PROJECT REPORT (Phase I)

Computer Science Career Guidance System

Submitted to

SAVITRIBAI PHULE PUNE UNIVERSITY

Submitted By

Parth Lokhande 72031464L

Manali Umardand 72031559L

Yash Nayakwadi 72031484E

Vedant Araj 72031562L

UNDER THE GUIDANCE OF

Prof. Dheeraj Patil

DEPARTMENT OF INFORMATION TEHNOLOGY

NUTAN MAHARASHTRA INSTITUTE OF ENGINEERING AND TECHNOLOGY

Samarth Vidya Sankul Talegaon Dabhade, PUNE-410507

2022-2023

AFFILIATED TO

SAVITRIBAI PHULE PUNE UNIVERSITY

Department of Information Technology "Samarth Vidya Sankul"

Talegaon Dabhade, PUNE-410507

NUTAN MAHARASHTRA INSTITUTE OF ENGINEERING AND TECHNOLOGY

CERTIFICATE

This is certified that the project entitled

‘Computer Science Career Guidance System’

submitted by

Parth Lokhande 72031464L

Manali Umardand 72031559L

Yash Nayakwadi 72031484E

Vedant Araj 72031562L

Is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor’s of Engineering(Information Technology) at NUTAN MAHARASHTRA INSTITUTE OF ENGINEERING AND TECHNOLOGY,Pune Under the University of Pune. This work is done during year 2022-23, under our guidance.

Date:

Prof. Dheeraj Patil	**Prof. Dheeraj Patil**
(Project Guide)	(Project Cooradinator)

Prof. Nitin Dhawas		**Dr.Vilas Deotare**
(HOD IT Dept.)	External Examiner	(Principal)

Acknowledgements

We are profoundly grateful to **Prof. Dheeraj Patil** for his expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion.

We would like to express deepest appreciation towards **Dr. Vilas Deotare**, Principal, Nutan Maharashtra Institute of Engineering and Technology, **Dr. Nitin Dhawas**, Head of Department of Information Technology their valuable guidance and support for making full-time availability of all the laboratories and necessary equipment and to all staff members for their encouragement and suggestions during the partial fulfilment of the project.

Yash Nayakwadi

Manali Umardand

Vedant Araj

Parth Lokhande

(B.E. IT)

Abstract

The purpose of this document is to describe requirements and summary of a platform that helps users pursue and learn about computer science domains.

Computer science offers various domains to choose from for an individual to pursue, hence one faces the problem of determining the proper field of interest and move forward to gain mastery in it. Therefore, the person has to research about various domains and find out his inclination by trial-and-error method which costs lots of effort and time investment on his part. Thus, the process becomes difficult and inefficient.

Contents

1. Introduction and aims/motivation and objectives

2. Literature Survey

3. Problem statement/definition

4. Software Requirement Specification (SRS Document)

5. Flowchart

6. Project requirement specification

7. Proposed system Architecture

8. High level design of project (DFD, UML, ER Diagram)

9. System Implementation-code documentation: Algorithm style, Description of detailed methodologies, protocols used etc.

10. Test Cases

11. Proposed GUI/ Working model/ Experimental Results in proposed format

12. Project Plan

13. Conclusion

14. Bibliography in IEEE format

Introduction and aims/motivation and objectives

- Introduction:

  The purpose of this document is to describe requirements and summary of a platform that helps users pursue and learn about computer science domains.

- Aims:

  The purpose of the platform is to guide people and help them get information about various domains of computer science and to provide roadmaps to progress in them along with providing affinity tests and domain test to check the user's inclination towards the corresponding domains.

- Motivation:

  During our initial years of engineering, we came across this problem of not having enough knowledge and guidance about the possible future paths in computer science. We also lacked awareness about the ongoing and potential future technologies. This led to enormous consumption of

our time and energy. We lacked a solution which could reduce this effort by providing information and guidance about various pathways. This motivated us to create Computer Science Career Guidance System.

- Objectives:

  To create a platform which provides knowledge and guidance to computer science pursuers to discover suitable domains and work towards achieving expertise in those domains.

Literature Survey

Choosing a domain in Computer Science

The uncertainty of professional identity and future career prospects have enormously increased in higher education. Particularly in the field of Information Technology (IT), fast and mostly unexpected technical advances as well as rapid changes in working life require abilities to cope with uncertainty. However, although they are the main agents in training IT professionals, most Computer Science programs pay little if any attention to the critical field of educational counselling.

Recent research on guidance in higher education considers these career questions as part of the student's life situation and future plans as a whole. The questions of career guidance seem to be present from the beginning of the study path.

Choosing a career path is a difficult decision high-school students need to take at a very young age. Such a decision is affected by many factors such as; family influence, gender, personality, academic performance, and cultural and financial influence

Students usually do not have guidance nor experience to help them choose their career path. For example in computer engineering there are many domains to choose from such as AI/ML, Development, Cloud, Database etc. As there is a relationship between personality types and career development and success, personality based guidance systems were proposed to guide students in there search towards future careers.

Problem statement/definition

Lack of knowledge of a beginner aspirer of computer science to choose a sub-domain of computer science like data science, software development, cyber security and so on, to specialize in.

Computer science offers various domains to choose from for an individual to pursue, hence one faces the problem of determining the proper field of interest and move forward to gain mastery in it. Therefore, the person has to research about various domains and find out his inclination by trial-and-error method which costs lots of effort and time investment on his part. Thus, the process becomes difficult and inefficient.

Software Requirement Specification

1.Introduction:

· The purpose of this document is to describe requirements and summary of a platform that helps users pursue and learn about computer science domains.

- Scope:

  The purpose of the platform is to guide people and help them get information about various domains of computer science and to provide roadmaps to progress in them along with providing affinity tests and domain test to check the user's inclination towards the corresponding domains.

2.General description:

The platform provides the following functionalities:

- Domain exploration: The platform will have information related to various domains along with roadmaps that consist of steps of requisites to progress in that domain along with links to learning resources and courses which one can follow along with.
- Tests: The platform also consists of two types of tests:
  - Common affinity test: Taking this test will help the user to learn about their inclination towards a suitable domain.
  - Domain test: These tests will test one's progress in the corresponding domains. Each domain section will have a domain test.

- Industrial guidance: Platform enrolled industrial professionals can connect with learners to offer guidance.
- Operating Environment:

Operating environment for the guidance platform is as listed below:

- distributed database
- client/server system
- Operating system: Windows.
- database: MongoDB
- platform: Java Spring Boot

3.Functional requirements:

- ·Database:

NoSQL database should be hosted and it should be accessible to spring boot server.

- Client/server system:

The term client/server refers primarily to an architecture or logical division of responsibilities, the client is the application (also known as the front-end), and the server is the DBMS (also known as the back-end).

A client/server system is a distributed system in which,

- Some sites are client sites and others are server sites.
- All the data resides at the server sites.
- All applications execute at the client sites.

4.Interface Requirements:

- User interfaces:

- Front-end software: Any JS engine.
- Back-end software: MongoDB.

- Software interfaces:

  - OS: Windows, Linux for development.
  - Database: MongoDB NoSQL database.
  - Frontend: ReactJS library.
  - Spring-Boot: Java based framework to process data and execute business logic.

- Communication interfaces:

  This project supports all types of web browsers that support JavaScript.

5.Non-Functional requirements:

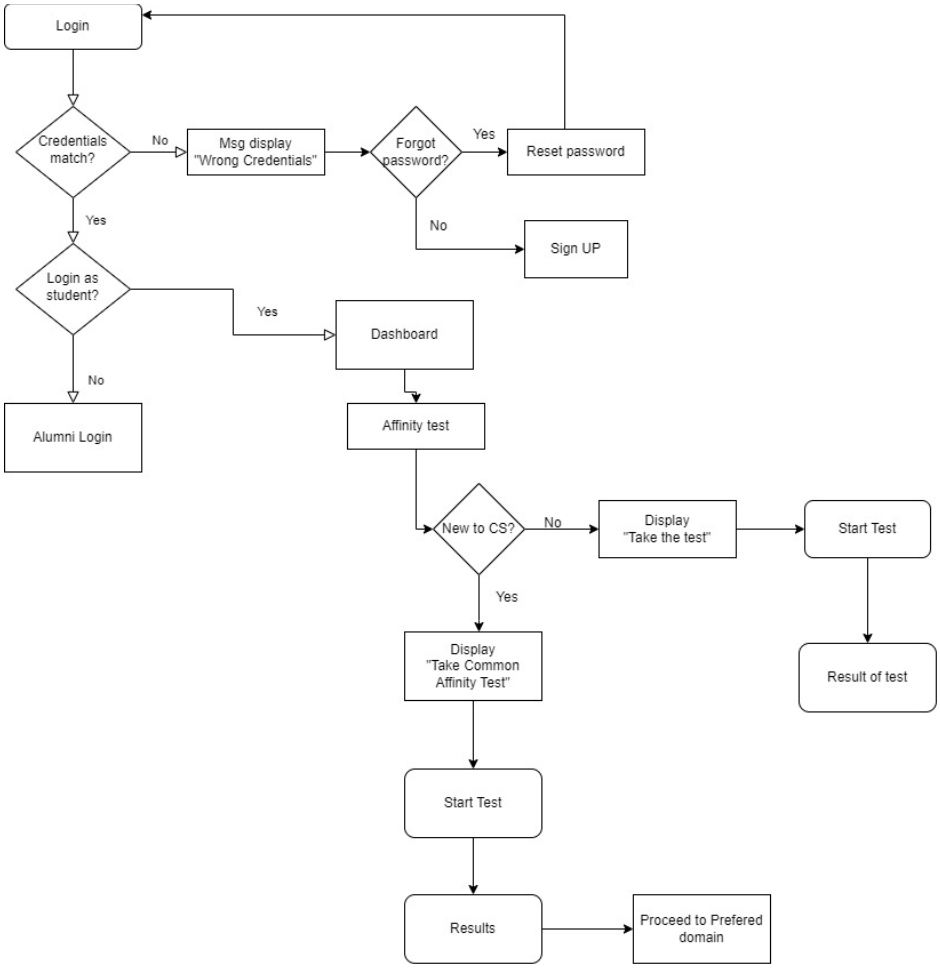
- ·Safety requirements:

  If there is extensive damage to a wide portion of the database due to catastrophic failure, such as a disk crash, the recovery method restores a past copy of the database that was backed up to archival storage (typically tape) and reconstructs a more current state by reapplying or redoing the operations of committed transactions from the backed-up log, up to the time of failure.

- Security requirements:

  Security systems need database storage just like many other applications. However, the special requirements of the security market mean that vendors must choose their database partner carefully.

Flowchart


Login
Credentials match?
No
Msg display "Wrong Credentials"
Forgot password?
Yes
Reset password
No
Sign UP
Yes
Login as student?
Yes
Dashboard
No
Alumni Login
Affinity test
New to CS?
No
Display "Take the test"
Start Test
Result of test
Yes
Display "Take Common Affinity Test"
Start Test
Results
Proceed to Prefered domain

Project requirement specification

Functional requirements:

- ·Database:

  NoSQL database should be hosted and it should be accessible to spring boot server.

- Client/server system:

  The term client/server refers primarily to an architecture or logical division of responsibilities, the client is the application (also known as the front-end), and the server is the DBMS (also known as the back-end).

A client/server system is a distributed system in which,

- Some sites are client sites and others are server sites.
- All the data resides at the server sites.
- All applications execute at the client sites.

Interface Requirements:

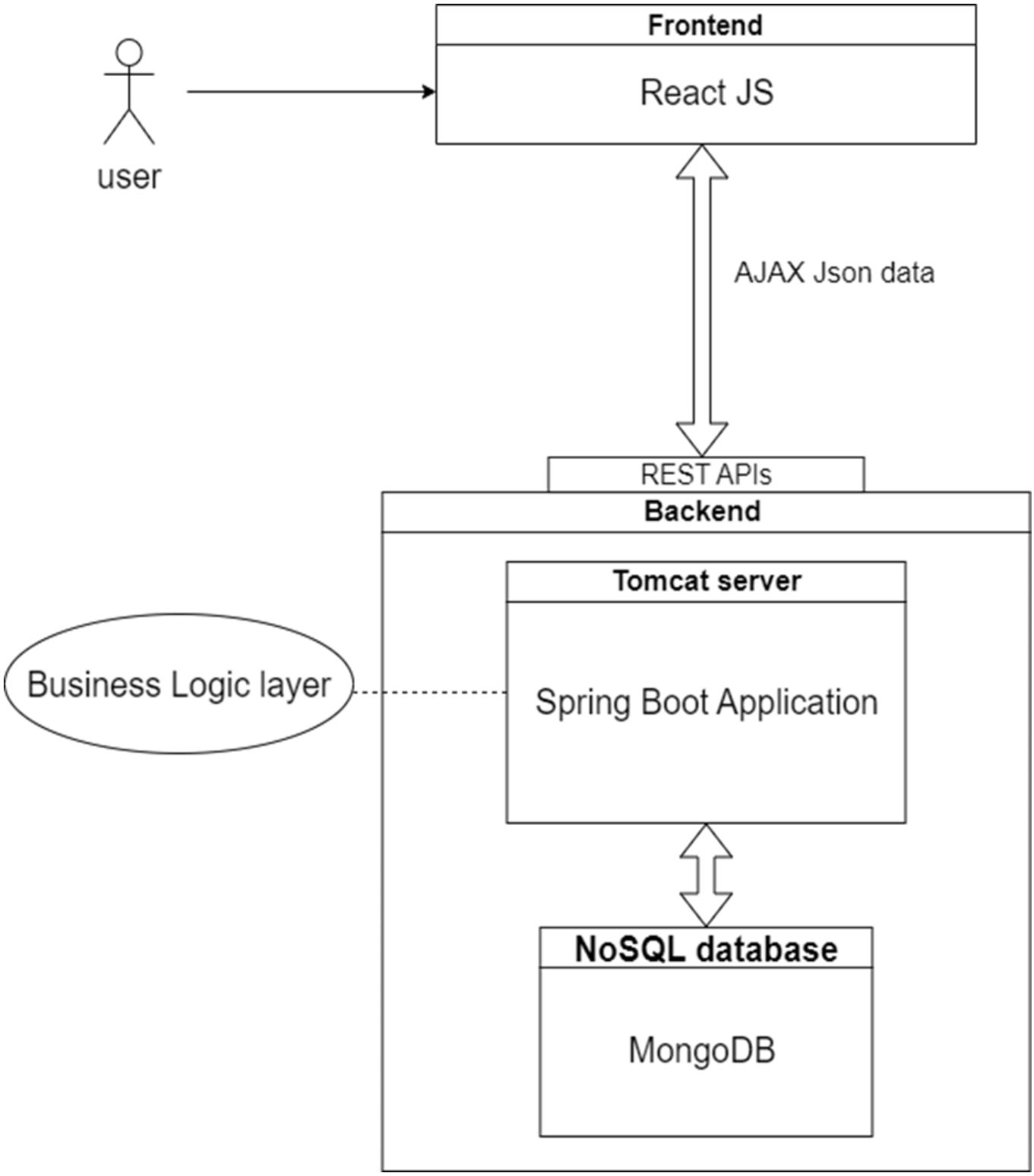
- User interfaces:
  - Front-end software: Any JS engine.
  - Back-end software: MongoDB.
- Software interfaces:
  - OS: Windows, Linux for development.
  - Database: MongoDB NoSQL database.
  - Frontend: ReactJS library.

    - Spring-Boot: Java based framework to process data and execute business logic.

- Communication interfaces:

  This project supports all types of web browsers that support JavaScript.

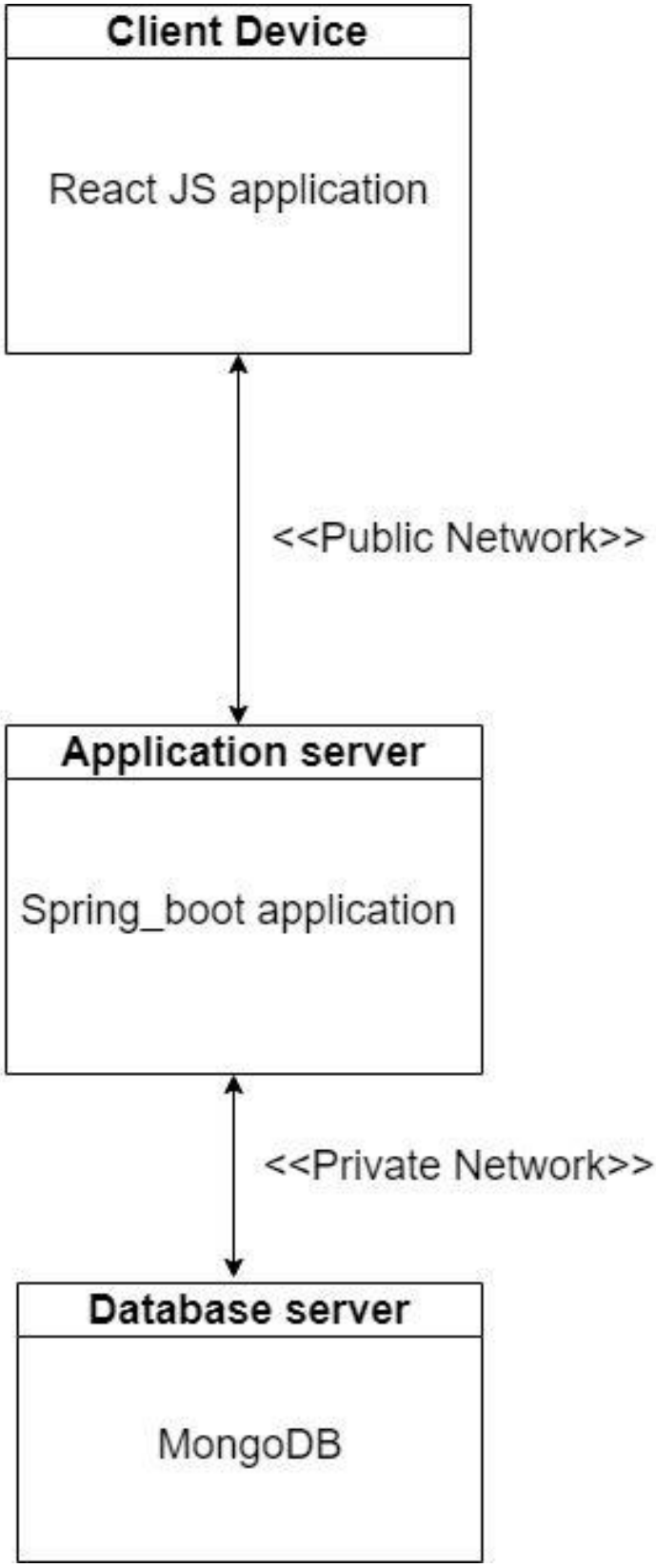
Proposed system Architecture

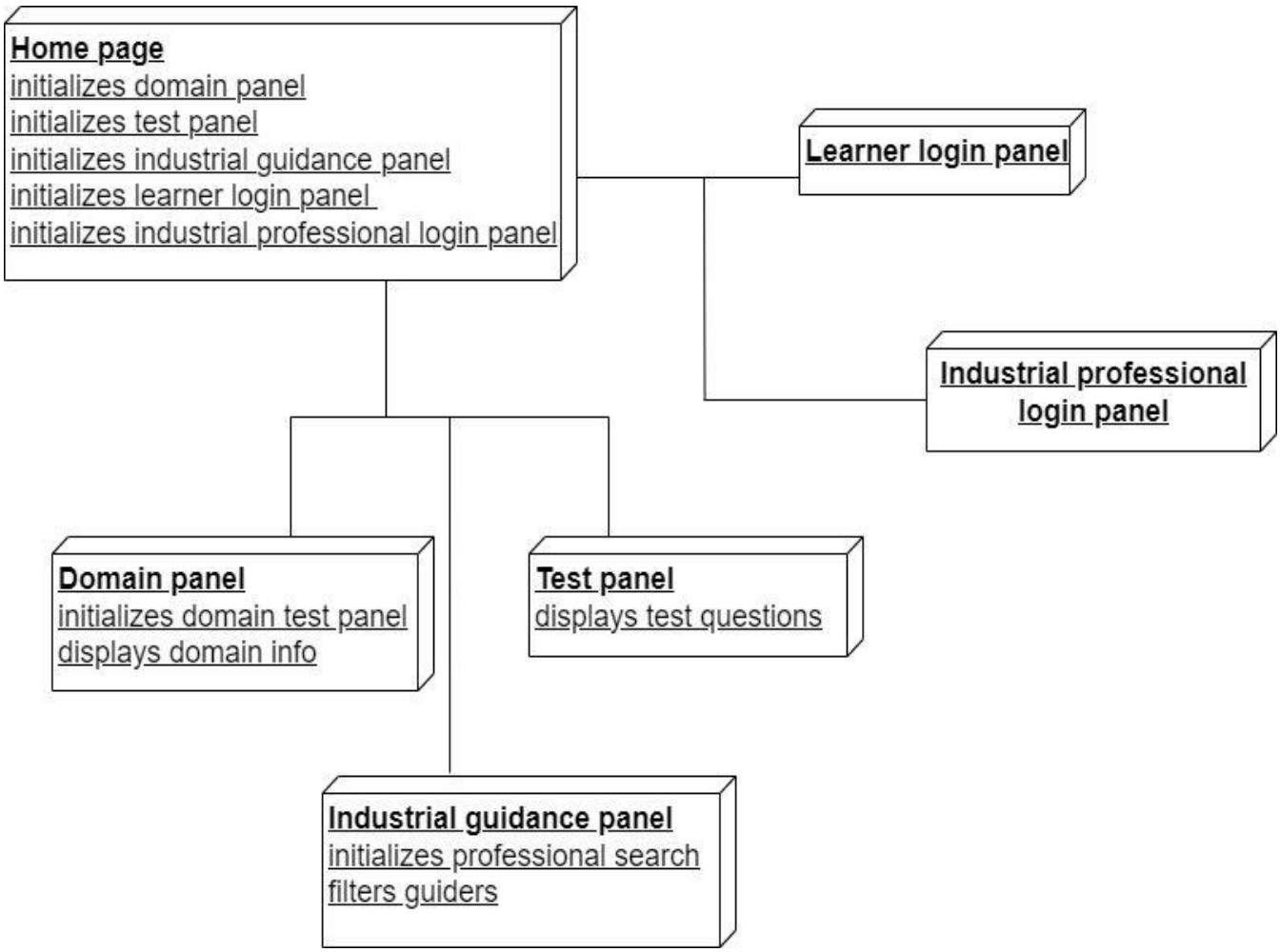


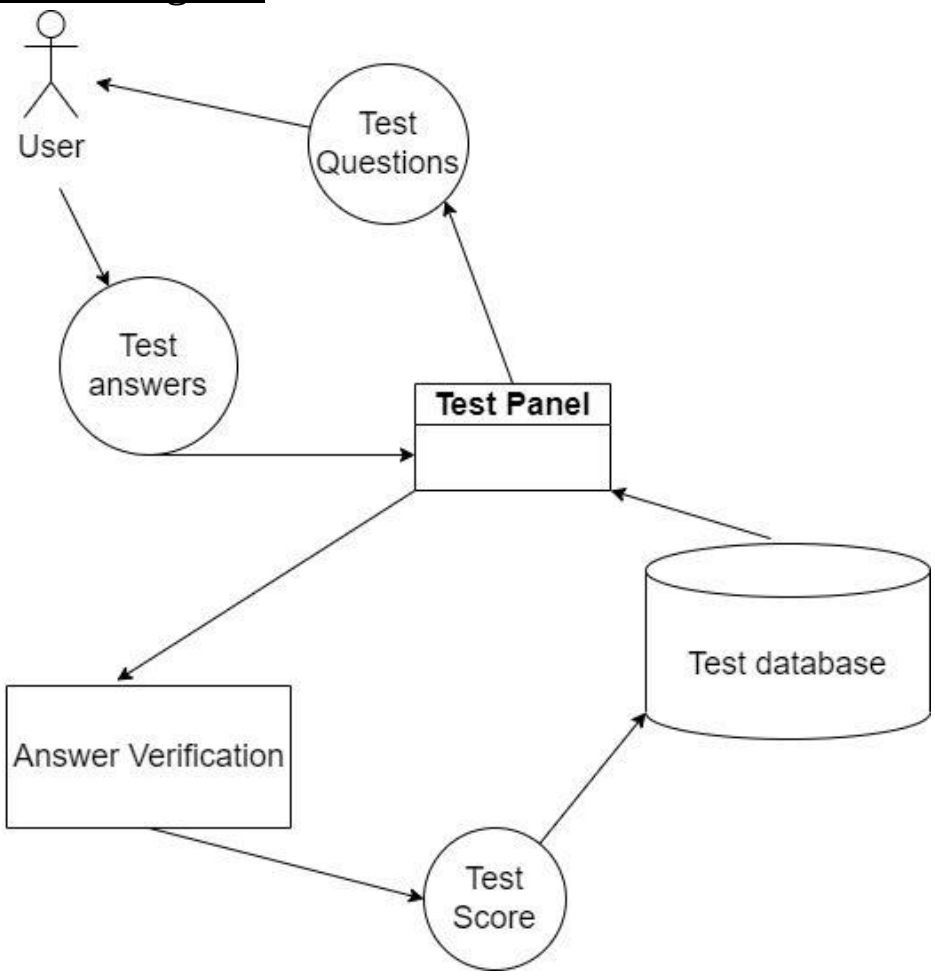
- General MVC architecture will be used for the development process of the web application implemented by Spring boot.
- Asynchronous communication of JSON data will happen with the help of Ajax technology.
- React JS will be used to develop the client-side web-application which will also be screen responsive as per the device and executable across various browsers.
- Spring boot application will serve as the business logic layer in the application which will be developed using Open-JDK SDE.
- MongoDB will serve as a NoSQL backend database which will maintain JSON data and data security.

High level design of project

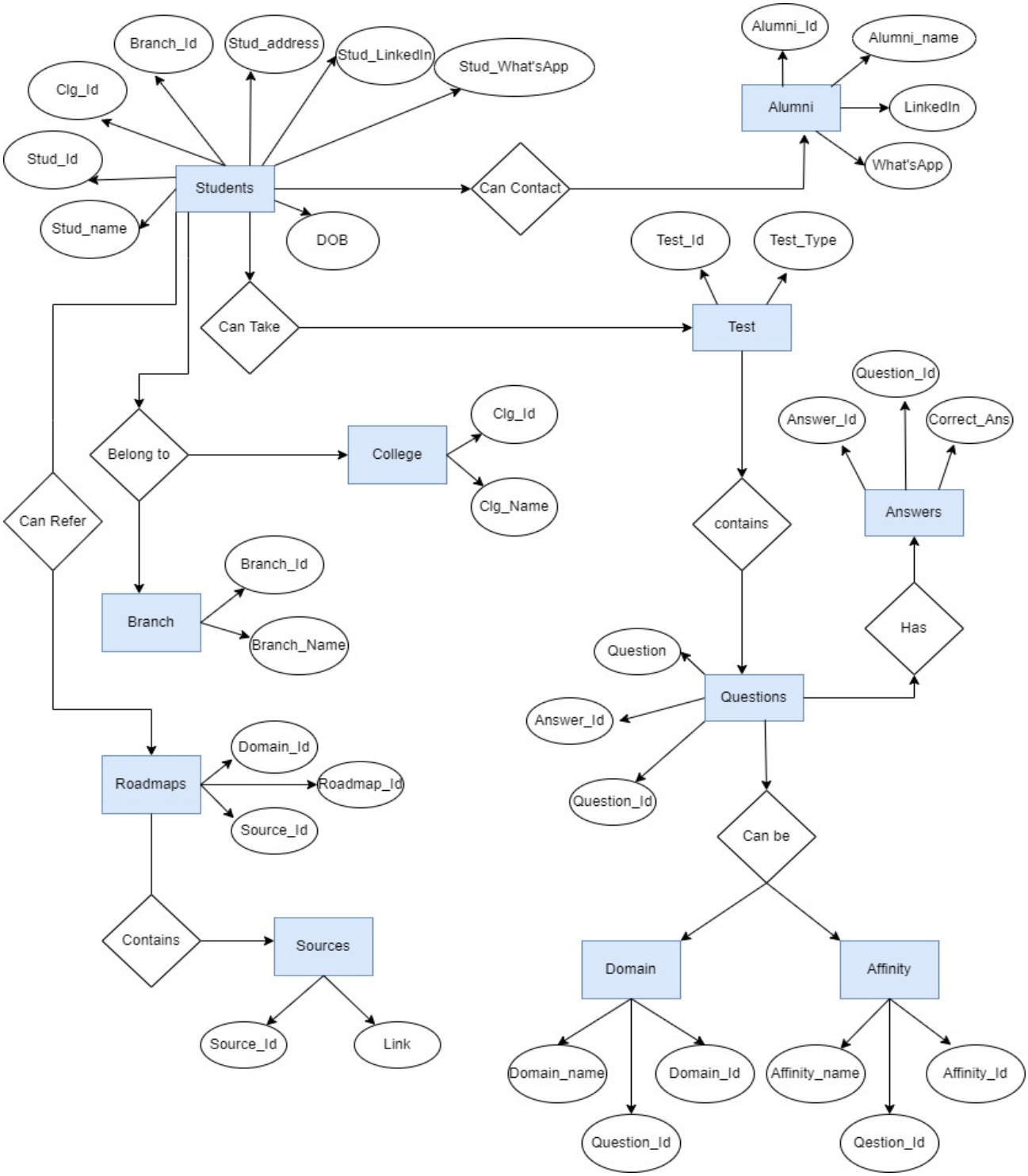
- UML Diagrams:



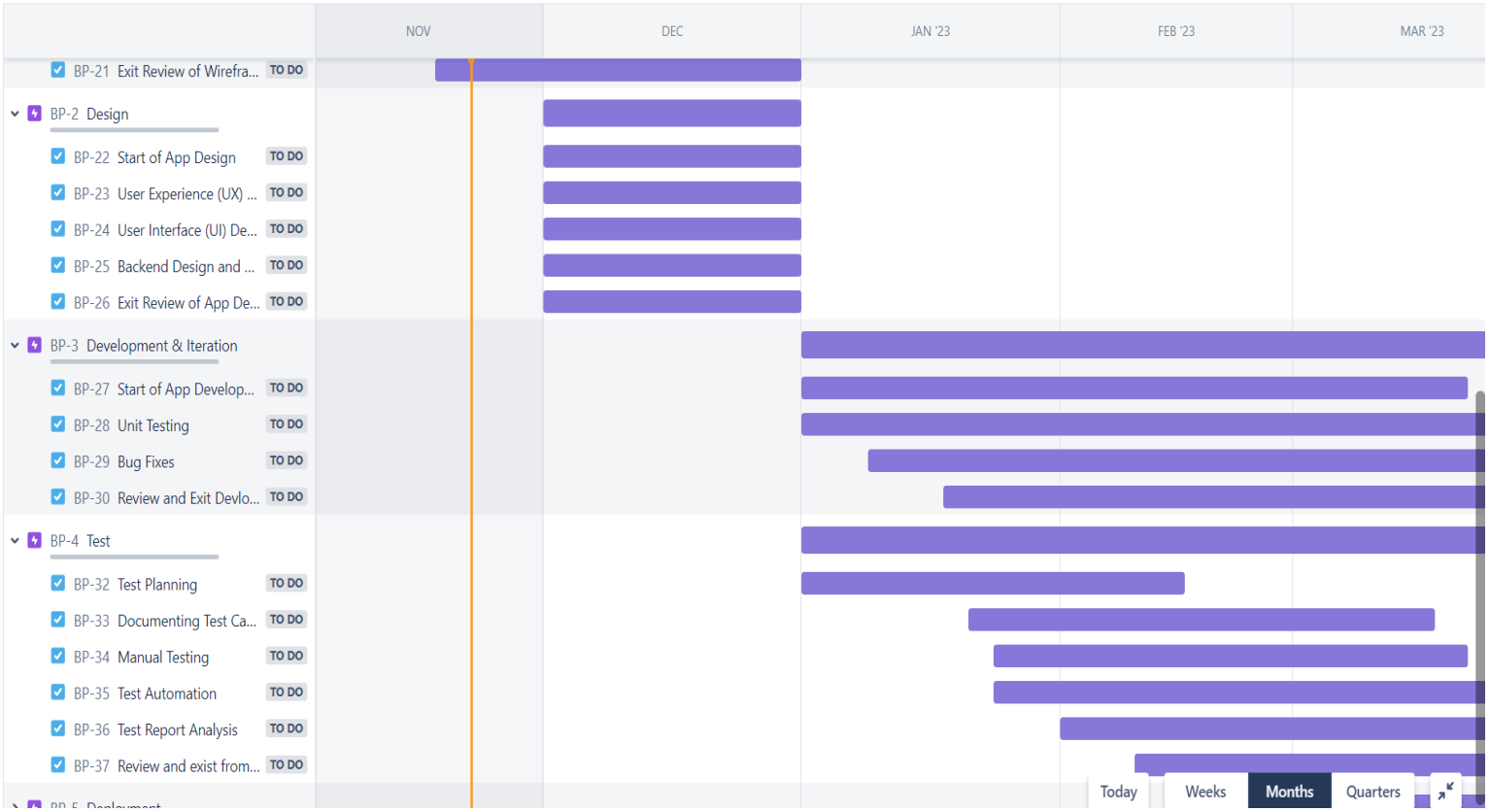

Home page
initializes domain panel
initializes test panel
initializes industrial guidance panel
initializes learner login panel
initializes industrial professional login panel
Learner login panel
Industrial professional login panel
Domain panel
initializes domain test panel
displays domain info
Test panel
displays test questions
Industrial guidance panel
initializes professional search
filters guiders

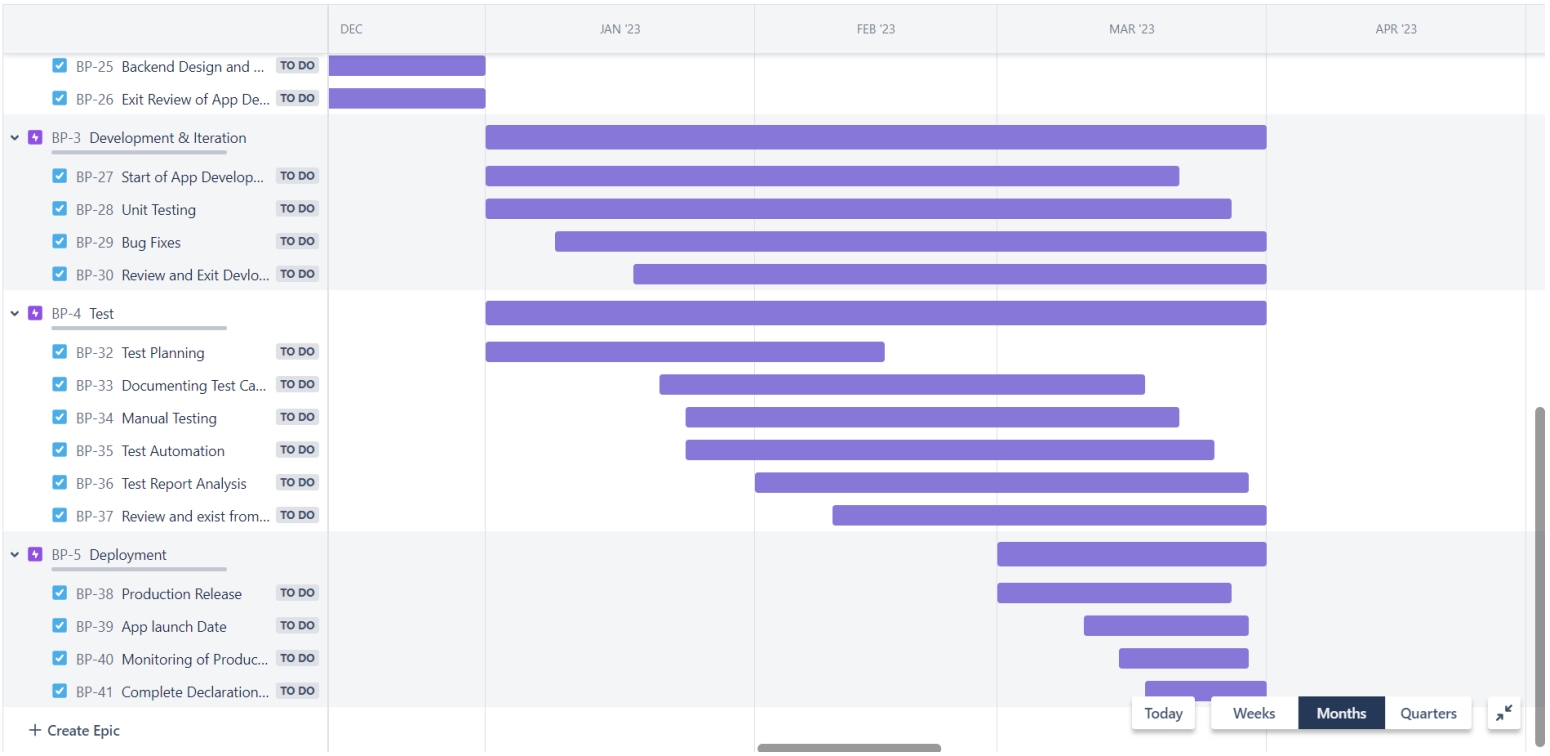
- DFD Diagram:
- 
User
Test Questions
Test answers
Test Panel
Test database
Answer Verification
Test Score

- ER Diagram:


Branch_Id
Stud_address
Stud_LinkedIn
Stud_What'sApp
Clg_Id
Stud_Id
Students
Stud_name
DOB
Can Contact
Alumni_Id
Alumni_name
Alumni
LinkedIn
What'sApp
Test_Id
Test_Type
Can Take
Test
Question_Id
Answer_Id
Correct_Ans
Belong to
College
Clg_Id
Clg_Name
Can Refer
contains
Answers
Branch_Id
Branch
Branch_Name
Has
Question
Questions
Answer_Id
Question_Id
Domain_Id
Roadmaps
Roadmap_Id
Source_Id
Can be
Contains
Sources
Domain
Affinity
Source_Id
Link
Domain_name
Domain_Id
Affinity_name
Affinity_Id
Question_Id
Qestion_Id

Project Plan




DEC
JAN '23
FEB '23
MAR '23
APR '23
BP-25 Backend Design and ... TO DO
BP-26 Exit Review of App De... TO DO
BP-3 Development & Iteration
BP-27 Start of App Develop... TO DO
BP-28 Unit Testing TO DO
BP-29 Bug Fixes TO DO
BP-30 Review and Exit Devlo... TO DO
BP-4 Test
BP-32 Test Planning TO DO
BP-33 Documenting Test Ca... TO DO
BP-34 Manual Testing TO DO
BP-35 Test Automation TO DO
BP-36 Test Report Analysis TO DO
BP-37 Review and exist from... TO DO
BP-5 Deployment
BP-38 Production Release TO DO
BP-39 App launch Date TO DO
BP-40 Monitoring of Produc... TO DO
BP-41 Complete Declaration... TO DO
Create Epic
Today
Weeks
Months
Quarters

Conclusion

In this proposed system, we have implemented the career guidance method which will help the students and computer science learners to improve their skills in basic and advanced computer fundamentals and help them connect with their alumni repectively. Thus helping them to choose their specialized domain with ease.

Bibliography

References:

- M. Vesisenaho et al., "Need for study and career counselling in computer science," 2009 39th IEEE Frontiers in Education Conference, 2009
- Personalized Career-Path Recommender System for Engineering Students date of publication November 24, 2020
- Computer assisted Career Guidance system: A part of CDA history, JoAnn Harris-Bowsley