



# AskMissy

For a more *personalized*  
educational resource finder

Design Presentation - December 9, 2021

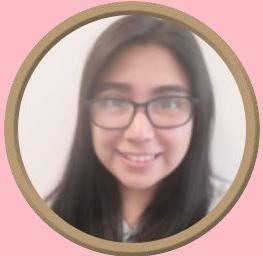
Team Red  
CS410  
Fall 2021

Old Dominion University

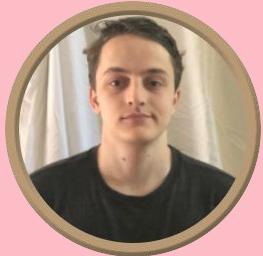
# Team Red



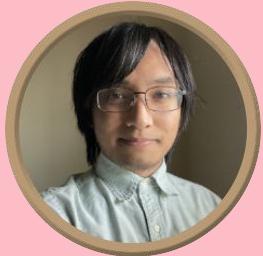
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# Table of Contents:

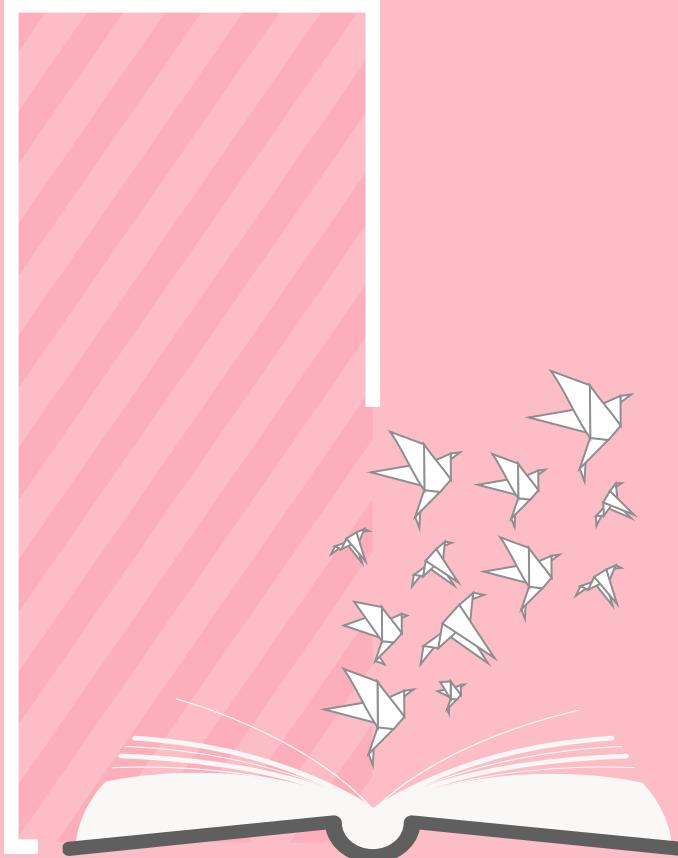
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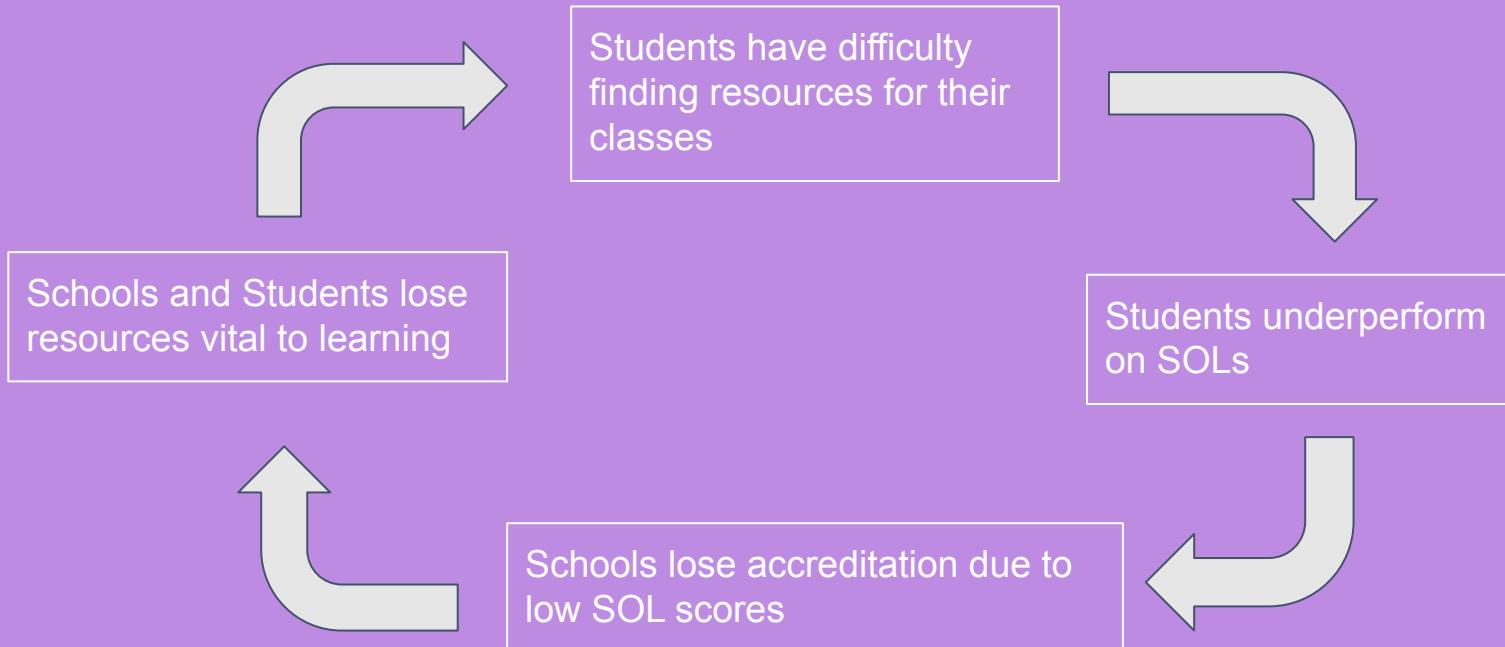
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# Problem Introduction





# Students

- Students face many struggles in their pursuit of learning: time management, familial commitment, and difficult lessons
- A consistent struggle is finding reliable resources to aid and reference in their assignments
- The ability to correctly research subject matter is a skill that needs to persist into adulthood
- A student's access to resources greatly determines their success in accurately researching data

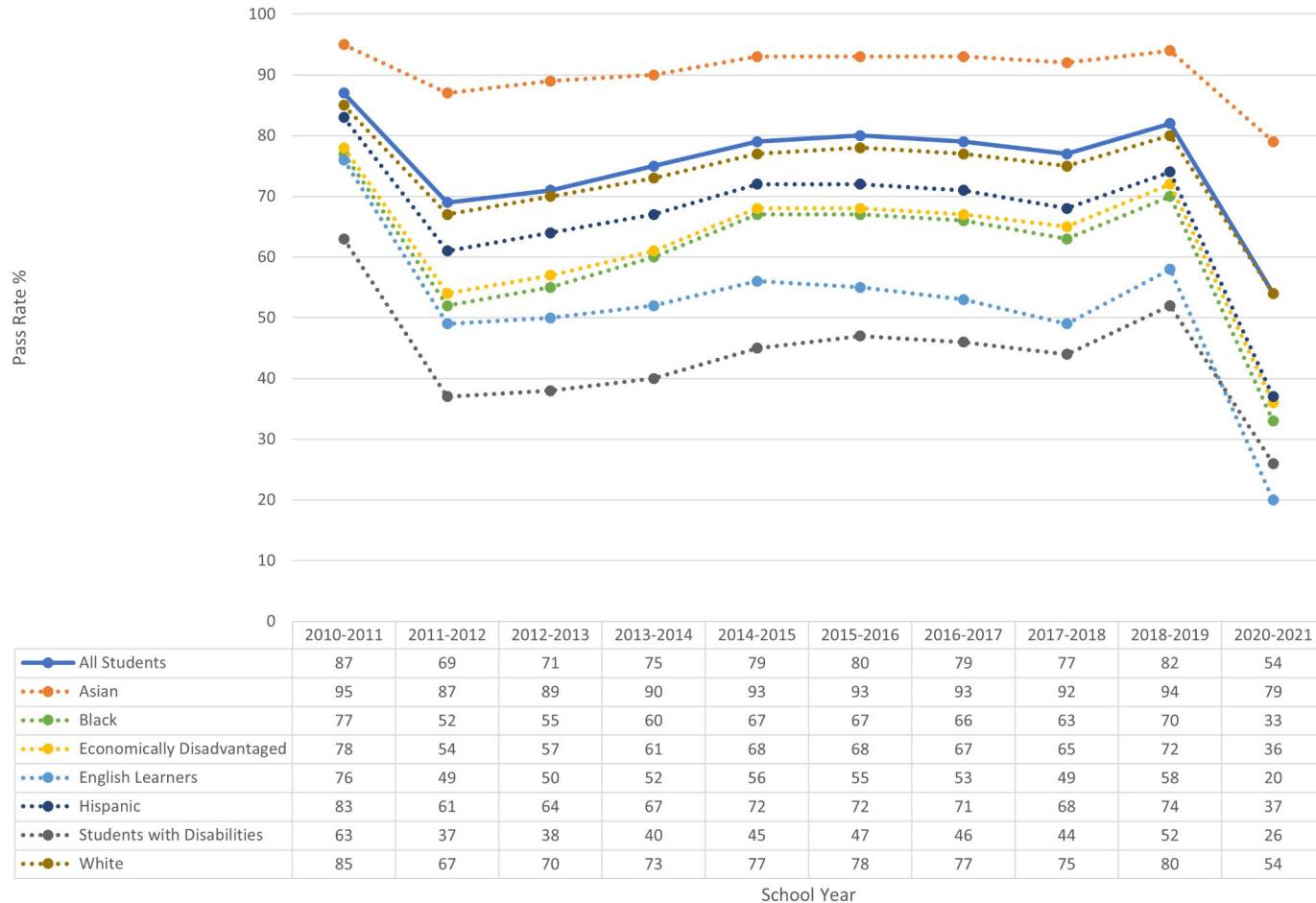
# SOLs

- SOLs are the Standards of Learning - Virginia's method of measuring the learning and achievement of students in english, mathematics, history, and science.
- For many students these are the culmination of their entire school year.
- SOLs contribute to determining a school's accreditation and the class placement of students. (12)

# Impact of COVID-19 on Students

- COVID-19 has negatively impacted students in all districts, economic status and ethnicity as seen by their SOL test scores.
- For example, the reading SOL pass rates have gone down between the 2018-2019 and the 2020-2021 school year an average of 9% for all students.
- This decrease is more evident for Black, Hispanic, and low-income students, who dropped an average of 11%. (12)

## Pass Rate of Virginia Math SOL by Demographic



(13)

## Pass Rate of Virginia Reading SOL Tests by Demographic



(13)

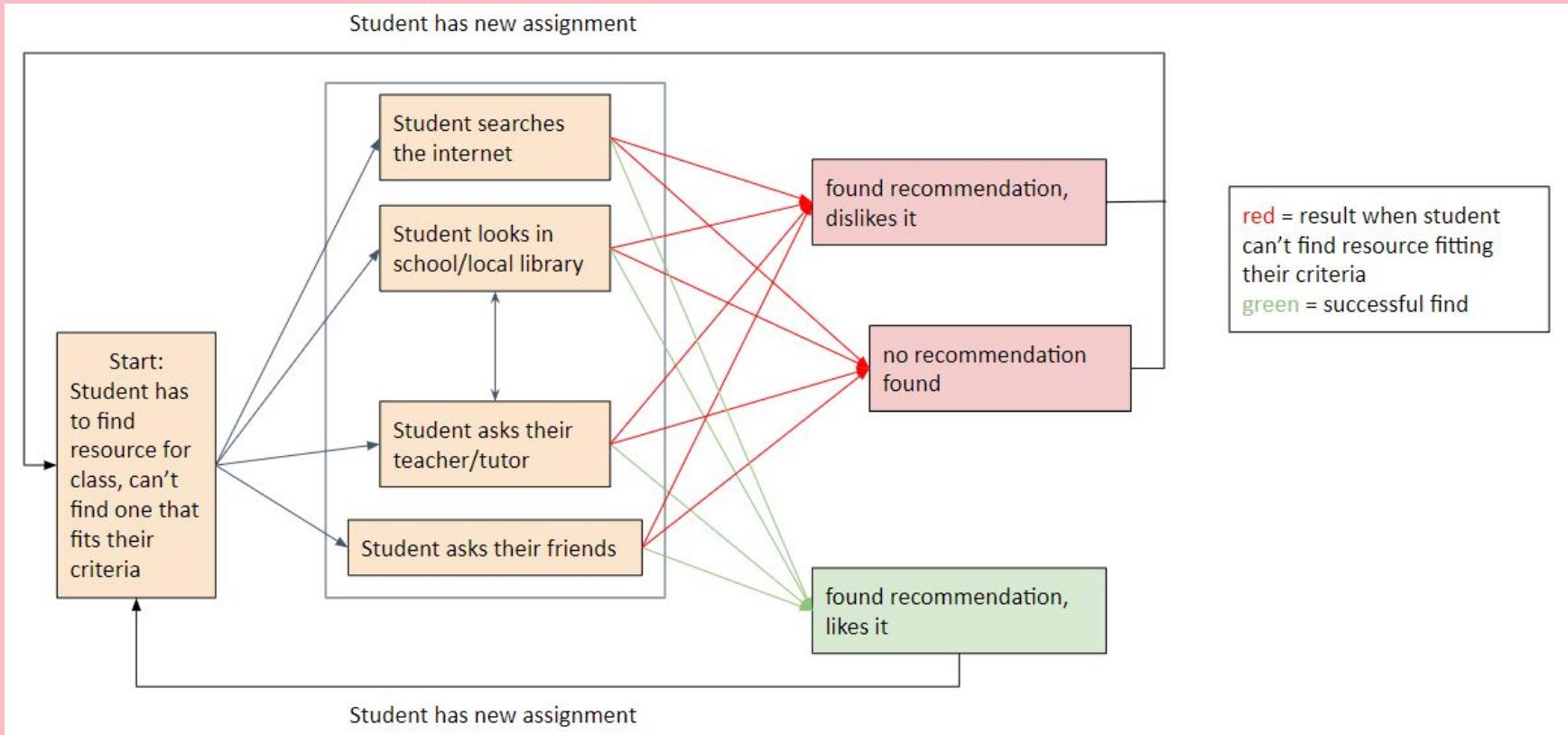
# The Problem



Students' performance are non-optimized because of a lack of materials tailored to their learning preferences



# Problem Flow





# The AskMissy Solution

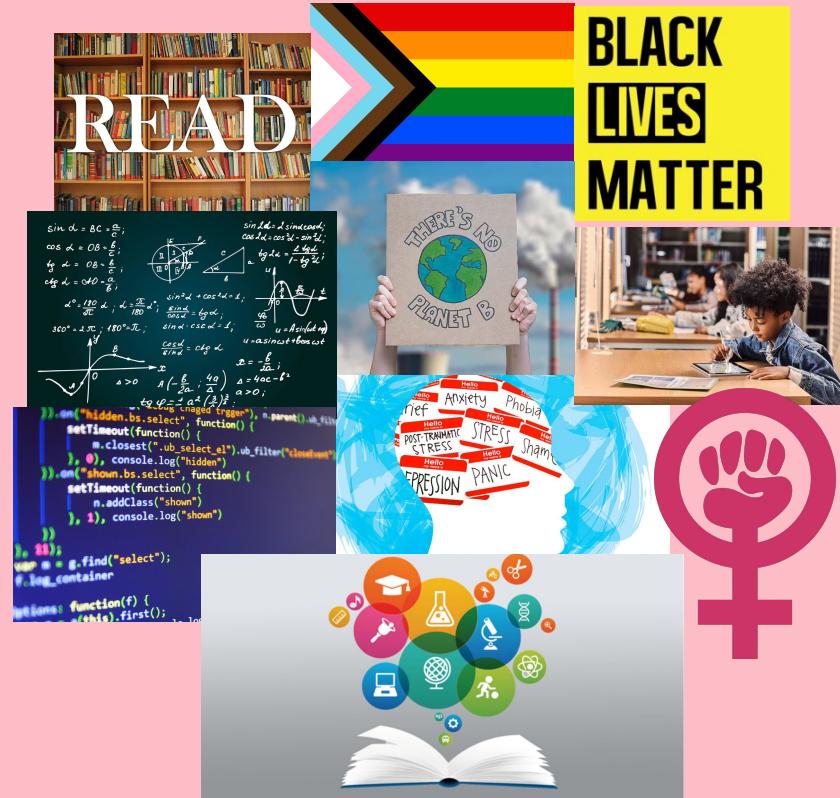
The AskMissy software application will help users find the resources necessary for them to bridge the gap between conventional and digital learning for a more personalized experience.

# Look for Resources About YOU

Filter results about books from a **wide** range of topics based on user preferences

Search resources about/written by authors from different communities: **LGBTQ+, BLM, mental health, etc...**

Allows for a more **personalized** experience



# Resource Statistics

Users can see the individual statistics of each resource they select/search:

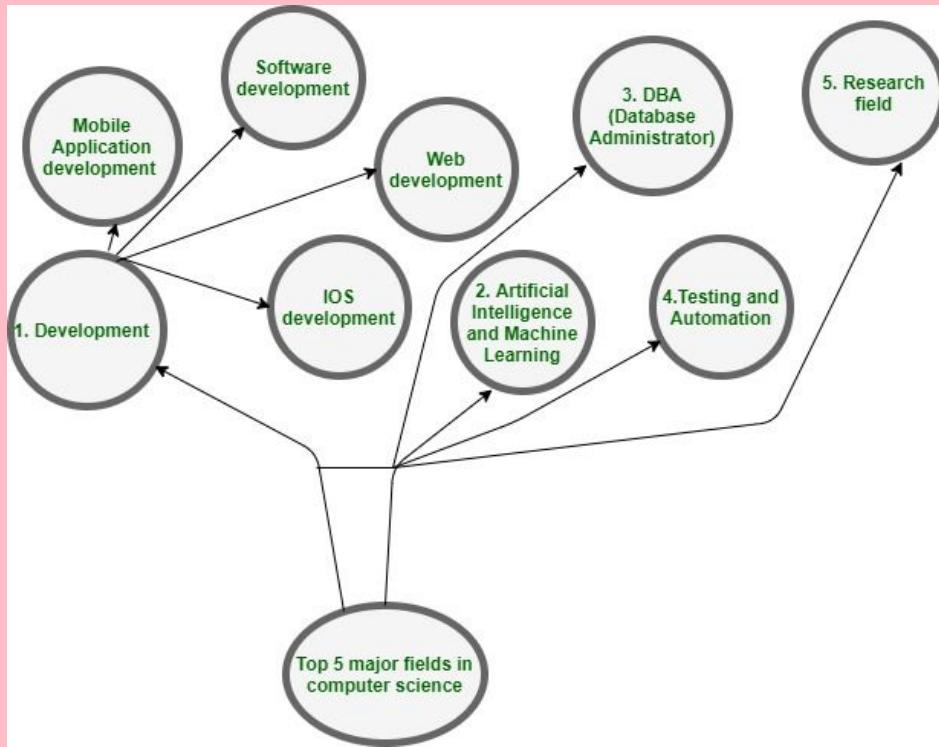
- Summary
- ISBN (books)
- Reviews/Ratings
- Authors
- Number of Pages/Chapters (books)
- Genre (books)
- Tags



For books, users will be able to search through available resources at their nearest bookstore through boolean attributes



# Subcategory Search Tool



Provide the users the ability to search for *specific* subcategories about **nonfiction** resources

'Swipe left/right' on a book

Text too complicated? Filter through **difficulty/experience** level

# Personalized Profiles:

Make profiles **public and private**

## User types

Guest - Given basic search functions

Students - Can display interest on profile, search using full algorithm, provides feedback

Teachers/Tutor - Can display what they teach and organize class groups, provides feedback

Librarian - Keeps inventory of resources, receives feedback

Admin - keeps database



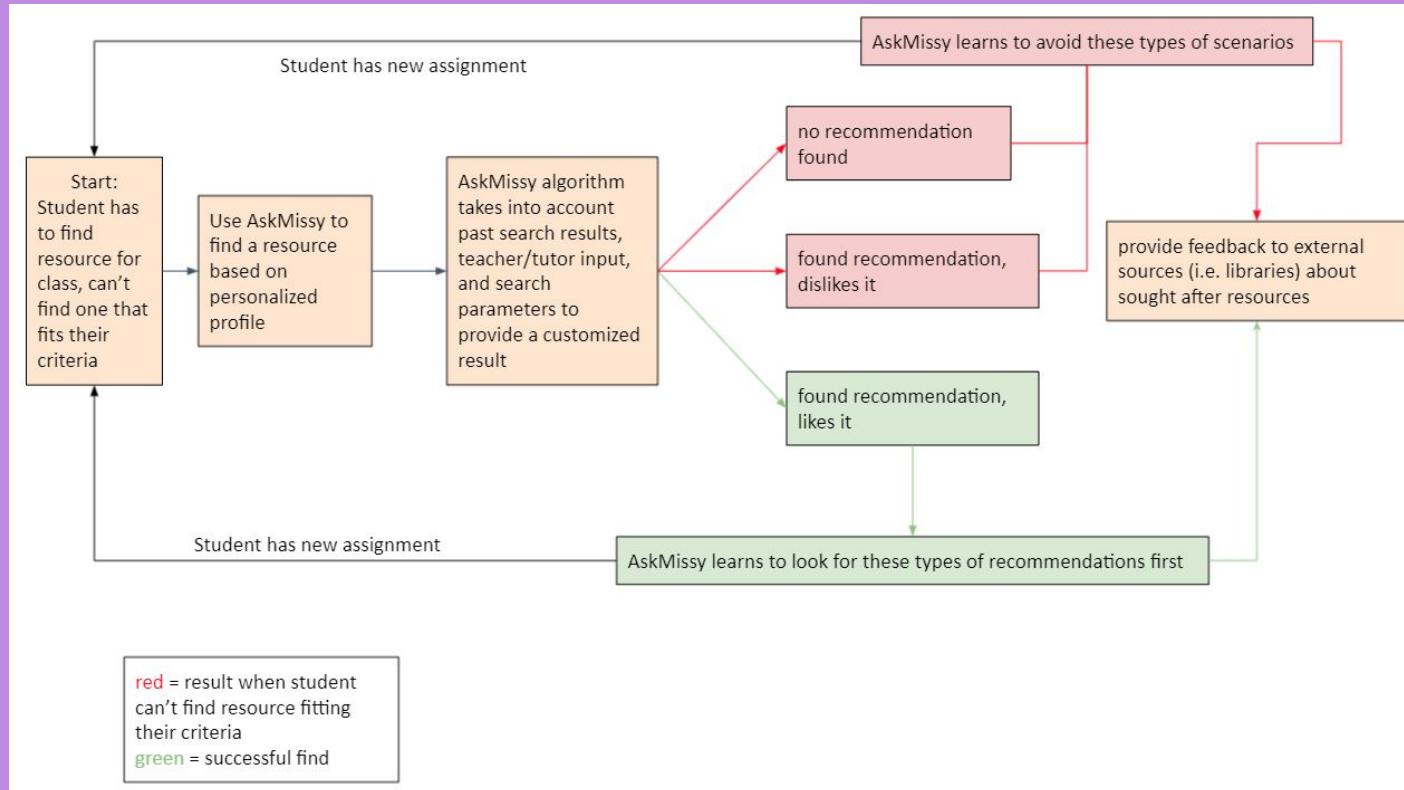
# Community/Library Interaction

If the resource you want isn't available where you want it, say something on the app!



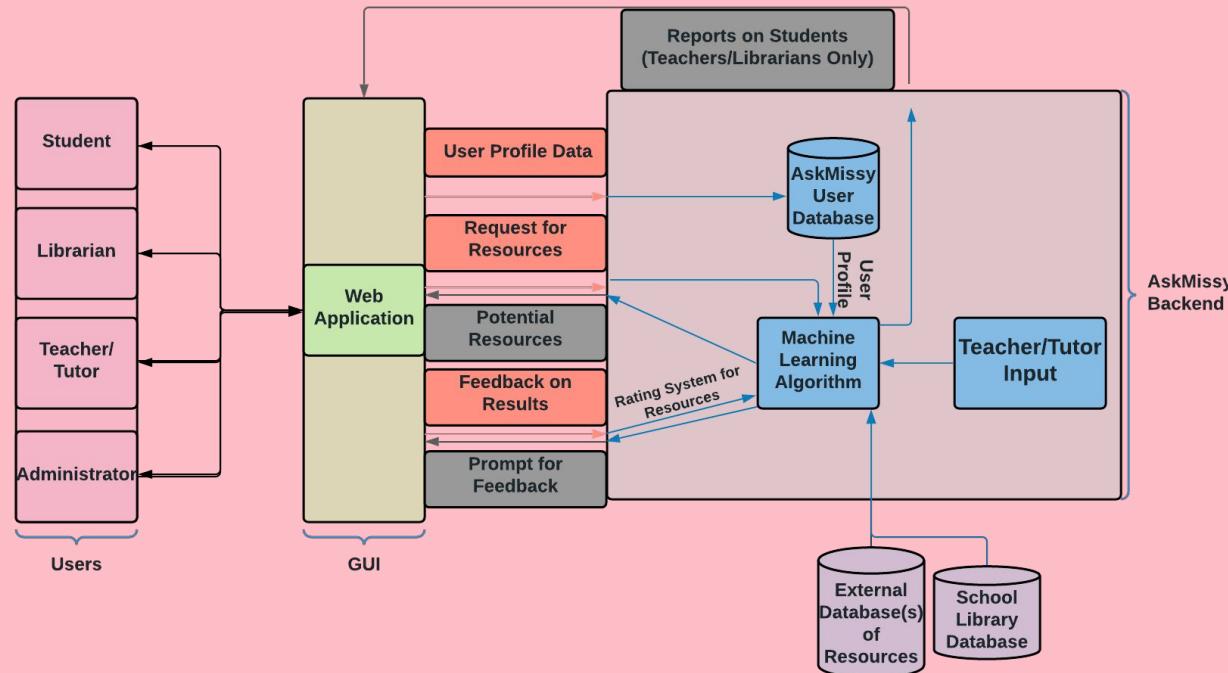
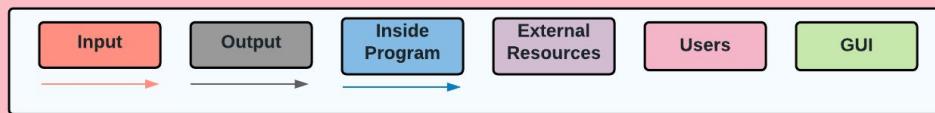
Registered bookstores & libraries will receive feedback to help stay updated with inventory

# Solution flow



# Major Functional Component Diagram

Key



# Competition Matrix

	What Should I Read Next	Goodreads	Amazon	Allreaders	AskMissy
Specific Book Search	✓	✓	✓	✓	✓
Genre Search	✓	✓	✓	✓	✓
Cover Shown	✓	✓	✓		✓
Incorporated Synopsis		✓	✓	✓	✓
Incorporated Reviews And Rating System		✓	✓		✓
Personalized Profiles	✓	✓	✓		✓
Specified Groups/Communities		✓			✓
Community/School Library Integration					✓
Reading/Difficulty Level					✓
Reports for Teachers/Librarians					✓
Intelligent Feedback Usage					✓
Machine Learning Based Search Results					✓

# Customer Risks

Risk	Mitigation
C1: User is dissatisfied with the application	C1: Users are asked for their feedback on improving the application in future
C2: Users don't get the experience they expected from a resource they searched up	C2: The software will ask the user for their intended experience and tones to look for it in a resource
C3: Texts do not fit the user's personalized preferences or are too hard to read	C3: Users are able to search for specific subcategories and filter results by difficulty level to their liking
C4: Users do not know how to use the AskMissy application	C4: Users are given tutorials on setting up their personalized profiles and all the search/filter tools available to them

# Customer Risk Matrix

	Consequence				
Likelihood	Insignificant	Minor	Moderate	Major	Critical
Almost certain					
Likely			C2		
Possible	C3 C2		C3		
Unlikely	C4	C1 C4		C1	
Rare					



Post-Mitigated



Pre-Mitigated

# Technical & Security Risks

Risk	Mitigation
T1: Searches leading to incorrect or inconsistent results of resources	T1: Thorough testing of the search and filtering algorithms with datasets
T2: The servers can't keep up with the growing database as the app grows popular with users	T2: Implement an architecture for the app that can be scaled up from the user growth
T3: Compatibility with external resources becoming unaligned	T3: Steady connection with external resources to stay up-to-date
S1: User data security breach	S1: Database Encryption
S2: Unauthorized users entering the application	S2: Strong password and authentication methods

# Technical & Security Risk Matrix

		Consequence			
Likelihood	Insignificant	Minor	Moderate	Major	Critical
Almost certain					
Likely					
Possible		T3			T1
Unlikely		T3	T1	S2	S1
Rare		T2	S2	T2	S1



Post-Mitigated



Pre-Mitigated

# Development Tools

- Python environment for large-scale data processing, machine learning and scientific computing. Useful for organizing external code libraries, and provides easy access to the following libraries:
  - NumPy
  - SciPy
  - Matplotlib
  - Pandas
  - IPython
  - Jupyter Notebook
  - scikit-learn

# Development Model

- Agile
  - Incremental development
  - Driven by user stories
  - Small teams, minimal formal structure, frequent communications
  - Internal commitment to quality
  - Continuous testing

# Hardware Requirements

- Device with internet access
- Multiple Servers
  - Main frontend server
  - Main backend server
  - Web scraping backend server
  - machine learning backend server
  - Main database backend server

# Software Requirements

- Frontend
  - HTML5
  - CSS3
  - JavaScript
- Backend (machine learning algorithms, and natural language processing)
  - Python
- Repository
  - Gitlab
- Database
  - Amazon RDS, MySQL

# User Roles

Category	Feature	Guest	Student	Teacher	Librarian	Administrator	Tester**
Data Retrieval	Metadata Report			M, A	M, A	M, A	
	Basic Search	A	A	A	A	A	
	AskMissy Search		A	A	A	A	
Data Management - Live Product	Machine Learning					M, A	
	Source Tag Creation						
	Source Tag Management				M	M	
	Lesson Plans			M, A	M, A	M, A	
	Internal Database Manipulation				M, A	M, A	
	External Database Manipulation					A	

M - Manipulate: edit the working data and specialized reports

A - Access: use feature through intended use

\*\*For Development Purposes

# User Roles

Category	Feature	Guest	Student	Teacher	Librarian	Administrator	Tester**
Data Management - Development	Source Tag Development						A
	Machine Learning Training						A
	Simulated Data						M, A
	User testing reports						A
Security	Login/Authentication	A	A	M, A	M, A	M, A	
	Data Encryption, moving					M, A	
	Data Encryption, resting					M, A	
Account Management	User Profile		A	M, A	M, A	M, A	
	Feedback		A	A	A	M, A	
	Group Management			A	M, A	M, A	
	Login/registration	A	A	M, A	M, A	M, A	

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A - Access: use feature through intended use

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# User Roles

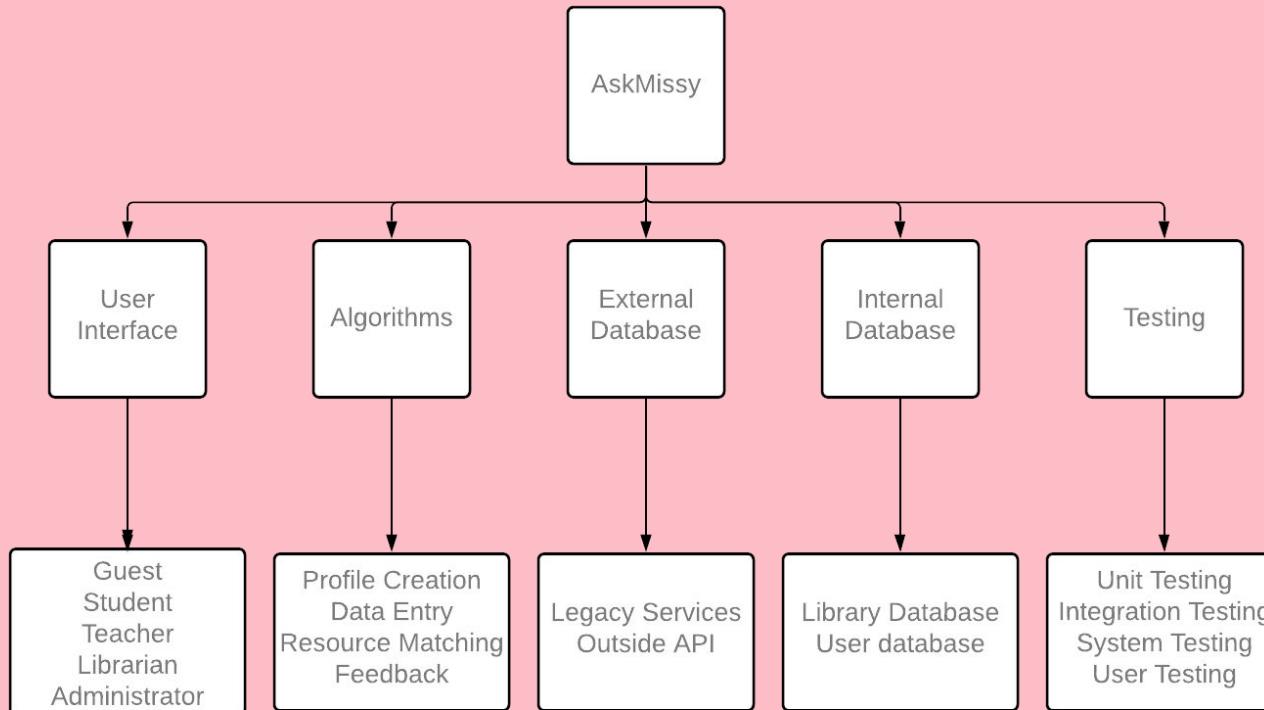
Category	Feature	Guest	Student	Teacher	Librarian	Administrator	Tester**
UI	Group Interaction		A	M, A	M, A	M, A	
	Bug Report	A	A	A	A	M, A	
	Basic Search	A	A	A	A	A	
	AskMissy Search		A	A	A	A	
	Communication		A	M, A	M, A	M, A	
	Personal Data Report	A	A	A	A	M, A	

M - Manipulate: edit the working data and specialized reports

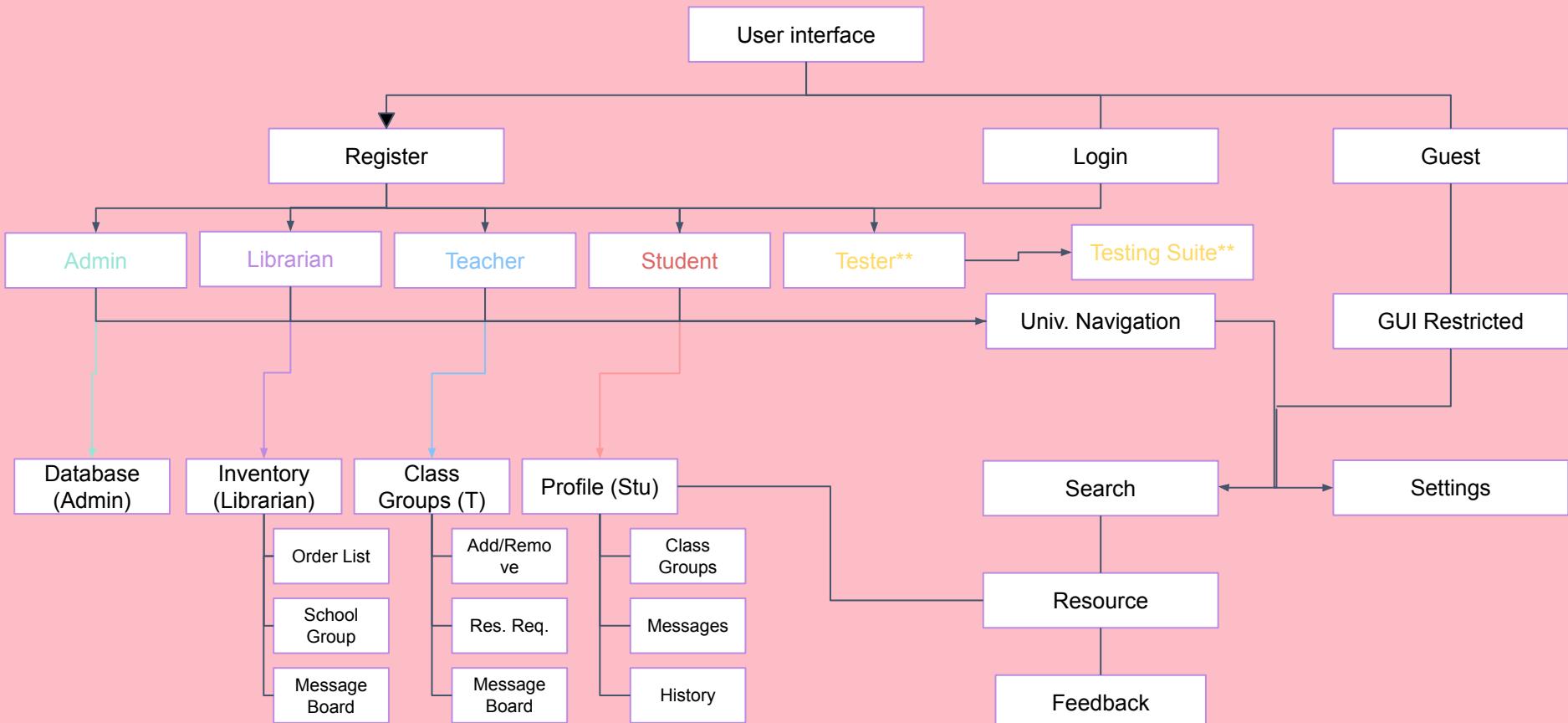
A - Access: use feature through intended use

\*\*For Development Purposes

# Work Breakdown Structure



# UI FULL



# Mockups - Login

## AskMissy Registration

Student

First Name  Last Name

Email

Password

Confirm Password

School

School Code

Grade Level

Submit

AskMissy

### Login to AskMissy

Student

or do via email

Email  JaneDoe@gmail.com

Password  ⚡

Remember me

Don't have an account? [Register](#)

REGISTER    **HOME**    TEAM    SEARCH    SETTINGS



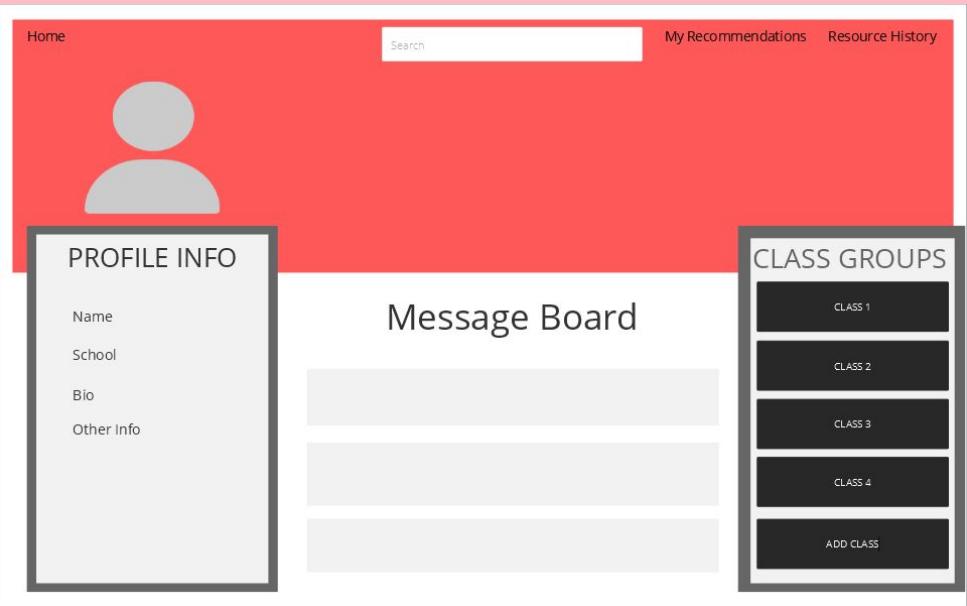
LOGIN

# AskMissy

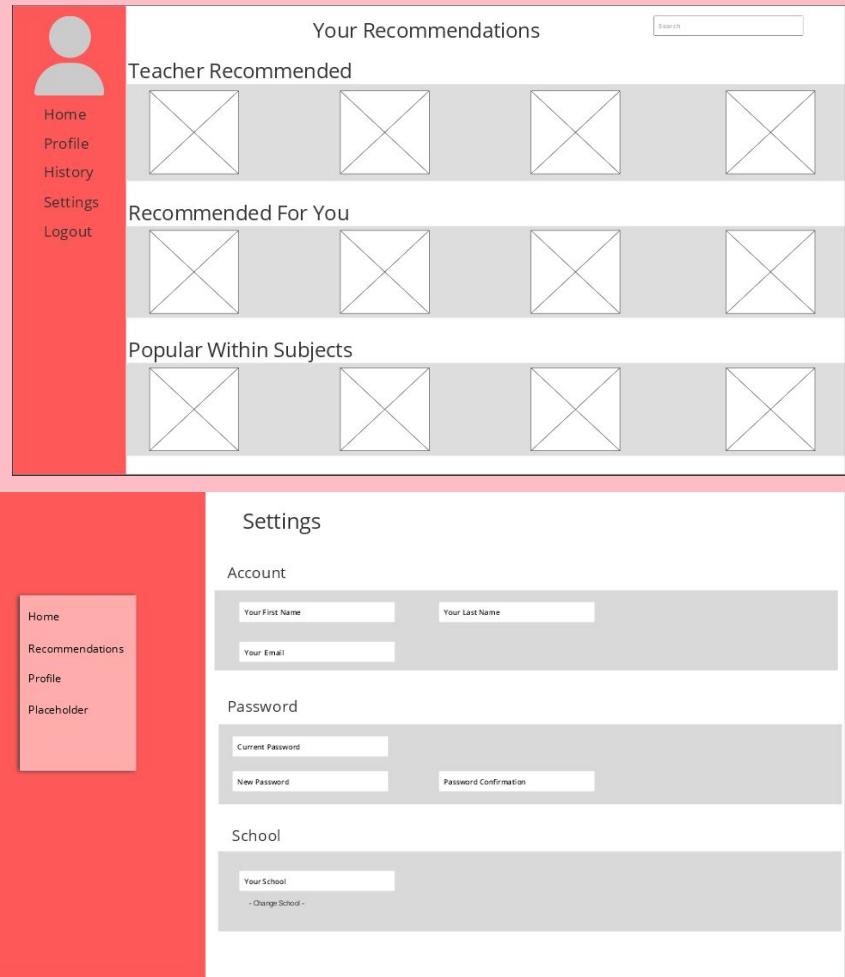
For a more personalized educational resource finder

SEARCH RESOURCES

# Mockups - Students



The student home page features a large red header bar with a search bar and navigation links for "My Recommendations" and "Resource History". Below the header is a sidebar with a user icon and links for "Home", "Profile", "History", "Settings", and "Logout". The main content area includes a "PROFILE INFO" section with fields for Name, School, Bio, and Other Info. A "Message Board" section contains several placeholder message boxes. On the right, a "CLASS GROUPS" sidebar lists "CLASS 1", "CLASS 2", "CLASS 3", "CLASS 4", and an "ADD CLASS" button.



The student settings page has a sidebar with a user icon and links for "Home", "Recommendations", "Profile", and "Placeholder". The main content area is titled "Your Recommendations" and includes sections for "Teacher Recommended" (with four placeholder boxes) and "Recommended For You" (with four placeholder boxes). Below these are sections for "Popular Within Subjects" (with four placeholder boxes) and "School" (with a "Your School" field and a "- Change School -" link). The "Settings" section includes tabs for "Account" (with fields for First Name, Last Name, and Email), "Password" (with fields for Current Password, New Password, and Password Confirmation), and "School".

# Mockups - Teacher

**Resource Requests**

Send Resource Request

Add Resource

Student Resource Requests

Pending Requests

Accept Deny

Accept Deny

Home Profile Analytics Settings Logout

**Home**  Resource Recommendations Analytics

Class 1 Group Members

Student 1  
Student 2  
Student 3  
Student 4  
Student 5  
Student 6  
Student 7  
Student 8  
Student 9  
Student 10  
Add/Remove Student

Join Requests

Current Lesson Plan

Your Recommended Resources

Your Groups

CLASS 1  
CLASS 2  
CLASS 3  
CLASS 4

Create Group

**Message Board**

TEACHER NAME

School

Class

Preferred Teaching Style

Lesson Plans

-Create Lesson Plan-

To:   
Type message...

Your Groups

BUTTON  
BUTTON  
BUTTON  
BUTTON

Create Group

**Team Red - CS 410**

# Mockups - Librarian

Home	Settings	Search	Orders	School Group
Inventory Search	Book Title	Author	ISBN	
	Resource 1	Last, First	Numbers	
	Resource 2	Last, First	Numbers	
	Resource 3	Last, First	Numbers	
	Resource 4	Last, First	Numbers	
	Resource 5	Last, First	Numbers	
	Resource 6	Last, First	Numbers	
	Resource 7	Last, First	Numbers	
	Resource 8	Last, First	Numbers	
	Resource 9	Last, First	Numbers	
	Resource 10	Last, First	Numbers	
	Resource 11	Last, First	Numbers	
	Resource 12	Last, First	Numbers	
	Resource 13	Last, First	Numbers	
	Resource 14	Last, First	Numbers	
	Resource 15	Last, First	Numbers	



# Order Viewer

Search

Teacher Resource Requests

Home

Inventory

School Page

Settings

Logout

Accept Deny

Accept Deny

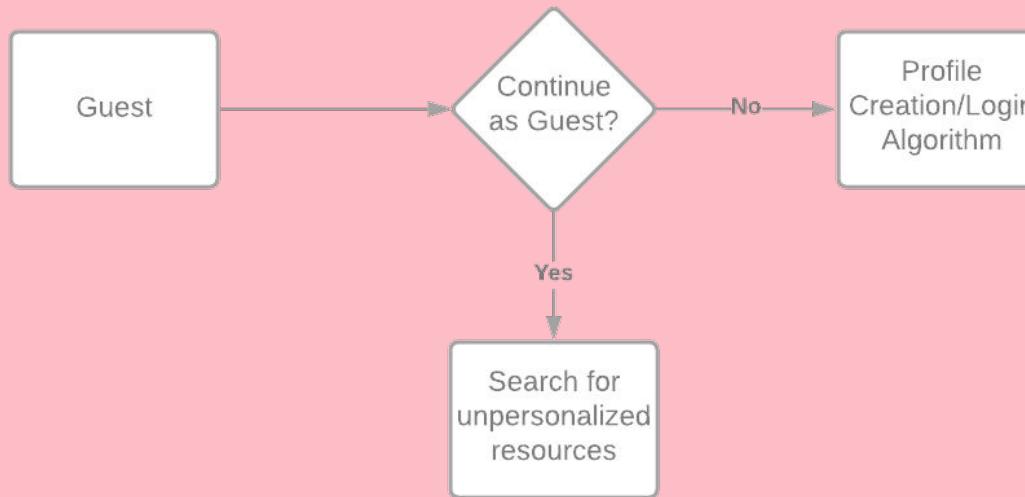
Order List

Resource	Last, First	ISBN
Resource	Last, First	ISBN
Resource	Last, First	ISBN
Resource	Last, First	ISBN
- Add Resource -		
- Add Resource -		

Place Order

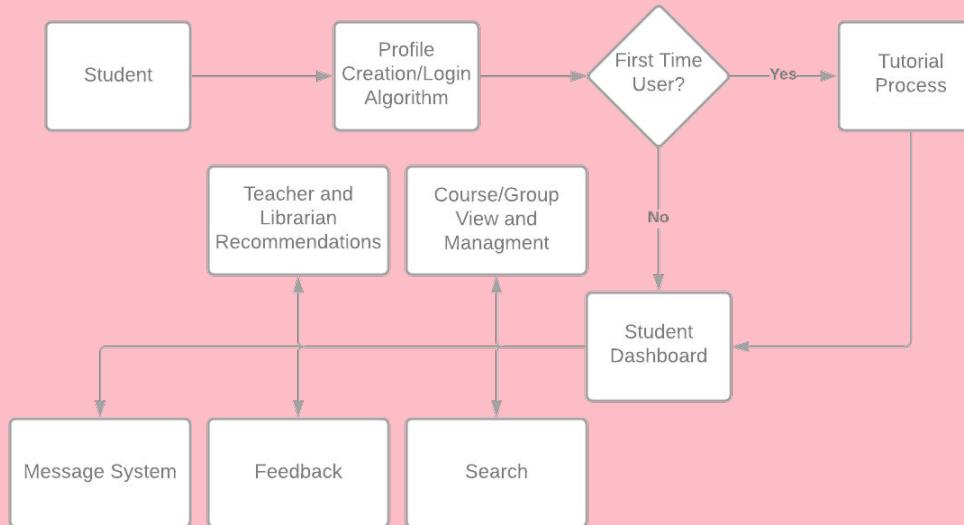
# Work Breakdown Structure

## User Interface - Guest



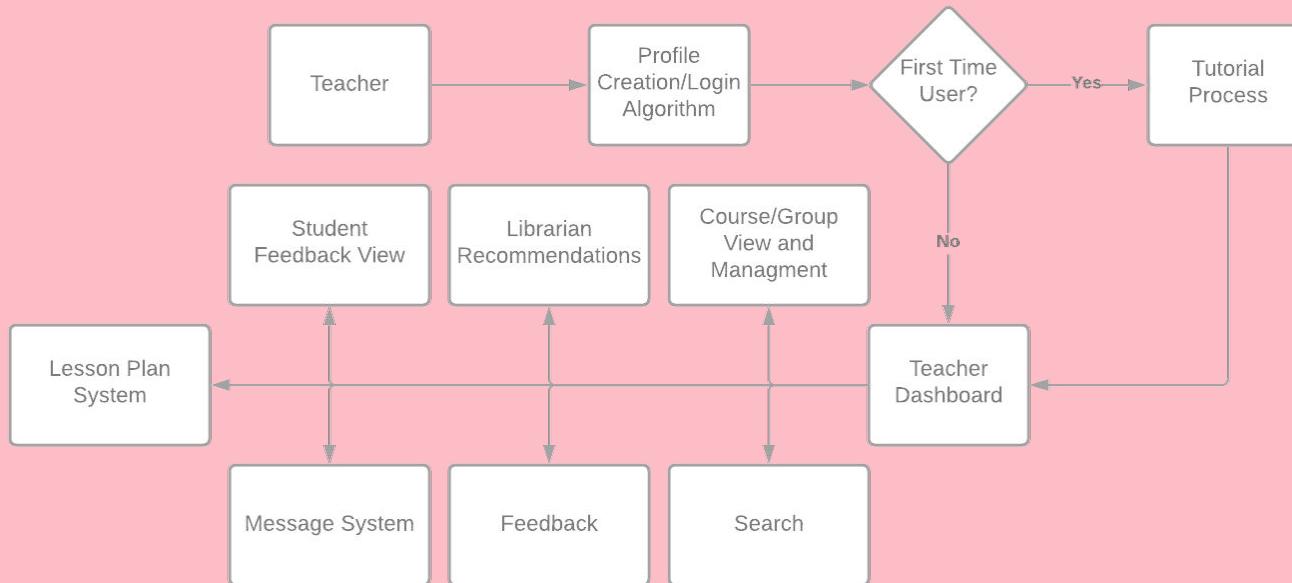
# Work Breakdown Structure

## User Interface - Student



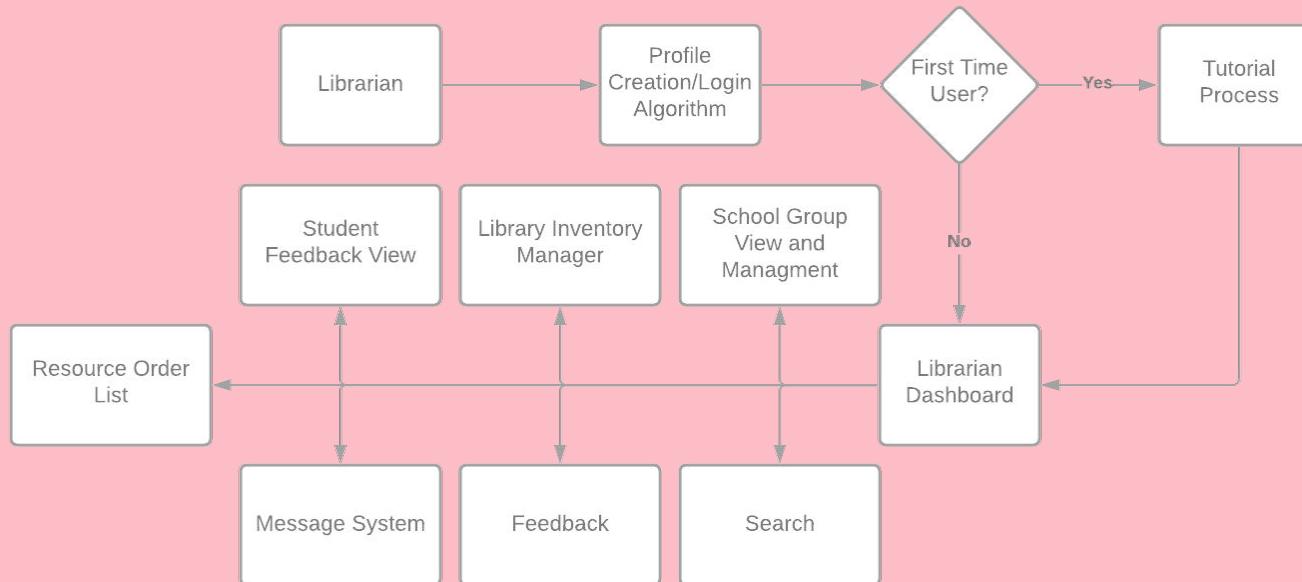
# Work Breakdown Structure

## User Interface - Teacher



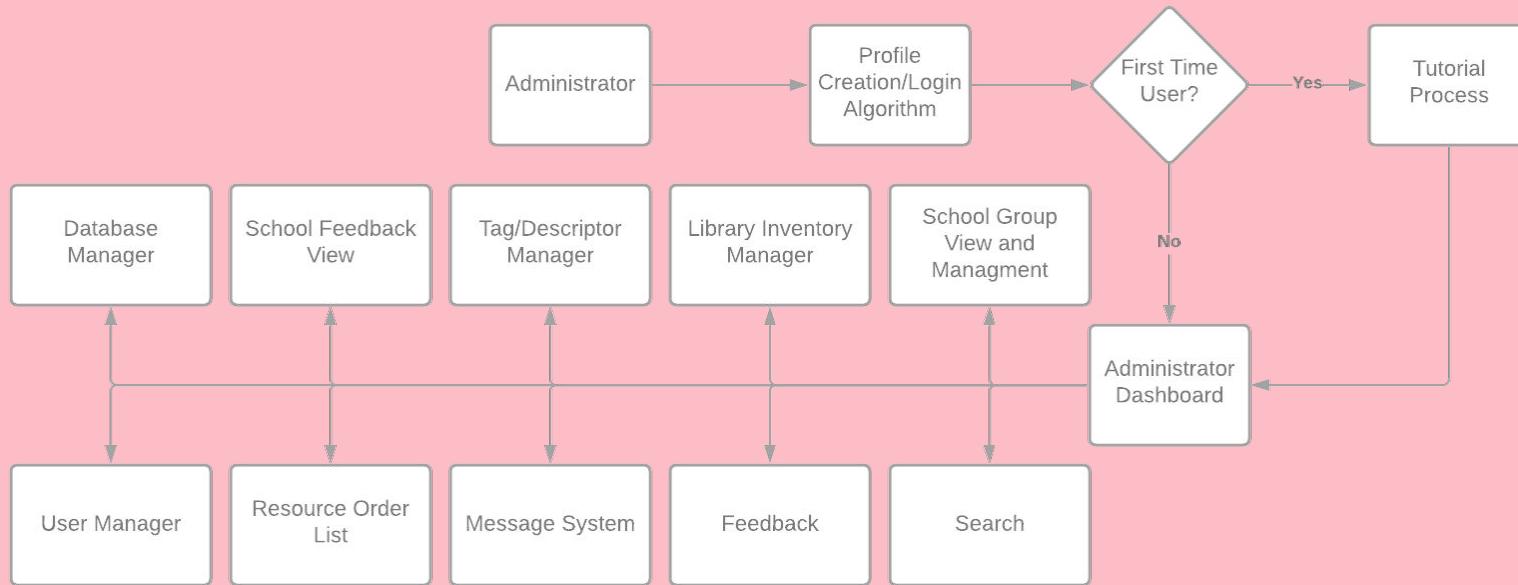
# Work Breakdown Structure

## User Interface - Librarian



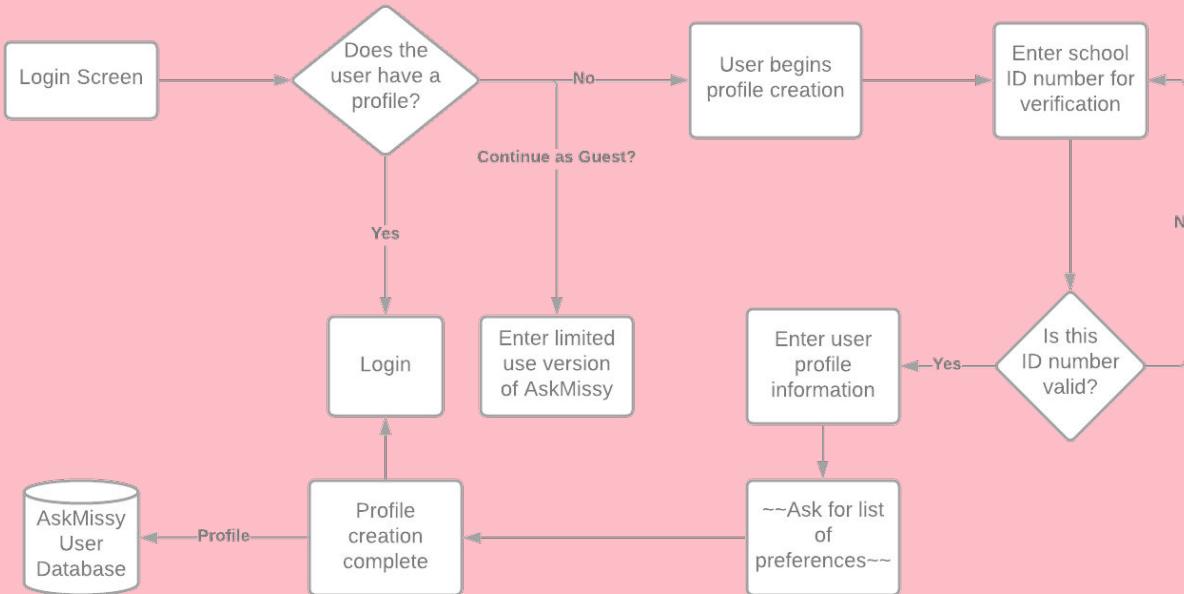
# Work Breakdown Structure

## User Interface - Administrator

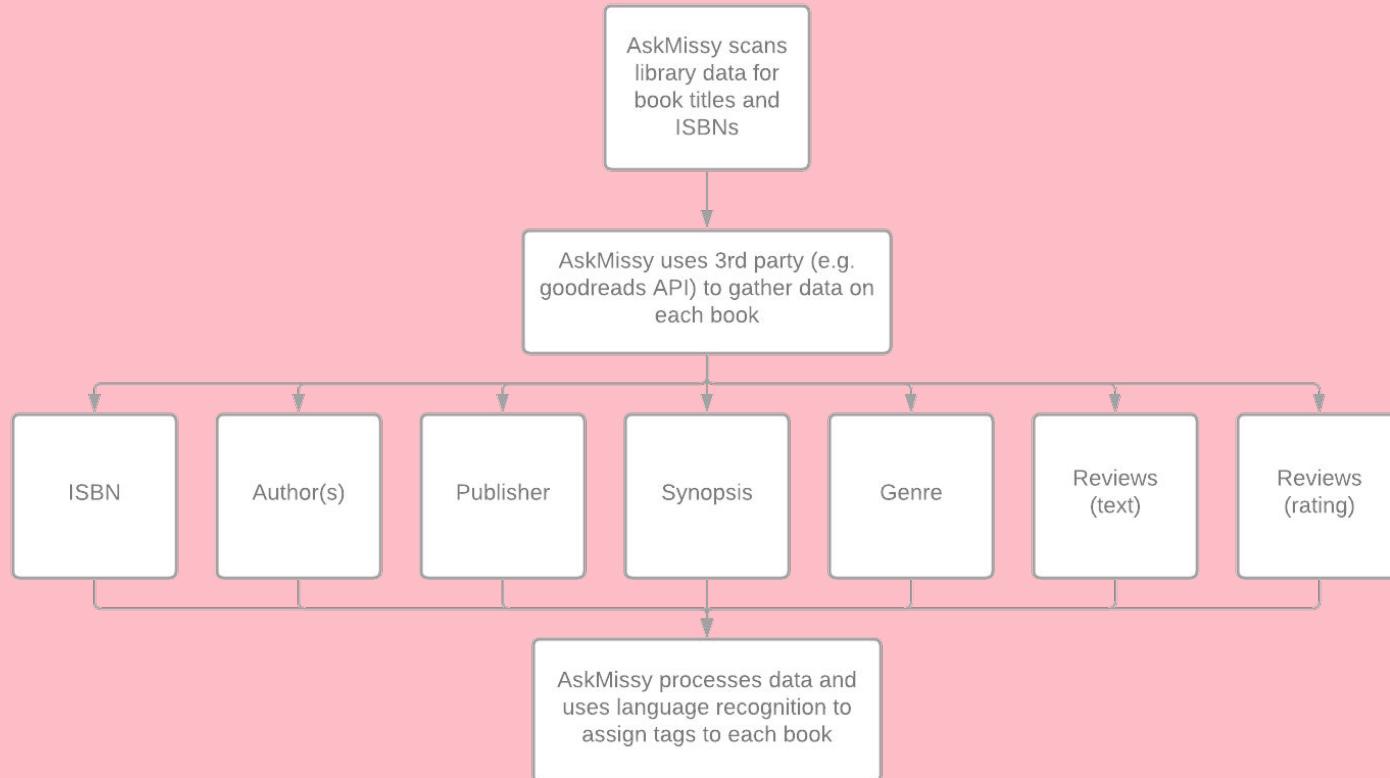


# Process Flow

## Algorithms - Profile Creation

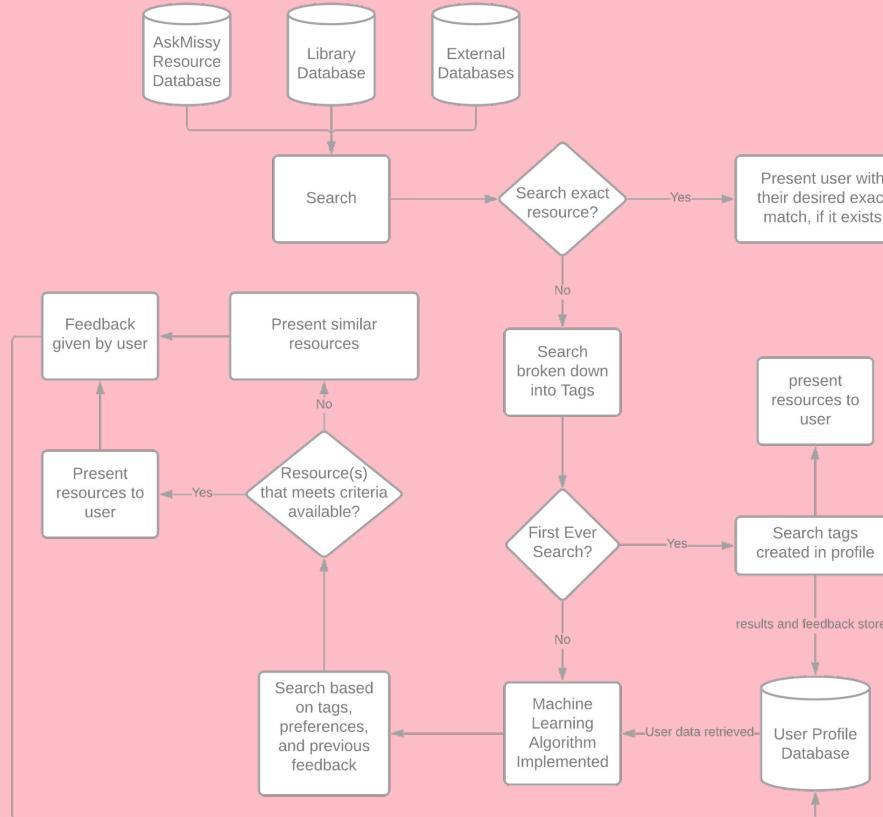


# Machine Learning Algorithm - Data Entry



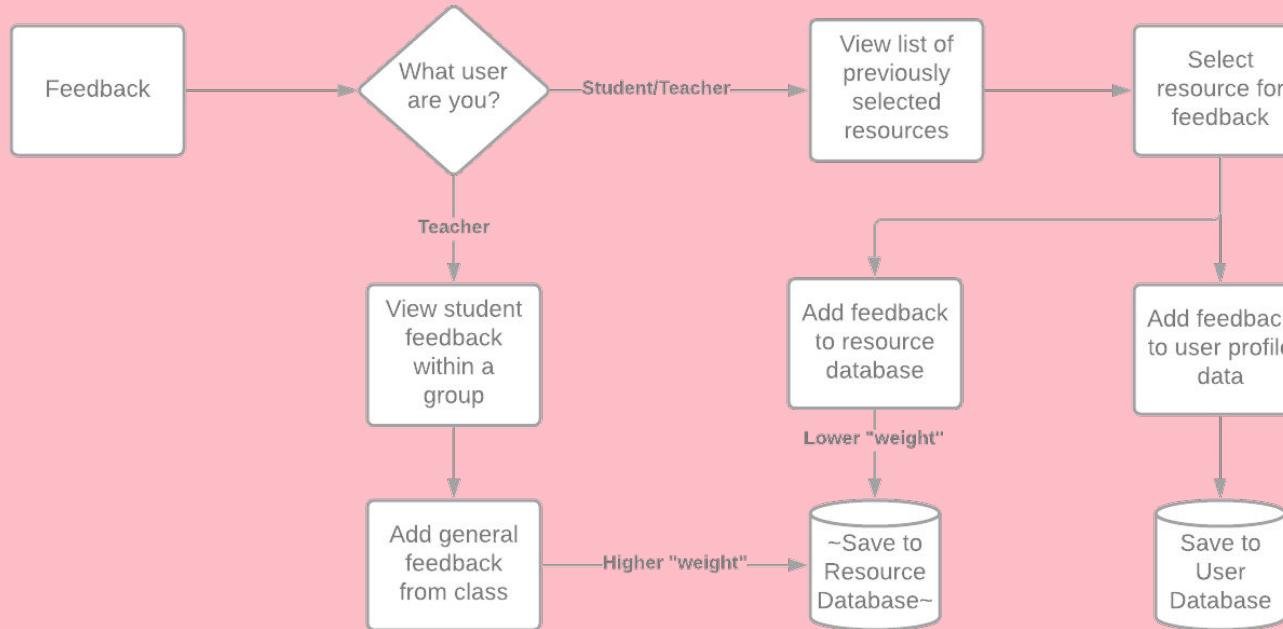
# Work Breakdown Structure

## Algorithms - Resource Matching

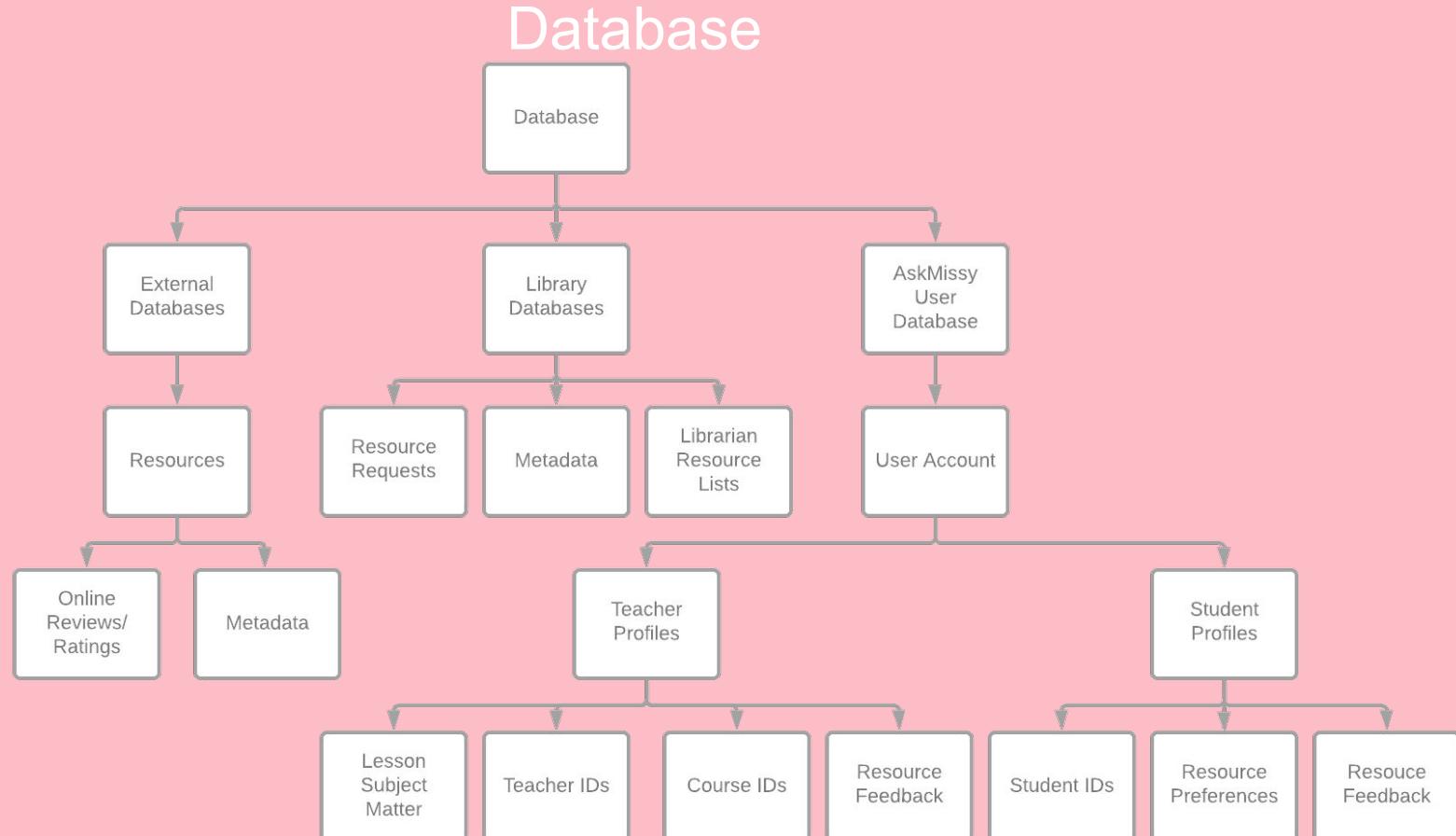


# Work Breakdown Structure

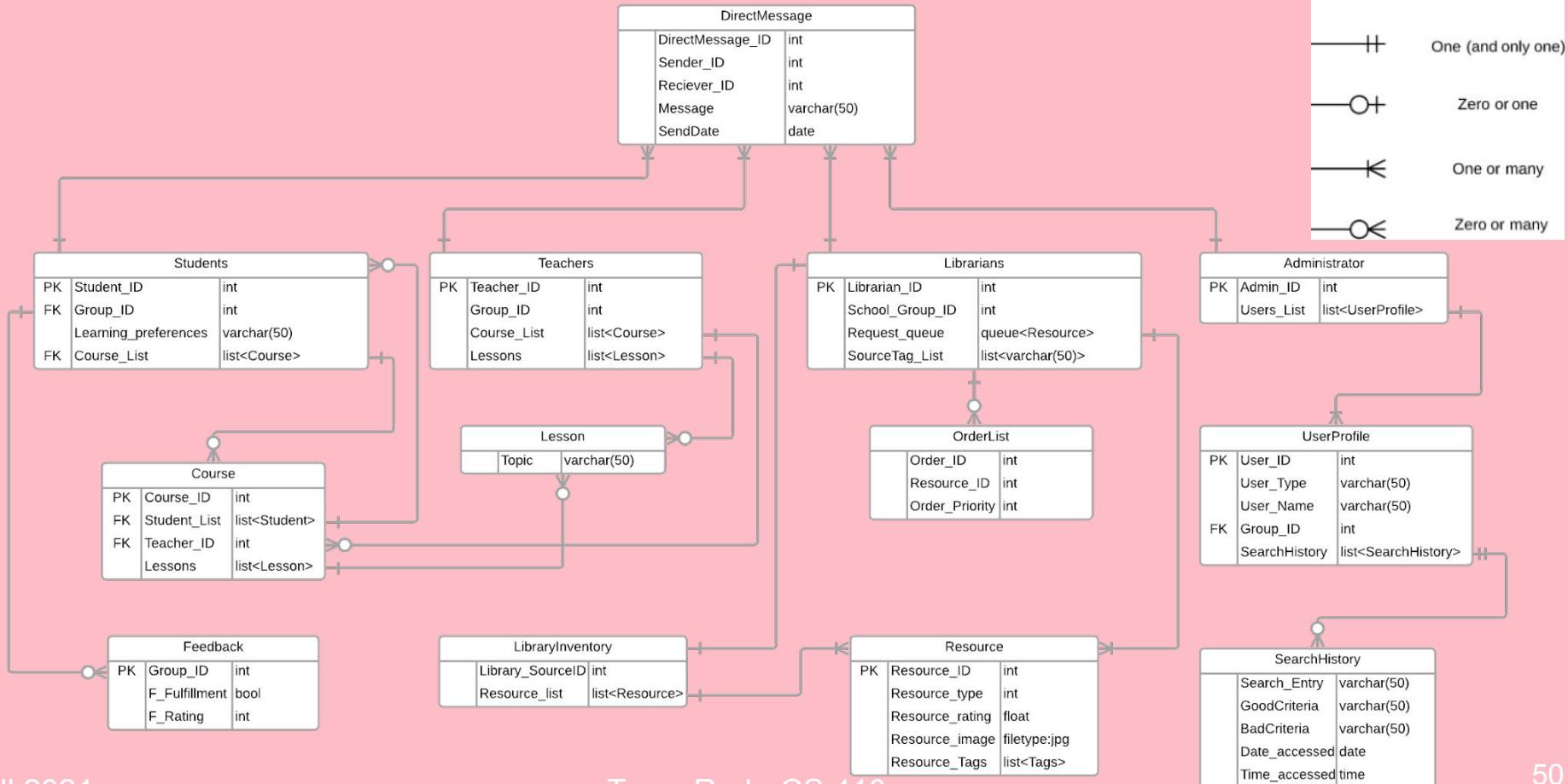
## Algorithms - Feedback



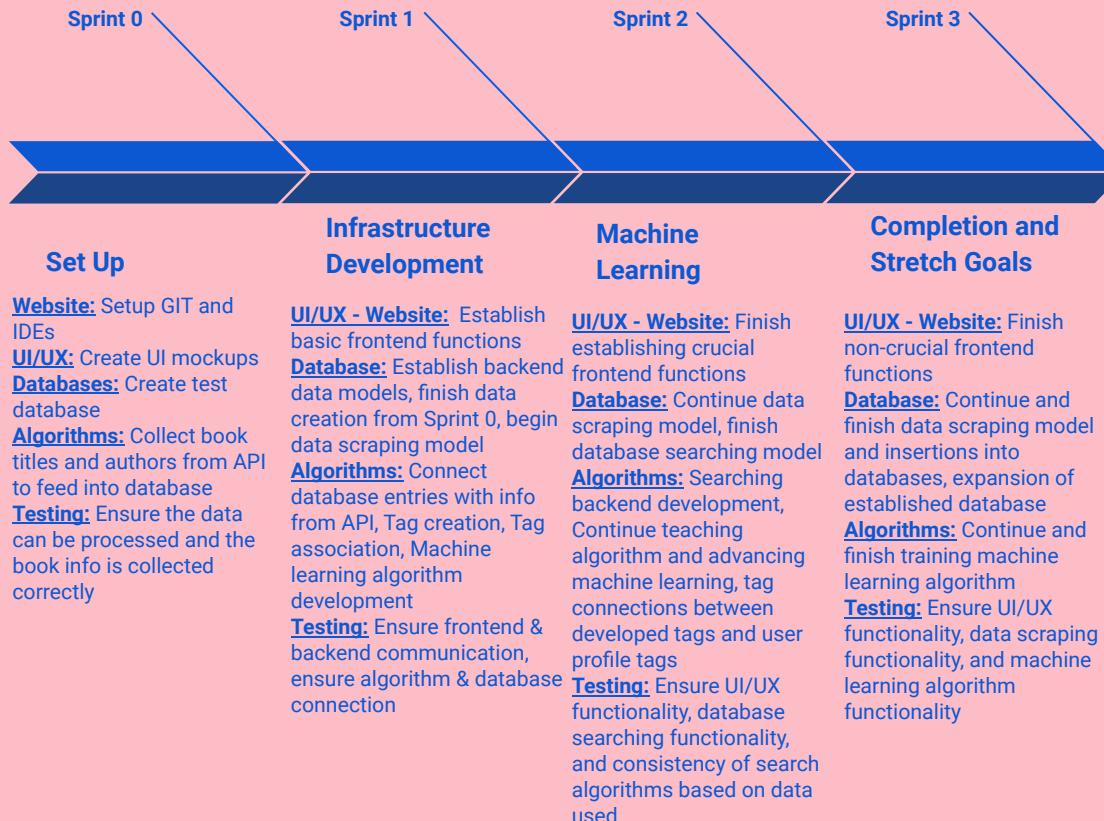
# Work Breakdown Structure



# Database Schema



# Agile Sprints



# What AskMissy *Won't* Do

AskMissy won't:

Teach students directly - it will help users find the appropriate resource

Be a social media platform

Store the full resources found within the database - users will need to obtain resources separately

Allow for the creation of external tags

# Conclusion

Student performance is falling across the board

Adjustment to new learning mediums must become a regular aspect of student learning

Individualized resource locator is vital to student learning

machine learning will provide personalized resource recommendations

AskMissy will allow students to efficiently find resources to aid them in their learning journey

# References



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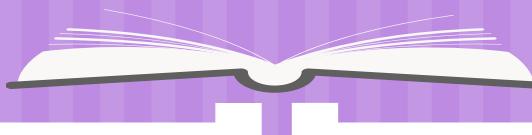


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# Glossary of Terms

- **Administrator:** A user who is responsible for managing a majority of AskMissy's working data.
- **Agile:** Set of frameworks and practices where solutions evolve through collaboration between self-organizing cross-functional teams
- **AskMissy:** A software application that will help users find more relevant resources
- **API:** Application Programming Interface
- **Data Retention:** The continued storage of an organization's data for compliance or business reasons
- **Database:** Structured data held in a computer
- **Economically Disadvantaged:** A student in Virginia is considered economically disadvantaged if the student:
  - is eligible for Free/Reduced Meals
  - receives TANF, or
  - is eligible for Medicaid
- **Exact Match Search:** A search for a single specific type of resource.

- **File Server:** Controls access to separately stored files
- **Guest:** A user who is not a student, teacher, librarian, or administrator; has limited access to the AskMissy program.
- **Librarian:** Responsible for managing the library's inventory/database, communicating with teacher and students
- **Personal Learning:** An educational approach that aims to **customize** learning for each user's strengths, needs, skills, and interests.
- **Student:** A person studying at a K-12 education institution in need of reliable resources.
- **Teacher:** A person who helps students (K-12) to acquire knowledge; Responsible for making plans, managing students' groups/communication.
- **Temporary Assistance for Needy Families (TANF):** Provides eligible families with a monthly cash payment to meet their basic needs
- **Tester:** Responsible for designing and conducting testing suites for usability testing
- **User:** A user will be anyone using the AskMissy Interface and will fall into the category of a guest, student, teacher/mentor, librarian or admin.
- **Web Scraping:** Extracting/scraping data from websites
- **Web Server:** A computer that runs websites.
- **Windows:** Series of operating systems developed by Microsoft



# User Stories

## As a Guest I need to:

1. Search for resources using the system without personalized results
2. Attempt to create a non-guest profile using validation
3. Sign into an existing non-guest profile using validation

## As a Student I need to:

1. Use my student number to create and validate my account
2. Request to join a class group within AskMissy
3. Be able to be in more than one class group
4. Input search criteria to find sources
5. Prioritize searches based on specific criteria
6. Have machine learning learn my personal preferences based on a number of Personal Search Factors (see list below)
7. Receive recommendations of sources to use from my teachers and other users
8. Give my own feedback about a specific source and whether or not it fulfilled my expectations
9. View ratings and reviews about a recommended source
10. Request for a resource to a Teacher/Librarian
11. Send/receive messages to Teachers and Librarians

## As a Student I want to:

1. Share the sources that I enjoy to other users
2. Learn what criteria the teacher used to find a specific source and how closely that source matched the criteria
3. View my own search history
4. Prioritize searches based on learning style
5. View my previous ratings of resources
6. Create a "To Read/Future Use" list
7. Manage my "To Read/Future Use" list
8. Change or amend my previous ratings

# User Stories

## As a Teacher I Need to:

1. Upload a lesson plan's key subject matter to AskMissy
2. Be able to access the save lesson plans at any time
3. Search for relevant sources pertaining to a saved lesson's key subject matter based on the criteria I've inputted
4. Take the relevant sources that AskMissy gave me and present multiple avenues to obtaining this source (avenues shown below)
5. Share the sources that AskMissy has found for me to other users
6. Give my own feedback about a specific source and whether or not it fulfilled my expectations
7. Observe the feedback and reviews from other users and their experience with a specific source
8. Create a class group
9. Be in more than one class group
10. Manage members and applicants of a class group
11. Send a resource requests to librarians
12. Take resource requests from students
13. ~~Forward a student's resource request to a librarian~~ (redundant, ref. Line 12)
14. Send/receive messages to students, other teachers, and librarians

## As a Teacher I Want to:

1. View analytics of student preferences
2. Send lesson plans to librarians
3. Filter relevant sources with statistics about aspects including the author, the publisher, the time it was published, what criteria from my search that it meets or avoids
4. Upload a profile describing my preferred teaching style based off criteria to be determined at a future date, but will include things like my class subject and preferred means of accessing teaching resources

## As a Librarian I Need to:

1. Upload my library's inventory to the AskMissy database
2. Make changes to my library's inventory
3. Create qualities for inventory sources such as media type, intended reading level, or other objective topics
4. Pre-assign qualities to inventory sources as a 'default' description
5. Receive list of most requested resources from students and teachers
6. Create a resource order list
7. Create a school group
8. Manage members and applicants of a school group
9. ~~Remove members from a school group~~ (redundant, ref. Line 8)
10. Send/receive messages to students, teachers, other librarians and administrators

# User Stories

## As a Librarian I Want to:

1. Add priority to an order list
2. View analytics of student preferences
3. Maintain the availability of a source in real-time to reflect current inventory accurately
4. Create a calendar for the year
5. Receive lesson plans from teachers
6. Take lesson plans created by teachers and plug those topics into the calendar
7. Promote sources with high ratings during specific times of the year that correspond to the lesson plans of all students within that lesson
8. Blacklist resources within library inventory

## As an Administrator I need to:

1. Back up the data within AskMissy so that the data is safeguarded
2. Encrypt, edit and retrieve the data within AskMissy
3. Connect AskMissy to external databases through legacy tools like API
4. Manage AskMissy's connection to external databases
5. Manage the profiles of the users
6. Encrypt the data of the users
7. Send/receive messages to librarians and other administrators
8. Verify requests from Librarians to create School groups
9. Contact a user about their experience using standardized communications

## As an Administrator I want to:

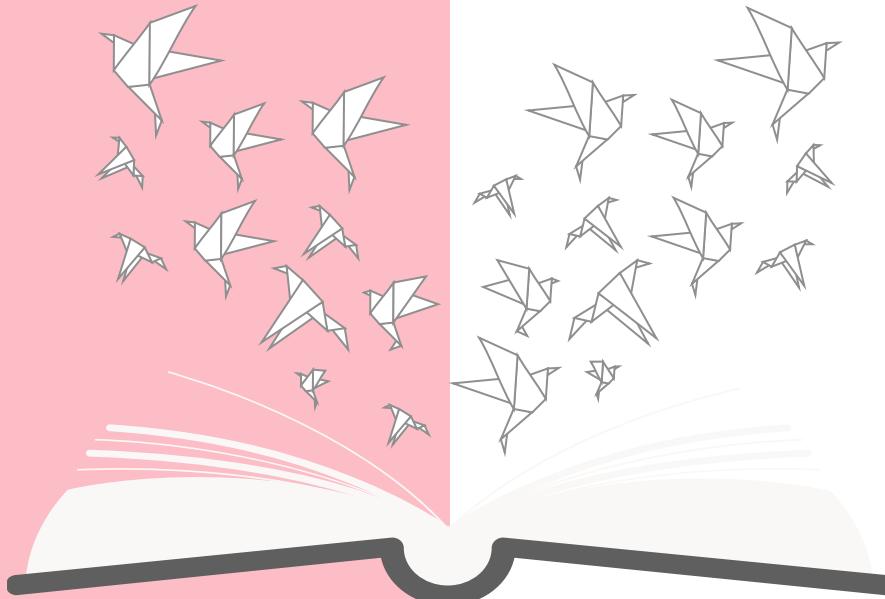
1. Contact an owner about data requests

## As a Tester I need to:

1. Evaluate the quality of the product
2. Ensure Beta readiness (Alpha)
3. Focus on finding bugs within the AskMissy program
4. Evaluate customer satisfaction (Beta)
5. Ensure release readiness for production launch (Beta)
6. Focus on collecting suggestions/feedback (Beta)
7. Evaluate feedback effectively (Beta)
8. Create test product documentation
9. Design testing scenarios for usability

## As a Tester I want to:

1. Carry out testing as per the defined procedures
2. Participate in walkthroughs of testing procedures
3. Prepare all reports related to the software testing carried out
4. Ensure all test requirements are carried out as per the defined standards and procedures



# Thank You