Danfoss Enterprise Layered Process Auditing

Project Plan

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Zach Carlson

Jamie Countryman

Mitch Valenta

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Overview

Problem Statement

In this project, our group will design and implement a web application to simplify and centralize Danfoss' auditing process. The current process lends itself to time-consuming or incomplete audits with too many possible points of failure. Simplifying this process will allow audits to be completed quicker with more flexibility, creating a safer workplace and higher-quality work output.

Deliverables

First Semester
- Documentation of auditing process flow
- UI prototype

Second Semester
- A working web app
- A database backend to support the web app.

Specifications

Auditing system must work for both PC and iPad platforms. This allows for mobile completion on the shop floor as well as in the office. The code should be developed using Stylecop standards.

System Requirements

Project Requirements
- Ability to answer audit questions
- Automatic selection of auditors with defined rotation
  - Select from list with managers, directors, and guests in defined rotation
  - Guest can be inserted at random and does not change the rotation
- Automatic notification by e-mail to auditor of upcoming audit
- Automatic notification by e-mail if audit is not complete when due
- 'Base' audit for to use when starting audits in a cell/area
- List of questions for audit by category to select when changes to the audit are desired by a cell/area
- How and where defined for questions
  - How to determine answer to question
  - Where to look for information to answer question
- Dropdown list of responses to audit questions
  - Automatic tracking of individual audit questions
    - Automatic notification when audit question competency is reached
  - Automatic tracking of total audit score (chart)

- Number of 'no' responses is limited on each question
- Standard work to be audited displays the current standard work from Navigator
- (optional) Capability to save audit progress

Assessment of Proposed Solution

The following is an assessment of this proposed solution by highlighting various strengths, weaknesses, and trade-offs of this system.

Strengths:
- The Danfoss Auditing system will make data results easier to process and view.
- More audits will be completed.
- Audits will be completed on time with use of email notifications.
- The entire process of completing an audit can be completed faster.

Weaknesses:
- Users may have to be trained with using this software.
- Have to have a computer or iPad in hand to complete an audit.

Trade-offs:
- Before, the admin would enter in results by hand and create a graph.
- Completing an audit through software takes away the hassle of printing, filling it out, and then scanning it to be sent electronically.
- May not have paper records of audits.
- Software is more intuitive than filling out a paper document.

Validation and Acceptance Test

We will validate our progress with our client by reviewing the requirements checklist they specified and have them ensure that each one works correctly. Each requirement listed below has a specific acceptance test that will validate the requirement is complete. This will be done iteratively according to the schedule. Various time constraints in the acceptance tests below will be determined by the client.

Requirement	Acceptance Test or Fit Criteria
Ability to answer audit questions	Verify that the Danfoss Auditing System will save answers to audit questions into the database as well as provide an interface to answer questions
Automatic selection of auditors with defined rotation	Verify that the Danfoss Auditing System will provide a list of auditors and will automatically select a defined rotation based on the time constraint given
Automatic notification by e-mail to auditor of upcoming audit	Verify the Danfoss Auditing System will send an email notification before an audit based on the time constraint given by sending test

	notifications to a potential user of the system
Automatic notification by e-mail if audit is not complete when due	The Danfoss Auditing System will send an email notification after an audit is due based on the time constraint given by sending test notifications to a potential user of the system
'Base' audit for to use when starting audits in a cell/area	Check to see that a user starts in a 'Base' audit when starting in a cell/area
List of questions for audit by category to select when changes to the audit are desired by a cell/area	Check with the client that the Danfoss Auditing System accurately displays a list of questions for the audit by category
How and where defined for questions	Verify that the Danfoss Auditing System provides a tooltip or popover information module to display helpful hints on where and how to answer the specific audit question
Dropdown list of responses to audit questions	Verify that the Danfoss Auditing System provides a dropdown list of responses to appropriate audit questions
Number of 'no' responses is limited on each question	Run a check that the user is given a message stating that the limit of 'no' responses after responding a specified number
Standard work to be audited displays the current standard work from Navigator	Verify that the Danfoss Auditing System correctly displays the current standard work from the Navigator by comparing the data

Interface / System Description

Listed below are UI Mockups of high level parts of the Danfoss Auditing System. It covers the Administrator dashboard and completing an audit. The look and feel of the system is subject to change once the Danfoss standard project setup is in place. Figure 1 displays Pending Audits and Completed Audits which is available to all users, not just administrators.
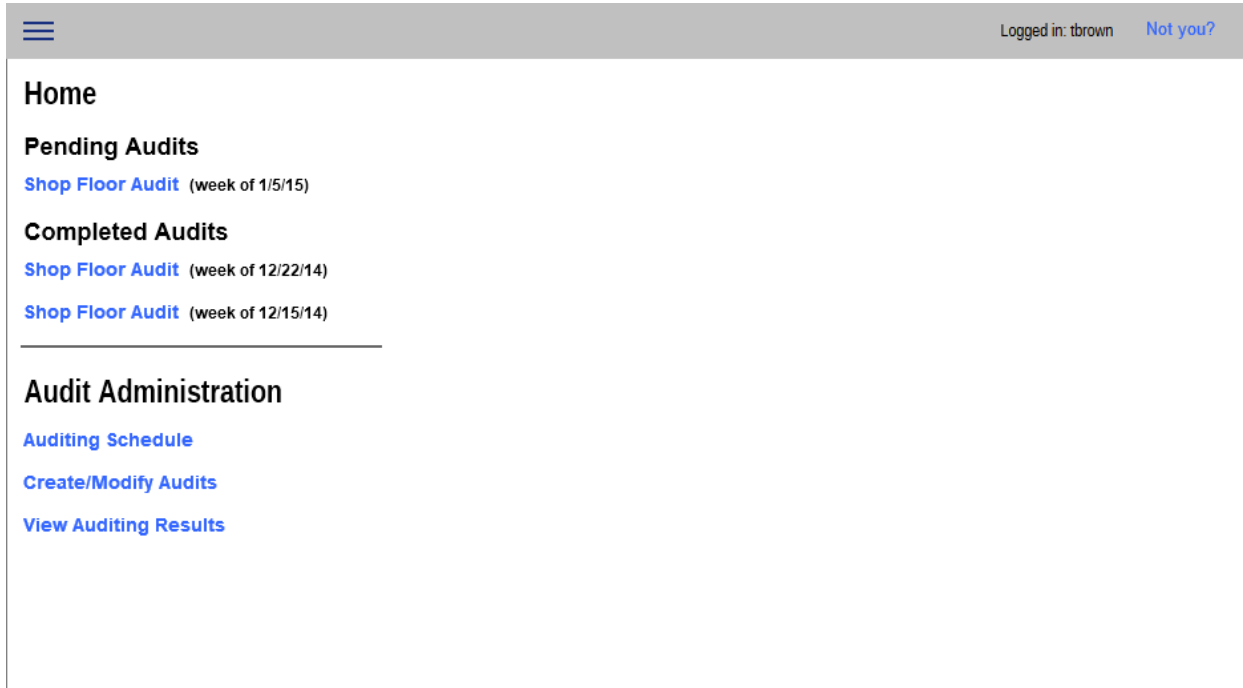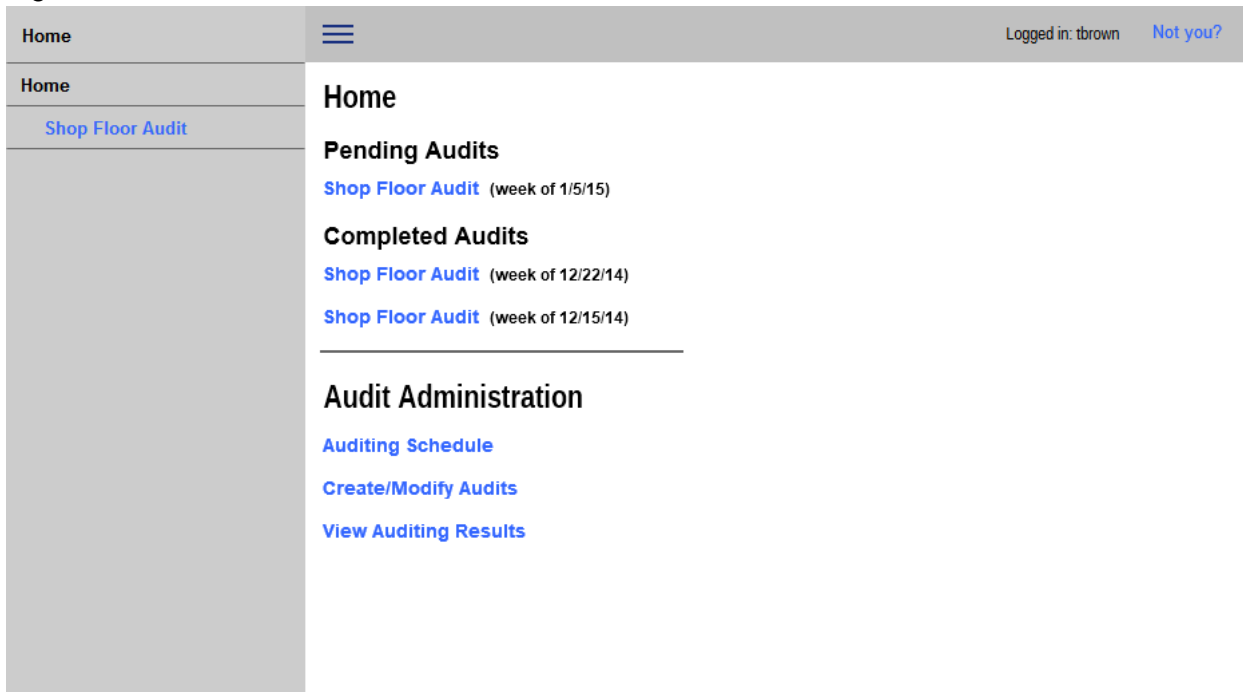
Figure 1 - Administrator Dashboard

Figure 2 - Administrator Dashboard with Menu

Figure 3 - Completing an Audit

Figure 4 - Completing an Audit with Menu

Non Functional Requirements
- Responsive design supports both desktop and tablet screen sizes
- Automatic picture based results
- Dropdown list of response to audit questions

Technical Approach
The system will provide accurate feedback of audit results after finishing an audit. This will include SSRS to process the data and represent the results in visually appealing graph. Each section of the audit process will be split up into a hierarchy and have set scores. Each question will be on its own page and clicking next will take the user to the next page and question.

Test Plan
This project will utilize unit testing during development (through [NUnit](#)), aiming for 70% code coverage. Unit tests will be supplemented by functional and implementation testing to ensure usability of common use cases.

Work Breakdown

Cost Considerations

Resource	Source	Estimated cost
Visual Studio with Microsoft SQL Server	Provided by ISU through Dreamspark	N/A
StyleCop	Open Source	N/A
Development web server	AWS/Microsoft Azure	Free
Apple iPad	Provided by Danfoss	N/A

Project Schedule

Fall 2014	August 25th	Dec 12th
Task	Start	End
Requirements gathering	Sept 1st	Sept 12th

Project Plan	Sept 22nd	Sept 29th
UI Designs	Sept 22nd	Oct 17th
-Main Design	Sept 22nd	Oct 17th
-Login Design	Sept 22nd	Oct 17th
-Admin Design	Sept 22nd	Oct 17th
-Tablet Interface	Oct 18th	Nov 10th
-Report design	Oct 18th	Nov 10th
Prototypes	Nov 10th	Dec 12th
-Full Prototype	Nov 10th	Dec 12th
--Login	Nov 10th	Nov 21st
--Admin	Nov 17th	Nov 28th
--Reporting	Nov 24th	Dec 12th
Database setup	Nov 10th	Dec 12th

Risks

Risk	Probability of occurrence	Criticality (1-100)	Risk factor (prob * criticality)	Mitigation strategies
Essential requirements are missed	.4	80	32	Re-identify requirements with client frequently
Program doesn't interface with customer hardware	.2	90	18	Ensure development environment matches production environment
Program will need changes post release	.9	10	9	Provide thorough documentation and match clients code style (stylecop)

Market/ Literature Survey

Similar auditing systems are available for purchase from a number of other companies (such as Intelex and MKinsight). They provide more powerful functionality at the cost of complexity.

Conclusion

This web application will simplify and centralize Danfoss' auditing process. It will provide an easy to use question system and result analytics. Notifying users to complete an audit will result in higher completion rate than before. Editing current questions will be easier than the current system in place.