CSC301 - Assignment 1
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Analysis Report

Group: assignment-1-81-kaushikmurali01-hyeonjeongbyeon

Assignment Repository
https://github.com/csc301-fall-2021/assignment-1-81-kaushikmurali01-hyeonjeongbyeon

Environments

(1) Development Environment:
http://checkoutcalculatortesting-env.eba-3imhvu24.us-east-2.elasticbeanstalk.com/

(2) Production Environment:
Checkoutcalculator-env.eba-s2eq4spd.us-east-2.elasticbeanstalk.com

Video rundown explaining functionality of web app
https://www.youtube.com/watch?v=UjxIrOY6X0A&ab_channel=XOsKeLeToN

Video explaining CICD and deployment
https://www.youtube.com/watch?v=tJop3hY5gZI&ab_channel=XOsKeLeToN

In assignment 1, we chose technologies that we were somewhat familiar with from our prior experience in web app development as well as technologies that we believe might be helpful in preparing us for the team project.

Our project has a clear separation between the front end and the backend. All the calculator logic and functionality is on the backend and independent of the frontend completely. We used the appropriate CI/CD tool and we have a database in addition to the frontend and backend and have all the components required by the assignment.

Technologies:

- Frontend: HTML, CSS, Javascript and Jquery
- Backend: Java and JSP
- CI/CD: Jenkins
- Hosting: AWS Elastic Beanstalk
- Tomcat servlet engine was also used for testing on localhost

Frontend

Technology	Pros	Cons
HTML, CSS, Javascript and Jquery	1. Code is simple, readable, and reusable with jQuery. 2. Easy to learn all these languages 3. No need for many loops and DOM library calls with the Jquery. 4. A lot of prior knowledge in using this	1. Jquery functionality is limited despite the big library. 2. Jquery javascript file is necessary for executing the commands. This may sometimes pose problem on server when you are required to host jquery scripts
React	1. Easy to learn language 2. Provides for adapting the web app for different platforms 3. Provides good performance. 4. SEO friendly	1. Poor documentation since technology is constantly updated 2. Fast development pace making it hard for developers to get used to the environment.
Vue	1. Easy to learn language 2. Good virtual dom rendering and performance 3. Two way communication between UI and	1. Too flexible because sometimes giving developers too many options may cause errors.

	model data	

Our chosen solution: **HTML, CSS, Javascript and Jquery**
Key reasons:

- Lots of prior experience using these languages
- Suitable for small projects such as a checkout calculator
- Jquery makes html and css manipulation very easy

Backend

Technology	Pros	Cons
Java and jsp	1. Free and very good IDE is available. 2. object-oriented programming language. 3. Supports multithreading 4. Lot of experience working with java and jsp	1. The programming language is time-consuming.
Python django	1. Easy to learn hence fast development process 2. Provides a wide range of libraries for different functionalities 3. Platform independent language	1. Complex programs may take longer than normal to execute. 2. Multiple versions of python. Code in one version may cause errors in another.
NodeJs Express	1. Enables backend and front end by using the same javascript runtime environment. No need to learn	1. Does not support multi-threaded programming. 2. Lack of extensive library support

	another language for the server side. 2. Provides high performance. 3. A little prior knowledge using this 4. Object-Oriented Programming	

Our chosen solution: **Java and jsp**
Key reasons:

- Lots of prior experience using these languages
- Free and very good IDE available (eg. Eclipse)
- Syntax is simple to understand
- object-oriented programming language
- It enable the server side to run many instances at once

CI/CD

Technology	Pros	Cons
Jenkins	1. Very customizable as there are lot of plugins 2. Free and open source 3. Simple architecture to deploy. 4. Large community to provide support since it is widely used.	1. A lot of redundant plugins as well. Need to know which ones to use. 2. Maintain infrastructure by yourself
Github Actions	1. Free	1. Not many plugins

	2. Already have access to github api without providing authentication. 3. Easy to configure	2. Sparse documentation
CircleCI	1. Very configurable 2. No need for maintaining your own infrastructure. 3. Very huge user base 4. Free	1. Not as many plugins compared to others. 2. Not very fast.

Our chosen solution: **Jenkins**
Key reasons:

- Free and easy to use
- Very customizable and configurable due to the extensive plugins which simplifies the CI/CD flow.
- Large community to provide support if I do not know how to do something.
- Nice UI making configuring projects very easy to do.
- It is portable to all major platforms

Database

Technology	Pros	Cons
MySQL	1. Stores relational data 2. Very fast and reliable 3. It was made paying attention to web and Big Data	1. Complex and time consuming to design 2. Doesn't have very good debugging tool

	4. High Security 5. Supports large databases	
PostgreSQL	1. Many interfaces available 2. Supports json 3. Has a lot of predefined functions	1. Configuration is hard to understand and perform
MongoDB	1. High performance 2. Easy to set up 3. Horizontally scalable database 4. Suitable for hierarchical data storage	1. Doesn't support transactions 2. Joining documents is difficult. It does not support joins well
No database - maintained in memory	1. Easy and less work 2. Database not required for this assignment 3. Suitable for small project such as checkout calculator	1. When you add items to the product list, once the server is shut down, the added items are lost.

Our chosen solution: **No database - maintained in memory**
Key reasons:

- Easy to implement
- Database not required by the assignment
- Unnecessary for small scale web applications
- Creating a database is complex and time consuming

Web Hosting Service

Technology	Pros	Cons
AWS Elastic Beanstalk	1. Easy to build infrastructure 2. Easy to deploy 3. Good auto-scaling settings	1. Sometimes can be slow
Heroku	1. Free 2. Suitable for small apps 3. Easy to scale	1. Performance is not as good compared to some others.
Azure Web Apps	1. Very good scalability 2. Good management dashboard 3. Fast and easy setup	1. Might be a little hard to initially learn and get used to

Our chosen solution: **AWS Elastic Beanstalk**
Key reasons:

- Free tier is available
- Deployment process is very simple
- It has very good customization
- Elastic beanstalk supports Java and provides Tomcat environment which is necessary for our web application