TEAM ALPHA

SDLC Case Study Worksheet

Project Title: Resume Analyzer (AI-based)
Team Name: Team Alpha
Team Members and Roles: - Shaheer Ahmed (Project Manager, Developer) - Hasan Mustafa Javed (Researcher) - Hunain Amjad (Business Analyst) - Hamza Aijaz (Testing Helper) - Mauzam Abbas (Design Helper) - Sarim Hasan Naqvi (Supporter)

1. Requirements Phase

Write 5 functional and 2 non-functional requirements for your project.

Functional Requirements:

1. The system shall allow users to upload their resumes in various formats (e.g., PDF, DOCX).

2. The system shall extract key information from the uploaded resumes, such as contact details, work experience, education, and skills.

3. The system shall analyze the extracted information against job descriptions to identify relevant keywords and qualifications.

4. The system shall provide a compatibility score indicating how well a resume matches a given job description.

5. The system shall generate personalized feedback and suggestions for improving the resume based on the analysis.

Non-Functional Requirements:

1. The system shall maintain a response time of less than 3 seconds for resume analysis.

2. The system shall ensure the privacy and security of user data through encryption and access controls.

---

2. Design Phase

Draw a simple WBS (3 levels) and one UML diagram (use case/class diagram).

Work Breakdown Structure (WBS):

1. **Project Initiation**
2. 1.1. Define Project Scope
3. 1.2. Identify Stakeholders
4. 1.3. Formulate Project Plan
5. **Development**
6. 2.1. Requirements Gathering
   - 2.1.1. Functional Requirements
   - 2.1.2. Non-Functional Requirements
7. 2.2. Design
   - 2.2.1. UI/UX Design
   - 2.2.2. Database Design
   - 2.2.3. API Design
8. 2.3. Implementation
   - 2.3.1. Frontend Development
   - 2.3.2. Backend Development
   - 2.3.3. Database Implementation
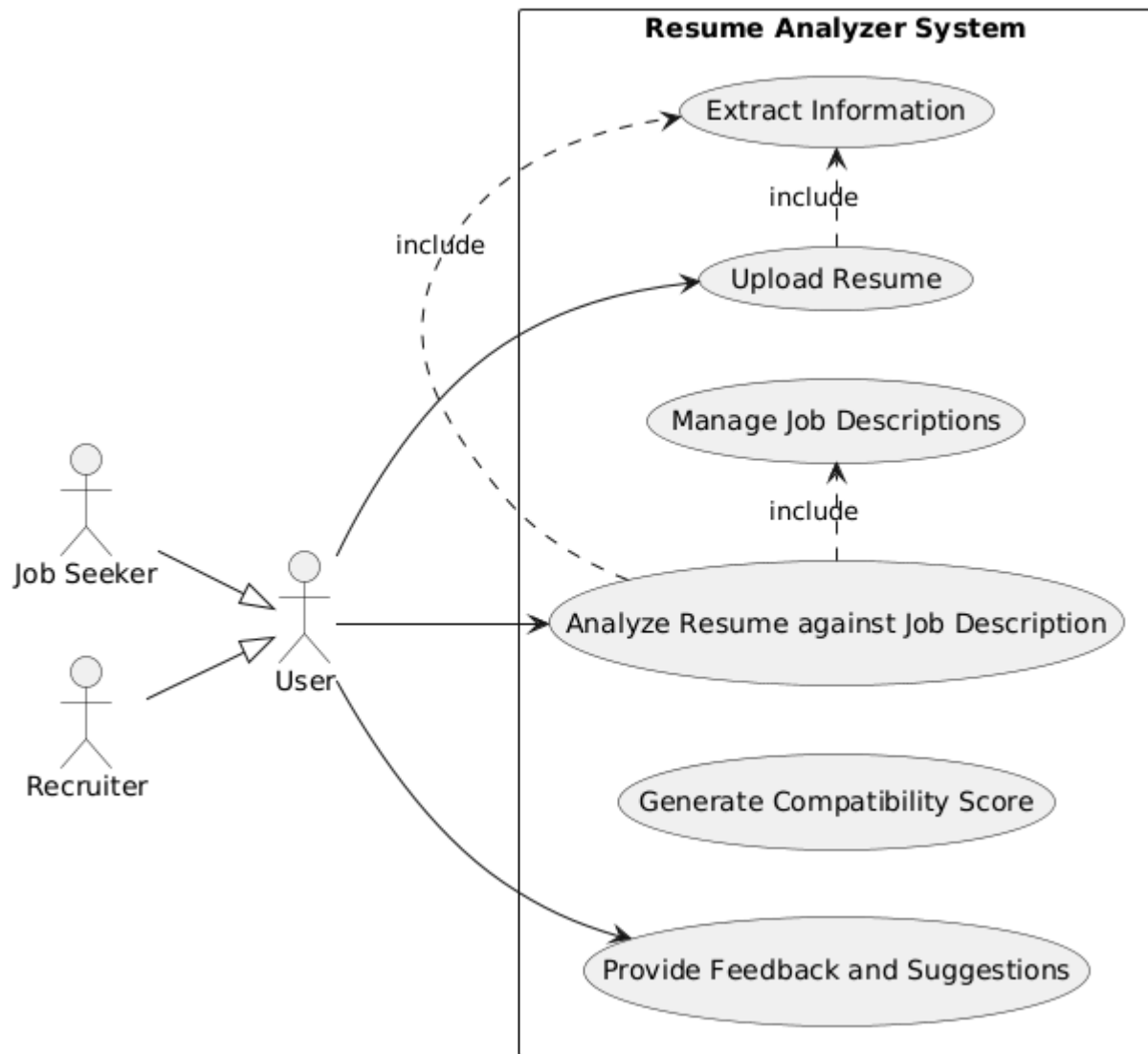9. **Testing & Deployment**
10. 3.1. Testing
    - 3.1.1. Unit Testing
    - 3.1.2. Integration Testing

UML Sketch (Use Case Diagram):

---

3. Backend Design

Attach your design file. And mention the tool that you used.
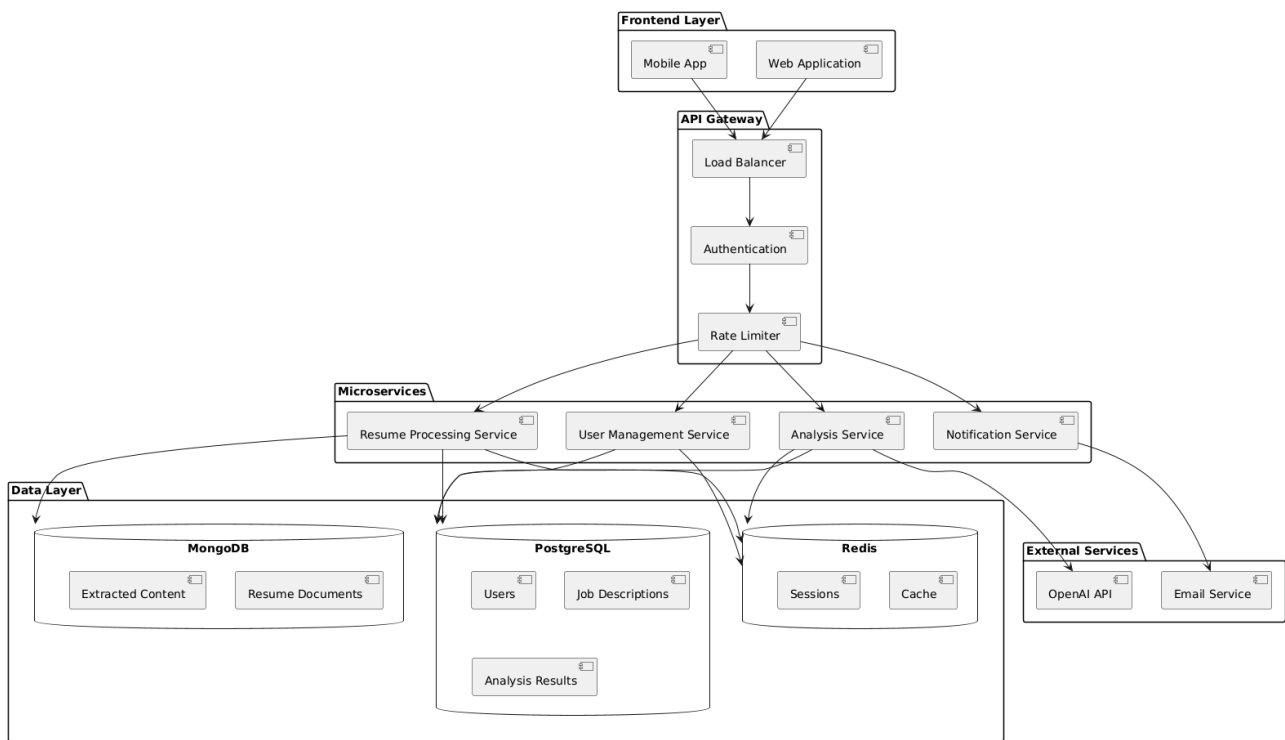
Tool used: PlantUML for architecture diagrams, PostgreSQL for relational data, MongoDB for document storage

4. Development Phase

Write pseudo-code/code for one key function in your system.

Pseudo-code:

```
FUNCTION analyzeResumeCompatibility(resumeText, jobDescription)
    BEGIN
        // Initialize variables
        SET compatibilityScore = 0
        SET matchedSkills = []
        SET missingSkills = []
        SET suggestions = []

        // Extract skills from resume
        SET resumeSkills = extractSkillsFromText(resumeText)

        // Extract required skills from job description
        SET requiredSkills = extractRequiredSkills(jobDescription)

        // Calculate skill matching
        FOR each skill IN requiredSkills DO
            IF skill EXISTS IN resumeSkills THEN
                ADD skill TO matchedSkills
                INCREMENT compatibilityScore BY (100 / LENGTH(requiredSkills))
            ELSE
                ADD skill TO missingSkills
            END IF
        END FOR

        // Analyze experience relevance using AI
        SET experienceScore = analyzeExperienceWithAI(resumeText,
jobDescription)

        // Calculate weighted compatibility score
        SET finalScore = (compatibilityScore * 0.6) + (experienceScore * 0.4)

        // Generate improvement suggestions
        IF LENGTH(missingSkills) > 0 THEN
            FOR each missingSkill IN missingSkills DO
                ADD "Consider adding " + missingSkill + " to your skillset" TO
suggestions
            END FOR
        END IF

        // Return analysis results
        RETURN {
            compatibilityScore: finalScore,
            matchedSkills: matchedSkills,
            missingSkills: missingSkills,
            suggestions: suggestions
        }
    END
```

5. Testing Phase

Write 3 test cases.

Test Case ID	Description	Input(s)	Expected Output	Result (Pass/Fail)
TC001	Resume Upload Functionality	Valid PDF resume file	File uploaded successfully, confirmation message displayed	Pass
TC002	Resume Analysis with Job Description	Resume text + Job description	Compatibility score between 0-100, matched skills list, suggestions	Pass
TC003	Invalid File Format Upload	.txt file instead of PDF/DOCX	Error message: "Unsupported file format"	Pass

6. Reflection

1. Which SDLC phase was the most challenging? Why?

The Design Phase was the most challenging because it required balancing multiple competing requirements while ensuring the system architecture could scale effectively. Designing the AI integration component was particularly complex as it involved coordinating between multiple external APIs, managing data flow between different services, and ensuring real-time performance while maintaining accuracy.

2. Which SDLC model (Waterfall, Agile) best fits this project? Why?

Agile methodology best fits this project for several reasons. The AI-powered analysis component requires iterative refinement based on user feedback and testing results. The accuracy of the compatibility scoring algorithm can only be validated through real-world usage and continuous improvement. Agile's flexibility allows for quick adaptation to changing requirements and technology updates.

### 3. How did you determine functional and non-functional requirements?

Functional requirements were determined by analyzing the core user needs and business objectives. We conducted stakeholder analysis to identify primary users (job

seekers and recruiters) and their specific goals. Non-functional requirements were identified by considering system constraints and quality attributes essential for user satisfaction, such as performance and security requirements.
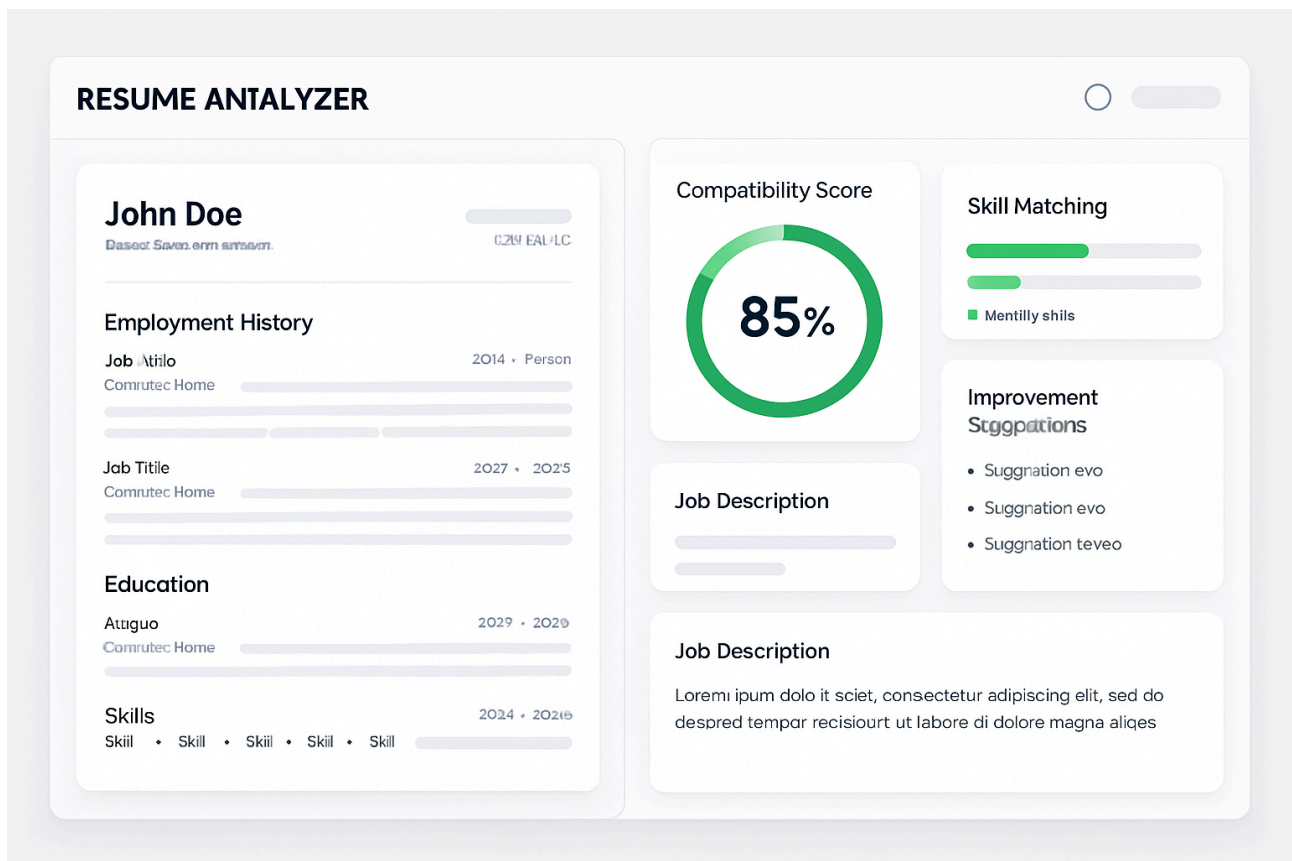
7. Attachments

Frontend Design Mockups:

Landing Page:
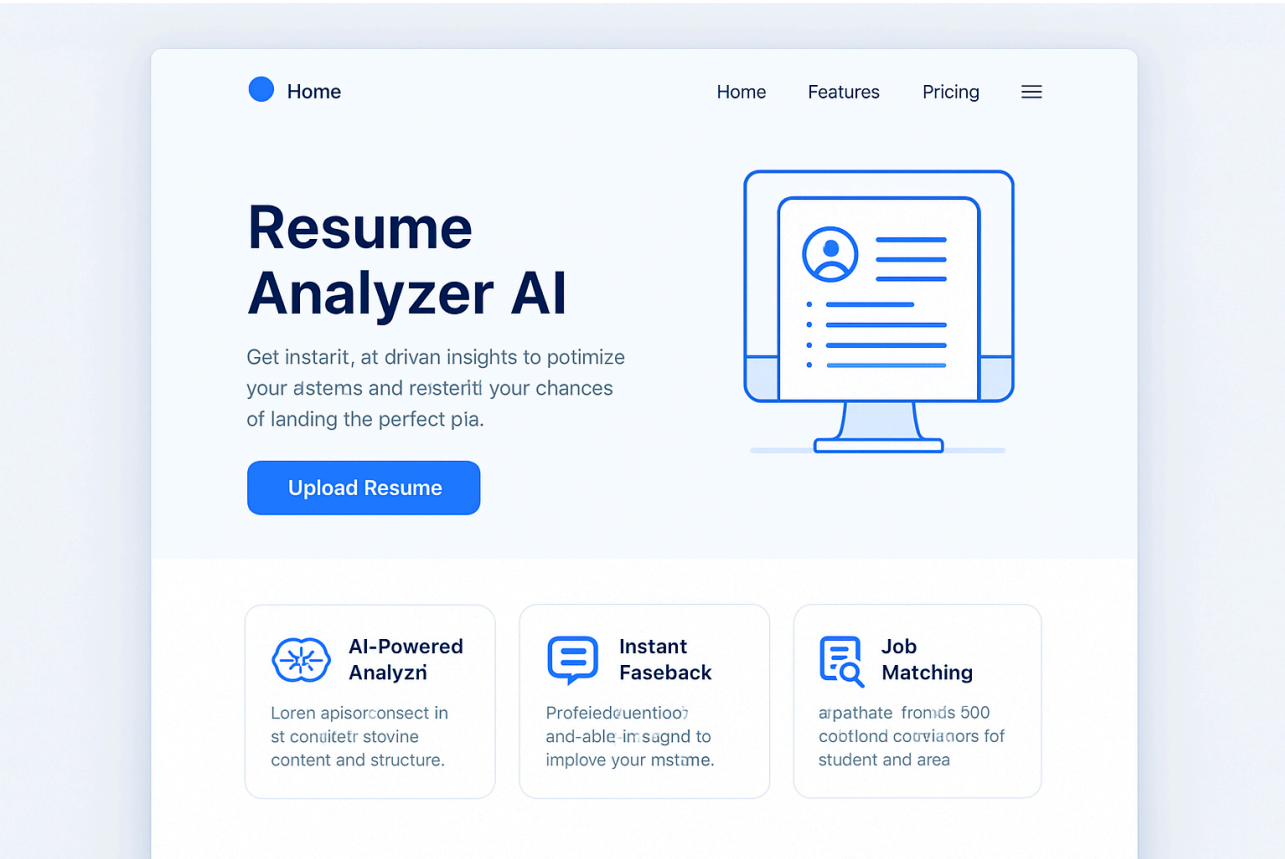
Dashboard Page:

Supporting Documentation:

- Complete project documentation with detailed technical specifications
- UML diagrams for system architecture
- Database schema and API documentation
- Figma design files for UI/UX reference