

Software Development Pension Calculator

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About

- Redesign a pension calculator for the Massachusetts state employees
- Most visited site on mass gov
- **Client:** Massachusetts State Retirement Board (MSRB)
- **Problem:** Current calculator does not have a modern look and feel and is difficult to navigate

Requirements

1. UI must have a modern look and feel
2. Instructions and calculator must be on the same page
3. The two calculators, one for employees who began work prior to April 2, 2012, and for one the rest, should be combined to one
4. The code must be better documented and modularized to facilitate easier updates in the future.
5. The information should be generic for all users. It would be helpful if the calculator could retrieve employee information from the database, such as employment start date, to create a more realistic pension estimate.

Additional Goal:

6. Add multi-job support to increase computation accuracy.

Current Calculator

Please Read and Agree Before Continuing

I understand that the information and/or calculations displayed on this site do not necessarily reflect the actual amount of my retirement allowance. The results provided by this calculator are approximations and should not be considered as the final determination of my retirement benefit. They should not be relied upon for planning purposes.

This calculator provides estimates for members entering service **BEFORE April 2, 2012**.

☐ I Agree, continue filling out form

1. **Select and Enter** your date of birth

Month Select Month Day Select Day Year(yyyy)

2. **Select and Enter** your projected date of retirement

Month Select Month Day Select Day Year(yyyy)

3. Select a group number 1, 2 or 4 Group Number 1

4. Are you a military veteran? Non-Veteran

5. **Select** your estimated total number of years of creditable service, including any purchased service or may be eligible to purchase, as of your projected date of retirement (for example, 10 years and 2 months) 10 Years of Service 0 Month

6. **Enter** the estimated average of your highest **thirty-six consecutive months** of annual regular compensation. (omit \$ sign, commas; for example 32000 or 102900.98) \$

7. **OPTIONAL:** If you are interested in estimating your benefits under **Option C**, please **select and enter** Date of Birth or select your beneficiary's age on the birthdays that are closest to your date of retirement. **Reminder: Your Option C beneficiary must be your spouse, child, sibling, parent or former spouse who has not remarried.**

☐ Check here to calculate by date of birth

Month Select Month Day Select Day Year(yyyy)

or

Demo Time!

Sprint One

1. Requirements
2. Use Cases
3. Front end digital mockups
4. Selecting technology stack

Technology Stack



spring

by Pivotal™



PostgreSQL



Java™



heroku



HIBERNATE

Sprint Two: Setup

1. Created database on Heroku
2. Deploy application on Heroku
3. Set up basic spring boot project
4. Set up Jenkins



Sprint Three: Development Begins

1. Back-end services, POJOs
2. Basic front-end templating and controllers
3. Database population and connection to Spring Boot Project
4. Connected front-end and back-end.

Sprint Four: Finalize Project

1. Responded to comments from client demo and feedback from testers.
2. Add support for Option C
3. Multi-job support
4. Created data access objects using hibernate

Response to Feedback

From client:

- Replaced question mark with “More information” button.
- Added progress bar.
- Ensured you cannot jump to calculation page without agreeing to disclaimer.

From user testing:

- Made back button more noticeable.
- Removed update button for each job on the check page

Sprint Five: Touch-Ups

1. Users can now autofill data from the database
2. Added form validation
3. Styling using Mayflower pattern library
4. Evaluated code to maximize test coverage

Accuracy

Calculation from Guide

Calculation:

$(\text{Age Factor})(\text{Years of Creditable Service})(\text{Salary Average}) = \text{Total Option A Annual Allowance}$

Group 2: $(.025)(10)(\$50,000) = \$12,500$, (1,041.67 per month)

Group 1: $(.020)(20)(\$50,000) = \$20,000$, (\$1,666.67 per month)

Both calculations are added together, not to exceed the maximum of 80% = 32,500 annual benefit

Veteran's Premium: \$300.00

Total Annual Option A Allowance: \$32,800 (\$2733.33 per month)

Old Calculator

RETIREMENT ESTIMATES:

Option A.

1. Annual Allowance: \$ 37,800.00

2. Monthly Allowance: \$ 3,150.00

3. *Beneficiary Annual Allowance: N/A

Option B.

1. Annual Allowance: \$ 37,425.00

2. Monthly Allowance: \$ 3,118.75

New Calculator

Option A - No Survivor Benefit

Annual Allowance

Monthly Allowance

\$32800.00

\$2733.33

Option B - Protects Your Annuity

Annual Allowance

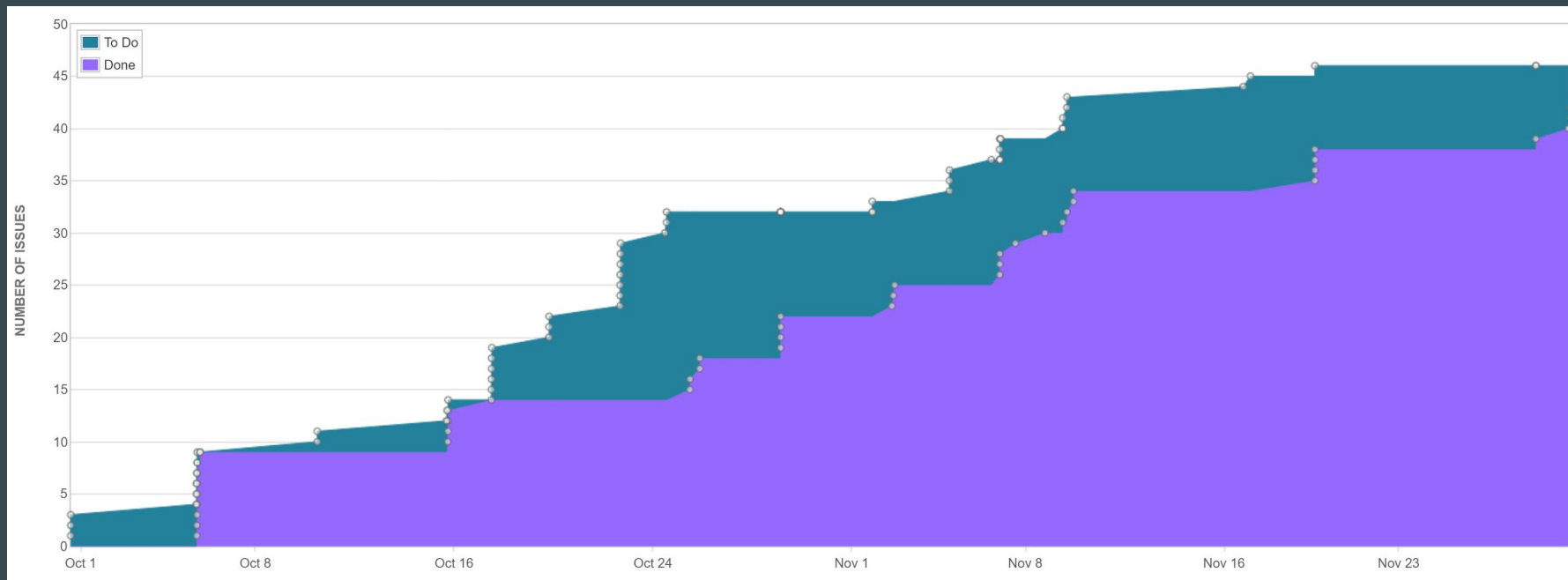
Monthly Allowance

\$31816.00

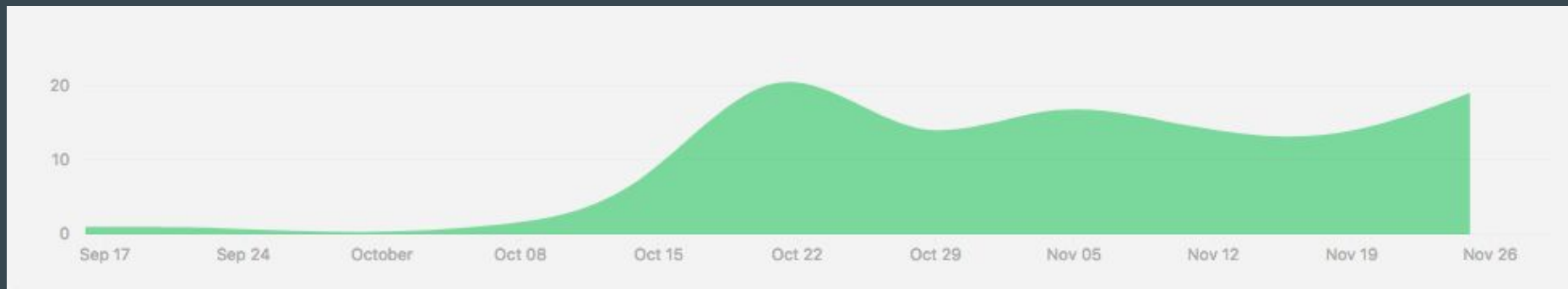
\$2651.33

14.1% error in old calculator

Jira Cumulative Flow Diagram



Commit Graph



Code Coverage



Used JUnit4

Remaining 6.8%:

- Exceptions that cannot be triggered
- Database operations that we do not use

Coverage on BackEnd Calculations

 src/main/java/service/agefactor/AgeFactorGroup.java	100%	0	0
 src/main/java/service/calculatePension/CalculatePensionService.java	100%	0	0
 src/main/java/config/DatabaseConfig.java	100%	0	–
 src/main/java/model/Employee.java	100%	0	0
 src/main/java/model/EmployeeCalcInfo.java	100%	0	0
 src/main/java/model/Employment.java	100%	0	0
 src/main/java/model/EmploymentCalcInfo.java	100%	0	0
 src/main/java/service/agefactor/GroupType.java	100%	0	0
 src/main/java/service/calculatePension/PensionResult.java	100%	0	0

Teamwork!

1. Weekly meetings to update each other
2. Slack for 24/7 communications
3. Confluence for meeting notes and documents
4. Jira for continuous integration
5. Github for version control
6. Jenkins/SonarQube for test coverage



Challenges

1. Lack of domain knowledge
2. Heroku deployment issues
3. Hibernate configuration issues

State of Project and Future

1. All six goals achieved.
2. App can be dropped into an iframe on MSRB site.
3. App is ready to use for users who manually input all information.
4. App needs to be modified to incorporate logins and use the MSRB database, but has capability to retrieve information from a database using an employee ID at the moment.
5. Would like to add buyback support and group 3 support.

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