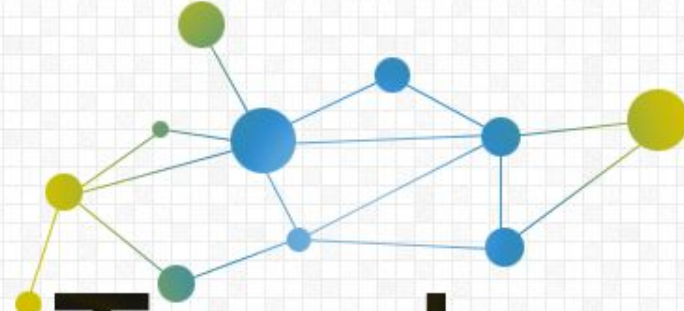


DESIGN



iTracker

Team Yellow
Old Dominion University
CS410, Fall 2018
Nov 28, 2018

Before We Begin...

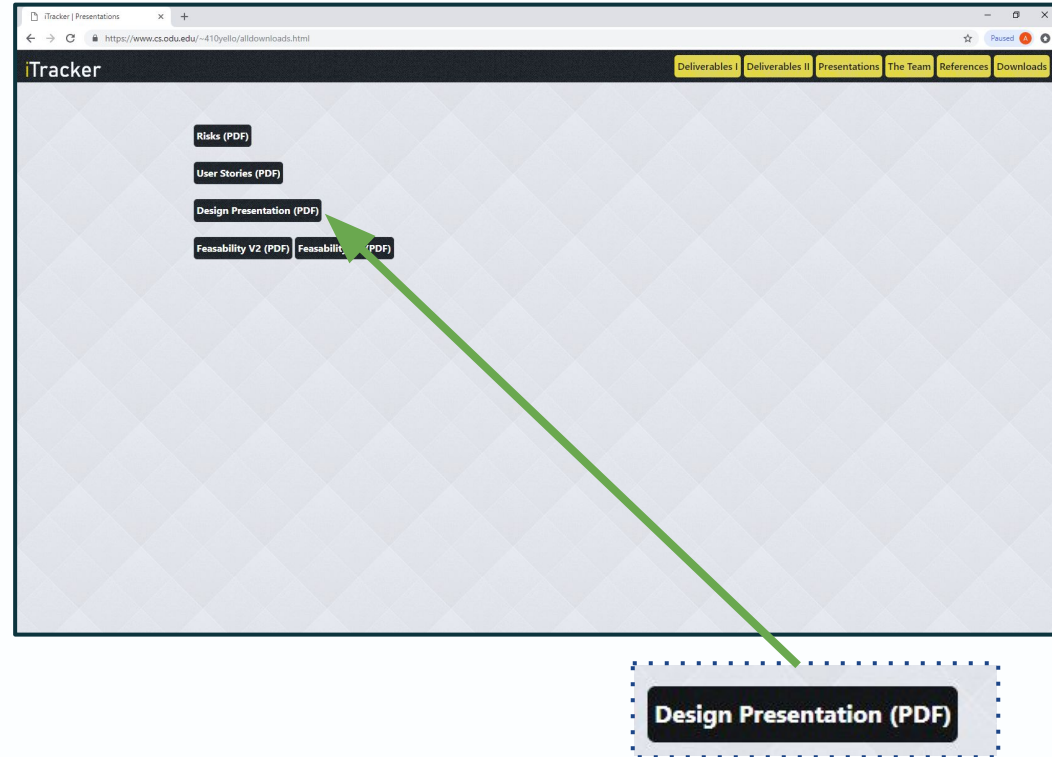
- Download buttons available on website for:
 - All presentations.
 - User stories.
 - Risks.
- All docs also available in deliverables.

All Downloads

- <https://www.cs.odu.edu/~410yello/alldownloads.html>

Main Site

- <https://www.cs.odu.edu/~410yello/>



Meet Our Team



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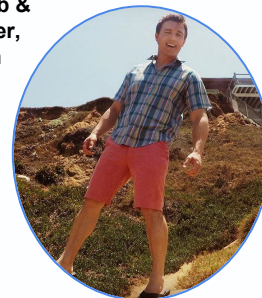
Joshua Leigh
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Software
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Manager, Editor



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Software Engineer,
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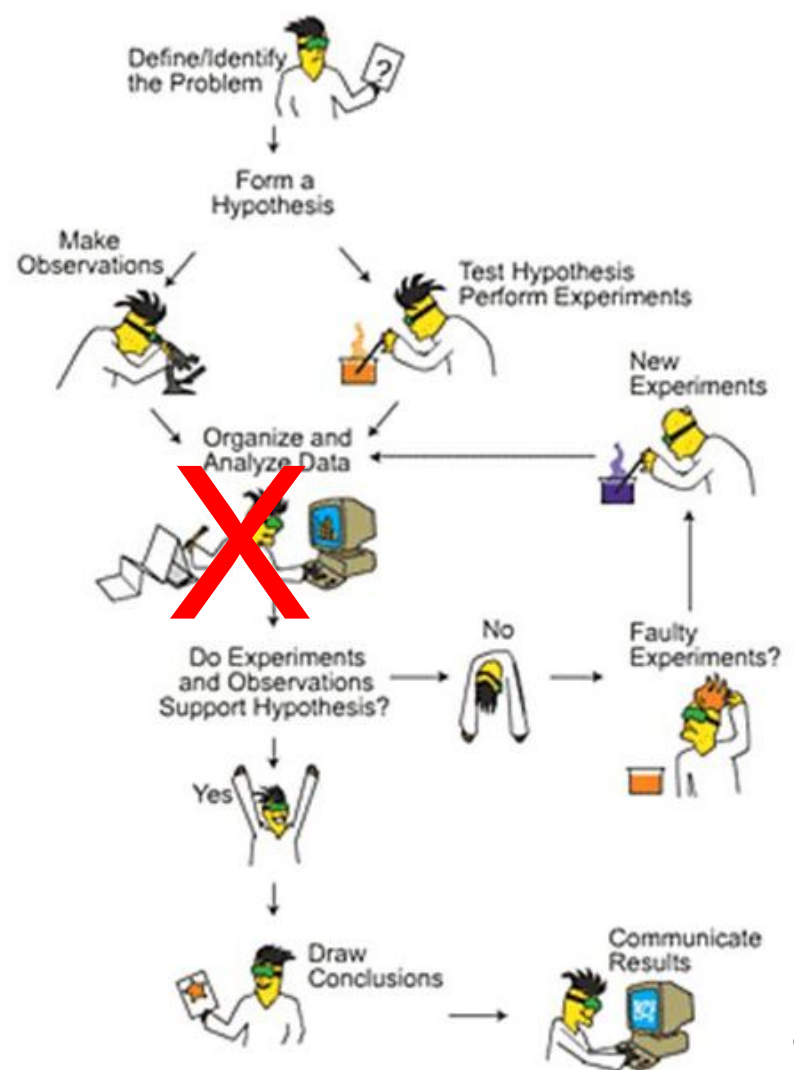


Problem Statement

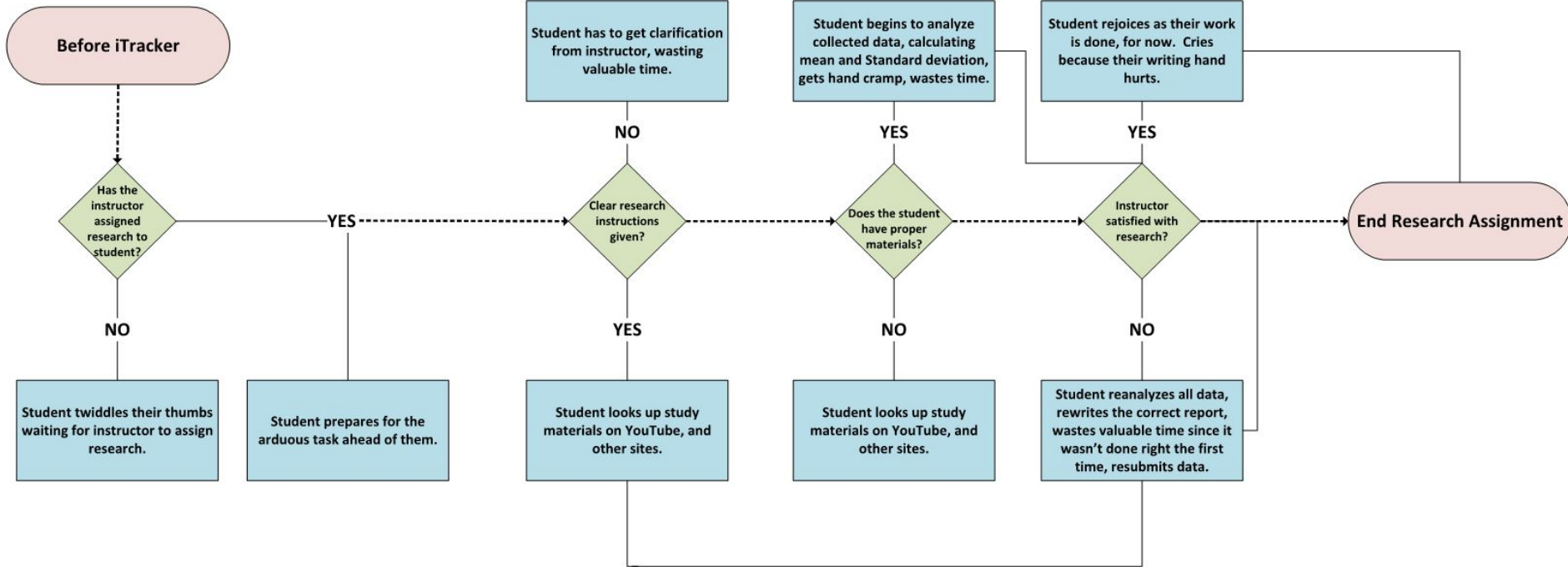
There is a need to automate the processing of scientific experiment observations, and to facilitate efficient analysis of raw data by students and faculty.

Research Process Before iTracker

- ~1000 students take Intro Biology every semester at ODU.
- Missed opportunity to utilize software for data collection.
- Analysis of data is currently not in real time.
- Major delay between recording observations and analysis.



Current Process Flow



LEGEND:

Pink - iTracker Start / End

Greenish - Decisions

Blue - Processess

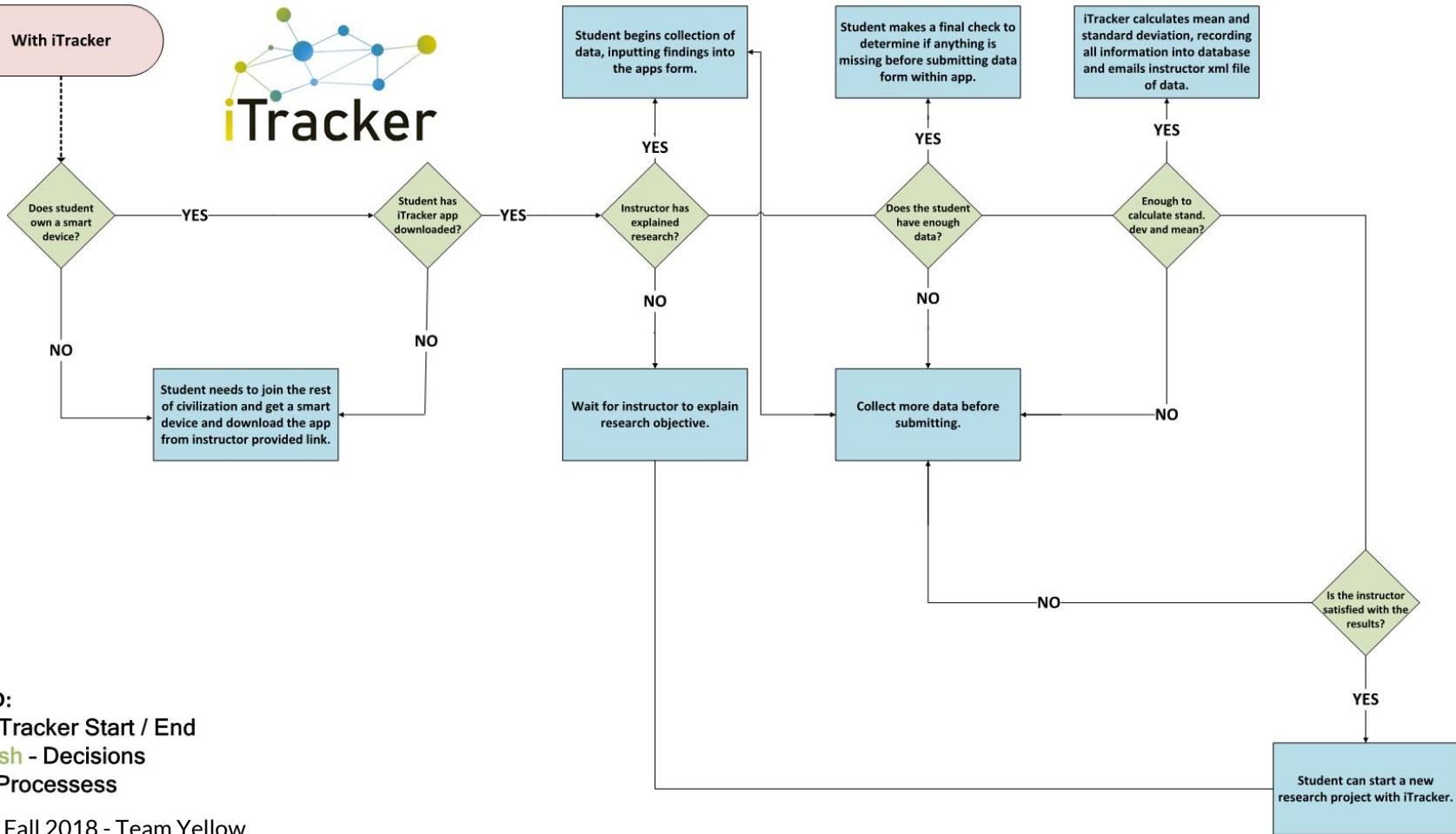


Our Solution

By streamlining the analysis portion of the scientific process, iTracker will allow Old Dominion University's Biology department to efficiently gather, organize, and visualize data and trends in an intuitive manner.

This will allow ODU's biology students to analyze their collected data and start to draw conclusions at a much faster pace than before.

With iTracker



LEGEND:

Pink - iTracker Start / End

Greenish - Decisions

Blue - Processess



What does iTracker do?

The Program Will:

- Allow students and faculty to input scientific data and access it in real time.
- Take advantage of the massive amounts of data collected by the ~1000 Biology students at ODU.
- Display pertinent data and graphs from previous collection time periods.
- Give information pertaining to possible trends.
- Highlight the significance of accessing historical data.
- Flag outlier data.

The Program Will Not:

- Do your homework for you.
- Make any conclusions for the student.
- Automate the collection of data.



Customers

Colleges and Universities

- That offer classes in biological research.
 - Case study: Biology department at Old Dominion University.



End Users

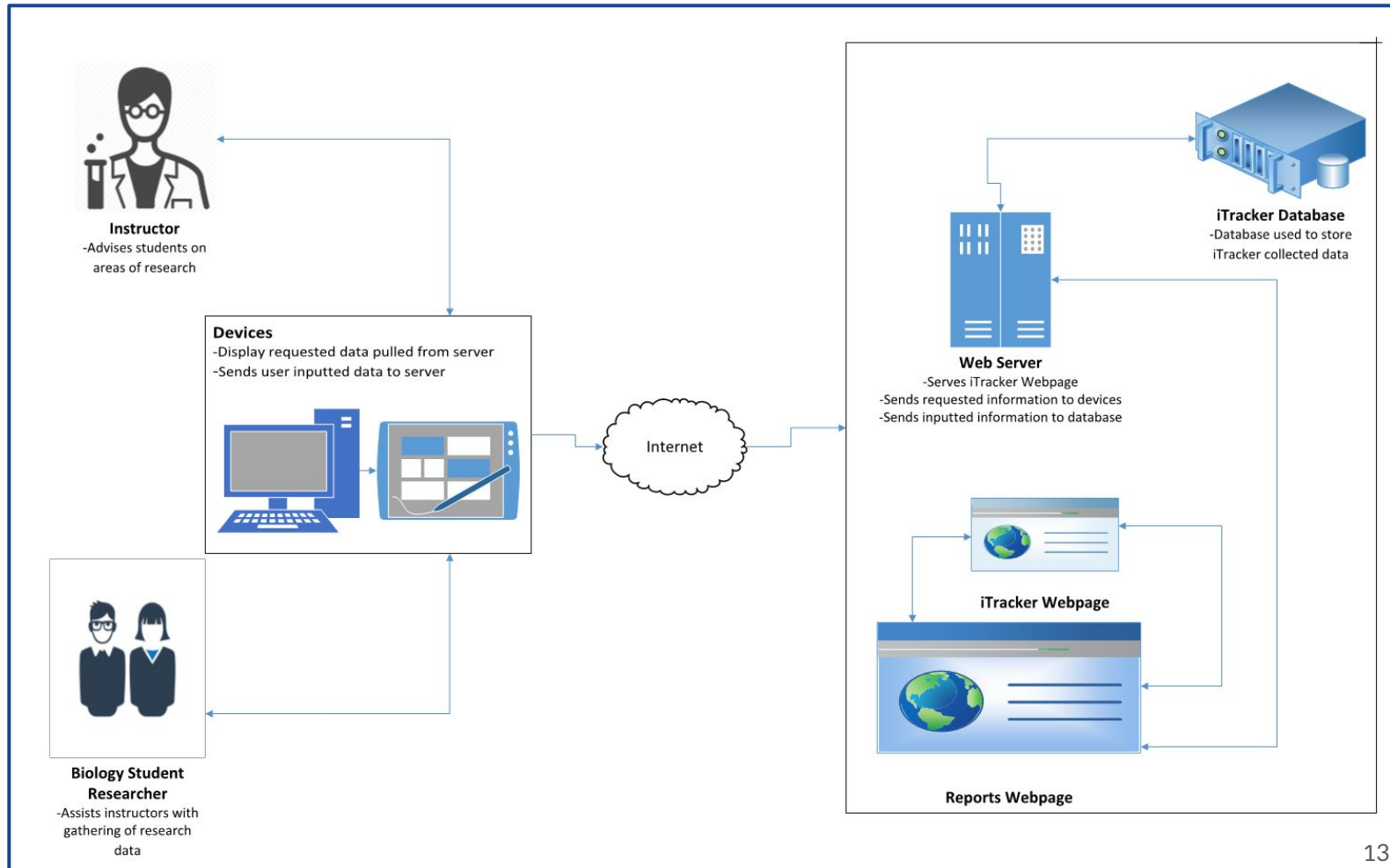
Students:

- Helps come to a conclusion in the experiment.
- Discover what is unique with their findings.
- Provides a better understanding of the scientific process.

For Faculty:

- Aid in keeping track of scientific data.
- Meaningful real time data examples.
- Provides added levels of accessible information.
- Provides convenient methods for sharing educational materials.
- Provide timely feedback to students.

Major Functional Components



Risks Overview

Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				


Probability

Technical

Customer

<ul style="list-style-type: none"> T1 - Software proves incompatible to newer versions of iOS/Android with previous software versions. 	<ul style="list-style-type: none"> C1 - Primary customers (Biology instructors) decide not to use the program, due to any reason.
<ul style="list-style-type: none"> T2 - Backward compatibility of newer software versions with old survey data. 	<ul style="list-style-type: none"> C2 - Students/instructors are not able to efficiently utilize the program, due to any reason.
<ul style="list-style-type: none"> T3 - Software reliability due to local (single smart device) issues. 	<ul style="list-style-type: none"> C3 - Unacceptable time required to manage software options.
<ul style="list-style-type: none"> T4 - Software reliability due to central server (communication) issues. 	

Technical Risks - T1



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


T1 Risk

- Software proves incompatible to newer versions of iOS/Android with previous software versions.

T1 Mitigation

- Web-application is planned in addition to mobile applications; all versions should be adequately tested before release.

Technical Risks - T2



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


T2 Risk

- Backward compatibility of newer software versions with old survey data.

T2 Mitigation

- Ensure adequate beta testing has been performed on the software with old survey data before new version releases.

Technical Risks - T3



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


T3 Risk

- Software reliability due to local (single smart device) issues.

T3 Mitigation

- Software testing and follow through on all user reported bugs.

Technical Risks - T4



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


T4 Risk

- Software reliability due to central server (communication) issues.

T4 Mitigation

- Allow for local storage of all data and reports in case of server downtime.

Customer Risks - C1



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


C1 Risk

- Primary customers (Biology instructors) decide not to use the program, due to any reason.

C1 Mitigation

- Acquire feedback from instructors and make necessary changes; ensure adequate beta testing has been performed.

Customer Risks - C2



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability


C2 Risk

- Students/instructors are not able to efficiently utilize the program, due to any reason.

C2 Mitigation

- Acquire feedback and make necessary changes. Interface should be simple and intuitive.

Customer Risks - C3



Impact

	Very Rare	Rare	Possible	Likely
Extremely Damaging		T3		C1
Very Damaging			T1	C2
Moderately Damaging		C3	T2	
Slightly Damaging		T4		
Negligible				

Probability

C3 Risk

- Unacceptable time required to manage software options.

C3 Mitigation

- Ensure adequate beta testing has been performed and acquire feedback from primary customers (instructors).



Identification of Software Development

Project Management Tools

- Git for version control
- JavaDocs for documentation and analysis

Programming Languages/Libraries

- C#, Java
- JQuery (Javascript Library)

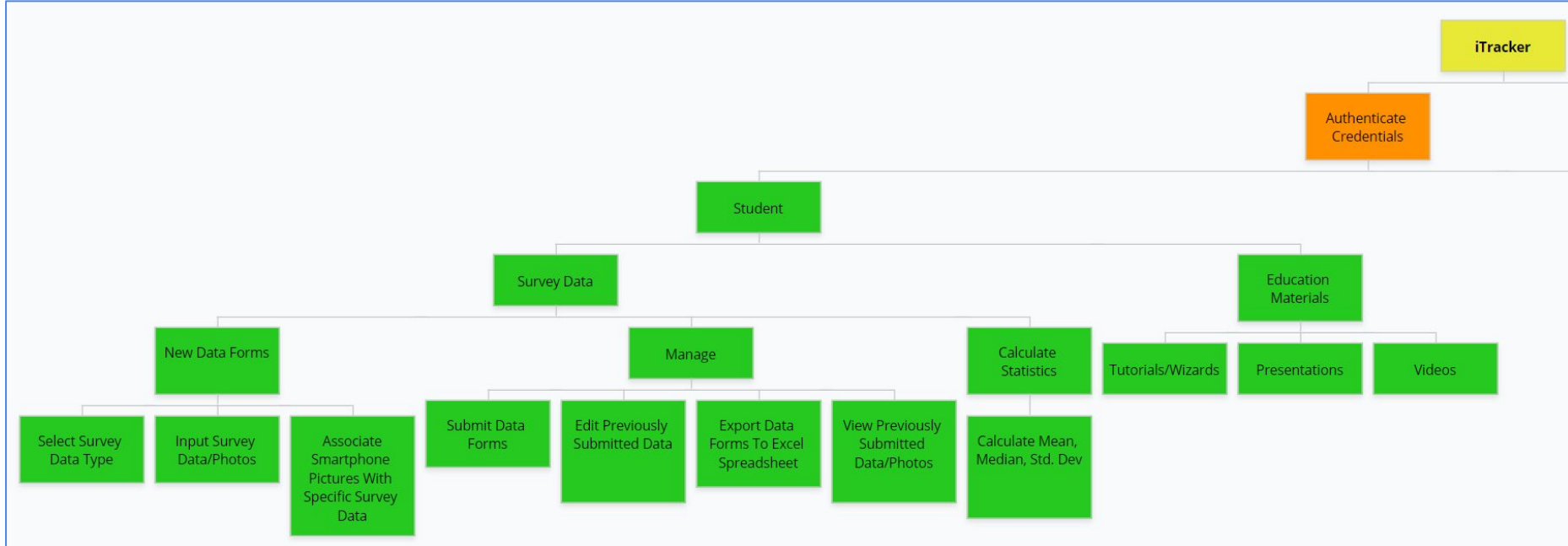
Databases

- MySQL

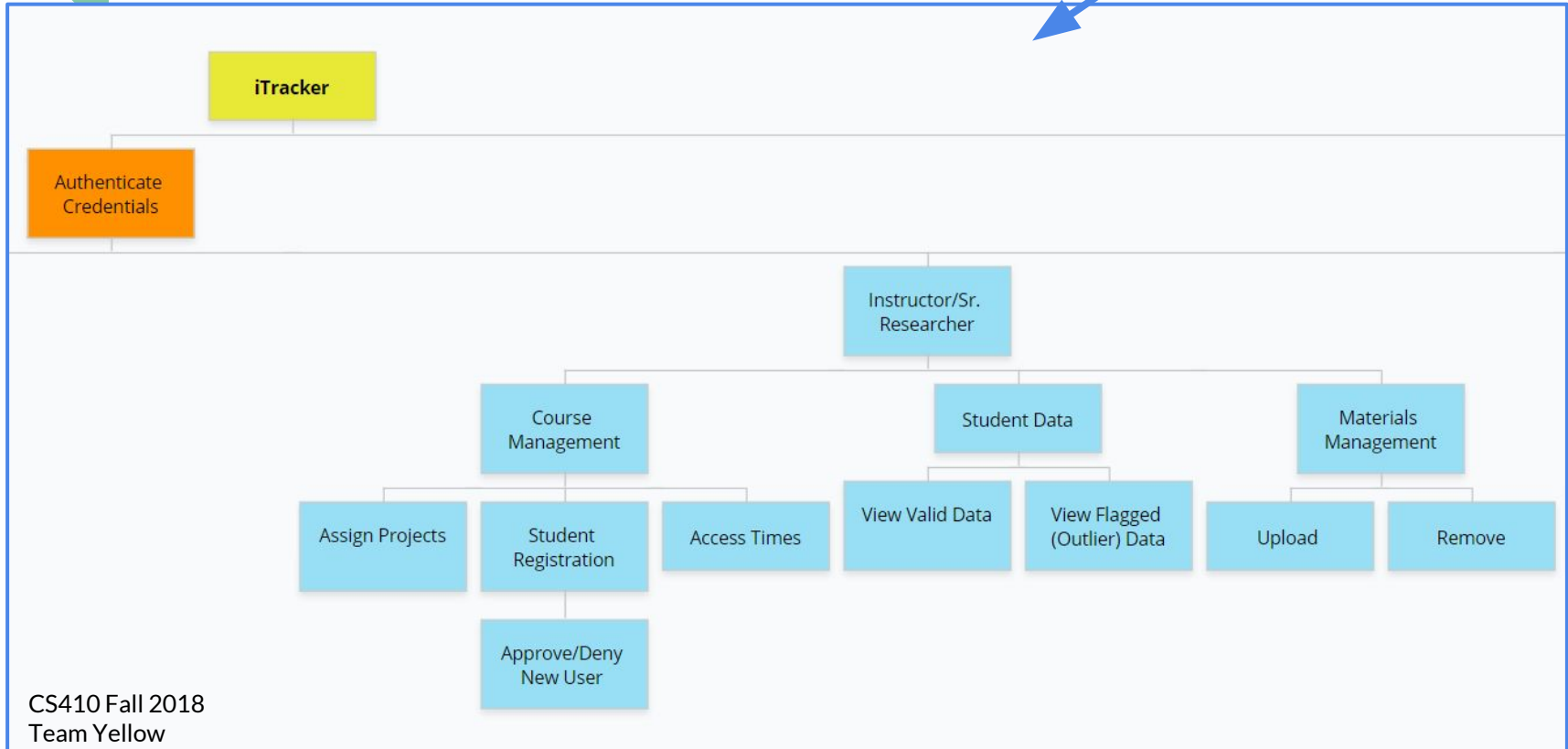
Other

- JSON

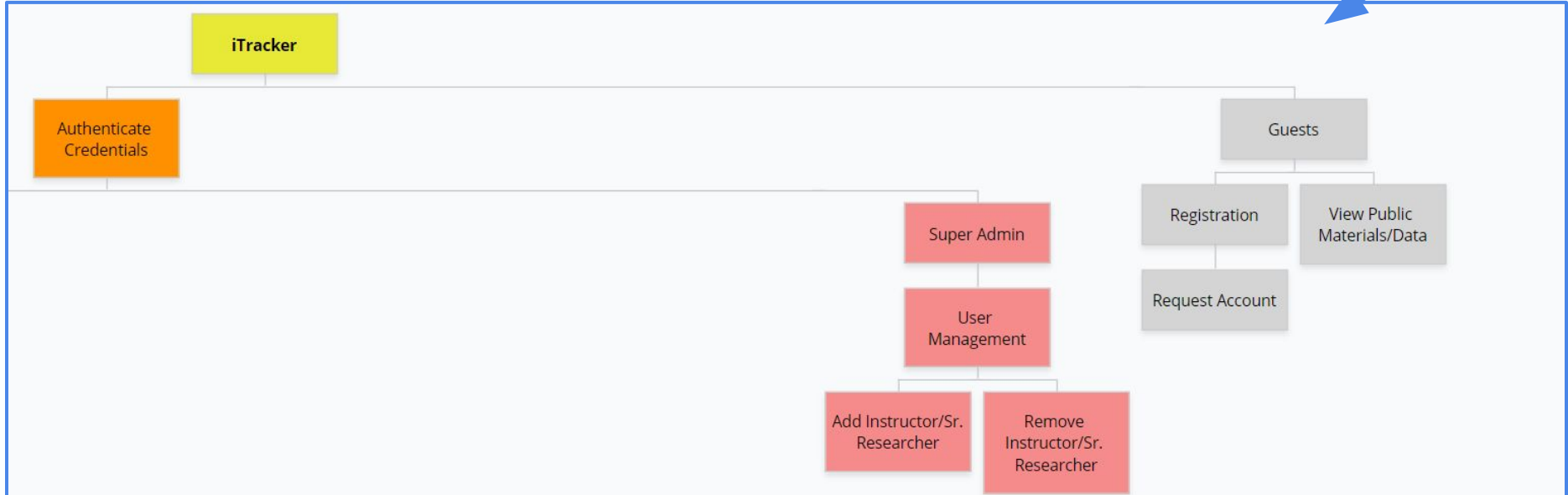
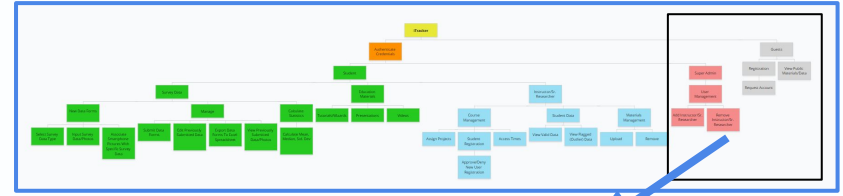
Site Map - Student



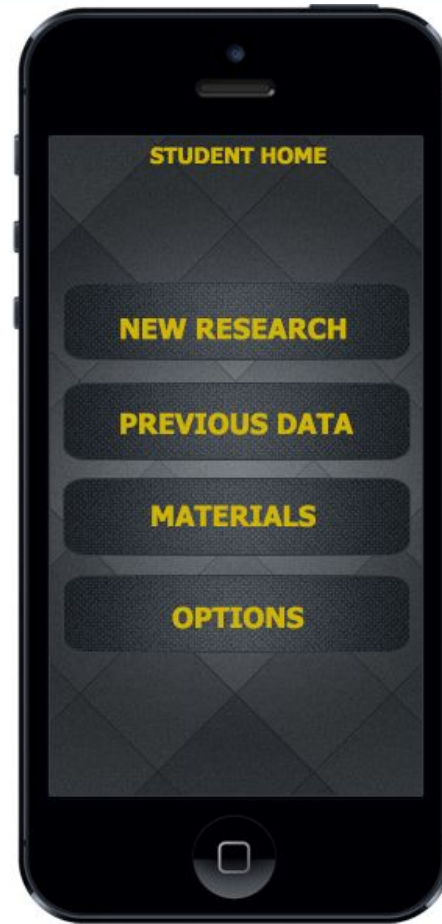
Site Map - Instructor / Sr. Researcher



Site Map - Super Admin / Guests



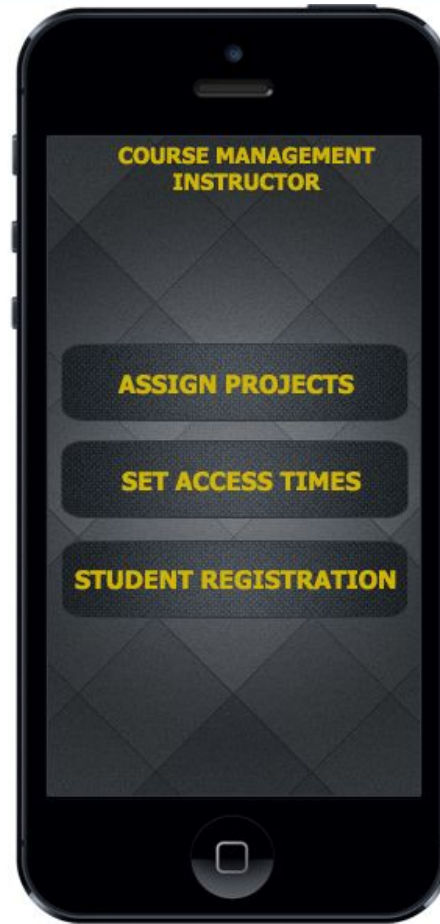
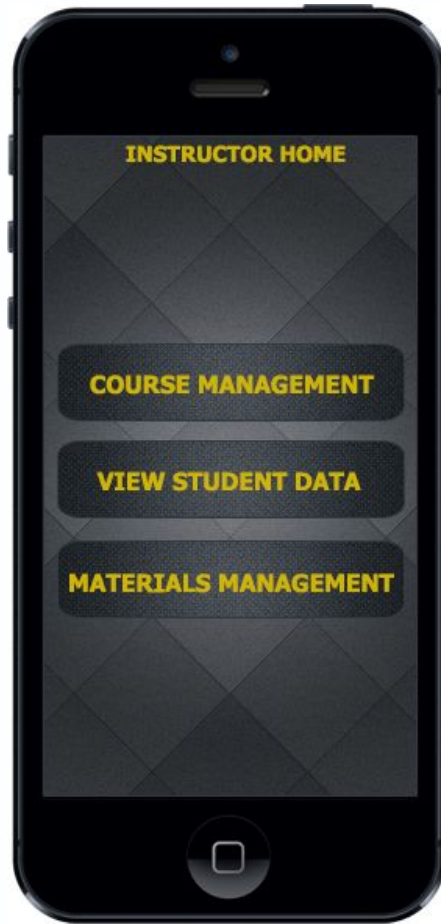
Mockup - Student View



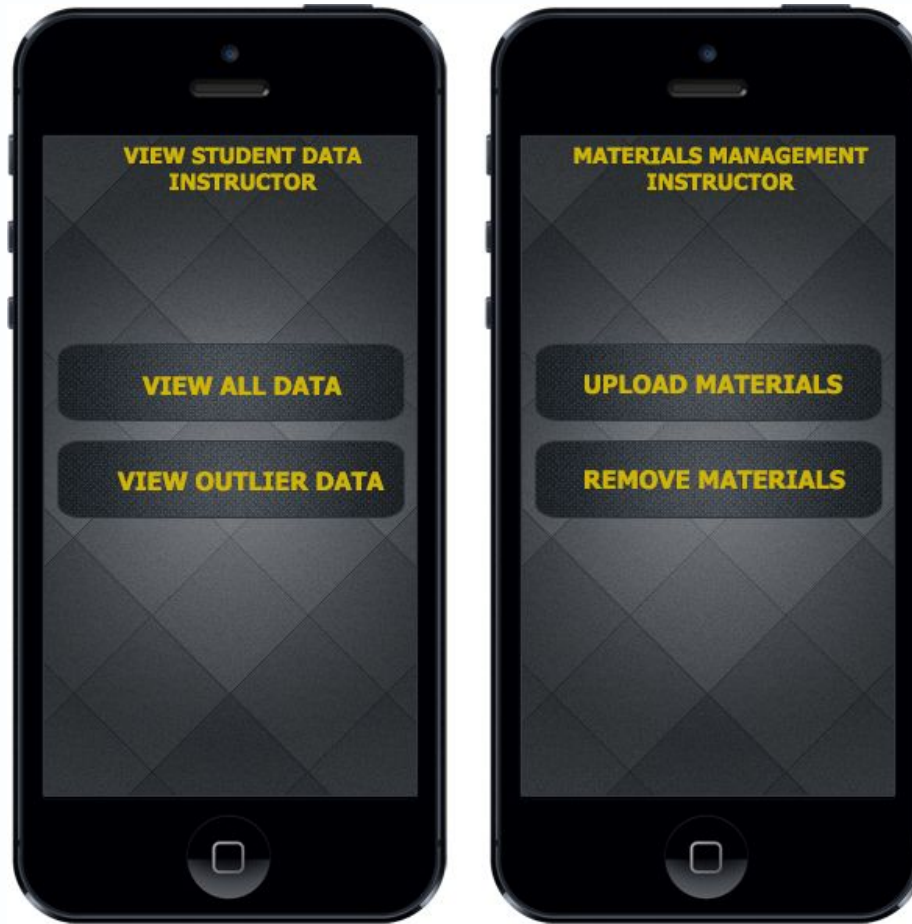
Mockup - Student View (continued)



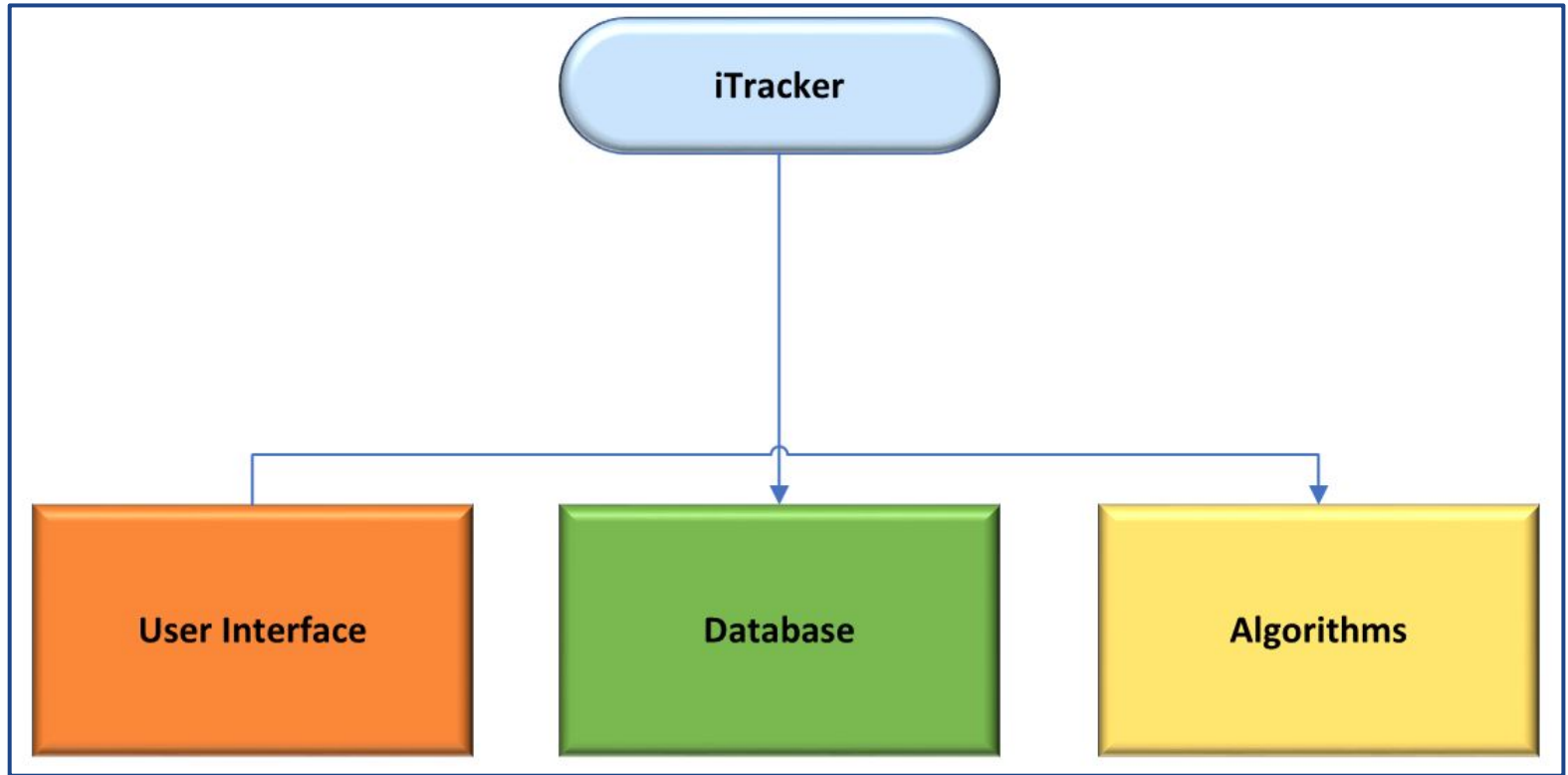
Mockup - Instructor View



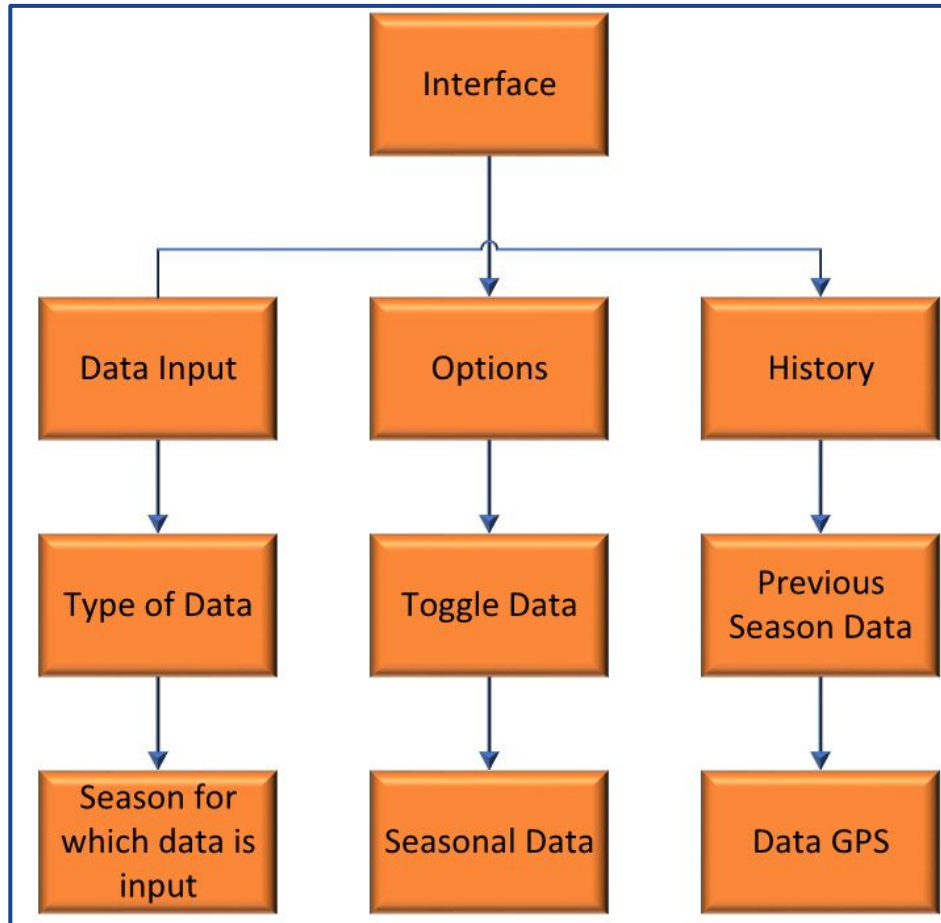
Mockup - Instructor View (continued)



iTracker - Implementation Overview



iTracker - Interface



iTracker - Old System

STUDENT NAME _____
DATE _____
ROOM NUMBER _____ DAY _____ TIME _____

FIRST OBSERVATION

TERRARIUM ID#	CONDENSATION	FUNGAL GROWTH	LIGHTS (ON/OFF)

Do you see any ticks? Are the ticks moving or sitting still?

QUESTING TICK#	HEIGHT CLIMBED	SPECIES (<i>A. americanum</i> or <i>L. scapularis</i>)	NOTES
1			
2			
3			
4			
5			
6			
7			
8			

Additional comments or observations:

SECOND OBSERVATION

TERRARIUM ID#	CONDENSATION	FUNGAL GROWTH	LIGHTS (ON/OFF)

Do you see any ticks? Are the ticks moving or sitting still?

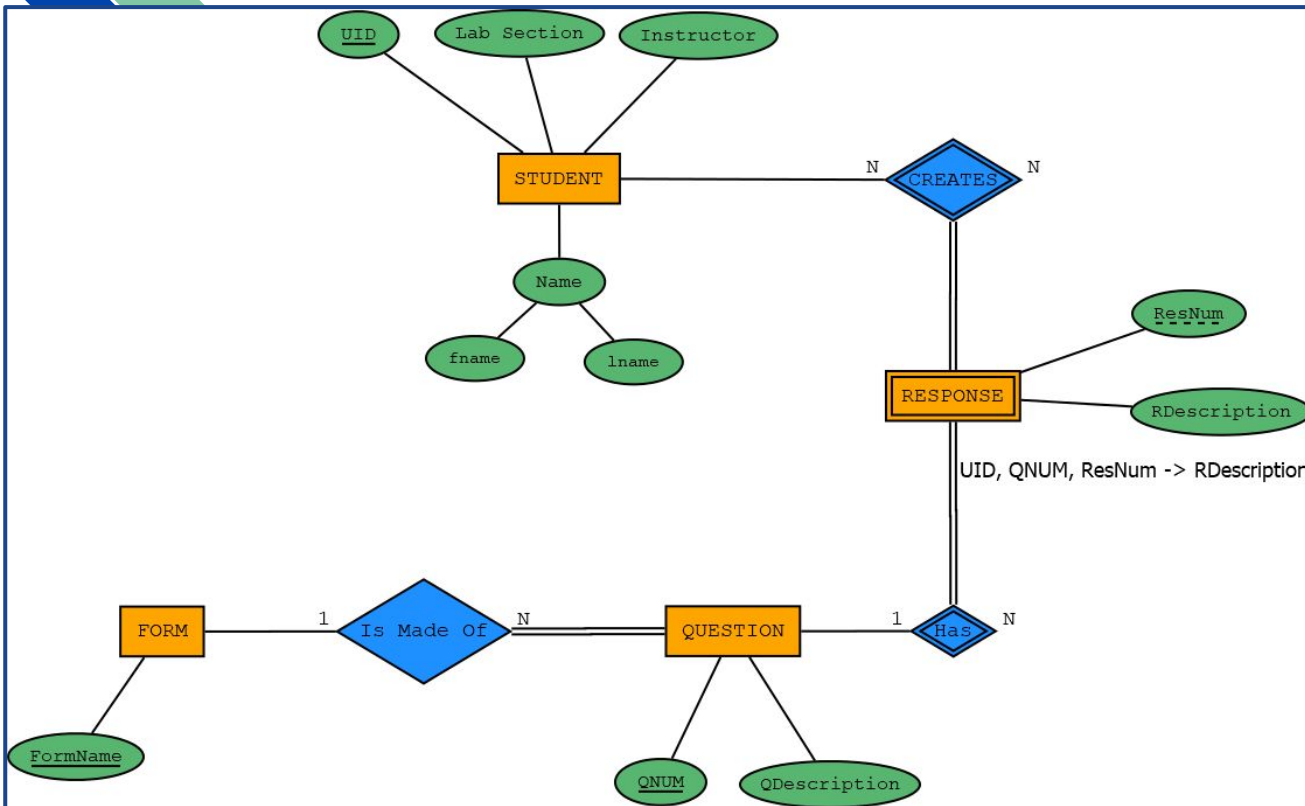
QUESTING TICK#	HEIGHT CLIMBED	SPECIES (<i>A. americanum</i> or <i>L. scapularis</i>)	NOTES
1			
2			
3			
4			
5			
6			
7			
8			

Additional comments or observations:

Data Sheet ID	Ticks observed	Date	Observer	Tank	Tick Activity	Height (c	Material	Dowel #	Time	Time Fin
20		1 5/16/2018	MA	A	Q	14.5	G	NA	11:00	11:04
21		1 5/16/2018	PS	A	Q	18	G	NA	NA	11:42
22		1 5/16/2018	FA	A	Q	14.1	G	NA	NA	11:33
23		1 5/16/2018	TE	A	Q	14.5	G	NA	NA	11:33
24		1 5/16/2018	KG	A	Q	14	G	NA	NA	11:33
25		1 5/16/2018	BS	A	Q	14	G	NA	NA	11:33
26		1 5/16/2018	IW	A	Q	14	G	NA	NA	11:33
27		1 5/16/2018	MR	A	Q	15.2	G	?	11:18	11:33
28		1 5/16/2018	OB	A	I	U	G	NA	NA	11:32
29		1 5/16/2018	AC	A	U	U	G	NA	NA	11:32
30		1 5/16/2018	KE	A	U	U	NA	NA	NA	11:31
31		1 5/16/2018	JM	A	Q	15	G	NA	NA	11:29
32		1 5/16/2018	JE	A	Q	15	G	NA	NA	11:22

Data Sheet ID	Observer	Time	Room	Date	<i>I. scapularis</i> _ob	<i>A. americanum</i> _	Notes
W1	CS	8:00	115	9/26/2018	0	2	
W2	ST	8:00	115	9/26/2018	0	2	
W3	SS	8:00	115	9/26/2018	0	2	
W4	AM	8:00	115	9/26/2018	0	2	
W5	MS	8:00	115	9/26/2018	0	1	
W6	DW	8:00	115	9/26/2018	0	1	
W7	KB	8:00	117	9/26/2018	1	6	
W8	SP	8:00	117	9/26/2018	1	4	

iTracker - Databases - Entity Relationship (ER) Diagram



Problem is to create a flexible database of databases not single database that can't be changed.

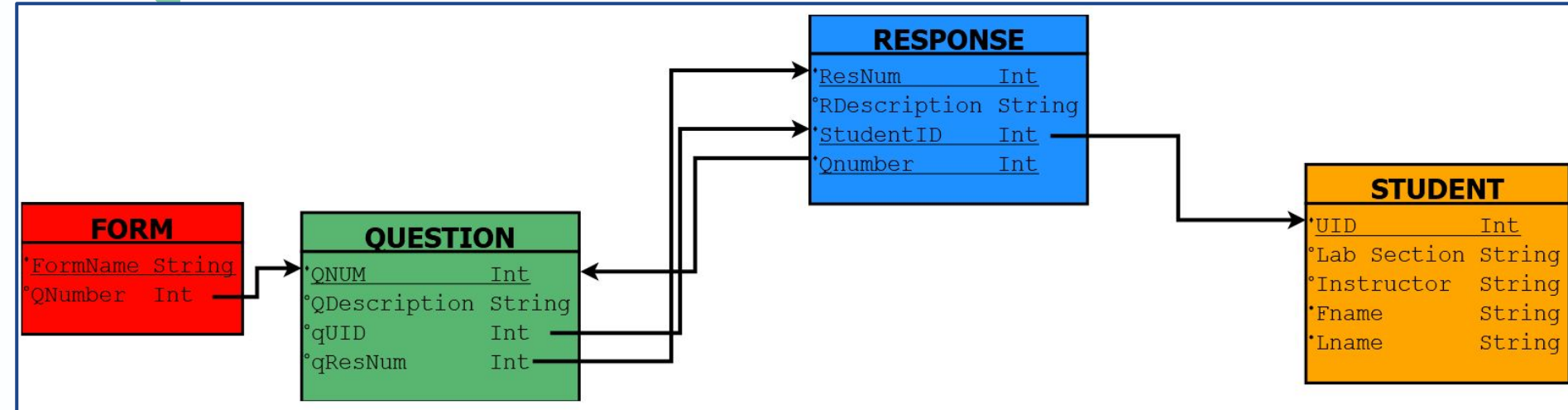
A form holds questions and all the responses to those questions

Students insert tuples all into the same form. They do not each create their own form.

All information that isn't a listed attribute is handled as a question.

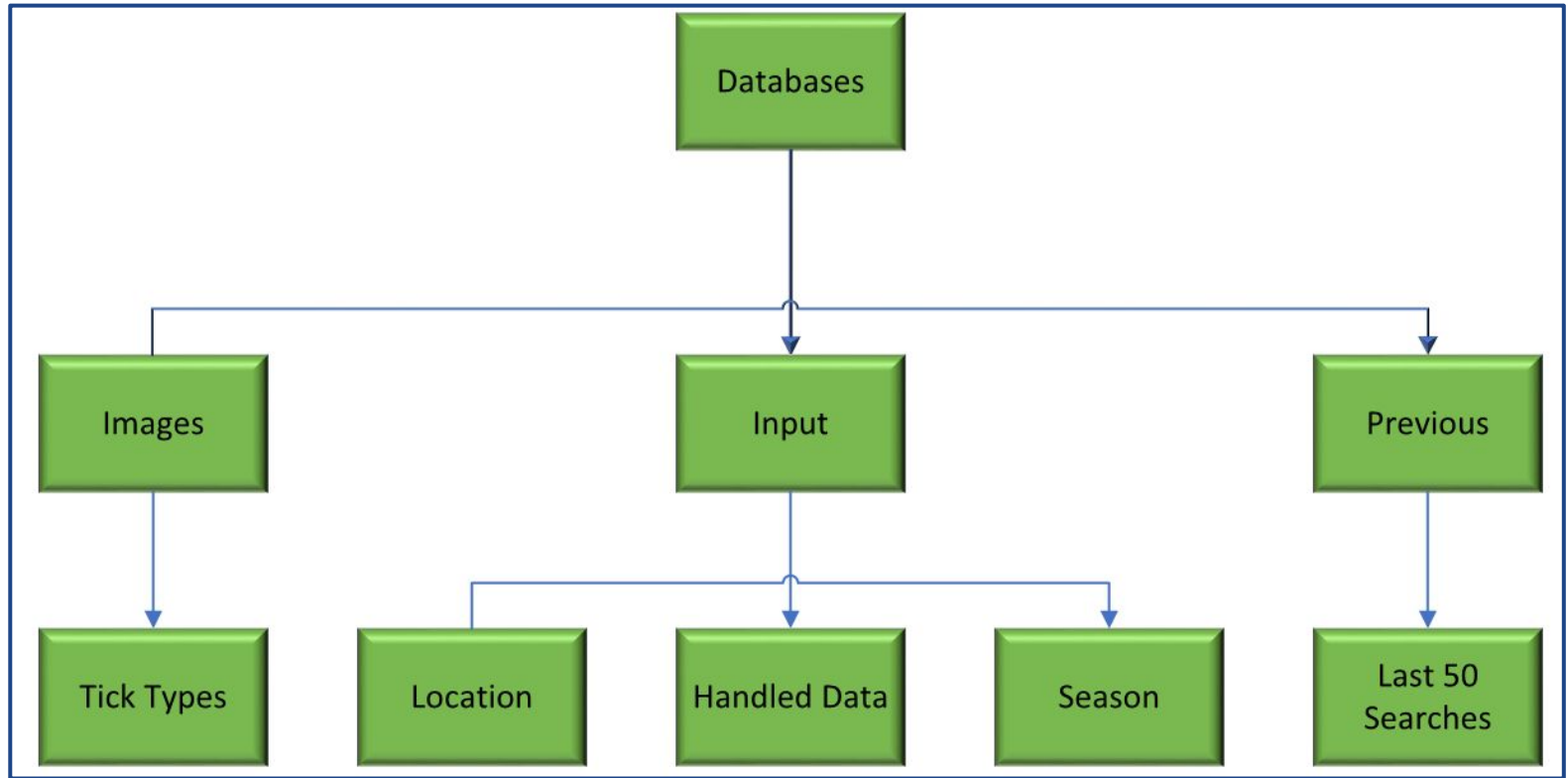
New forms can use previously created questions. (Questions are a strong entity)

iTracker - Databases - Schema

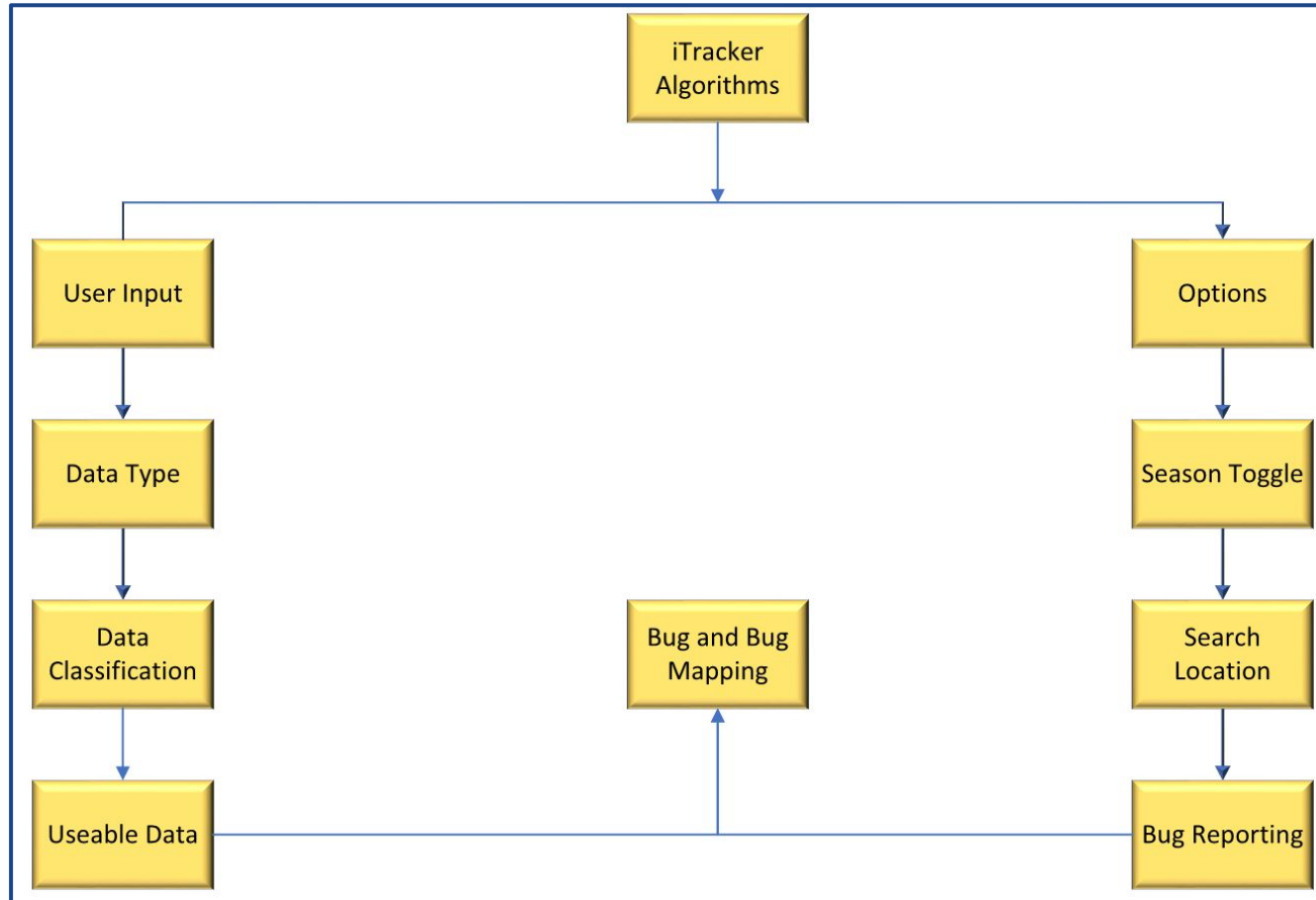


- **Keys: Underlined.**
- **Foreign Keys - Tails of arrows. Reference other tables.**
 - **FORM: Qnumber ->QNUM**
 - **QUESTION: qUID->StudentID, qResNum->ResNum**
 - **RESPONSE: Qnumber -> QNUM, StudentID->UID**

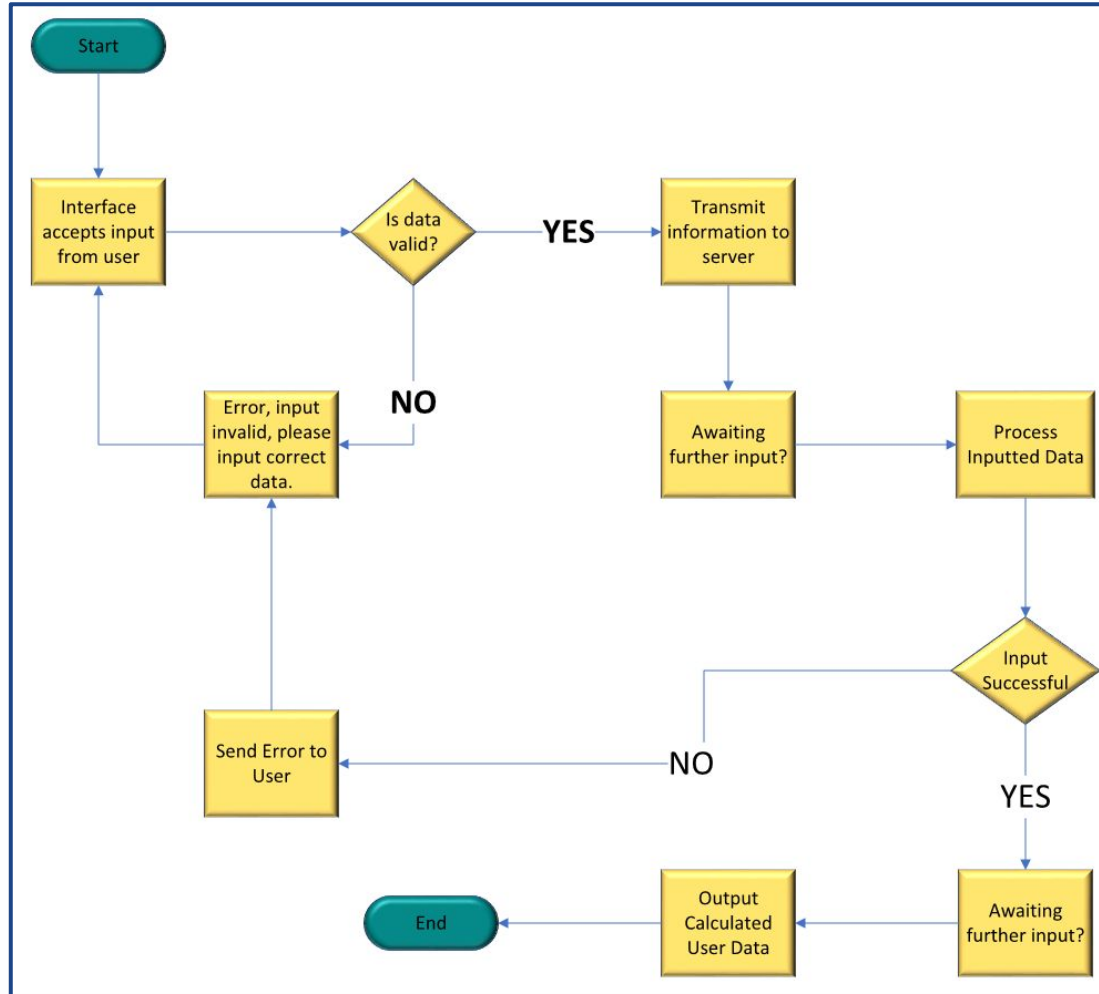
iTracker - Databases



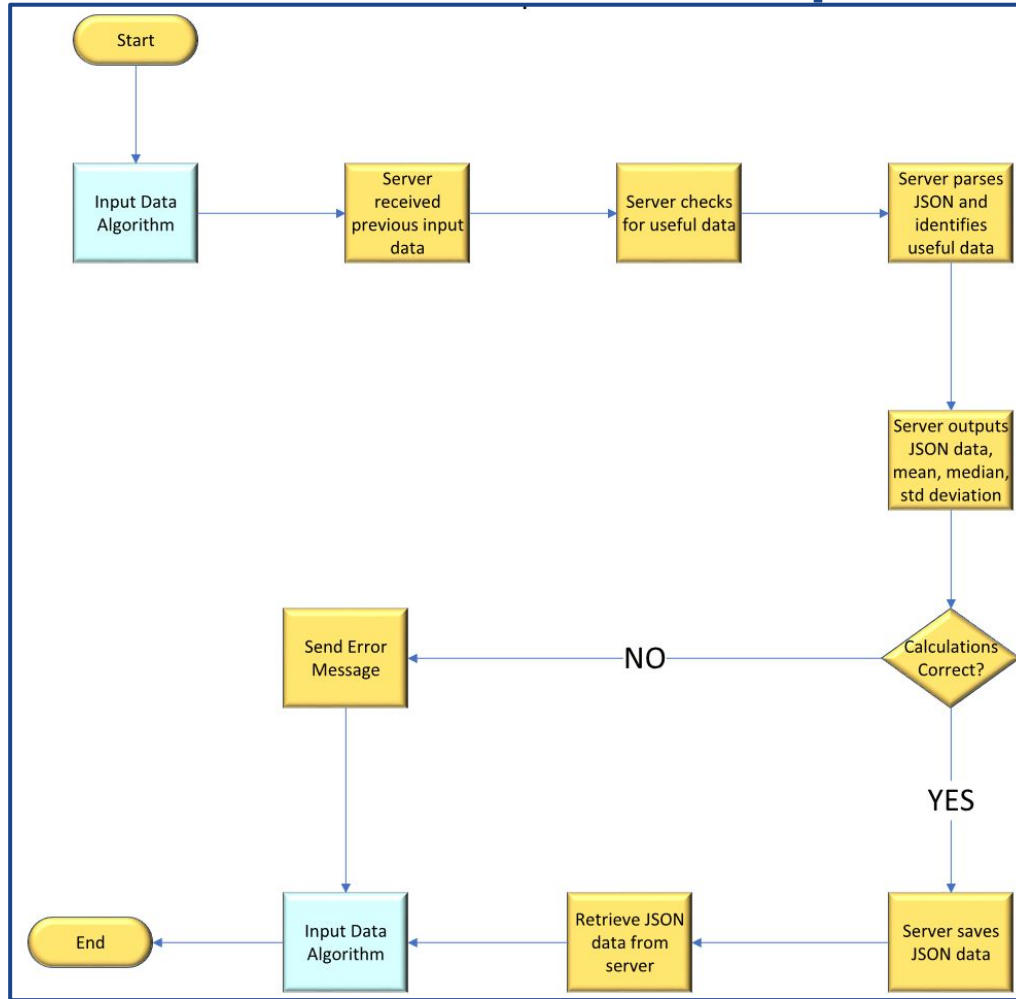
iTracker - Algorithms: Overview



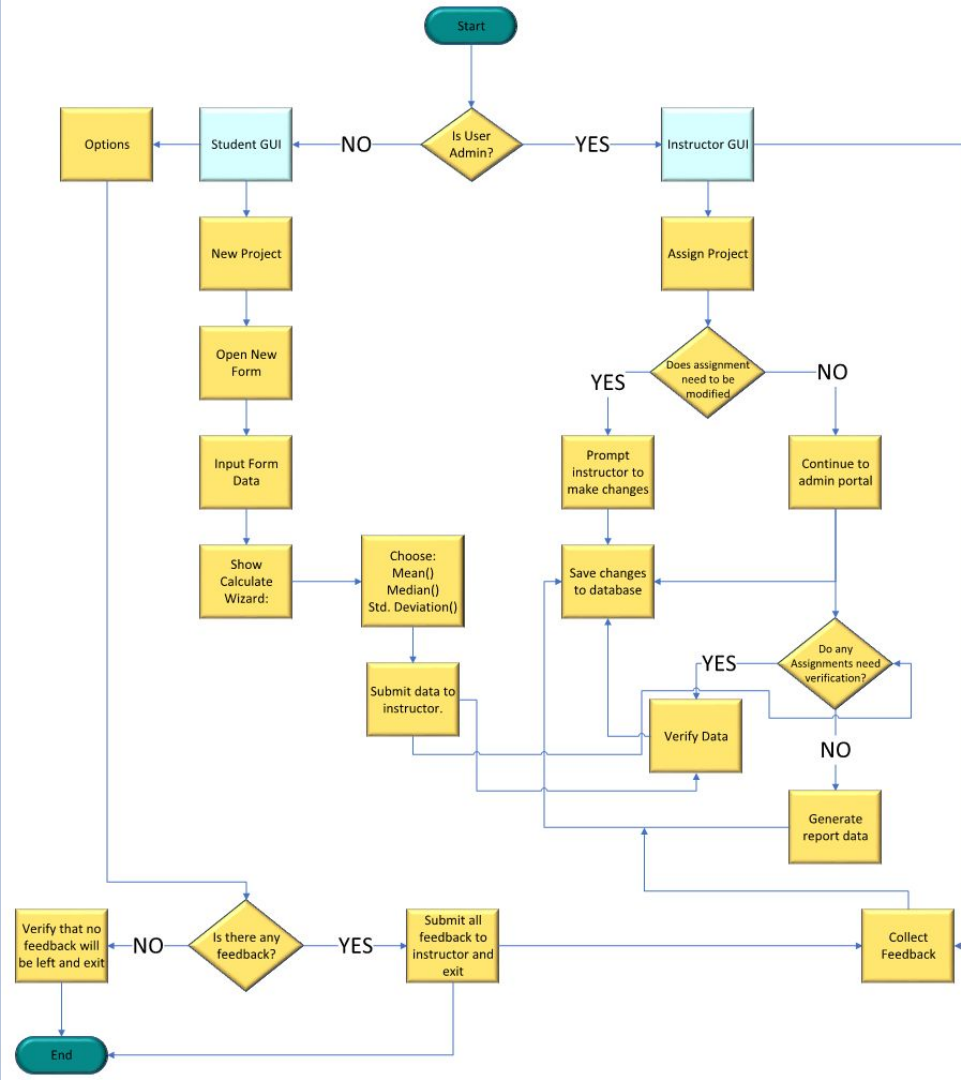
iTracker - Algorithms - Process Data Input



iTracker - Algorithms - Process Data Output



GUI Input



iTracker: Summary



What:

The collection of data is currently being done by hand and it takes the TA's time to enter data. To see the data may take days to view and the opportunity to follow the scientific process efficiently is lost.

Who:

Aiming to have students, faculty, and individuals interested in the scientific process use iTracker.

How:

Allows students and faculty to input scientific data, automate the organization of data, and give them the ability to accurately visualize the data in the same day.