Assignment 4. Stakeholder requirements.

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Part 1: Stakeholder Identification and Requirements

Our system is "AI-enhanced text summarization tool for students", a mobile application designed to help students summarize academic documents (Word, PDF, PPTX) effectively. The tool allows users to upload, organize, and summarize documents while offering features like customizable summarization levels and note-taking. Its purpose is to ease the study process by making large amounts of academic content more manageable.

Key Stakeholders:

1. Students (Primary Users):

- Role. Primary users of the application.
- Need: efficient, accurate summaries; customizable summary lengths; easy document uploads and organization.
- Importance - high. The tool is designed specifically for them.

2. Teachers and Academic Mentors:

- Role. Secondary users providing content or recommending the tool to students.
- Need: ensure the summaries maintain context and are suitable for academic purposes.
- Importance - medium. Indirect users but possible influencers.

3. Educational Institutions:

- Role. Organizations integrating the tool into learning platforms or promoting it to students.
- Need: scalability, ease of integration, and cost-effectiveness.
- Importance. medium. Affects widespread adoption.

4. Developers and Engineers:

- Role. Responsible for building and maintaining the tool.
- Need: clear requirements, robust architecture, and manageable technical complexity.
- Importance - high. Critical to the tool's success.

5. Researchers or Academicians:

- Role. Users evaluating the tool for research or recommending it to students.
- Need: summaries that retain technical accuracy and depth for academic studies.
- Importance - high. Ensure credibility within academic communities.

Functional requirements:

- Summarize uploaded documents accurately.
- Provide customizable summary lengths.
- Allow users to create folders and add notes to summaries.

Non-functional requirements:

- Maintain high accuracy in retaining the core meaning of the content.
- Ensure low latency for summary generation.
- Offer a user-friendly and visually appealing interface.

Conflicting requirements and trade-offs:

- Students may prioritize free usage, while investors may demand monetization options.
- Institutions may prefer integration capabilities, which may complicate the architecture.
- Researchers may demand summaries that preserve technical depth, conflicting with students' preference for simplicity.

Part 2: Requirement-Decision Matrix

Stakeholder	**Requirement**	**Architectural Decision**	**Justification**
Students	Customizable summary lengths	Implement an API-based modular architecture	Enables flexible customization of summaries without impacting other components.
Teachers	Contextually accurate summaries	Use transformer-based AI models	Ensures summaries retain essential academic content with high accuracy.
Educational Institutions	Scalability and integration with LMS systems	Adopt a cloud-hosted microservices architecture	Supports seamless integration and scalability based on institutional demands.
Developers	Maintainable and efficient system	Use a layered architecture with caching mechanisms	Separates concerns for maintainability and uses caching to improve efficiency.
Researchers or Academicians	High accuracy and reliability of summaries	Train and fine-tune AI models on academic datasets	Provides reliable, context-sensitive summaries tailored to academic research.

Part 3: Risk Assessment and Mitigation

Risk	**Mitigation Strategy**
Conflicting priorities between stakeholders	Establish a requirements prioritization framework with input from all stakeholders.
Misalignment of summaries with academic needs	Regularly test the tool with real academic documents and involve researchers in testing.
Resource constraints for scalability	Use cloud-based solutions to handle high traffic efficiently.

Part 4: Reflective Analysis

The stakeholder requirements influenced the system's architectural design. For instance, the need for high accuracy and customizable summaries led to the selection of transformer-based models. Researchers' requirement for preserving technical depth prompted the consideration of fine-tuning the model on academic datasets. Additionally, the inclusion of organizational features, such as folders and note-taking, was driven by students' productivity needs. Theoretically, in future, more stakeholder involvement during the design phase potentially could improve alignment and reduce conflicts.