GONZAGA UNIVERSITY
School of Engineering and Applied Science
Center for Engineering Design and Entrepreneurship

PROJECT STATUS REPORT
December 3, 2024

Graphical Document Generator from Datasets
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1 Project Overview

Currently there are no ways that a client may convert websites into flow diagrams that may be used to programmatically create automation tests. The purpose of this project is to help customers create a design of their website, using a visualization tool for process flowcharts, such that the website is fully defined, and they may see how the users interact with the site. During the creation of the visualization, all pertinent metadata for the programmers to embed in the source code is also requested as each flowchart item is placed in the visualization. The project will also allow clients to ensure that they have tested all necessary components and process flow paths during the development lifecycle. The interface with CS25-16 will pass the data gathered in a format to enable automation testing of the created website to check the design is met.

The entire team will create a standardized instruction set that can be sent to CS25-16 so that their team may create automation testing tools for the customer's website and data. Joshua created a pipeline from this project to the aforementioned through a graphical database, allowing for a rapid development cycle in which this project intakes data from the customer while they use Visio to construct a flow chart, transforms the given data into an instruction set, and sends it to the partner project who will create automation tests from the instructions. Joseph has created an initial pass of reading in Visio Shapes and their respective data, as well as converting the shapes into the graphical-based data structure that will be written by the pipeline created. Sebastian is currently creating the dialog boxes that will allow for users to add data graphically to the shapes in Visio. Raja is updating and has created an initial stencil that the users will use initially when creating the flowchart, as well as figuring out how to publish and deploy the project.

2 Summary of Work Accomplished

Work Accomplished to Date:
- Added Connection to Neo4J database that allows for the writing of graph-based objects that represent HTML and a website flow chart.
- Able to read in a subset of the shapes initially defined by the project plan and their corresponding data.
- Able to convert shapes that can be read in, into their graphical-based counterparts that are more easily managed.
- Added Dialog Boxes that enable users to add data with a GUI to their shapes rather than manually.
- Created a stencil that incorporates custom data that will be used to help the generative process of shape data.

Statistics:
- Lines of Code:

| Author	Lines Added	Lines Removed	Total Lines
Joshua Venable	8096	3462	4634
Sebastian Matthews	586	127	459
Raja Sori	0	0	0
Joseph Holdnak	550	284	266

- Total Tests: 21
- Pull Request Count: 12

3 Working Prototype

With Microsoft Visio, an engineer is going to design a flowchart prototype of how a user may potentially interact with their website. Once they are finished, they will then click the "Generate Tests" button found in the "Data" section of the ribbon.
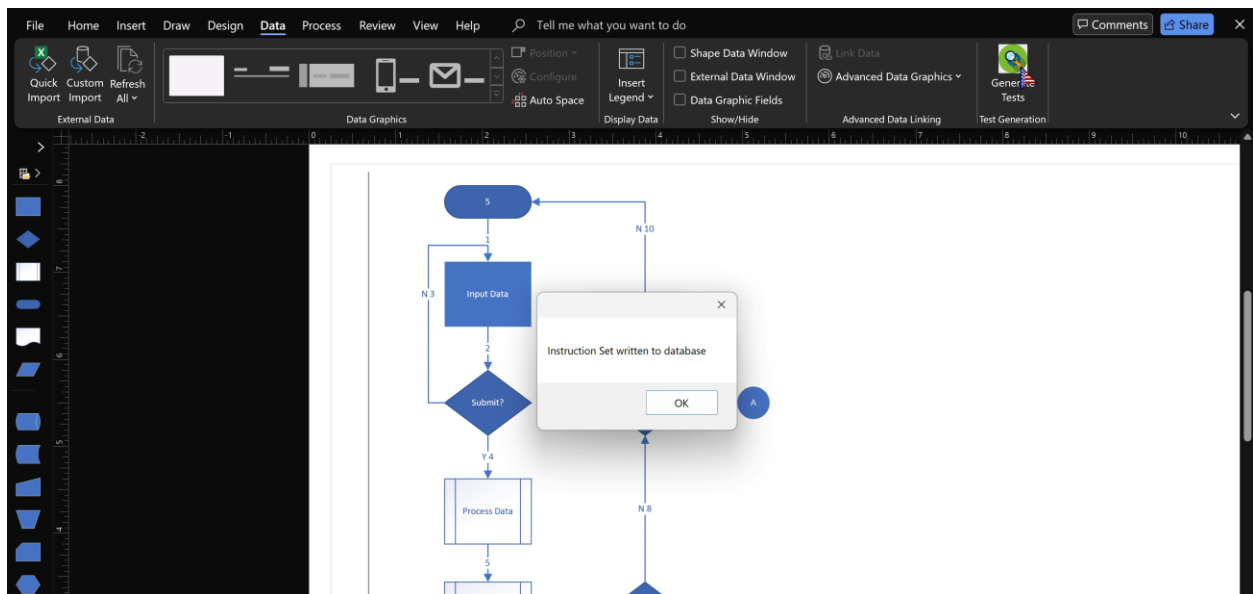
A graph version of their flowchart should then be stored in Neo4j, ready for the testing harness (CS25-16) to run.
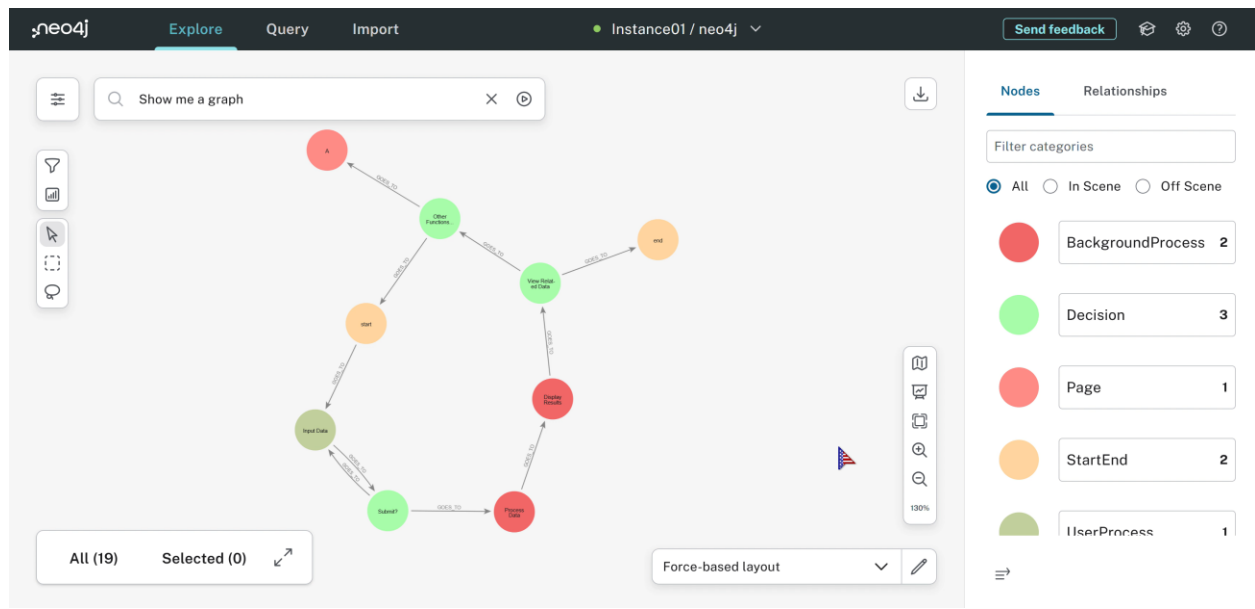
4 Revised Product Backlog

We are ahead of schedule. We still have custom elements remaining to create and conversions to build for instruction sets. To be clear, the two remaining backlog items go hand in hand. As more custom elements become available, so do more conversions.

Table 1: Revised Product Backlog

Requirement	Description	Major Feature	Priority	Estimate
Convert Instruction set	I want a converter because the instruction sets must be understood by the other team's testing suite. If what the other team is testing against is not in a uniform format, then the tests will fail.	4	2	1
Create Custom Elements	I want to create custom elements for the Visio Intake because I want to ensure that the correct form elements are being used, rather than having to assume which objects are which.	2	1	3

5 Revised Product Release Plan

Table 2: Revised Major Milestones

Milestone	Description	Target Completion Date
Presentation 3	Parts of our project will be completed where we demonstrate the progress made.	Fourth week of December
Design Expo	Demonstration of our final product.	Third week of January

Presentation 4	Our entire project will be completed where we will demonstrate the progress made since presentation 3, up to the final product.	Fifth week of April
Final Report	Document the final product and progress made.	First week of May

As far as our sprint plan goes, not much has changed. We have stayed on schedule managed to complete our work. We have CI/CD pipelines set up for deployment of code, and they're being used right now for each commit we push to GitHub. In terms of testing, unit testing won't be feasible. Microsoft Visio is proprietary and difficult to mock. The Instruction Set Dictionary is being used for storing nodes and our final project plan is finished.

Table 3: Sprint Release Plan

Sprint Date	Spring Goal	Backlog	What we will demo
4th Week in Oct to 1st week in Nov	Have Initial Project Plan Created, Instruction Set Design Document	Instruction Set Dictionary	Project Plan, Instruction Set Design Document
2nd Week in Nov to 3rd Week in Nov	Final Project Plan Created	None	Project Plan
4th Week in Nov to 1st Week in Dec	(other design documents)	...	...

6 Project Risks

One risk we had identified in our previous report is that <CS25-16>'s testing suite could potentially not work properly. We had identified that we must send the correct format for the instruction sets. We have made progress in mitigating this risk because we have decided that we are going to use a json to send the instruction sets. There is still a possibility for issues during this step, but it is less of a risk as we stand.

Since we will be using a database, we identified that it could be vulnerable to security attacks such as SQL injections putting user data at risk. Since we have decided that we are not using a relational database management system, this risk is less of an issue but still present. We are using NEO4j, which is a graph database, which still has risks. Cypher, Neo4j's query language, is still vulnerable to injection attacks if queries are not parameterized properly. To mitigate this risk, we plan to integrate secure authentication mechanisms, use parameterized queries, and ensure the database is updated to the latest secure version

Another risk we have previously identified is that the communication pipeline between our team and CS25-16 breaks. This is still a risk for our project. To prevent this risk from happening, we are going to test the connection. We will monitor this risk by frequently checking uptime. If the pipeline breaks, we will mitigate this risk by restarting the pipeline.

A new external risk we have identified for our project is that the legacy codebase we are running, which is .NET 4.8, may present compatibility, security, and performance issues. We will ensure our development environment is aligned with the legacy setup and carefully document any unexpected behaviors. We will monitor this risk by running periodic compatibility checks and reviewing error logs for anomalies. If .NET 4.8 causes critical failures, we will consult with our sponsor for potential refactoring or external support.

We have identified there is no way to unit test Visio with CI/CD pipelines. We will mitigate this risk by employing mock data or finding alternative testing frameworks if there are any. If testing remains insufficient, we will escalate the issue to stakeholders and explore alternative validation processes.

Changes in how Visio stores shape data also risk our ability to analyze and process data. We will monitor this risk by periodically checking how Visio stores shape data during development and after any updates to Visio. If significant changes occur, we will explore alternative methods for storing shape data. We could, upon discussing it with our project sponsor, also reach out to Microsoft support for any assistance they can provide.

7 Delivery and Maintenance Considerations

As previously established, our project will integrate with Microsoft Visio as a VSTO add-in rather than be a local service on an individual's system. Although Visio lacks any recent updates regarding shape data storage and processing, the possibility of a program-breaking modification remains a key concern for the integrity of the project and means that our resource would become deprecated upon such an event, losing out on features associated with new versions.

Our program utilizes a graphical database, Neo4j, to store flowcharts rather than the previously established relational database of MongoDB. Engineers wishing to maintain the project, e.g. D2B's two senior architects, John and Herman, will have to familiarize themselves with using Neo4j and have access to the database to extract instruction sets from flowchart elements. The aforementioned designers have an elevated level of expertise in software management and development, completely able to provide future support for our system alongside CS25-16's testing suite to ensure perpetual usability amongst stakeholders.

8 Project Management Considerations

Our project has a weekly recurring in-person/online meeting with all team members every Tuesday from 3:15 to 4:15 pm in Bollier 033. During this meeting we meet with our advisor, project sponsor and faculty members on occasion. We also have online stand-up meetings daily: Mondays, Wednesdays, and Fridays from 11:00 to 11:15 am, and Tuesdays and Thursdays from 9:00 to 9:15 am. On Wednesdays from 12:00 to 12:45 pm, we meet with Pete on Teams. We update our project stakeholders via a recurring Microsoft Teams meeting. For communication, we are using a combination of Teams and Azure DevOps with a focus on Azure in the future. Joseph Holdnak is currently scrum master and a developer. Joshua Venable will be taking the role of project manager and developer. Sebastian Matthews will primarily focus on user

interface and user experience (UI/UX). Raja Sori will primarily take on the role of development and working to get the project published.

We find that there are some minor issues in having a rotating team lead. To align with our sponsor, we will be continuing to do so, however we will be having a continuous team lead as Joshua Venable who will act as the underlying coordinator while the rotating team lead will primarily act as the intermediary with our sponsor and project advisor.