

Tutor Dash

Find a tutor. Be a tutor.

Old Dominion University
CS410 - Team Gold
Spring 2019
April 23, 2019

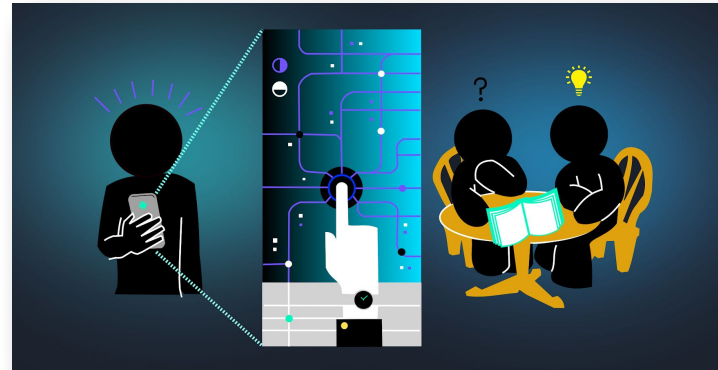


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Team Gold



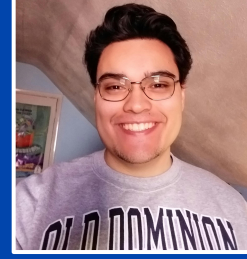
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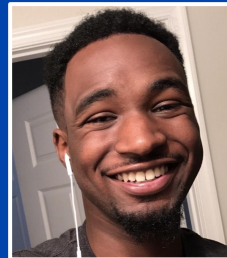
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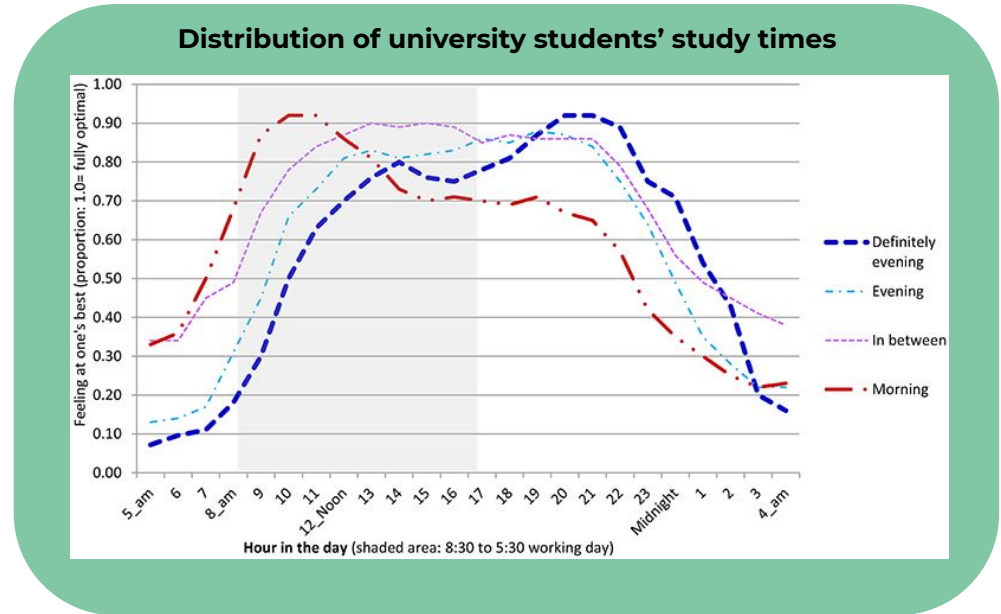


Dwight Owings

Tester
Quality Assurance

Availability of University Tutoring Programs

- University students study at no specific time of the day.
- Studies even suggest that more students study at night (as opposed to daytime).



Source: Evans MDR, Kelley P and Kelley J (2017)

The Private Tutoring Market

- Private tutoring is a growing industry.
- However, there is no centralized network for tutors.
- Most tutor-hosting services only tend to focus in the online tutoring market.



Source: technavio.com



University Students as Tutors

- Student-to-student interactions are effective; tutees learn more cognitively through bonds with their peers.
- PAL is a peer mediated instructional program where students tutor their peers.
- Peer Assisted Learning Programs (PAL) proves that students tutoring other students is effective.
- University students are willing to tutor people what they know in their free time if it is easy to find people to tutor.



Problem Statement

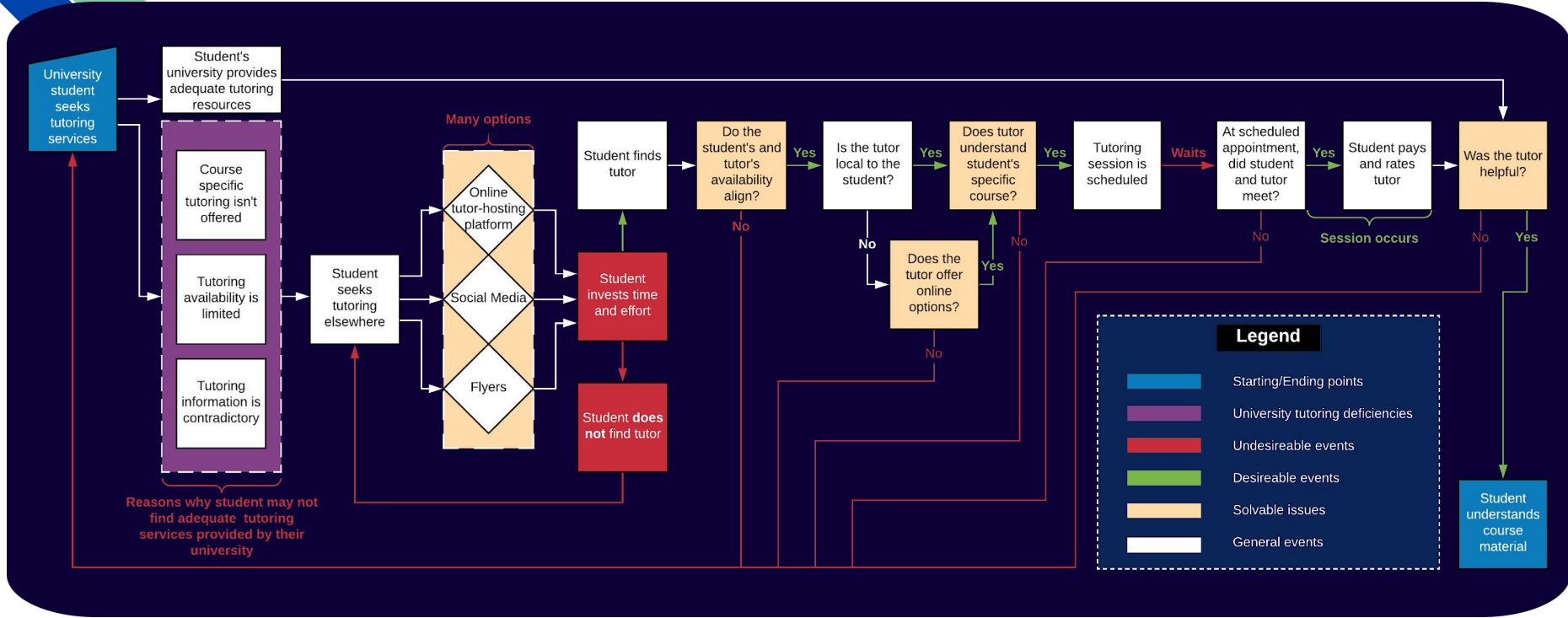
1. Tutoring services available to university students are limited in scope, do not provide flexibility, and lack a centralized platform for promotion.
2. Students willing to provide tutoring services lack a tool to promote those services.



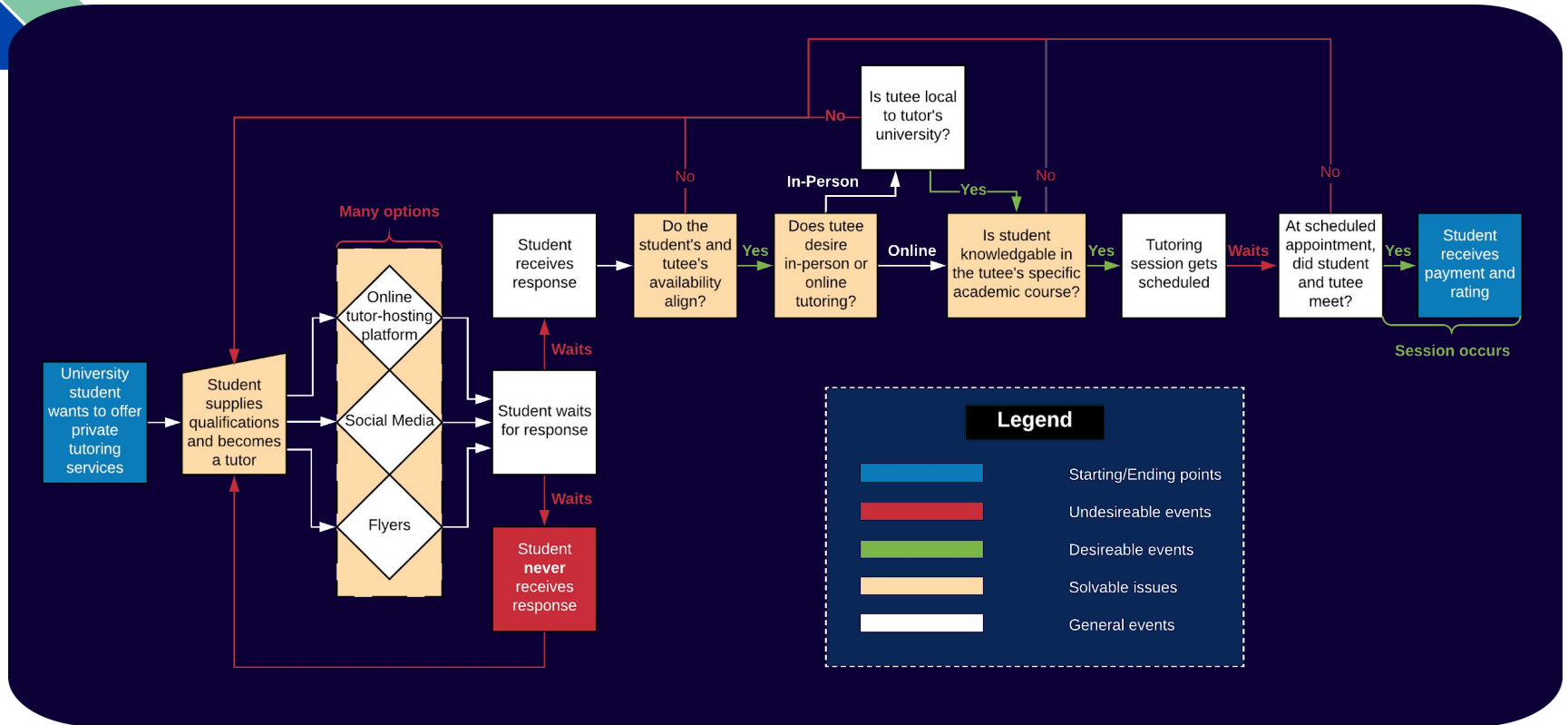
Problem Characteristics

- Limited Scope; not all courses offer tutoring
- Tutoring services do not encompass all study times.
- Information inconsistency; university tutoring information is spread out
- Private tutors are complete unknowns. University students have difficulty estimating a tutor's helpfulness before a meeting.
- Students do not have an adequate platform to advertise their tutoring services.

Current Process - Tutees Seeking Tutors

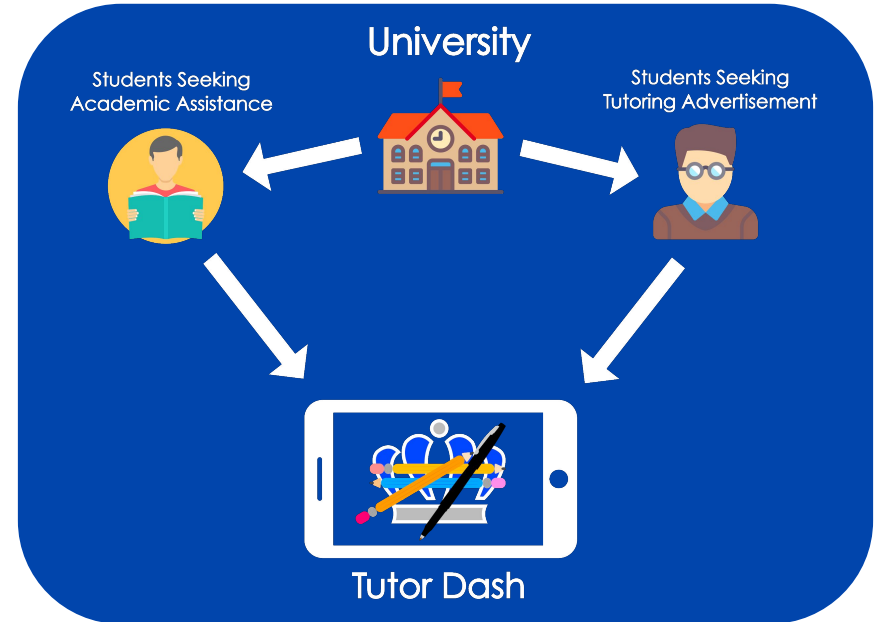


Current Process - Tutors Seeking Tutees



Proposed Solution - Tutor Dash

- Tutor Dash is a mobile application-based service that unifies university students who are interested in tutoring with university students who desire course-specific tutoring in real-time.
- Tutor Dash provides an extension of any university's current tutoring services so that students can receive help for all courses 24/7.



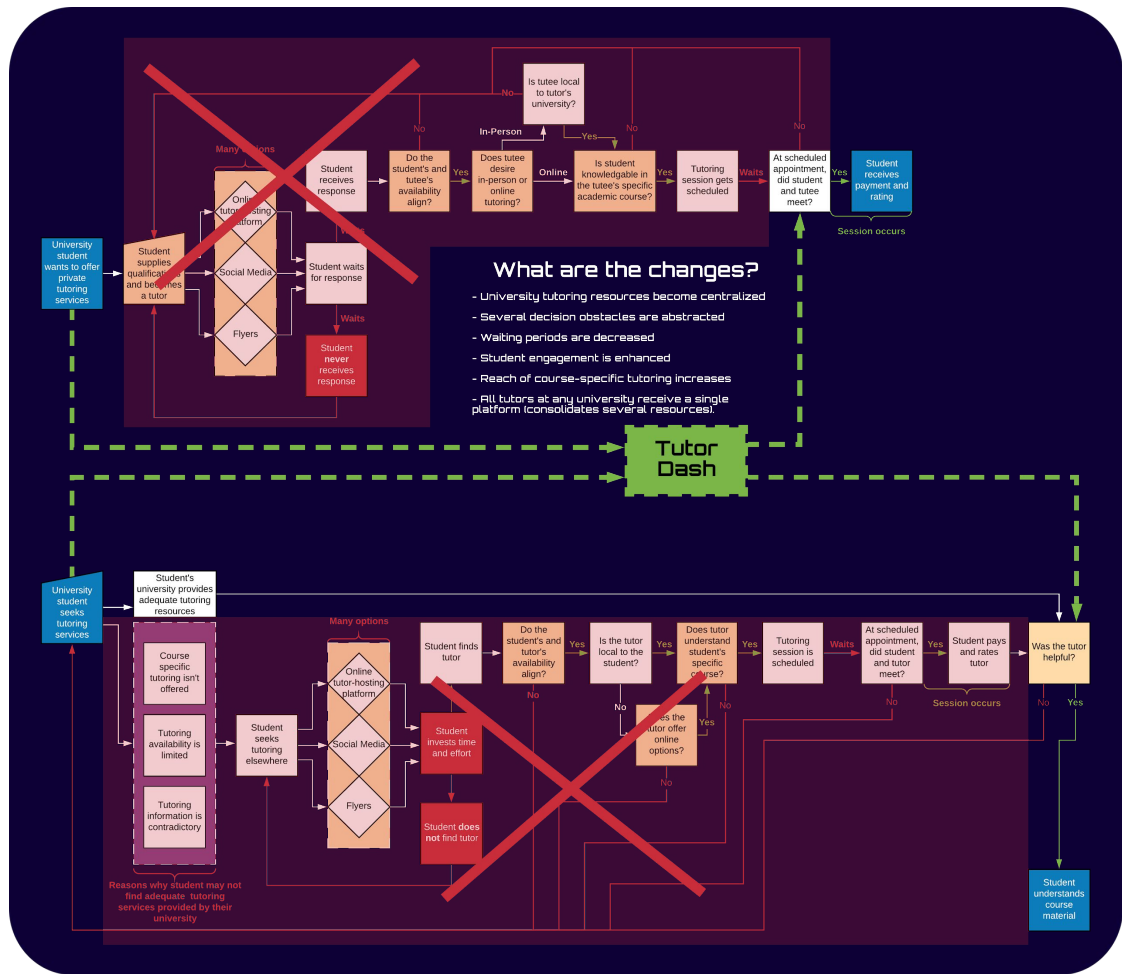


Characteristics of Tutor Dash

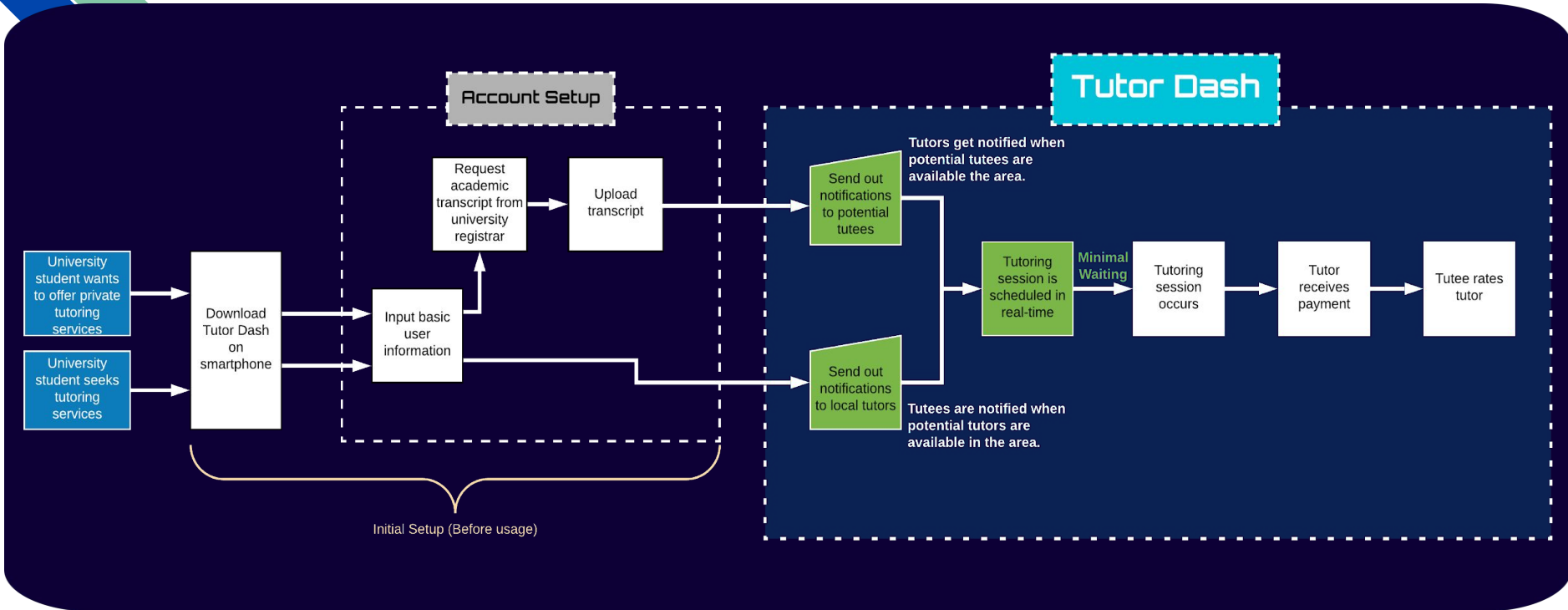
- User-base constrained to university students
- Every tutor verified based on their previously taken classes
- Rating system for both tutors *and* tutees
- Qualified tutors can tutor in any class available at their respective university
- Tutors and tutees can be available at any time
- Notifications sent to connect participating tutors and tutees
- Allows for in-person and online meetings
- Mechanism for payment within application

How Tutor Dash Affects the Current Processes

- Creates a more obvious connection between tutors and tutees at universities
- Niche tool for participating tutors and tutees
- More centralization → Less options → More opportunity



Current Process Flows & Tutor Dash





What Tutor Dash Won't Do

- Not an “official” university tutoring resource, rather a tool for presenting information on a unique platform
- Will not make any money off of existing university tutoring resources
- Will not interfere with current university tutoring resources; only improve advertisement to extend reach
- Will not violate the Family Education Rights and Privacy Act (FERPA)
- Cannot guarantee there is a tutor for everyone online 24/7
- Cannot prevent students from voluntarily violating the honor code
- Will not be a hosting platform for established tutoring businesses

Customers

- University students seeking tutoring services (academic help)
- University students interested in tutoring (providing academic help)



End Users

University student bodies:

- University students looking for tutors
 - Seeking immediate help
 - Seeking future help
- University students looking for tutees
 - Seeking network growth
 - Seeking extra money



User Roles

Tutee



- University student
- Seeks academic assistance

Private Tutor



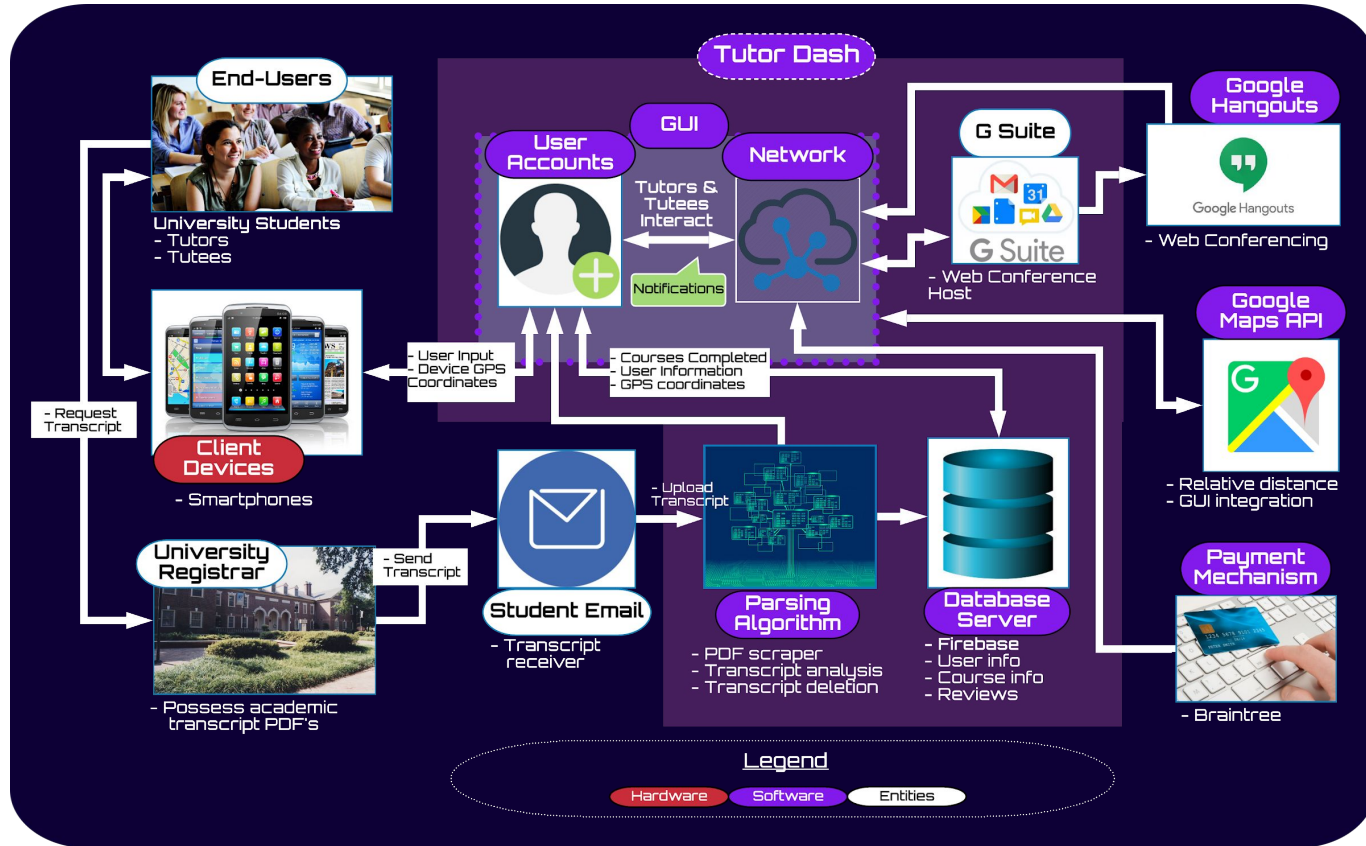
- University student
- Qualified to tutor previously taken courses
- Offers tutoring services
- Works independently

* See Appendix A for user stories

Competition

	US	DIRECT COMPETITORS					INDIRECT COMPETITORS	
Features	Tutor Dash	Tutor.com	Tutor Matching Service	Skooli	Wyzant	HeyTutor	Care.com	Public Facebook Group
Offers various university course-specific tutoring	✓	✓	✓	✗	✗	✗	✗	✗
Allows qualified undergraduate students to be tutors	✓	✗	✗	✗	✗	✗	✗	✗
Sends notifications about local tutors/tutees	✓	✗	✗	✗	✗	✗	✗	✗
Qualified tutors are constrained to university communities	✓	✗	✗	✗	✗	✗	✗	✗
Provides real-time scheduling capabilities	✓	✓	✗	✗	✗	✗	✗	✓
Available as mobile application	✓	✓	✓	✗	✓	✓	✓	✓
Includes online tutoring options	✓	✓	✓	✓	✓	✗	✗	✓
Includes in-person tutoring options	✓	✗	✓	✗	✓	✓	✓	✓
Provides tutor ratings	✓	✓	✓	✓	✓	✓	✓	✗
Establishes hourly rate ceilings	✓	✓	✓	✗	✗	✗	✓	✗
Requires tutor verification/validation	✓	✓	✓	✓	✓	✓	✗	✗
Does not require subscription commitment	✓	✗	✗	✗	✗	✗	✓	✓
Provides 24/7 scheduling	✓	✓	✓	✓	✓	✓	✓	✓

Major Functional Component Diagram



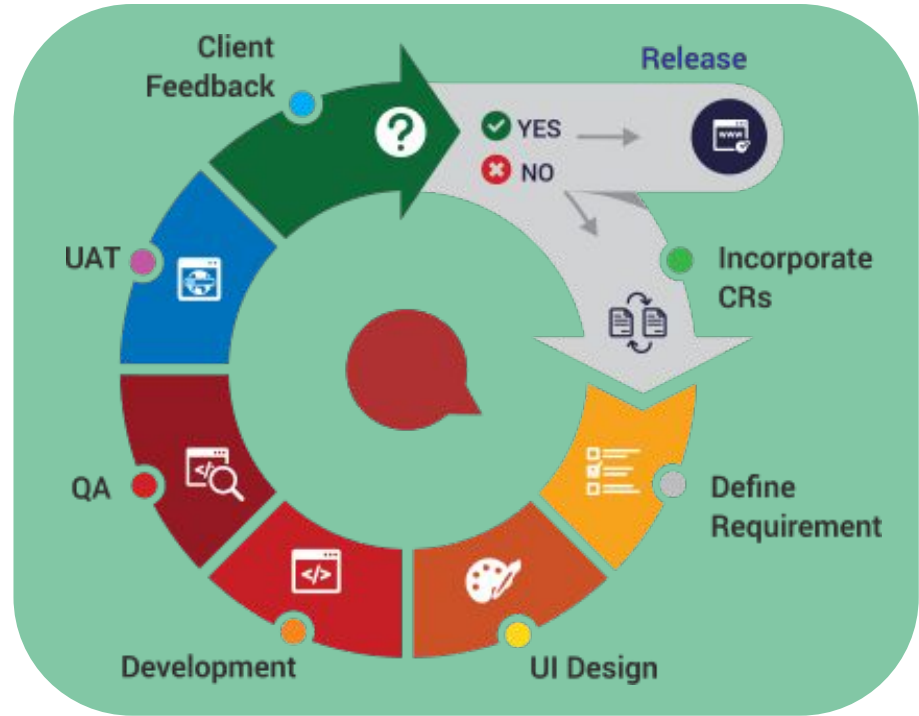
Development Tools

Component	Android	iOS
<i>Language</i>	Java	Swift
<i>IDE</i>	Android Studio	Xcode
<i>UI/UX</i>	Android Studio	Xcode
<i>Database</i>	Firebase	Firebase
<i>Payment Mechanism</i>	Braintree	Braintree
<i>Build Manager</i>	Gradle	Swift Package Manager
<i>Version Control</i>	GitLab	GitLab
<i>Issue Tracker</i>	Trello	Trello
<i>Testing Framework</i>	JUnit/Firebase	XCTest/Firebase

* Due to Team Gold's knowledge of Android development, this will be our focus when developing the prototype.

Development Model - Agile

- Work completed in brief time iterations
- Testing implemented throughout development
- Focus on observable behavior

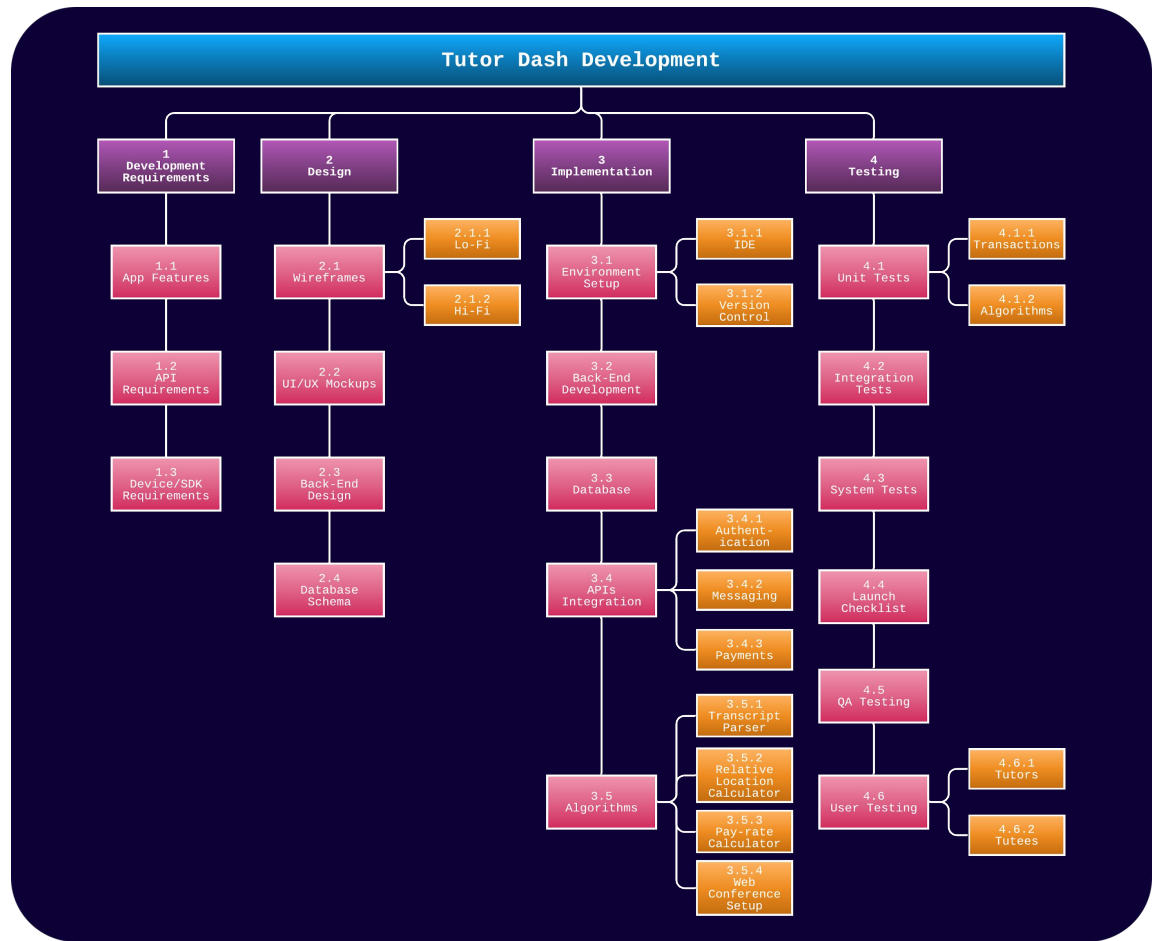


Source: *Integrain Technologies*

Work Breakdown Structure

1. Development Requirements
2. Design
3. Implementation
4. Testing

* Testing and Implementation will be done in parallel.



Core Components

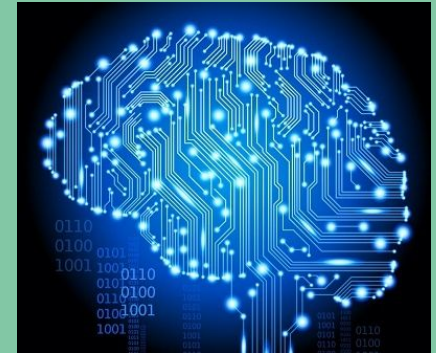
UI/UX



Database



Algorithms





User Interface & User Experience Design



UI/UX Breakdown

Tutor Dash's UI/UX design is broken down into 4 phases and 2 views:

Phases

1. Login/Sign up
2. Tutor/Tutee Discovery
3. Session Selection
4. Active Session

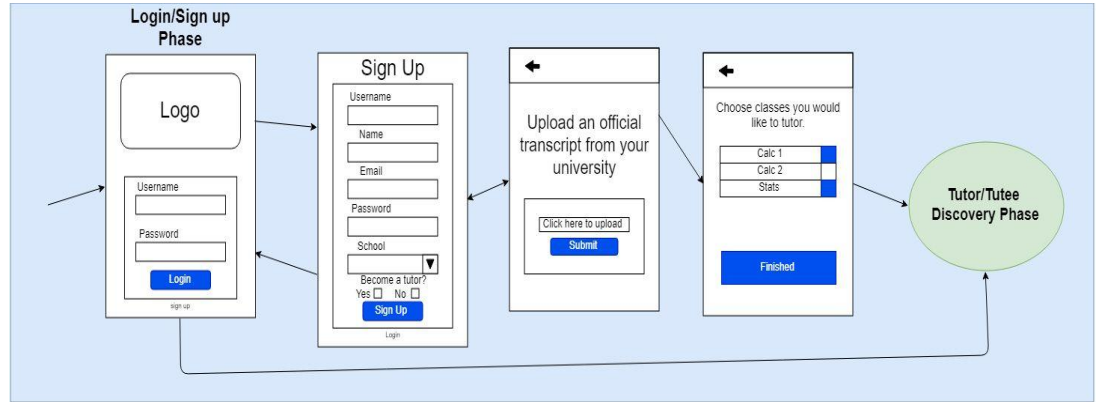
Views

1. Settings
2. Profile Edit

Phase 1: Login/Sign Up

The Login/Sign-Up Phase allows the user to do the following:

- Sign up and register as a user (either tutee or tutee and tutor)
- Login to registered account
- Upload transcript for tutor authentication
- Initialize personal list of tutored classes from list of all permitted classes

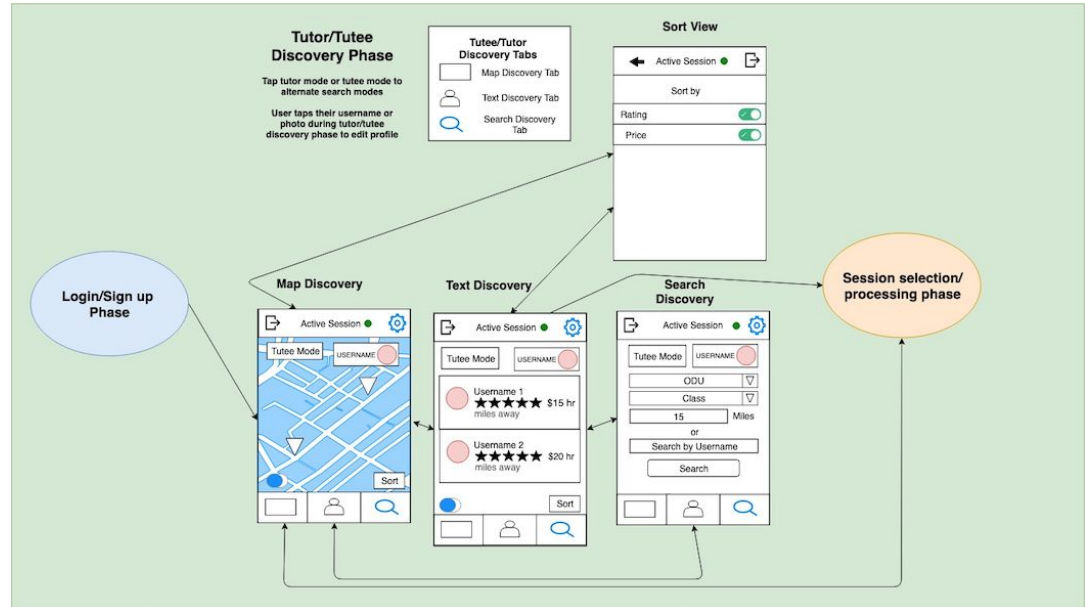


* See Appendix B for UI/UX context

Phase 2: Tutor/Tutee Discovery

The Discovery Phase allows users to do the following:

- Search for tutors or tutees based on mode through map or text
- Change view modes from map/text
- Change or sort content of map or text view through search criteria
- Search for a specific tutor in search view
- Change status to or from active

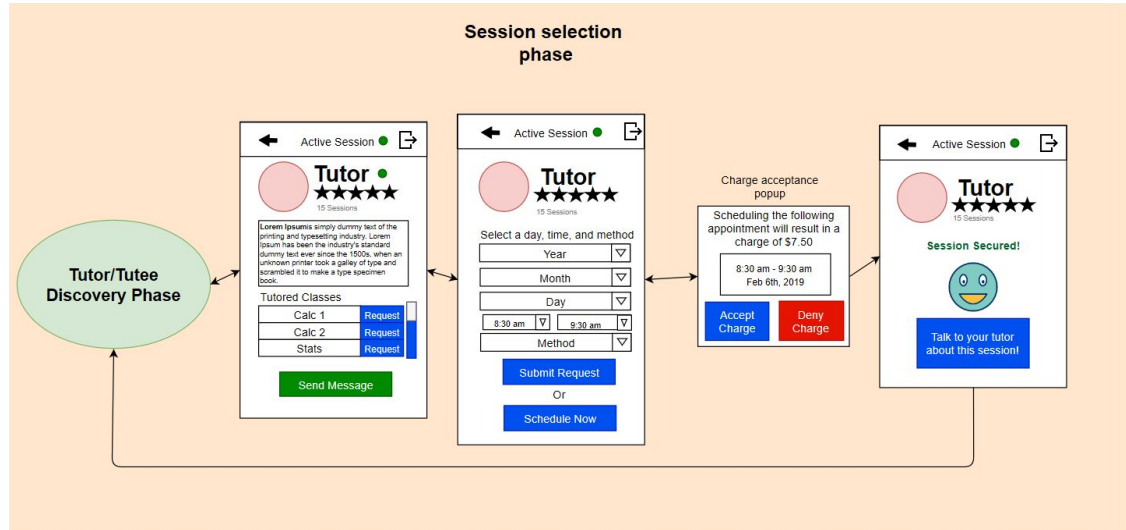


* See Appendix B for UI/UX context

Phase 3: Session Selection

The Session Selection Phase gives the user the ability to do the following:

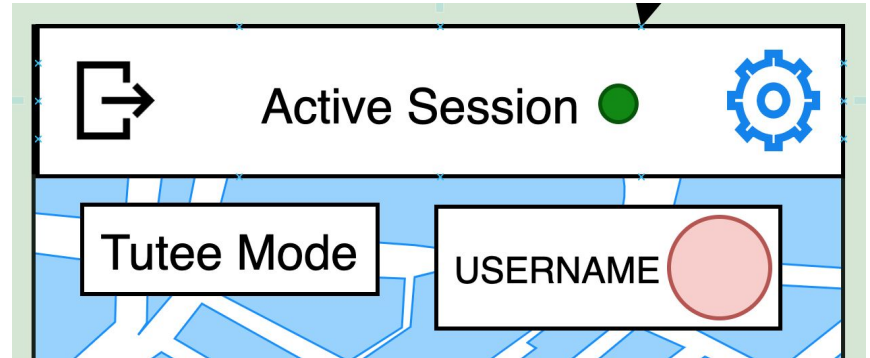
- View user information:
 - Username
 - Ratings
 - Bio
 - Classes available for tutoring
- Send messages to other users
- Schedule sessions from a tutor's available times
- Schedule sessions ASAP (in real-time)



* See Appendix B for UI/UX context

Phase 4: Active Session - A

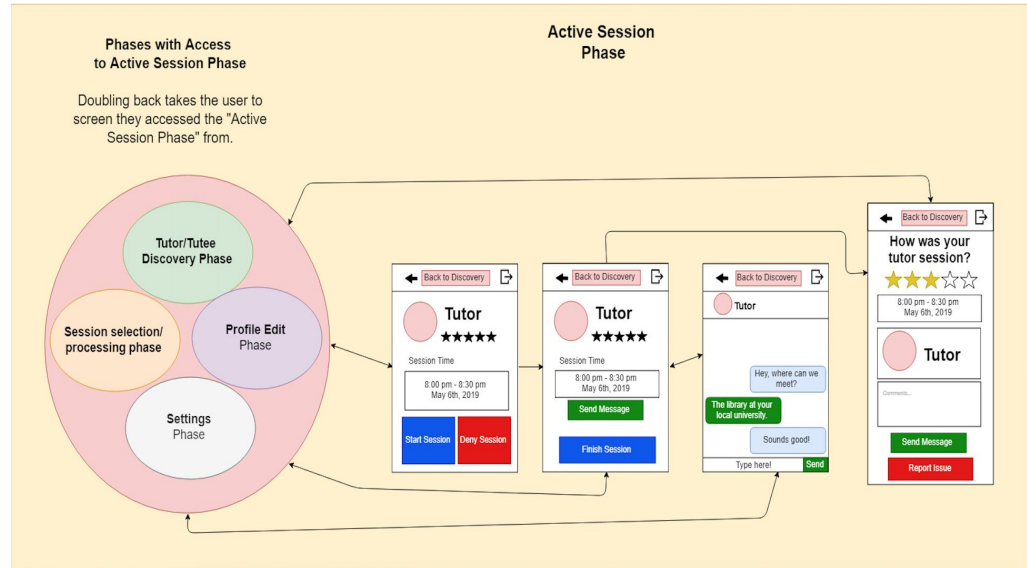
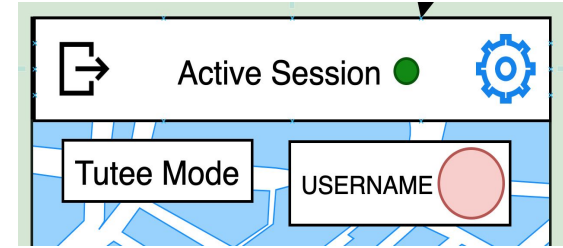
- The Active Session Phase is accessible from any screen where the “Active Session” beacon is presented.
- The beacon’s availability is dependent on the user’s scheduled sessions.
- Users may toggle in and out of their active sessions to and from the phase/screen they entered from.



Phase 4: Active Session - B

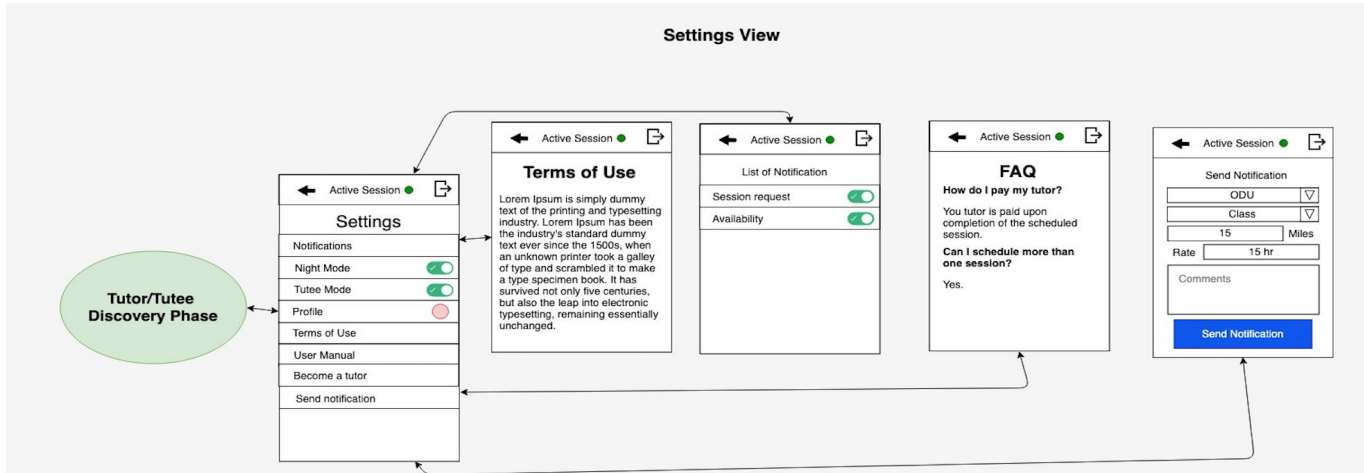
The Active Session Phase gives the user the ability to do as follows:

- Begin scheduled tutoring session.
- Communicate through in-app messaging system to coordinate session details with tutor.
- Dictate end of tutoring session upon completion.
- Rate tutor out of 5 stars and review them for the recently-finished session
- Report issue with current session and/or tutor.



* See Appendix B for UI/UX context

View 1: Options and Settings



* See Appendix B for UI/UX context

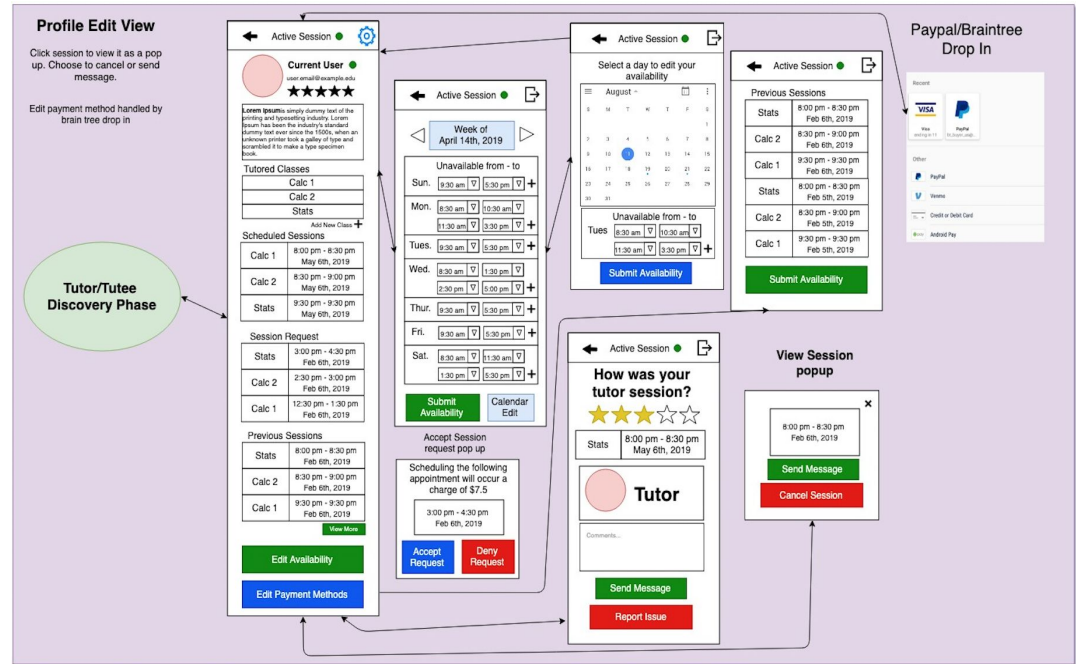
Users can:

- Modify Notifications
- Toggle Night Mode
- View Calendar for future sessions
- View their profile
- View the 'Terms of Use' policies
- View user's manual
- Become a tutor
- Send out local notifications

View 2: Profile Edit

The Profile Edit Phase gives the user the ability to do as follows:

- View their account information:
 - Username
 - Email
 - Rating
 - Bio
 - Tutored classes
 - Scheduled session(s)
 - Session request(s)
 - Previous session(s)
 - Availability
- Modify any of the aforementioned elements other than personal rating



* See Appendix B for UI/UX context



Database



Firestore

- Firestore is a mobile and web application development platform.
- Tightly integrated with Google Cloud Platform
- Tutor Dash will use the following Firestore products to handle backend services:
 - Cloud Firestore - Database
 - Firestore Auth - User Authentication
 - Cloud Storage - File Storage



Firestore

Used By:



venmo



trivago



Cloud Firestore

- NoSQL document-oriented database
- Keeps data synced across all client devices in real time
- Designed for automatic scalability
- Database will store user information, school information, schedules, messaging, and reviews.



Database Schema

User
<u>UID</u>
uName
fName
lName
email
picURL
schoolID
isTutor
isAvail
coursesOffered
coursesEligible
coursesPayRate
tutorRating
tuteeRating
inPerson
webConf
location
bio
timesSinceRequest

School
<u>schoolID</u>
schoolName
schoolSuffix
courses

Courses
<u>courseID</u>
courseName
meanPayRate
stdDev

Chat
<u>UID1_UID2</u>
senderName
sendeeName
message
timestamp

Reviews
<u>UID</u>
reviewerUID
rating
comment
timestamp

Schedule
<u>schoolID_UID</u>
date
eventID
eventName
startTime
stopTime

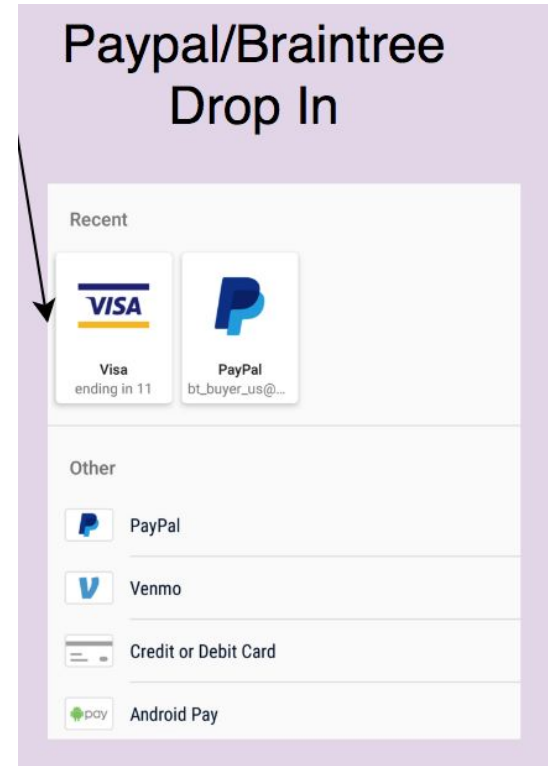


User Authentication & Cloud Storage

- User Authentication
 - Authentication allows users to create an account using email and password.
 - Capable of sending email confirmation to activate account.
 - Integrates with Cloud Firestore for secure DB access.
- Cloud Storage
 - Capable of storing user generated content such as photos and videos.
 - High scalability. Same infrastructure that powers Spotify and Google Photos.

Braintree - Payments

- Collection of cross-platform tool sets that allow developers to include multiple payment options safely within their applications
- Include drop-in UIs
- Managed by PayPal
- Used by several well-known companies such as Uber and Poshmark
- *Required toolsets*
 - Braintree Java SDK
 - Braintree Android v3 SDK



* See Appendix B for UI/UX context



Algorithms

PDF Transcript Parser

- **Purpose**

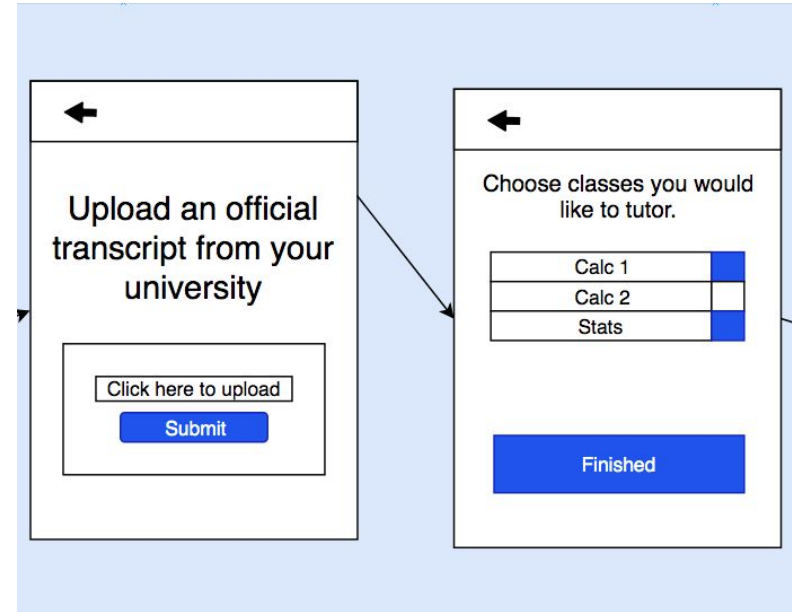
- Determine which classes a user is qualified to tutor
- Add new courses being tutored to the database

- **Tools**

- PDFBox Java Library

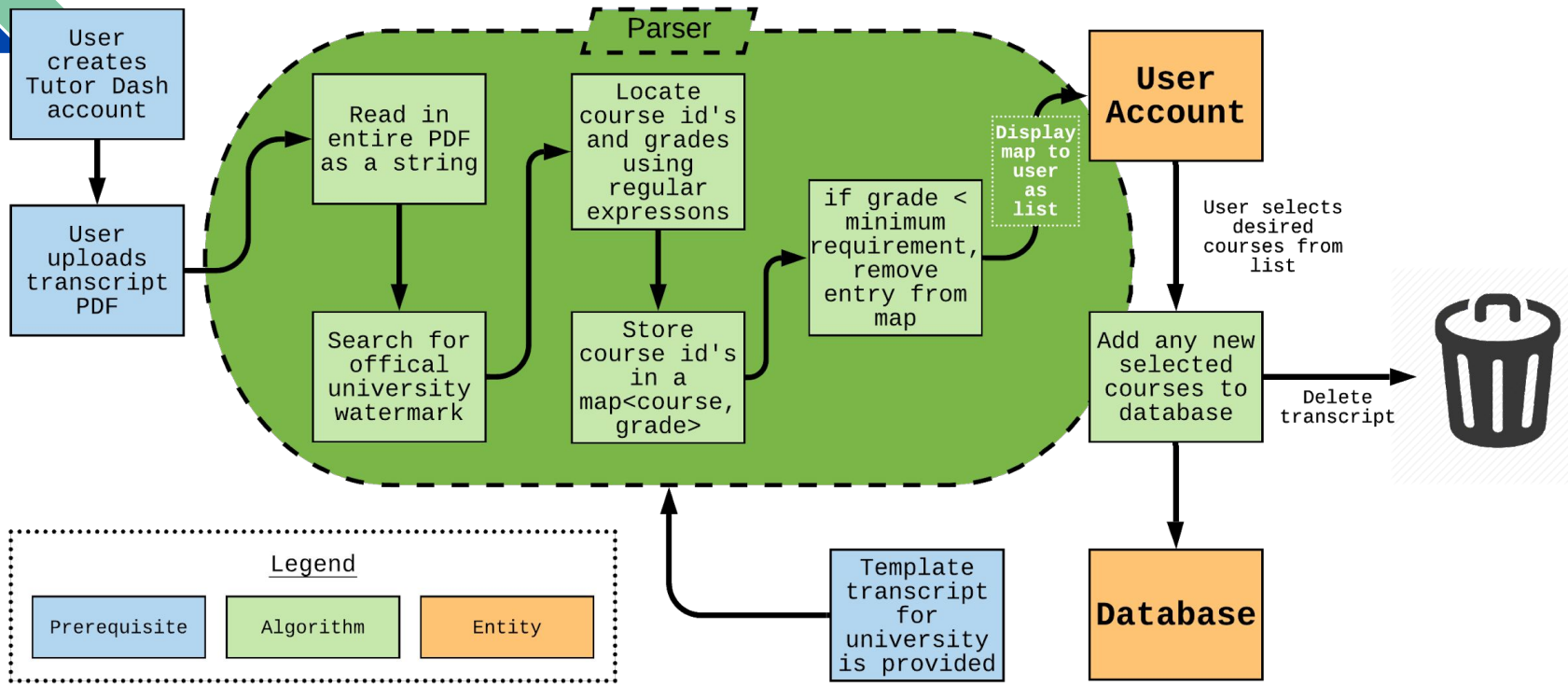
- **Parameters**

- University name
- Transcript (PDF)
- Minimum qualifying grade



* See Appendix B for UI/UX context

PDF Transcript Parser - Logic Flow



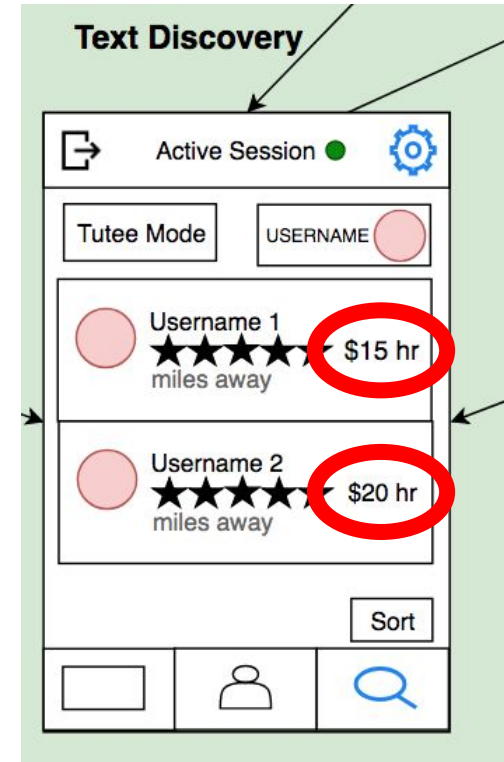
Pay-Rate Calculator

- **Purpose**

- Keep pay-rates competitive by providing an upper bound based on various factors
- Alleviate the possibility of tutors not getting hired often enough

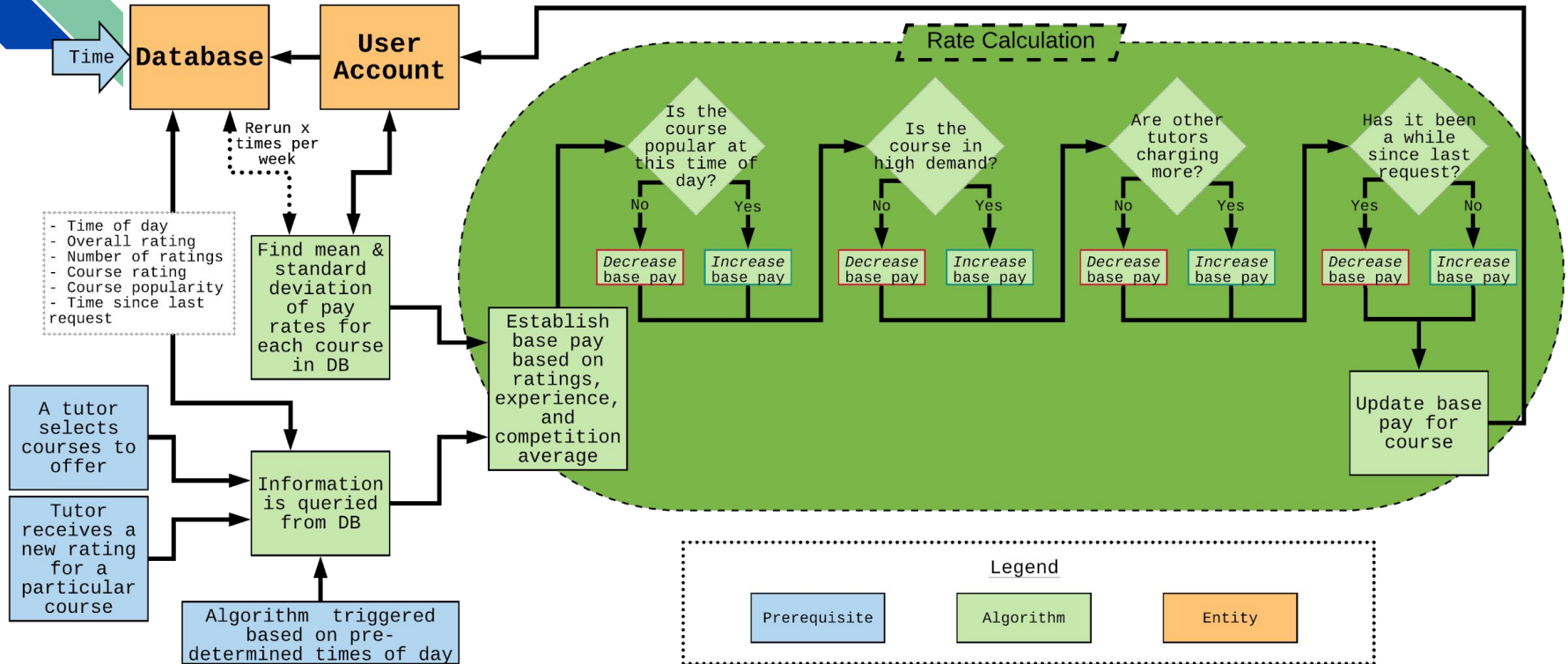
- **Parameters**

- Tutor rating (course-specific)
- Tutor rating (overall)
- Course demand/popularity
- Number of ratings
- Time of day
- Mean & standard deviation of rates for courses
- Time since tutor's last request in that course



* See Appendix B for UI/UX context

Pay-Rate Calculator - Logic Flow



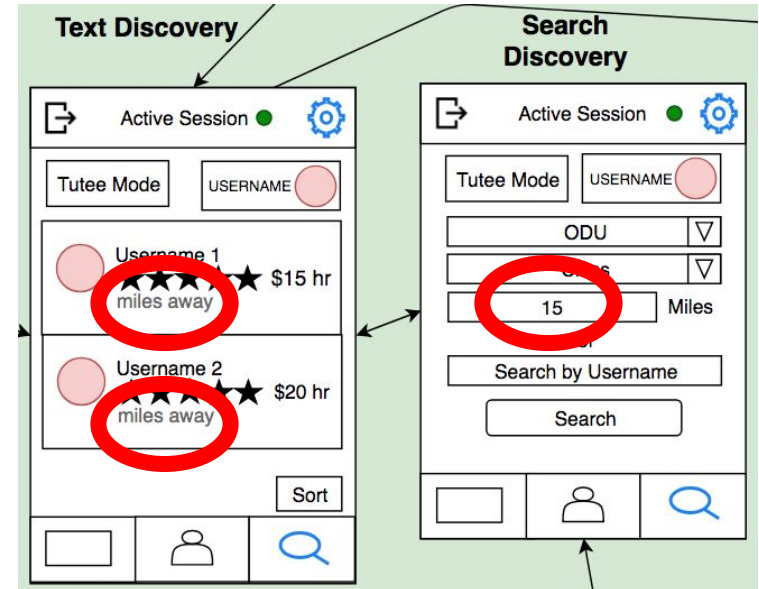
Relative Distance Estimator Algorithm

- **Purpose**

- Display how far a set of users B is from user A based on user A's search results.
- Keep the distance information updated as often as possible

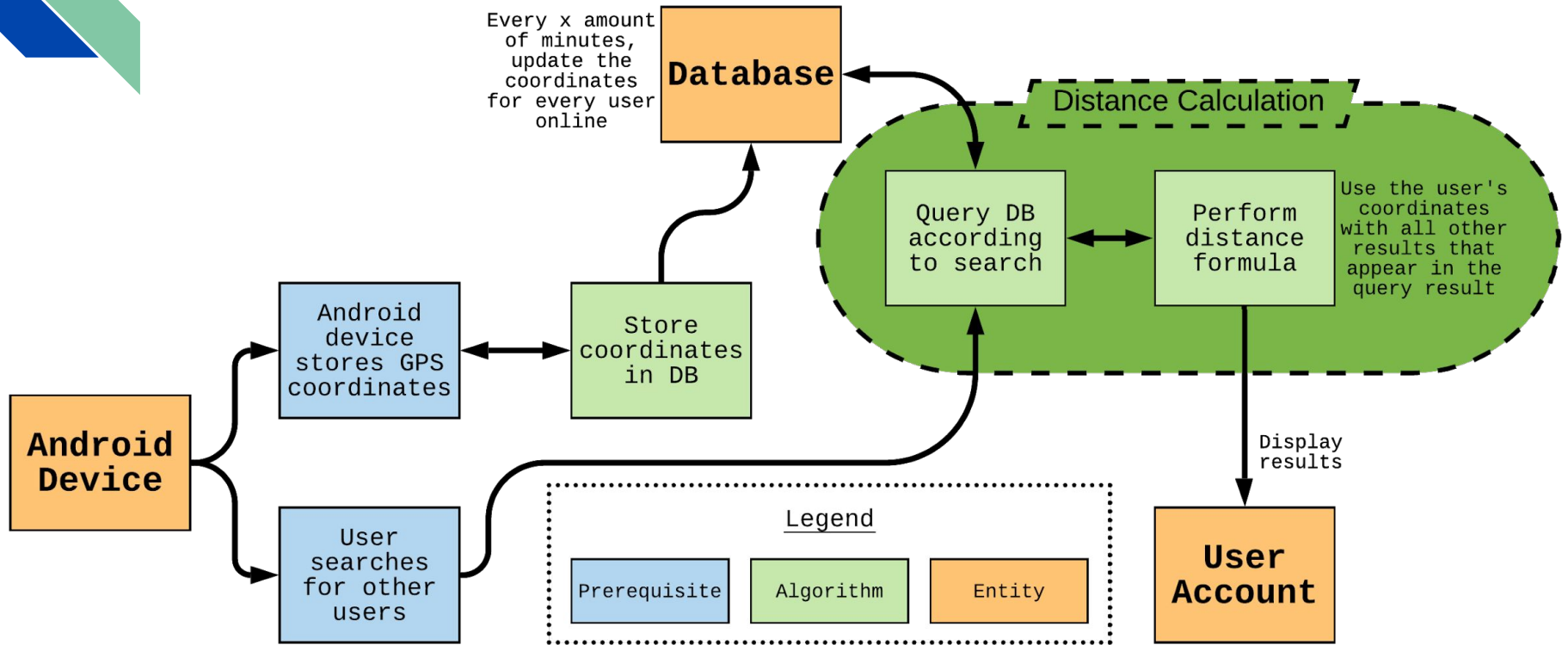
- **Parameters**

- Time
- Time interval for updates
- Android device's GPS coordinates
 - User A's longitude/latitude
 - Every user in B's longitude/latitude



* See Appendix B for UI/UX context

Relative Distance Estimator - Logic Flow



Web-Conference Appointment Creator

- **Purpose**

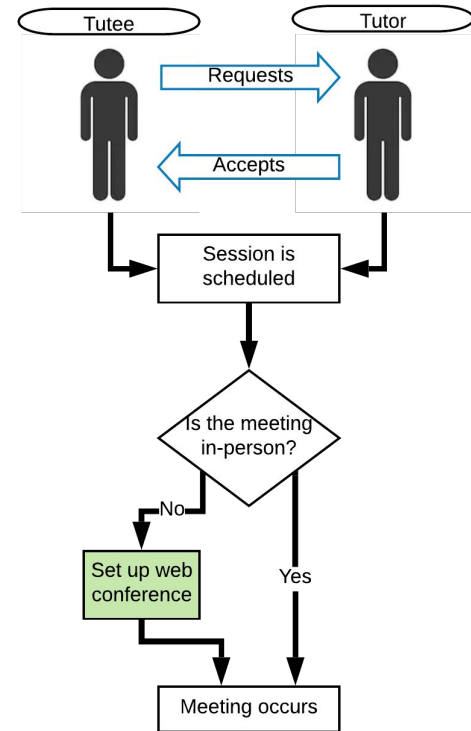
- Create a google hangouts meeting for two user's if the tutoring session in question is via web-conferencing

- **Tools**

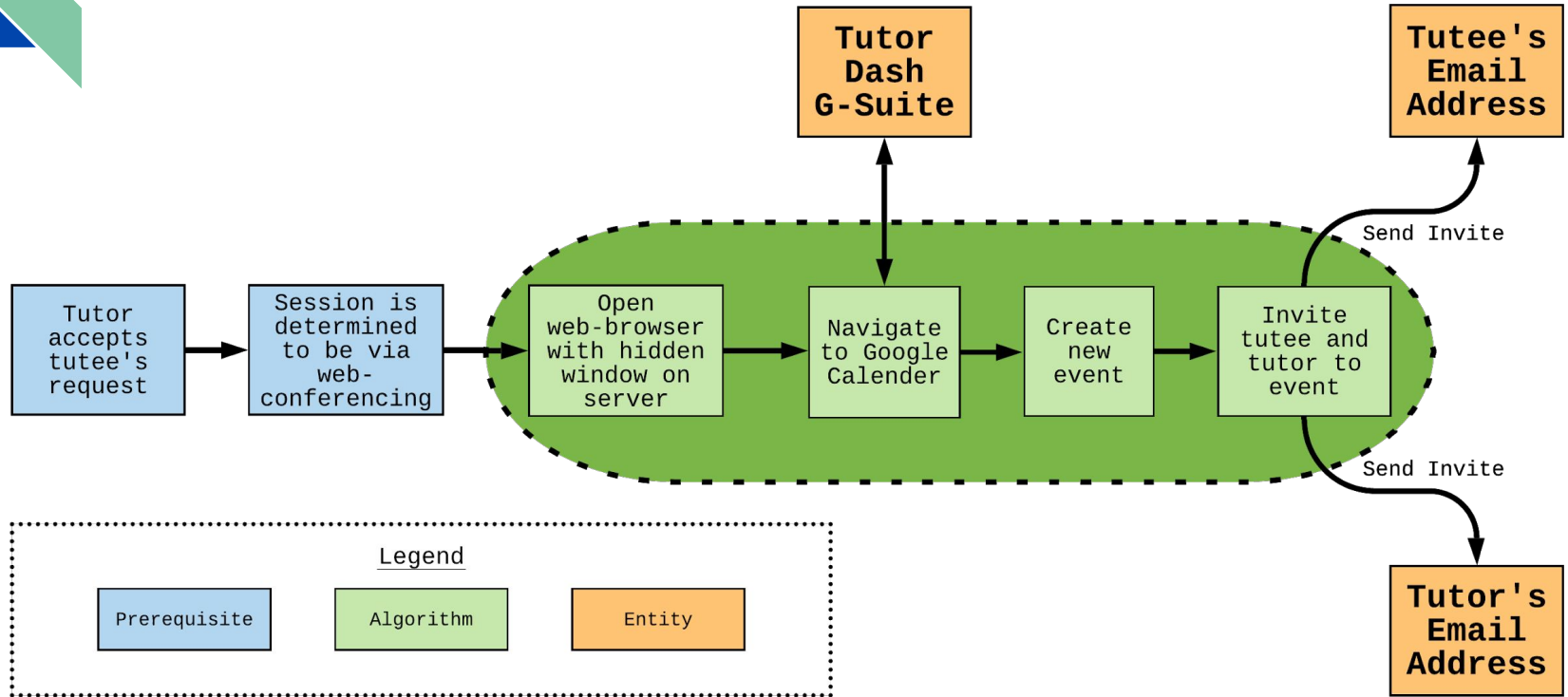
- Selenium Webdriver (Java)

- **Parameters**

- Start time of session
- End time of session
- User email addresses
 - Tutor
 - Tutee



Web-Conference Appt. Creator - Logic Flow



Hardware System Requirements

- Android API 16 (JELLY_BEAN) is required for both Firebase and Braintree
- Devices must have GPS capabilities



Risk Matrix

- “C” → Customer Risks
- “T” → Technical Risks
- “L” → Legal Risks

← Probability →

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

* See Appendix C for all risks

Customer Risks - C1

- **Risk:** Student finds tutors to be unhelpful

- **Mitigation**
 - Rating system
 - Payment refunds

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C2

- **Risk:** Prospective tutors faking their qualifications

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

- **Mitigation**

- Require official transcript (PDF) from university registrar
- Make tutors only eligible to tutor classes he/she has received a B or higher in

Customer Risks - C3

- **Risk:** Shortage of tutors

- **Mitigation**

- Give small bonuses to tutors for a limited time
- Similar to Uber's business model

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C4

- **Risk:** Shortage of tutees

- **Mitigation**

- Give free sessions to new users
- Give loyalty-free sessions for a certain number of usages

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C5

- **Risk:** Tutee/tutor leaves a false negative review

● Mitigation

- Users can challenge reviews (Requires manual investigation)
- Withhold all ratings/reviews until users agree

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C6

- **Risk:** Users abuse application; use application maliciously

- **Mitigation**

- Require users to agree to a terms of use agreement
- Blacklist users who misuse application

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C7

- **Risk:** Identity theft; non-users impersonate users and/or users impersonate other users

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

- **Mitigation**

- Re-authentication when navigating to app from outside window
- “Handshake” agreement between users when sessions begin

Customer Risks - C8

- **Risk:** Participating tutor/tutees don't show up to their scheduled meetings

- **Mitigation**
 - Preallocate payments
 - Require deposits
 - Threat of poor ratings

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Customer Risks - C9

- **Risk:** Users try to book overlapping sessions

- **Mitigation**

- Only allow users to make appointments for times they don't currently have a scheduled session
- Applies to both tutors and tutees

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T1

- **Risk:** Payment is not received

- **Mitigation**

- Integrate usage of a 3rd party API designed to handle e-transactions
- Braintree

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T2

- **Risk:** Difficulty automating the process of reading a submitted transcript

- **Mitigation**

- Define reusable code for general case
- Optimize as more information is discovered

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T3

- **Risk:** Database server failure

- **Mitigation**

- Use reliable servers maintained by large corporations
- Firebase

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T4

- **Risk:** Security breach

- **Mitigation**

- Use 3rd party APIs which are already secure

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T5

- **Risk:** Application is not compatible on all android devices

- **Mitigation**

- Define minimum SDK for weaker hardware phones
- Define normal SDK for normal hardware phones

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T6

- **Risk:** Network server failure

- **Mitigation**
 - Server redundancy

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Technical Risks - T7

- **Risk:** Pay-rate algorithm doesn't calculate competitive rates

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

- **Mitigation**

- Determine a base pay that will increase/decrease due to various factors
- Compare pay-rates of similarly rated tutors who tutor the same courses

Technical Risks - T8

- **Risk:** Web-conferencing session is not set up properly

- **Mitigation**

- Use Google Hangouts
- Use one or more G Suite hosts operated by Tutor Dash

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

Legal Risks - L1

- **Risk:** Violating The Family Education Rights and Privacy Act (FERPA)

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact

- **Mitigation**

- No portal access
- Transcripts are analyzed then thrown out
- Users agree to grade disclosure in terms of use agreement

Legal Risks - L2

- **Risk:** Users use application for illegal activities

- **Mitigation**

- Terms of use agreement
- Reporting features

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Impact



Benefits to Customer/User-base

- Expands the scope of any university's course-specific tutoring program(s).
- Decreases availability conflicts.
- Tutors aren't waiting around for responses.
- Reduces frequency of cancellations by providing real-time scheduling.
- As tutoring increases, DFWI (Drop/Fail/Withdraw) rates decrease. Students save GPA and money.
- Students won't have to go out of their way in search of tutoring services since they are contained conveniently in one place.
- Alleviates frustration in regards to contradictory information. Improves information consistency.



Future Goals

- Various university support
- Active community 24/7
- Every class offered at every university in the system has at least one eligible tutor
- Repeat/long-term customers

Conclusion

- *Our solution aims to engage university students and help them find what they need in an easier and more convenient format than what currently exists.*
- Some students need tutors
- Some students want to tutor
- Tutor Dash makes the connection obvious





Questions?



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Appendix A1 - User Stories (Tutees)

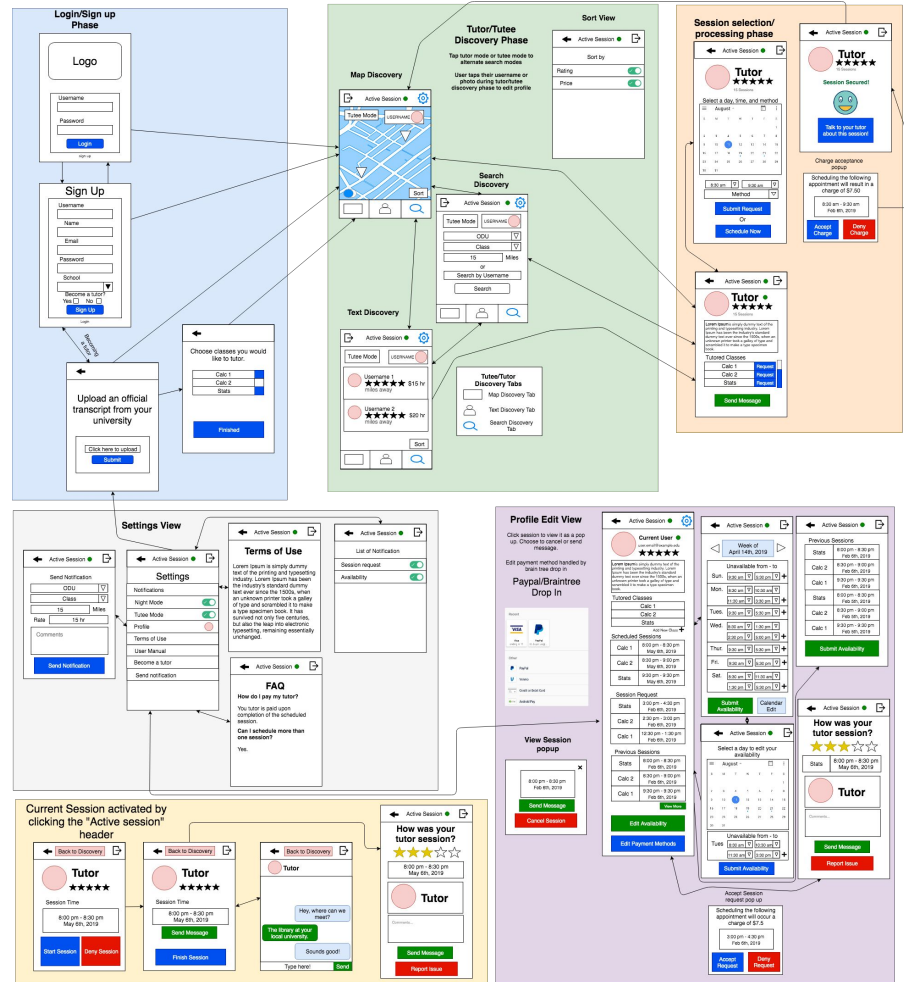
- As a **tutee**, I would like...
 - a. The ability to receive tutoring in any class which I am enrolled in.
 - b. The ability to receive/request tutoring at any time of the day.
 - c. The ability to message tutors in real-time before hiring them.
 - d. (*Optional*) The ability to receive tutoring in groups which I create.
 - e. (*Optional*) The ability to form groups and divide the tutor's payment amongst members.
 - f. To search for tutors who attend my university within a certain radius.
 - g. To search for classes I need help in and receive a list of tutors.
 - h. Registered tutors to be qualified and authorized to tutor me.
 - i. The ability to leave ratings and reviews based on my experiences with tutors.
 - j. The ability to report malicious activity regarding authorized tutors' activities.
 - k. Tutors to be notified when I am looking for them.
 - l. The ability to confirm that a session did, in fact, occur.
 - m. The ability to receive tutoring in both online and in-person meetings.
 - n. The ability to search for tutors tutoring any course at my university.
 - o. The ability to reconnect with a tutor I liked so I can rehire them in the future.
 - p. Tutor profiles to be public when I search for them.
 - q. Sensitive account information to be private and secure.
 - r. My payment methods to be remembered.
 - s. Reassurance that the person I am meeting is the person they say they are.

Appendix A2 - User Stories (Tutors)

- As a **private tutor**, I would like...
 - a. Potential tutees to have access to my user profile.
 - b. Potential tutees to message me before scheduling a session.
 - c. Payment to be handled within my hosting service.
 - d. My charging pay-rate to be based on my experience.
 - e. Competitive pricing to be recommended.
 - f. Qualifications to be based on my previous coursework.
 - g. My ratings to be given only by tutees which I have tutored.
 - h. The ability to challenge poor/negative ratings and/or reviews.
 - i. The ability to rate tutees based on my experiences with them.
 - j. Notifications when potential tutees may be looking for my services.
 - k. Notifications when potential tutees message/hire me.
 - l. A mechanism for confirming a session did, in fact, occur.
 - m. Sensitive account information to be private and secure.
 - n. The ability to refuse service.
 - o. A means of toggling my availability in real-time.
 - p. A weekly schedule to be present on my profile for tutees to view.
 - q. Web-conferencing and in-person tutoring options.

Appendix B - UI/UX Wireframes

[Click Here to View Full Diagram](#)



Appendix C1 - Risk Matrix

Probability

	Very Low	Low	Moderate	High	Very High
Very High	T3, T4, L1	T6, L2		C3, C4	
High	T1, C7	C6			
Moderate	C5	T8	C1, C8, T7		
Low	C2, T5		T2		
Very Low		C9			

Appendix C2 - Customer Risks

ID	Risk	Mitigation(s)
C1	Student finds tutors to be unhelpful	<ul style="list-style-type: none"> • Rating system • Payment refunds
C2	Prospective tutors faking their qualificaitons	<ul style="list-style-type: none"> • Require official transcript from university registrar • Make tutors only eligible to tutor classes he/she has received a B or higher in
C3	Shortage of tutors	<ul style="list-style-type: none"> • Give small bonuses to tutors for a limited time (similar to Uber's business model)
C4	Shortage of tutees	<ul style="list-style-type: none"> • Give free sessions to new users • Give loyaltee-free sessions for a certain number of usages
C5	Tutor/tutee leaves a false negative review	<ul style="list-style-type: none"> • Allow users to challenge reviews (requires manual investigation) • Withhold ratings/reviews until both users agree on justification
C6	Users abuse application; use app maliciously	<ul style="list-style-type: none"> • Require users to agree to the terms of use agreement • Blacklist (ban) users who violate terms of use agreement
C7	Identity theft; non-users impersonate users and/or users impersonate other users	<ul style="list-style-type: none"> • Re-authentication when navigating to app from outside window • "Handshake" agreement between users when sessions begin
C8	Participating tutor/tutees don't show up to their scheduled meetings	<ul style="list-style-type: none"> • Preallocate payments • Require deposits • Threat of poor ratings
C9	Users try to book overlapping sessions	<ul style="list-style-type: none"> • Only allow users to make appointments for times they don't currently have a scheduled session • Applies to both tutors and tutees

Appendix C3 - Technical Risks

ID	Risk	Mitigation(s)
T1	Payment is not received	<ul style="list-style-type: none"> • Integrate usage of a 3rd party API designed to handle e-transactions • Braintree
T2	Difficulty automating the process of reading a submitted transcript	<ul style="list-style-type: none"> • Define reusable code for general case • Optimize as more information is discovered
T3	Database server failure	<ul style="list-style-type: none"> • Use reliable servers maintained by large corporations • Firebase
T4	Security breach	<ul style="list-style-type: none"> • Use 3rd party APIs which are already secure
T5	Application is not compatible on all android devices	<ul style="list-style-type: none"> • Define minimum SDK for weaker hardware phones • Define normal SDK for normal hardware phones
T6	Network server failure	<ul style="list-style-type: none"> • Server redundancy
T7	Pay-rate algorithm doesn't calculate competitive rates	<ul style="list-style-type: none"> • Determine a base pay that will increase/decrease due to various factors • Compare pay-rates of similarly rated tutors who tutor the same courses
T8	Web-conferencing session is not set up properly	<ul style="list-style-type: none"> • Use Google Hangouts • Use one or more G Suite hosts operated by Tutor Dash

Appendix C4 - Legal Risks

<u>ID</u>	<u>Risk</u>	<u>Mitigation(s)</u>
L1	Violating The Family Education Rights and Privacy Act (FERPA)	<ul style="list-style-type: none">• No portal access• Transcripts are analyzed then thrown out• Users agree to grade disclosure in terms of use agreement
L2	Users use application for illegal activities	<ul style="list-style-type: none">• Terms of use agreement• Reporting features