Knight Foundation School of Computing and Information Sciences

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Spring 2024 Senior Design Project

Geometric Visualization Tool

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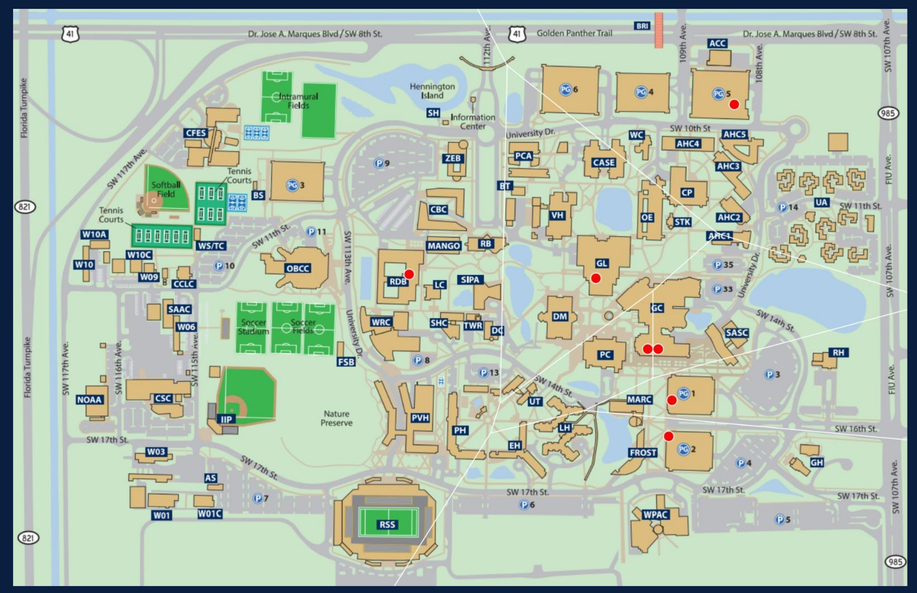
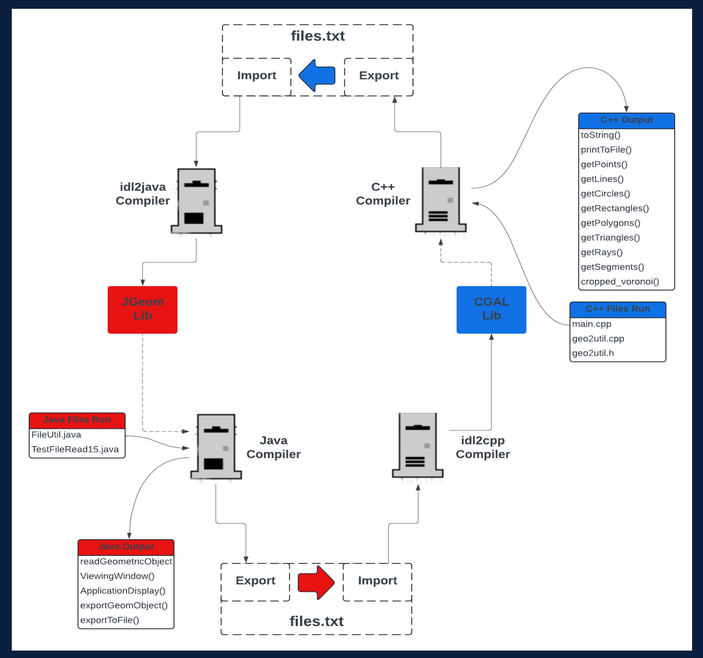


PROBLEM

We seek to solve with this tool the pressing need of efficient development for visualization and the lack of geometric data structures and algorithms (ds&a) readily available for learning and development in java. This tool primarily targeted towards help design, implement, and test geometric ds&a quicker in individual and group setting. While this tool leverages CGAL library capabilities it also reduces demand through circumvention of data in C++ through txt files, meaning only necessary for 1 group member.

SYSTEM DESIGN

Our system is designed to be fully implemented and sound in the application structure with ability to be separated by C++ tools and java tools. With a basis of geometric objects that have points, lines, objects data transfer and circumventing of CGAL becomes reality. The purpose of this design element optimizes speed in graphing for team development setting but also continuous development and refining.

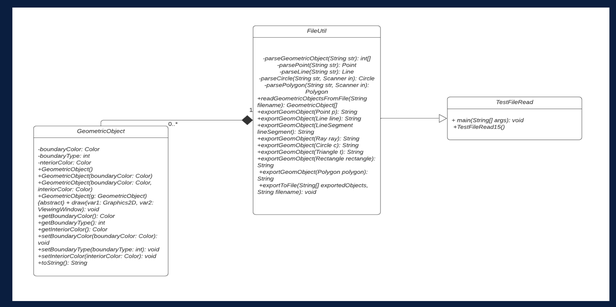


CURRENT SYSTEM

The abstract framework comprises of two outside sources needed in the CGAL library utilities and java JAR library for visualization through classes of viewing window, general utilities, multiple display classes and interfaces used in standardizing the visualization process and output. The system cannot run in C++ side without proper Cmake configuration plus arithmetic libraries.

SUMMARY

In this project I played a key role in developmental phase for all java aspects of file and data transfer, whether testing or coding. However, the most freedom and responsibility I was given regarding exporting the data to finalize the system's cycle and ability to refine. This was done through java development of abstract string export methods, then overloading for all possible objects. Standardization in export object methods as well as exporting the file to properly do error handling.



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IMPLEMENTATION

Implementation of export functionality for java codebase side of program. The system design of this tool is in a loop aspect in which export/import capabilities are needed for soundness. This is made possible with abstract exportGeomObject method extended to all types of geometric objects, through overloading. The input objects are transformed through appending into strings then stored. Set on towards test harness in final class for exportation after data visualization for further processing. Finetuning this process needs heavy involvement in testing with theoretical tester classes, for appropriate file and data manipulation at all steps.

REQUIREMENTS

CGAL Library
Java
Visual Studio
C++
IntelliJ
GitHub

ACKNOWLEDGEMENT

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