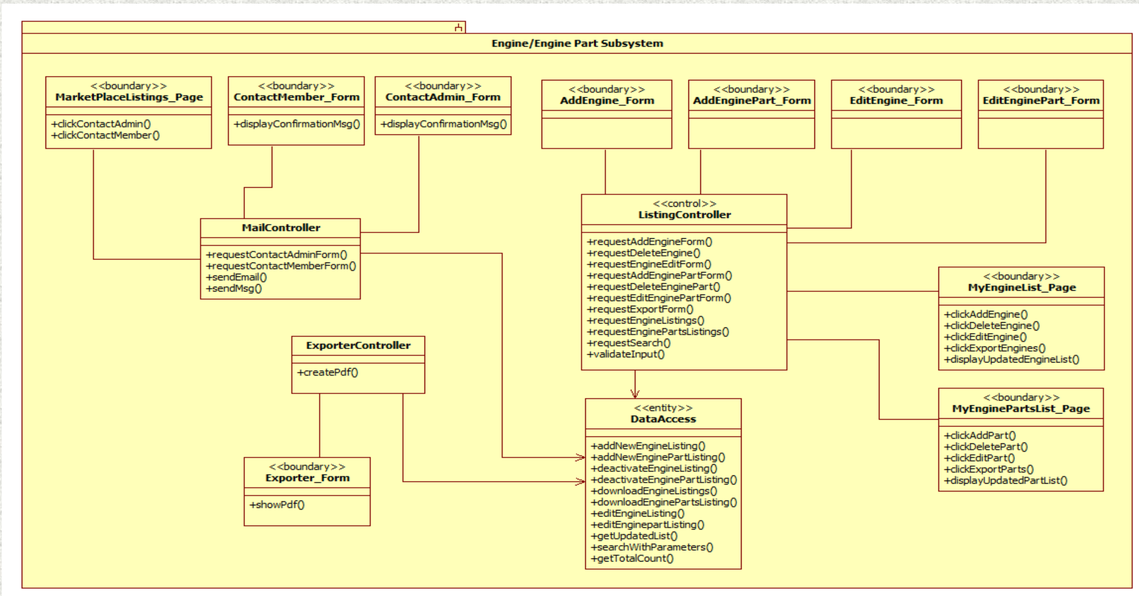

Figure 4: Class Diagram.

Verification

- Unit Testing for Engine and Parts subsystem was mostly performed manually. One function from the email controller was indeed unit tested using a function created with preset values.
- Integration Testing was conducted using Bing Bang approach. Overall system testing was conducted manually by mentor/client and team members. The mentor was given remote access to the system in which he tested all different functionalities with satisfactory results.

Test Name	testing sendmail function
Test Datatype	Array
Expected Datatype	Bool
Result	Passed
File Name	/Applications/Xampp/htdocs/aeroenginecloud/app/AeroEngineTest/controllers/email.php
Line Number	64

Figure 8: Unit Test for sendemail function.

Summary

- AeroEngine cloud is the solution for integrating the industry on a single e-commerce cloud platform. Phase one of development is to establish the structure with a simple professional graphical interface and a solid foundation providing important basic functionalities to operate the website.
- My solution to this problem was to develop a subsystem that extends the functionality of the current system.
- The Engines and Parts subsystem provide CRUD functionalities that facilitate members the listing of engines/parts for sale, lease and trade.
- The Engines and Parts subsystem facilitate members the search for specific engines and parts, as well as the communication with other members, for business opportunities. The subsystem will allow members to upload documentation as proof of ownership for engines and parts listed.
- Future releases may extend the subsystem by implementing an upload csv for the listing of parts and a bid system.

Acknowledgements

The material presented in this poster is based upon the work supported by Dr. Hooman Rezaei. I am thankful for the help that I received from my group members, Jerry Flores, Fernando Diaz, and Yishi Liu.