

Lab 2 – Product Specification Outline

CS 411W Lab II

Product Specification

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Version 2

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1 Introduction

According to Hanover Research (2014), many universities offer official tutoring services, but they tend to have several major issues, including poor advertising and schedules that do not work for all students. Despite these problems, tutors offer many benefits to universities, including an increase in retention of class topics. One of the major problems faced by many universities' tutoring services is a lack of organization. Students often find these resources difficult to use, and qualified students are discouraged from becoming tutors themselves due to inconvenient payment and scheduling options.

1.1 Purpose

Tutor Dash is an Android application that will act as a centralized, university-specific tutoring resource. This product will allow tutors and tutees to connect to each other, either in person or online, to simplify the process of seeking help in a specific class or offering tutoring services. The end goal of this product is to allow more university students to have better access to tutoring services, and to reduce the stigma associated with seeking a tutor.

The users of Tutor Dash will be students currently enrolled in a supported university that are either looking for help in one of their classes or looking to tutor other students in exchange for payment.

The supported universities will also benefit from Tutor Dash's services, as easier access to tutoring services will likely lead to an increase in student grades and a decrease in DFWI rates. If students are able to conveniently find help in additional locations, the universities' official tutoring services will become less overburdened, allowing university tutors to spend more time with any individual student because of the lower amount of students seeking help.

1.2 Scope

The prototype will contain most features of the real-world product, but will be limited in scope to Old Dominion University.

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Table 1 shows the differences between the prototype and the real-world product.

Feature	RWP	Prototype
On-the-fly tutor qualification based on transcript	Fully-Functional	Fully-Functional
University student verification based on email	Fully-Functional	Fully-Functional
Search results tailored based on tutor/tutee mode	Fully-Functional	Fully-Functional
Real-time scheduling	Fully-Functional	Fully-Functional
Weighted ratings for every course	Fully-Functional	Fully-Functional
Reviews and comments on user profiles	Fully-Functional	Fully-Functional
In-app payments/deposits (any transactions)	Fully-Functional	Fully-Functional
In-app messaging/history of conversations	Fully-Functional	Fully-Functional
Web conference and in-person meeting support	Fully-Functional	Fully-Functional
Relative distance user A is from user B appears in query	Fully-Functional	Fully-Functional
Night mode	Fully-Functional	Eliminated
Automated pay rate calculation for every course	Fully-Functional	Partially Functional - Mean & std. dev. of pay-rates will need to be mocked up
Reporting features	Fully-Functional	Partially Functional - Users can report, but no action will occur
Re-authentication when navigating back into app	Fully-Functional	Fully-Functional - However, this feature may disrupt the user experience
Refunds due to poor experiences	Fully-Functional	Partially Functional - Most likely, this will not be automated, but it still will exist
Free sessions/monetary bonuses	Fully-Functional	Eliminated
Blacklisting of users	Fully-Functional	Partially Functional - Capabilities will be implemented but not used
Support of multiple universities	Fully-Functional	Eliminated
Cross-platform support	Eliminated	Eliminated
Firebase console linked to test suite(s) with mockups	Eliminated	Fully-Functional

Table 1: RWP vs Prototype

1.3 Definitions, Acronyms, and Abbreviations

Course-specific tutoring: Academic assistance services provided for a particular course at a particular university.

DFWI: An acronym for Drop/Fail/Withdraw/Incomplete. This relates to university course incompleteness status.

DFWI rates: Represents the ratio of university students who do not complete their courses to students who do complete their courses.

Direct Competitor: Another product or company which is solely involved in the same domain space as Tutor Dash.

Entity: A person, object, or external server that serves as a leveraged functional component of the Tutor Dash product.

FERPA: The Family Educational Rights and Privacy Act is a United States federal law that protects the privacy of educational records.

Indirect Competitor: Another product or company which is involved in the same domain space as Tutor Dash, but doesn't focus solely in that space.

Serverless Architecture: Concerning database interactions over a network server, this type of architecture implies that the server's implementation is invisible (or abstracted) to the team developing the product using the actual server.

Tester: Individuals responsible for testing the quality of the software.

Tutee: A university student seeking academic assistance.

Tutor: A university student offering independent tutoring services that are qualified based off previously taken courses.

Uber: A ride-hailing company that offers the Uber mobile app, which you can use to submit a trip request that is automatically sent to an Uber driver near to you, alerting the driver to your location.

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[95e25c309878%40sessionmgr102&bdata=JnNpdGU9ZWhvc3QtbG12ZSZzY29wZT1zaXRI#AN=114789419&db=ehh](http://eds.b.ebscohost.com.proxy.lib.odu.edu/ehost/detail/detail?vid=0&sid=d93df6c4-3729-4b62-8d58-95e25c309878%40sessionmgr102&bdata=JnNpdGU9ZWhvc3QtbG12ZSZzY29wZT1zaXRI#AN=114789419&db=ehh)

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1.5 Overview

This specification contains a description of the architectural and functional components of the Tutor Dash application, along with the required interfaces, protocols, and requirements.

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2 General Description

Tutor Dash will allow students at any supported university to connect to each other through a centralized platform and simplify the process of giving or receiving help in any class. After creating an account, users may upload a transcript and become a tutor or search for help in a specific class through one of the application’s three discovery pages. Once a tutor is found, the application will schedule a session at a time that works for both users, then handle the payment of the tutor after the conclusion of the session.

2.1 Prototype Architecture Description

Figure 1 shows Tutor Dash’s MFCD.

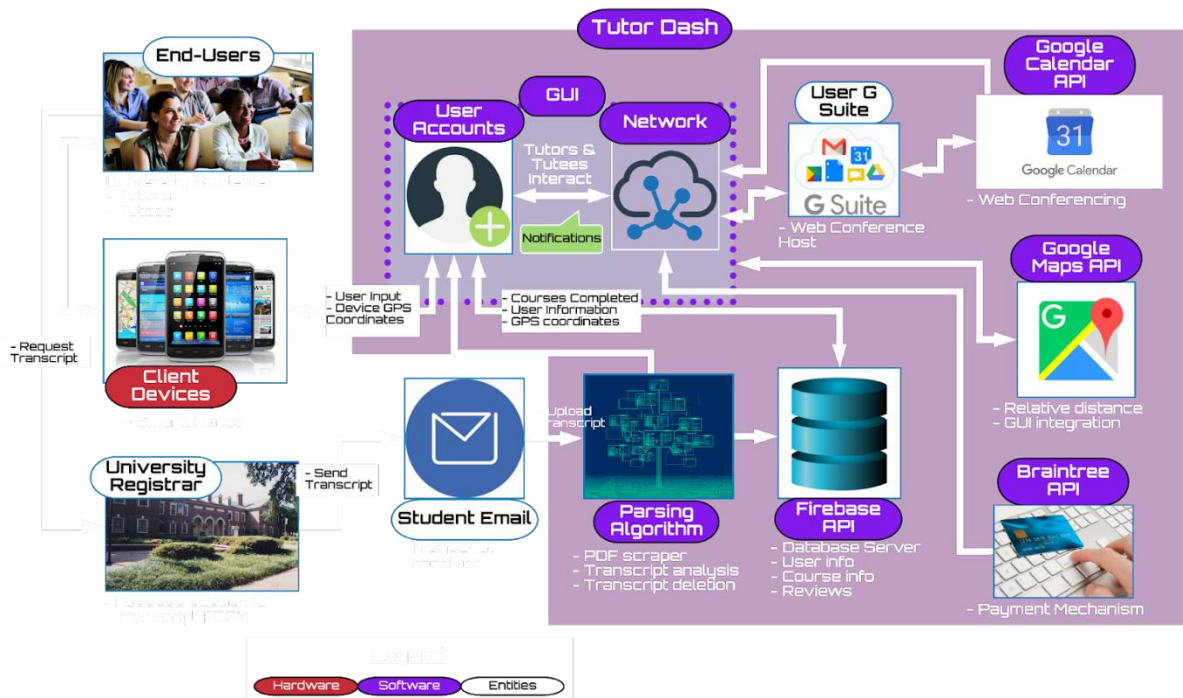


Figure 1: Major Functional Component Diagram

Tutor Dash is composed of the following major components:

- Client Device: Allows the end user to access the application.

- GUI: Allows the end user to access their personal account and communicate with other end users.
- Firebase API: Database server used to store user information, course information, university information, and user reviews.
- Google Calendar API: Used to track end users' scheduled meetings.
- Google Maps API: Calculates and displays relative distance to other end users.
- User G Suite: Google Hangouts is used to create online web conference meetings.
- Braintree API: Used to handle in-app payments.
- Parsing Algorithm: Used to analyze and delete uploaded transcripts to determine tutor eligibility.

2.2 Prototype Functional Description

The major functional components of Tutor Dash include the following:

- Account Creation: This function allows end users to create a personal account in the Tutor Dash database.
- Account Management: This function allows a user with an existing account to make various changes to that account, including switching between tutor mode and tutee mode and changing their password.
- Member Profile View: This function allows users to view and edit public information in their profile, including username and offered courses.

- Transcript Parser: This function analyzes a user’s transcript to determine tutor eligibility, then deletes the transcript. The algorithm flow is shown in Figure 2.

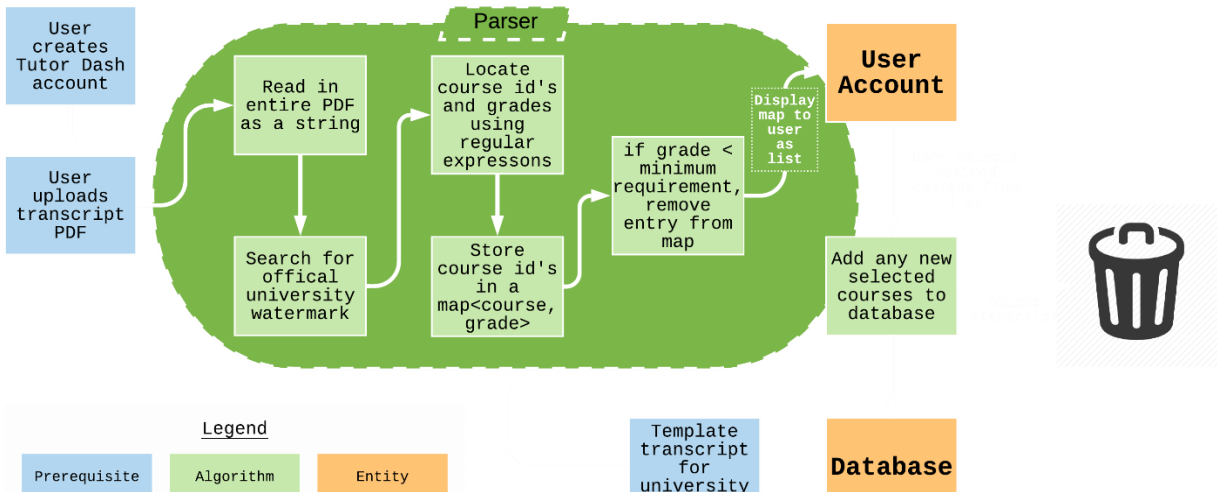


Figure 2: PDF Transcript Parser Algorithm Flow

- Relative Distance Calculator: This feature calculates the distance between users, allowing users to only show potential users within a certain distance of them. The algorithm flow is shown in Figure 3.

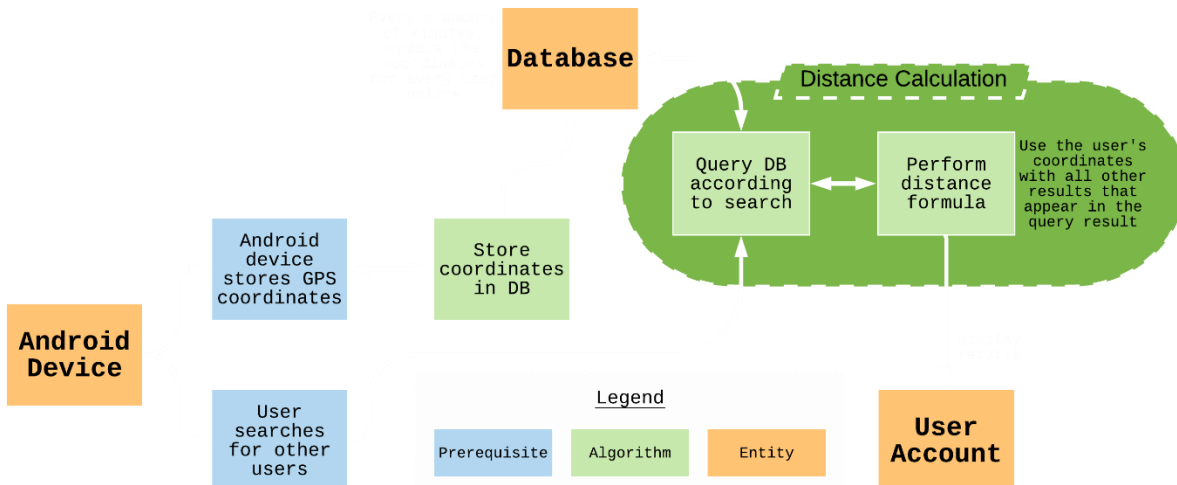


Figure 3: Relative Distance Calculator Algorithm Flow

- Alert System: This feature allows tutors and tutees to send and receive notifications requesting help of offering tutoring services.

- Automatic Pay-Rate Calculation: This feature automatically calculates a fair price for a tutor's services to keep rates competitive. The algorithm flow is shown in

Figure 4.

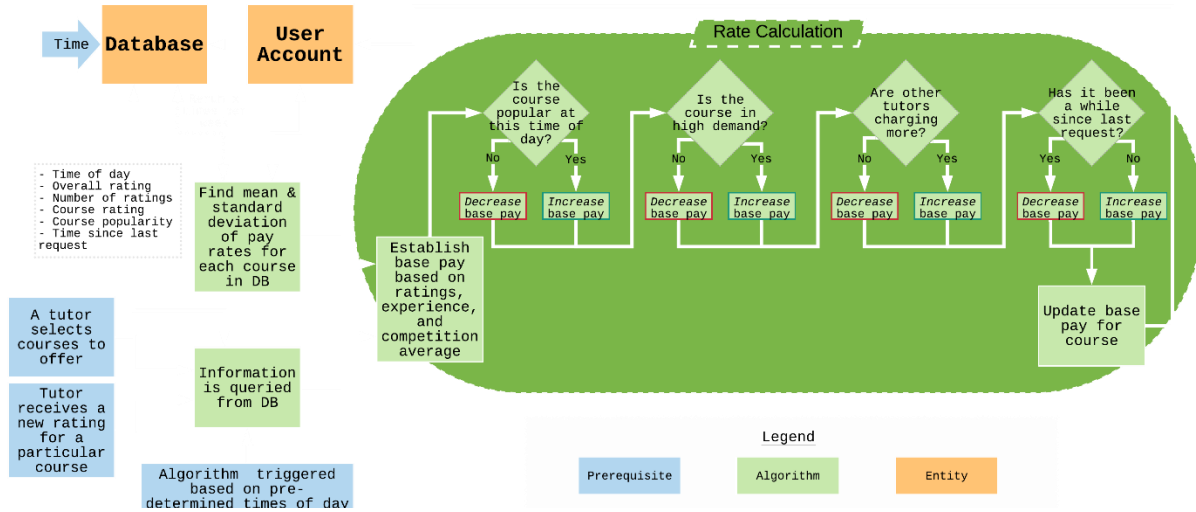


Figure 4: Pay-Rate Calculator Algorithm Flow

- Automatic Payment Handling: This function automatically handles in-app payments in a variety of situations.
- Tutor/Tutee Rating System: This feature allows tutors and tutees to rate each other, and allows users to see the ratings of potential partners.
- Discovery Pages: This feature allows users to search for potential partners via a map, a search query, or a sortable list.
- Chat Messaging: The feature allows users to communicate with each other outside of a tutoring session.

- Session Scheduling: This feature automatically creates a meeting with Google Hangouts if the users choose to meet via web conferencing. The algorithm flow is shown in Figure 5.

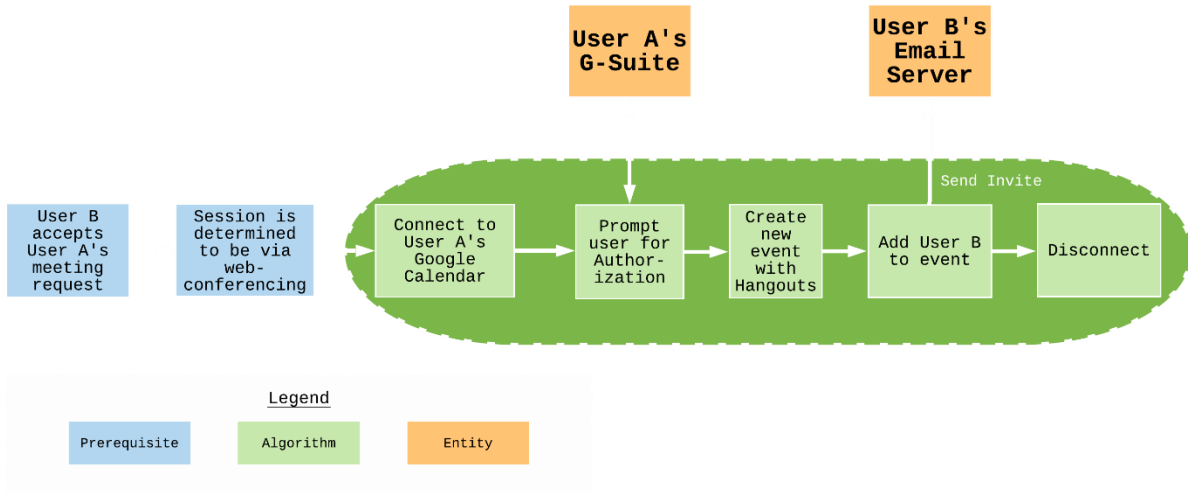


Figure 5: Web Conference Appointment Creator Algorithm Flow

2.3 External Interfaces

The external interfaces used by Tutor Dash can be divided into hardware, software, user, and communications interfaces.

2.3.1 Hardware Interfaces

Tutor Dash will only work on Android devices.

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2.3.2 Software Interfaces

Tutor Dash’s software interfaces include the following:

- Cloud Firestore: Cloud Firestore is a NoSQL, document-oriented database that will serve as the database for Tutor Dash. The database schemas are shown in Figure 6.

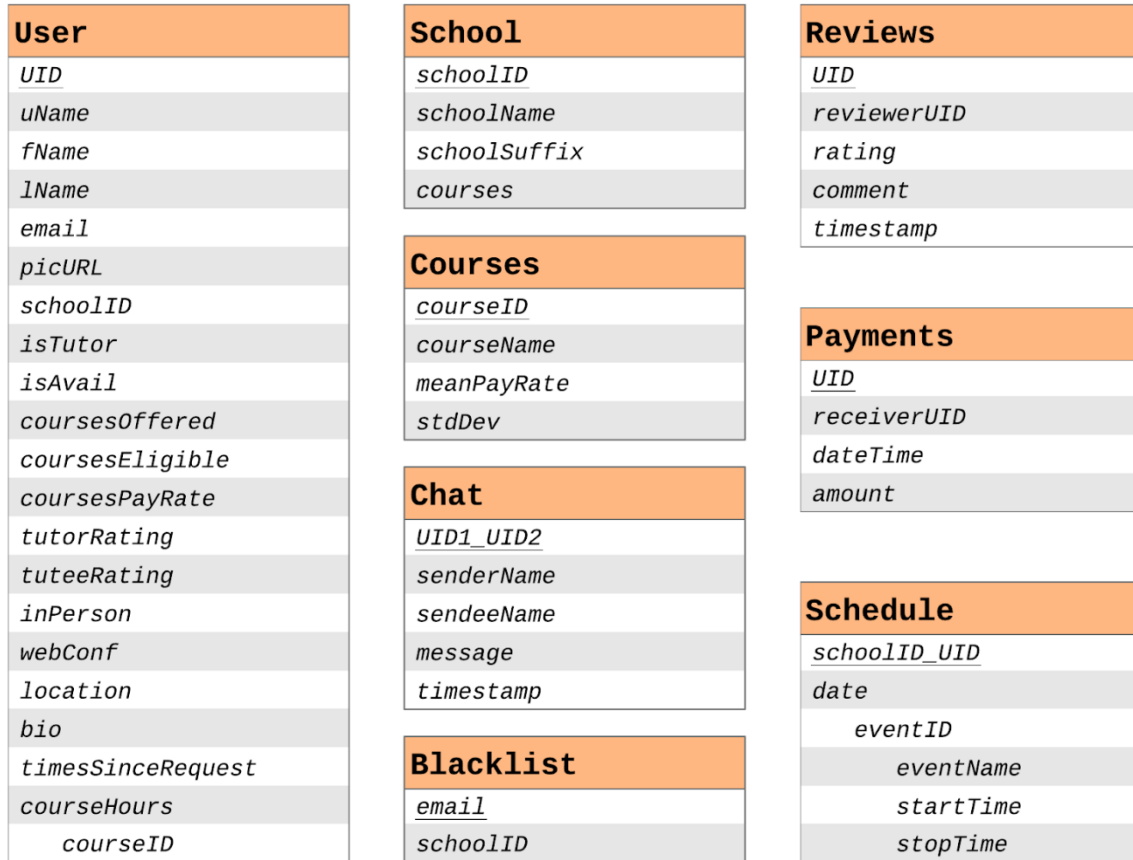


Figure 6: Database Schema

- Braintree: Allows Tutor Dash to handle in-app payments.
- Google Maps API: Provides the capability to use the map discovery view.
- Google Calendar API: Allows users to view a calendar that displays their current schedule.

2.3.3 User Interfaces

Tutor Dash will only be compatible with Android devices. To use the application, users must have Android API 16 or later installed, and their device must have GPS capabilities.

2.3.4 Communications Protocols and Interfaces

Users must have access to the Internet to use any of Tutor Dash's features.