

Final Project Update

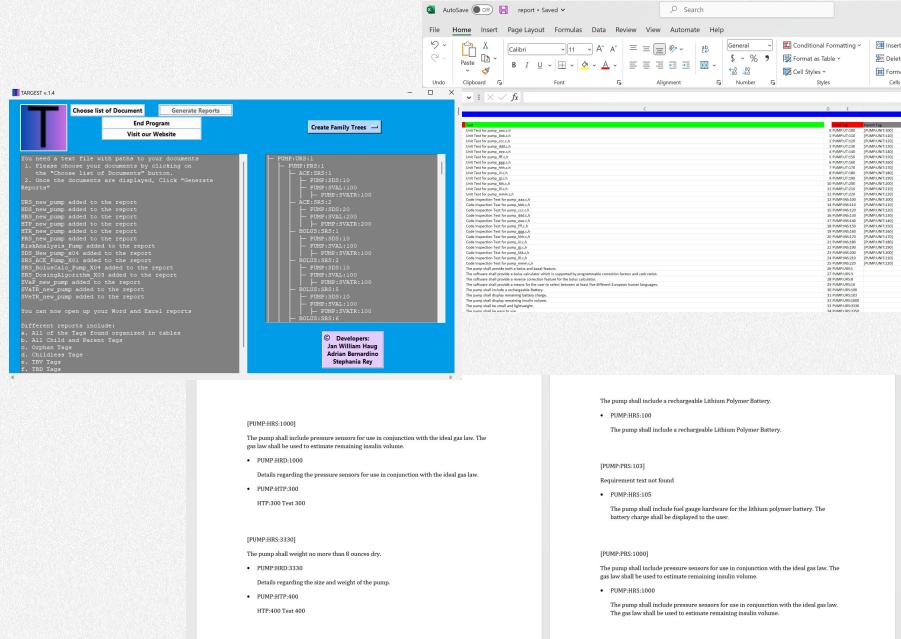
Targest

Team 006 - Adrian Bernardino, Jan William Haug, Stephania Rey

Business Background + Needs

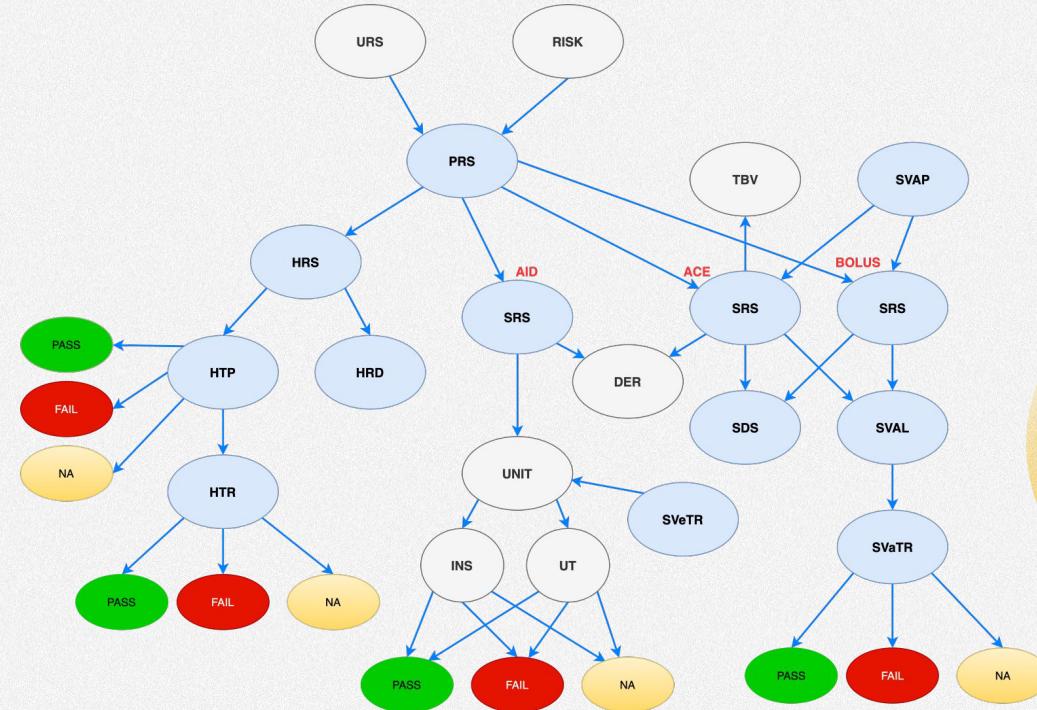
Requirements tracing software is a critical tool for modern businesses, but unfortunately, the market offers limited options.

- Enter **Targest** which stands for:
technical **a**bstraction **r**eport
generator **e**xtraction **s**oftware
tool.
- TARGETST application features
- Limited access to requirements traceability documentation in respects of software



Why we are doing this

- What we are trying to solve
- To show if requirements pass and fail
- Working properly
- To make sure we do not forget anything and giving the customer what they want
- Is it safe or dangerous?



Documentation

Introduction

This document is part of a test case for the Trace Tool. As such, these are not real requirements, but they do resemble real requirements.

This is an example of a paragraph with no requirements. This is an example of a paragraph with no requirements. This is an example of a paragraph with no requirements. This is an example of a paragraph with no requirements.

This is another example of a paragraph with no requirements. This is another example of a paragraph with no requirements. This is another example of a paragraph with no requirements.
This is another example of a paragraph with no requirements.

System Details

Sample Table	Sample Table	Sample Table
Sample Table	Sample Table	Sample Table
Sample Table	Sample Table	Sample Table

Hardware Requirements

PUMP:HRS:100 The pump **shall** include a rechargeable Lithium Polymer Battery. **[PUMP:PRS:100]**

PUMP:HRS:105 The pump **shall** include fuel gauge hardware for the lithium polymer battery. The battery charge **shall** be displayed to the user. **[PUMP:PRS:103]**

PUMP:HRS:1000 The pump **shall** include pressure sensors for use in conjunction with the ideal gas law. The gas law **shall** be used to estimate remaining insulin volume. **[PUMP:PRS:1000]**

PUMP:HRS:3330 The pump **shall** weight no more than 8 ounces dry. **[PUMP:PRS:3330]**

PUMP:HRS:3340 The pump **shall** fit within a volume of 3" by 2" by 0.75". **[PUMP:PRS:3330]**

PUMP:HRS:3350 The pump **shall** include a full color touchscreen. **[PUMP:PRS:3350]**

Introduction

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System Details

Sample Table	Sample Table	Sample Table
Sample Table	Sample Table	Sample Table
Sample Table	Sample Table	Sample Table

Software Requirements

PUMP:PRS:1 The pump **shall** provide both a bolus and basal feature. **[PUMP:URS:1]**

PUMP:PRS:2 The pump **shall** limit boluses to not exceed 25 units. **[PUMP:RISK:10]**

PUMP:PRS:3 The pump **shall** limit boluses to not exceed 15 units/hour. **[PUMP:RISK:20]**

PUMP:PRS:4 The software **shall** provide a programmable correction factor feature. **[PUMP:URS:3]**

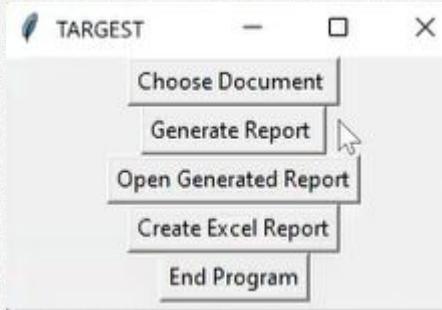
PUMP:PRS:5 The software **shall** provide a programmable carb ratio feature. **[PUMP:URS:3]**

PUMP:PRS:8 The software **shall** provide a reverse correction feature for the bolus calculator. **[PUMP:URS:8] [PUMP:RISK:30]**

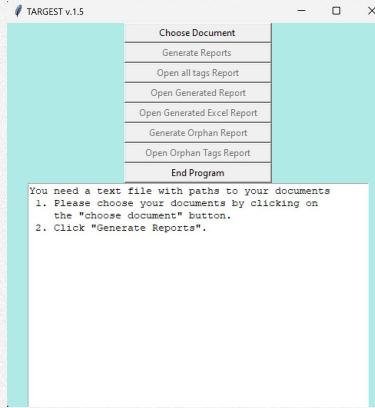
PUMP:PRS:10 The software **shall** provide a means for the user to select between at least five

TARGET GUI

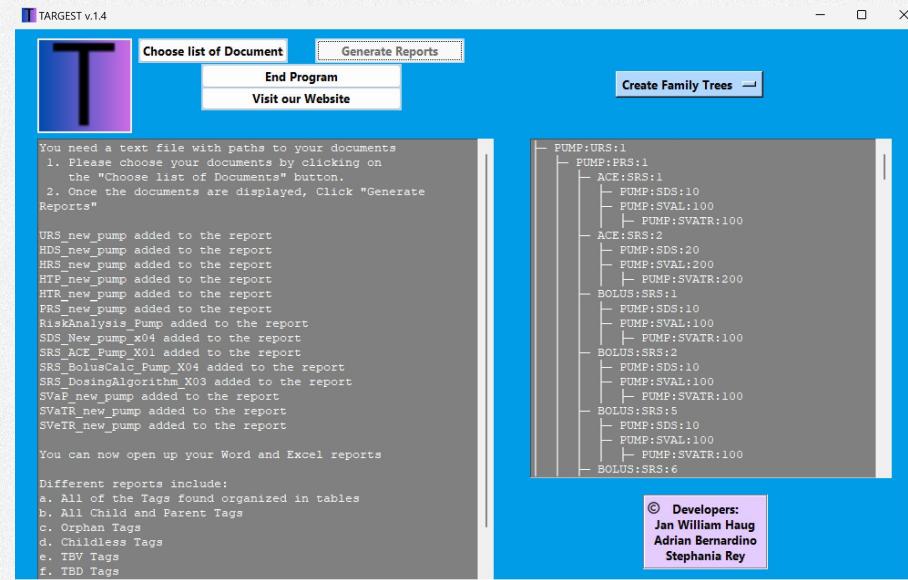
Last semester



Previous version



Current version



GUI

TARGET v.1.4

The screenshot shows the TARGET v.1.4 application window. At the top, there's a toolbar with a logo, a "Choose list of Document" button, a "Generate Reports" button, an "End Program" button, and a "Visit our Website" button. To the right of the toolbar is a "Create Family Trees" button. The main area contains a text-based interface for generating reports. It starts with instructions: "You need a text file with paths to your documents" followed by two steps: "1. Please choose your documents by clicking on the "Choose list of Documents" button." and "2. Once the documents are displayed, Click "Generate Reports"". Below these instructions is a list of document paths added to the report, such as "URS_new_pump added to the report", "HDS_new_pump added to the report", etc. Further down, it says "You can now open up your Word and Excel reports". A section titled "Different reports include:" lists six items: "a. All of the Tags found organized in tables", "b. All Child and Parent Tags", "c. Orphan Tags", "d. Childless Tags", "e. TBV Tags", and "f. TBD Tags". On the right side of the window, there's a large tree diagram showing the hierarchical structure of the document paths. At the bottom right, there's a purple box containing developer credits: "© Developers: Jan William Haug, Adrian Bernardino, Stephania Rey".

Choose list of Document Generate Reports

End Program

Visit our Website

Create Family Trees

You need a text file with paths to your documents

1. Please choose your documents by clicking on the "Choose list of Documents" button.
2. Once the documents are displayed, Click "Generate Reports"

URS_new_pump added to the report
HDS_new_pump added to the report
HRS_new_pump added to the report
HTP_new_pump added to the report
HTR_new_pump added to the report
PRS_new_pump added to the report
RiskAnalysis_Pump added to the report
SDS_New_pump_x04 added to the report
SRS_ACE_Pump_X01 added to the report
SRS_BolusCalc_Pump_X04 added to the report
SRS_DosingAlgorithm_X03 added to the report
SVaP_new_pump added to the report
SVaTR_new_pump added to the report
SVeTR_new_pump added to the report

You can now open up your Word and Excel reports

Different reports include:

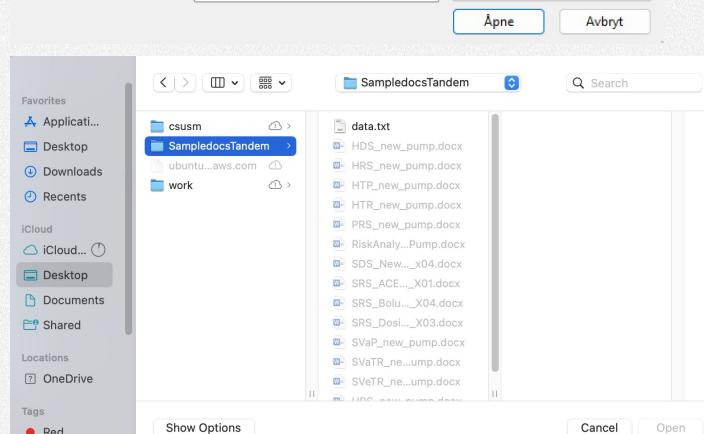
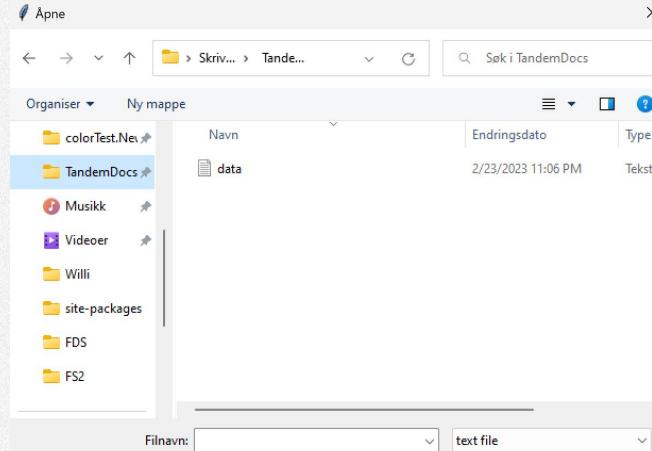
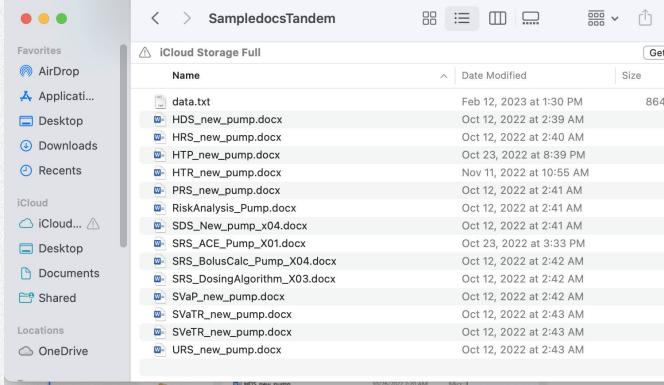
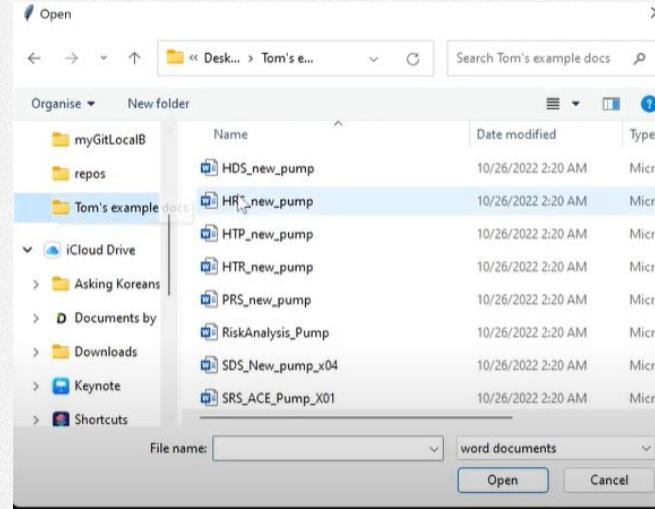
- All of the Tags found organized in tables
- All Child and Parent Tags
- Orphan Tags
- Childless Tags
- TBV Tags
- TBD Tags

PUMP:URS:1

- PUMP:PRS:1
 - ACE:SRS:1
 - PUMP:SDS:10
 - PUMP:SVAL:100
 - PUMP:SVATR:100
 - ACE:SRS:2
 - PUMP:SDS:20
 - PUMP:SVAL:200
 - PUMP:SVATR:200
 - BOLUS:SRS:1
 - PUMP:SDS:10
 - PUMP:SVAL:100
 - PUMP:SVATR:100
 - BOLUS:SRS:2
 - PUMP:SDS:10
 - PUMP:SVAL:100
 - PUMP:SVATR:100
 - BOLUS:SRS:5
 - PUMP:SDS:10
 - PUMP:SVAL:100
 - PUMP:SVATR:100
 - BOLUS:SRS:6

© Developers:
Jan William Haug
Adrian Bernardino
Stephanie Rey

Choosing the document



Text file



data.txt

```
/Users/adrian/Desktop/SampledocsTandem/HDS_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/HRS_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/HTP_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/HTR_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/PRS_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/RiskAnalysis_Pump.docx  
/Users/adrian/Desktop/SampledocsTandem/SDS_New_pump_x04.docx  
/Users/adrian/Desktop/SampledocsTandem/SRS_ACE_Pump_X01.docx  
/Users/adrian/Desktop/SampledocsTandem/SRS_BolusCalc_Pump_X04.docx  
/Users/adrian/Desktop/SampledocsTandem/SRS_DosingAlgorithm_X03.docx  
/Users/adrian/Desktop/SampledocsTandem/SVaP_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/SVaTR_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/SVeTR_new_pump.docx  
/Users/adrian/Desktop/SampledocsTandem/URS_new_pump.docx
```



data – Notisblokk

Fil Rediger Vis

```
"C:\Users\willi\Desktop\TandemDocs\SVeTR_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\URS_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\HDS_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\HRS_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\HTP_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\HTR_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\PRS_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\RiskAnalysis_Pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\SDS_New_pump_x04.docx"  
"C:\Users\willi\Desktop\TandemDocs\SRS_ACE_Pump_X01.docx"  
"C:\Users\willi\Desktop\TandemDocs\SRS_BolusCalc_Pump_X04.docx"  
"C:\Users\willi\Desktop\TandemDocs\SRS_DosingAlgorithm_X03.docx"  
"C:\Users\willi\Desktop\TandemDocs\SVaP_new_pump.docx"  
"C:\Users\willi\Desktop\TandemDocs\SVaTR_new_pump.docx"
```

Ln 1, kol 1

100 %

The different Reports our software generates

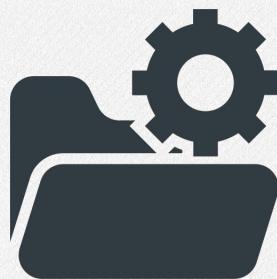
Report Docx generation:

- All Tags Table Report
- Child And Parent Tags Report
- Orphan Tags Report
- Childless Tags Report
- TBV Report
- TBD Report

Excel report generation:

- Requirements Excel Report:
- Relationships Trees Excel Report:

Tree diagrams in the Gui



All Tags Report

All Tags in each document

Document Name: SVeTR_new_pump

Front Tag	Back Tag/tags
PUMP:UT:100	[PUMP:UNIT:100]
PUMP:UT:110	[PUMP:UNIT:110]
PUMP:UT:120	[PUMP:UNIT:120]
PUMP:UT:130	[PUMP:UNIT:130]
PUMP:UT:140	[PUMP:UNIT:140]
PUMP:UT:150	[PUMP:UNIT:150]
PUMP:UT:160	[PUMP:UNIT:160]
PUMP:UT:170	[PUMP:UNIT:170]
PUMP:UT:180	[PUMP:UNIT:180]
PUMP:UT:190	[PUMP:UNIT:190]
PUMP:UT:200	[PUMP:UNIT:200]
PUMP:UT:210	[PUMP:UNIT:210]
PUMP:UT:220	[PUMP:UNIT:220]
PUMP:INS:100	[PUMP:UNIT:100]
PUMP:INS:110	[PUMP:UNIT:110]
PUMP:INS:120	[PUMP:UNIT:120]
PUMP:INS:130	[PUMP:UNIT:130]
PUMP:INS:140	[PUMP:UNIT:140]
PUMP:INS:150	[PUMP:UNIT:150]
PUMP:INS:160	[PUMP:UNIT:160]
PUMP:INS:170	[PUMP:UNIT:170]
PUMP:INS:180	[PUMP:UNIT:180]
PUMP:INS:190	[PUMP:UNIT:190]
PUMP:INS:200	[PUMP:UNIT:200]
PUMP:INS:210	[PUMP:UNIT:210]
PUMP:INS:220	[PUMP:UNIT:220]

PUMP:URS:3330
PUMP:URS:3350
PUMP:URS:4000

Document Name: HDS_new_pump

Front Tag	Back Tag/tags
PUMP:HRD:100	[PUMP:HRS:100]
PUMP:HRD:105	[PUMP:HRS:103]
PUMP:HRD:1000	[PUMP:HRS:1000]
PUMP:HRD:3330	[PUMP:HRS:3330]
PUMP:HRD:3350	[PUMP:HRS:3350]

Document Name: HRS_new_pump

Front Tag	Back Tag/tags
PUMP:HRS:100	[PUMP:PRS:100]
PUMP:HRS:105	[PUMP:PRS:103]
PUMP:HRS:1000	[PUMP:PRS:1000]
PUMP:HRS:3330	[PUMP:PRS:3330]
PUMP:HRS:3340	[PUMP:PRS:3330]
PUMP:HRS:3350	[PUMP:PRS:3350]

Document Name: HTP_new_pump

Front Tag	Back Tag/tags
PUMP:HTP:100	[PUMP:HRS:100]
PUMP:HTP:200	[PUMP:HRS:105]
PUMP:HTP:300	[PUMP:HRS:1000]
PUMP:HTP:400	[PUMP:HRS:3330]
PUMP:HTP:500	[PUMP:HRS:3350]
PUMP:HTP:1100	[PUMP:HRD:100]
PUMP:HTP:1200	[PUMP:HRD:105]
PUMP:HTP:1300	[PUMP:HRD:1000]

Parent-Child Text Compare Report

[PUMP:HRS:1000]

The pump shall include pressure sensors for use in conjunction with the ideal gas law. The gas law shall be used to estimate remaining insulin volume.

- PUMP:HRD:1000

Details regarding the pressure sensors for use in conjunction with the ideal gas law.

- PUMP:HTP:300

HTP:300 Test 300

[PUMP:HRS:3330]

The pump shall weight no more than 8 ounces dry.

- PUMP:HRD:3330

Details regarding the size and weight of the pump.

- PUMP:HTP:400

HTP:400 Test 400

The pump shall include a rechargeable Lithium Polymer Battery.

- PUMP:HRS:100

The pump shall include a rechargeable Lithium Polymer Battery.

[PUMP:PRS:103]

Requirement text not found

- PUMP:HRS:105

The pump shall include fuel gauge hardware for the lithium polymer battery. The battery charge shall be displayed to the user.

[PUMP:PRS:1000]

The pump shall include pressure sensors for use in conjunction with the ideal gas law. The gas law shall be used to estimate remaining insulin volume.

- PUMP:HRS:1000

The pump shall include pressure sensors for use in conjunction with the ideal gas law. The gas law shall be used to estimate remaining insulin volume.

Orphan Tags Report

Orphan Report

These are the orphan tags that were found in the documents:

PUMP:URS:1

PUMP:URS:3

PUMP:URS:8

PUMP:URS:10

PUMP:URS:100

PUMP:URS:103

PUMP:URS:1000

PUMP:URS:3330

PUMP:URS:3350

PUMP:URS:4000

PUMP:RISK:10

PUMP:RISK:20

PUMP:RISK:30

PUMP:RISK:40

PUMP:RISK:50

PUMP:HRS:103

PUMP:TBV:1111

PUMP:PRS:103

ACE:SRS:110

ACE:SRS:120

PUMP:TBV:1

PUMP:PRS:6

PUMP:TBD:1

PUMP:DER:2

ACE:SRS:1000

PUMP:UNIT:100

PUMP:UNIT:110

PUMP:UNIT:120

PUMP:UNIT:130

PUMP:UNIT:140

PUMP:UNIT:150

PUMP:UNIT:160

PUMP:UNIT:170

PUMP:UNIT:180

PUMP:UNIT:190

PUMP:UNIT:200

PUMP:UNIT:210

PUMP:UNIT:220

Childless Tags Report

Childless Report

These are the childless tags that were found in the documents:

PUMP:HRS:3340

PUMP:HTR:100

PUMP:HTR:1000

PUMP:HTR:1200

PUMP:HTR:1300

PUMP:HTR:1400

PUMP:HTR:1500

PUMP:HTR:200

PUMP:HTR:300

PUMP:HTR:400

PUMP:HTR:500

PUMP:INS:100

PUMP:INS:110

PUMP:INS:120

PUMP:INS:130

PUMP:INS:140

PUMP:INS:150

PUMP:INS:160

PUMP:INS:170

PUMP:INS:180

PUMP:INS:190

PUMP:INS:200

PUMP:INS:210

PUMP:INS:220

PUMP:PRS:2

PUMP:PRS:3340

PUMP:SDS:10

PUMP:SDS:20

PUMP:SDS:30

PUMP:SDS:40

PUMP:SDS:50

PUMP:SDS:60

PUMP:SDS:70

PUMP:SVATR:100

PUMP:SVATR:200

PUMP:SVATR:300

PUMP:SVATR:400

PUMP:SVATR:500

PUMP:UT:100

PUMP:UT:110

PUMP:UT:120

PUMP:UT:130

PUMP:UT:140

PUMP:UT:150

PUMP:UT:160

PUMP:UT:170

PUMP:UT:180

PUMP:UT:190

PUMP:UT:200

PUMP:UT:210

PUMP:UT:220

TBV Report

TBV Tags

[PUMP:TBV:1111]

- PUMP:HRD:3350

Details regarding the full color touchscreen.

PUMP:HTP:1500

Test 1500

- PUMP:HRD:0000

Details regarding the size and weight of the pump.

[PUMP:TBV:1]

- ACE:SRS:1

The software shall provide a bolus feature which generates boluses in the range of 0.01 to 25 units, which an increment of 0.01 units.

PUMP:SDS:10

Here are details of how the bolus calculator works

PUMP:SVAL:100

This test validates bolus features... blah, blah, blah

TBD Report

TBD Tags

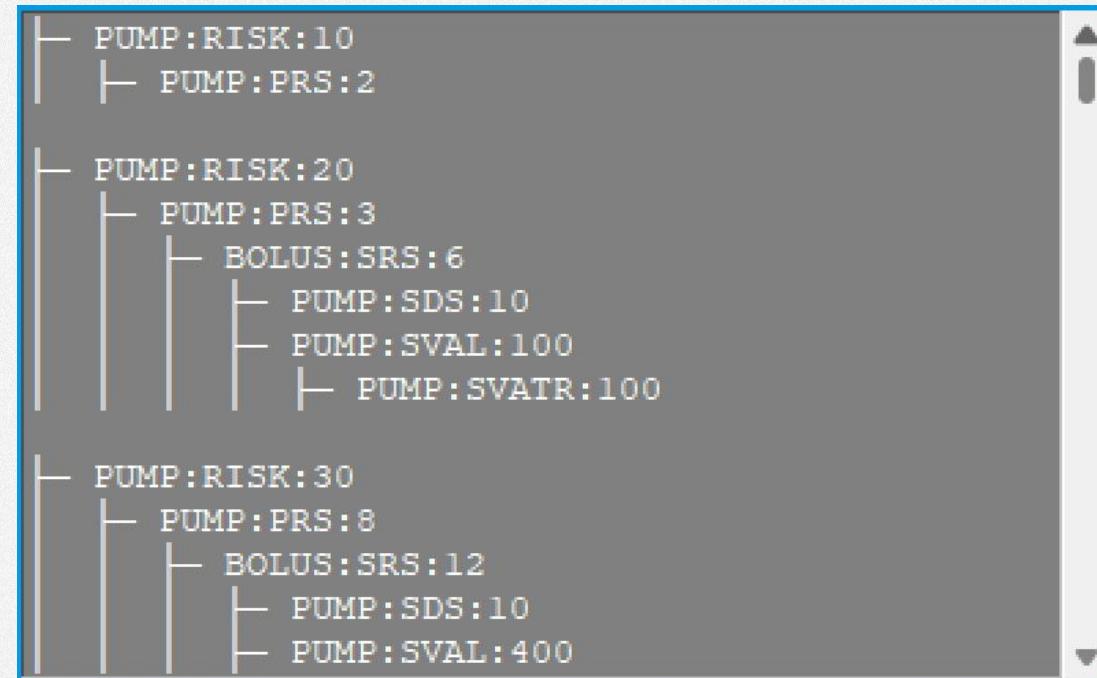
[PUMP:TBD:1]

- BOLUS:SRS:2

Relationships Trees Excel Report

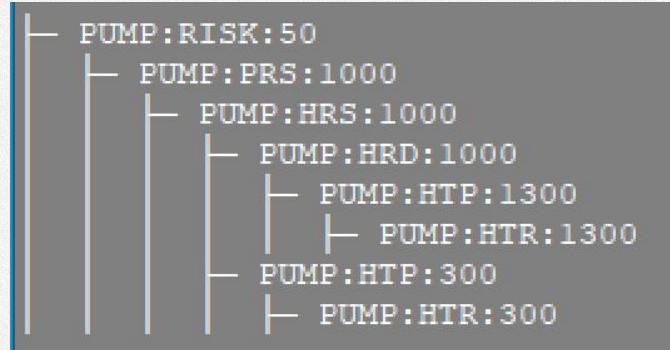
A	B	C	D	E	F	G	
1	First Generation	Second Generation	Third Generation	Fourth Generation	Fifth Generation	Sixth Generation	Seventh Generation
2	PUMP:RISK:10						
3		PUMP:PRS:2					
4	SEPARATOR						
5	PUMP:RISK:20						
6		PUMP:PRS:3					
7			BOLUS:SRS:6				
8				PUMP:SDS:10			
9				PUMP:SVAL:100			
10					PUMP:SVATR:100		
11	SEPARATOR						
12	PUMP:RISK:30						
13		PUMP:PRS:8					
14			BOLUS:SRS:12				
15				PUMP:SDS:10			
16				PUMP:SVAL:400			
17					PUMP:SVATR:400		
18	SEPARATOR						
19	PUMP:RISK:40						
20		PUMP:PRS:105					
21			ACE:SRS:100				
22				PUMP:SDS:70			
23				PUMP:SVAL:300			
24					PUMP:SVATR:300		
25	SEPARATOR						
26	PUMP:RISK:50						
27		PUMP:PRS:1000					
28			PUMP:HRS:1000				
29				PUMP:HRD:1000			
30					PUMP:HTP:1300		
31						PUMP:HTR:1300	
32				PUMP:HTP:300			
33					PUMP:HTR:300		
34	SEPARATOR						

Tree diagram generation

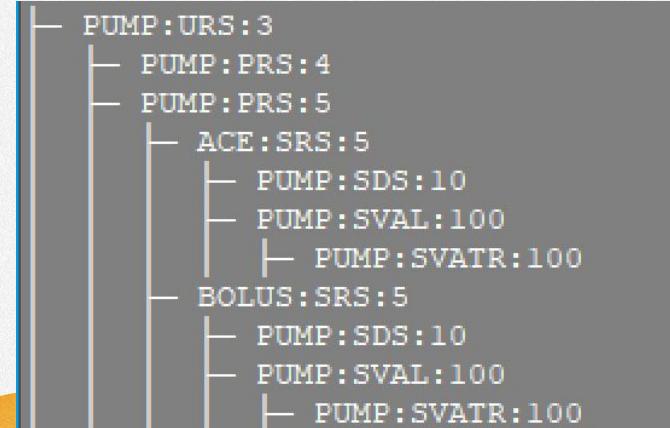


Comparison

PUMP:RISK:50					
	PUMP:PRS:1000				
		PUMP:HRS:1000			
			PUMP:HRD:1000		
				PUMP:HTP:1300	
					PUMP:HTR:1300
				PUMP:HTP:300	
					PUMP:HTR:300

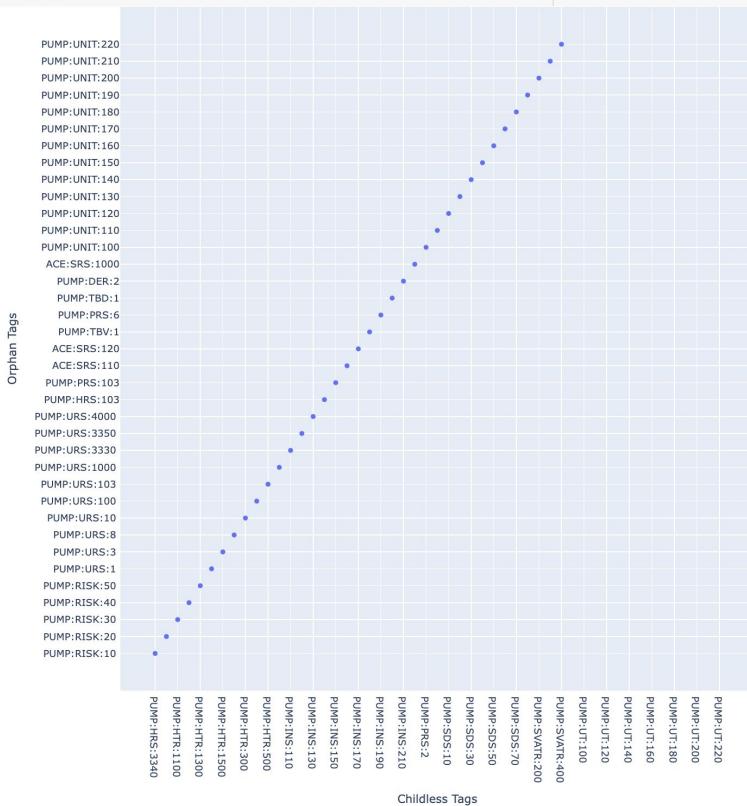


PUMP:URS:3					
	PUMP:PRS:4				
		PUMP:PRS:5			
			ACE:SRS:5		
				PUMP:SDS:10	
					PUMP:SVAL:100
					PUMP:SVATR:100
			BOLUS:SRS:5		
				PUMP:SDS:10	
					PUMP:SVAL:100
					PUMP:SVATR:100



QA Report

```
dropper_scatter = px.scatter(qa_df, y='Orphan Tags', x='Childless Tags', width=1000, height=1050)
dropper_scatter
```



```
from sklearn.metrics import mean_squared_error
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)

model = LinearRegression()
model.fit(X_train, y_train)

# model's performance on the testing data using mean squared error
y_pred = model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
print("Mean squared error:", mse)
```

Mean squared error: 0.02396116683274962

A mean squared error of **0.0869** is relatively small which is a good thing.
The model's predictions are fairly accurate and it's performing well on the testing data.

Project Objective

Need to meet the following:

- The scarcity of software options for managing requirements
- The need to streamline workload and effectively handle requirements
- The challenge of processing Word documents and reconciling the tags that indicate requirements



Broader Impacts



Team meets project initiatives

Solve the right problem

Real product in the market

Project Challenges

01

Small release cycles

02

Version Control

03

Purpose of this program

04

Active User involvement

05

Test Troubleshooting

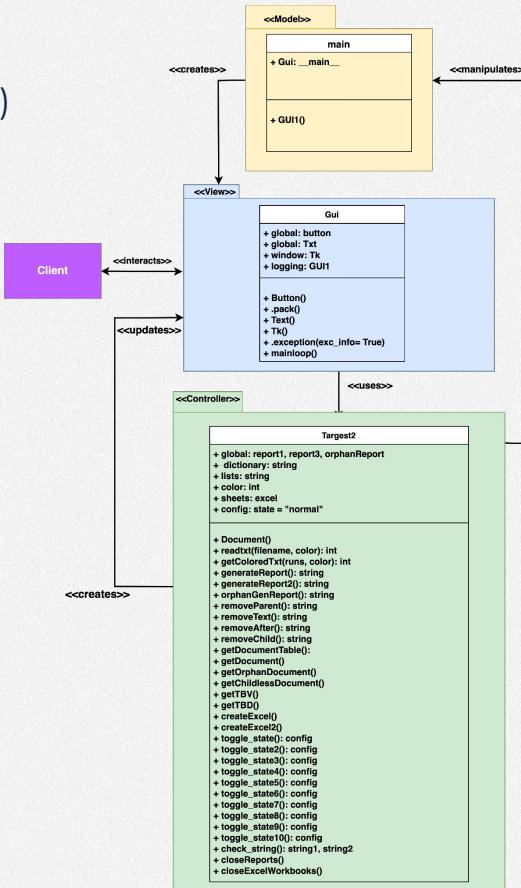
Project Updates

- Added TBD & TBV Reports
- Added Excel Generation Report
- Added Gui Trees
- Changes to the Gui
- Brainstorming testing procedures
- Implementing of test cases



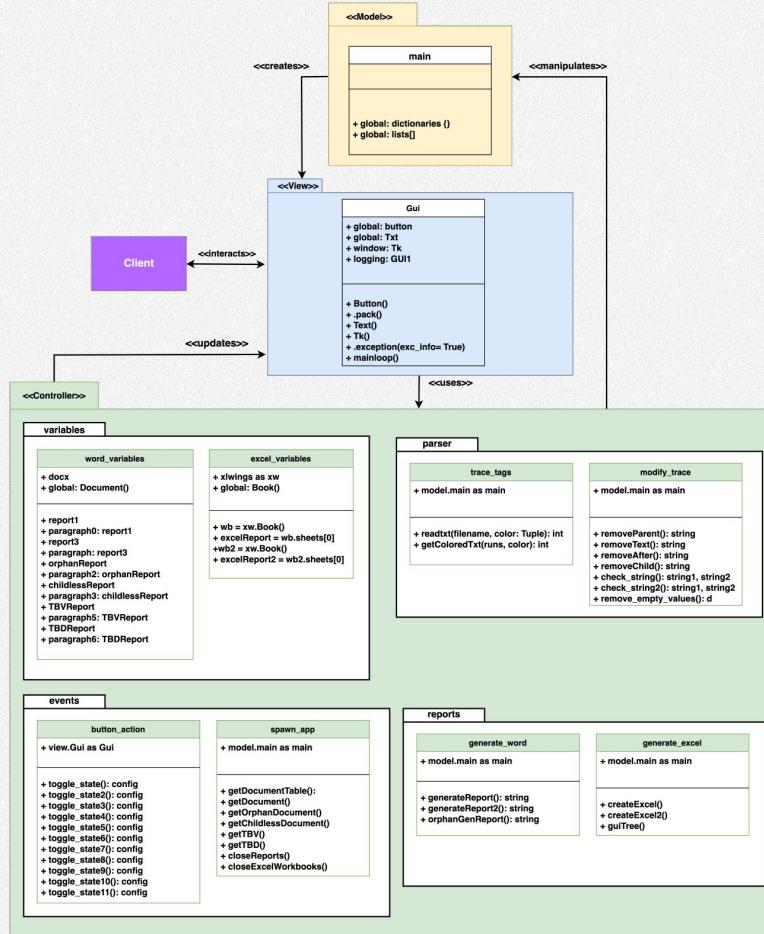
Former System Design

Model-View-Controller (MVC)



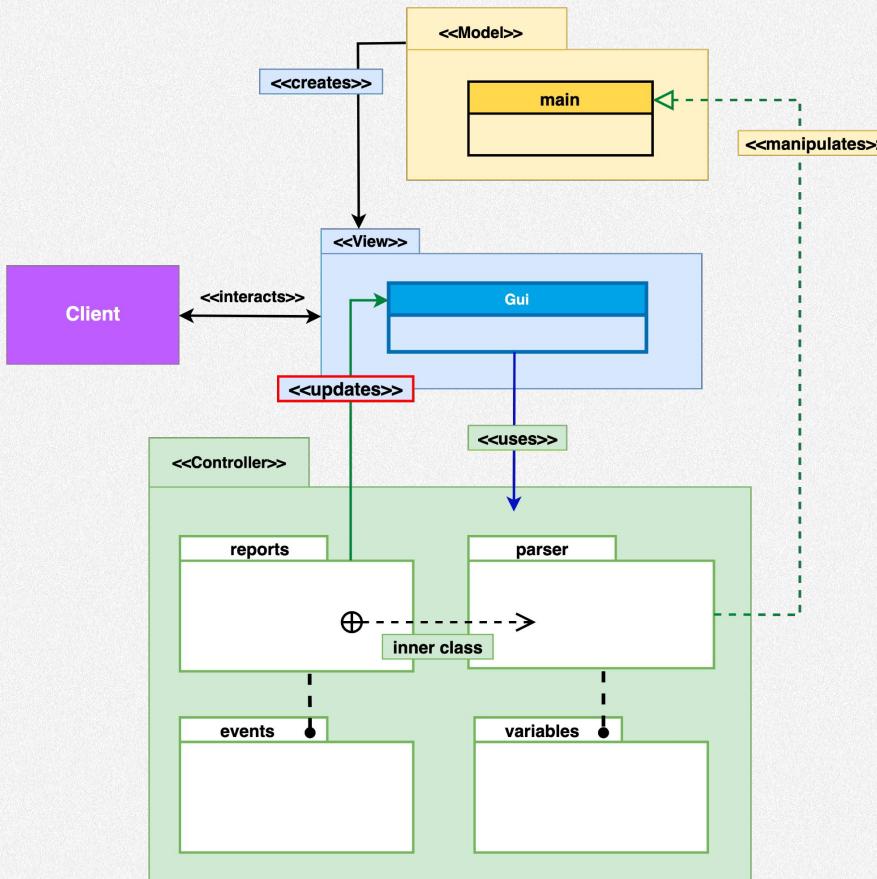
New System Design

- Pattern used : MVC
- The **Model** represents the data and business logic of the application.
- The **View** displays data to the user and handles user interaction.
- In our **Controller** component, we have folders that serve a specific purpose for managing the flow of data between the Model and the View.



New System Design

- Pattern used : MVC





System Requirements

Programming Languages and Tools

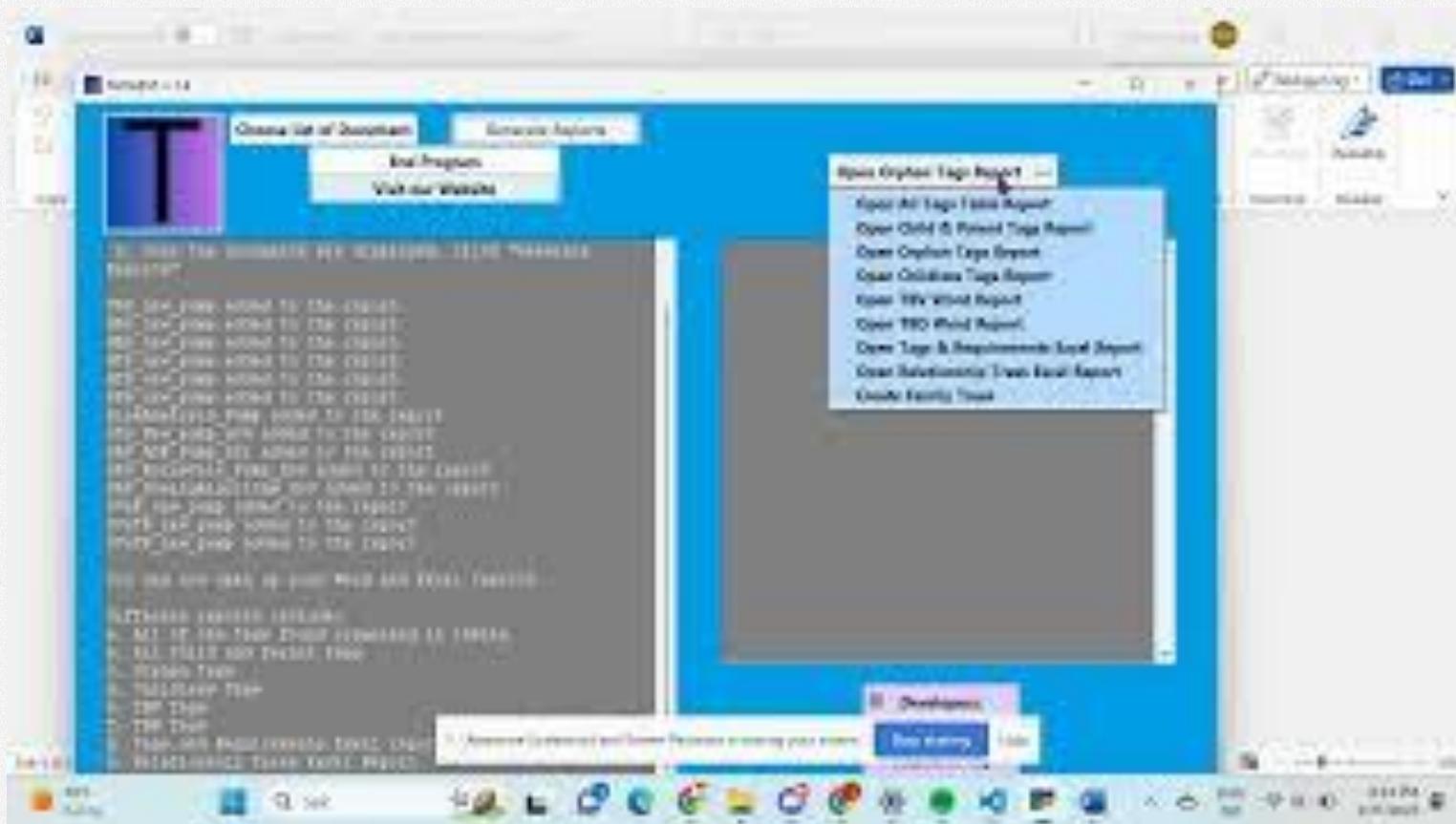
Language:

- Python 3.9

Tools:

- Xlwings 0.29.0
- Python-docx 0.8.11
- Pandas 1.3.5
- Matplotlib 3.5.3

Demo (Windows)

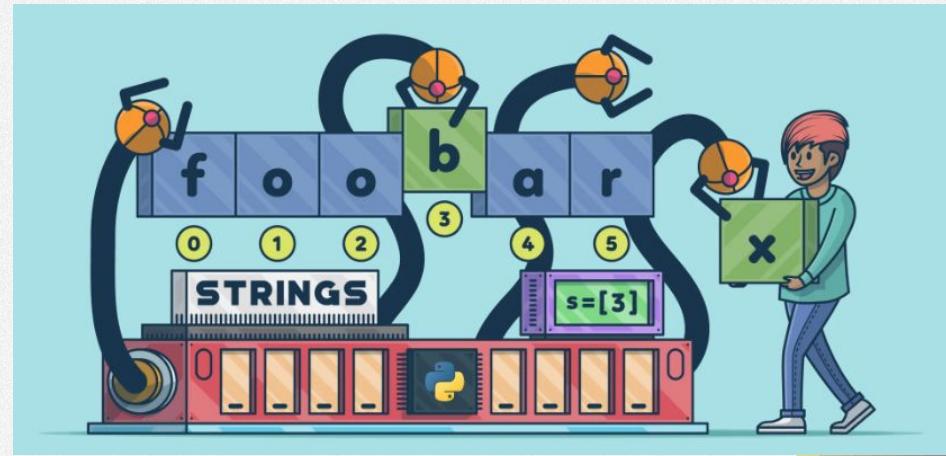


Demo (Mac)



Key Algorithms

- Document Parsing
- Tag Extraction
- Report Generation
- Requirements Hierarchy Construction
- Requirement Traceability Analysis
- Graphical Representation



Lessons learned

Stephania

- Being resourceful
- Time management
- Project management
- Understanding the importance of comprehending requirements specification

Adrian

- Time Management

Jan

- Early Clarity on Project Requirements and Purpose.
- Value of investing extra time in the early phase.
- Importance of Adaptability
- Importance of having a flexible mindset
- Learned to view challenges as opportunities for learning and growth

Skills learned

Stephania

- Pyunit testing
- Project management
- Learning Python

Adrian

- Configuration of libraries used on Mac

Jan

- Requirement Analysis:
- Coding and Debugging:
- Version Control:
- Problem Solving and Critical Thinking:

Next Steps

- Refactoring
- Create test cases for quality assurance
- Continuation of testing



Thanks!

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