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Requirement Definitions *and Critical Parameters*

Team Name: *Maze Runners*

Team Members and % contribution:

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Qualitative Requirements

General Requirement:

- A software tool that finds an optimal path for wires between a start and an end point within a 3D space, given a set of constraints.

Input Requirements:

- **Quantitative Constraint Input:** The software will accept either a 2D matrix or table for the separation distance constraint
- **Excel Input:** The software will accept an Excel spreadsheet with attributes characteristic to each wire (i.e. thickness, max curvature, start and end point)
- **3D CAD Input:** The software will accept a 3D triangulation (mesh) as the routing domain, which will include restricted triangulated mesh regions. The input file type could include but is not limited to STEP or STL.



Qualitative Requirements

Base Requirements:

- **Accessibility:** EWRO software application will be in the form of an executable file

Output Requirements:

- **2D Output:** The software will provide the user with the spline equations that represent the path of the wires stored in a JSON or STEP file
- **3D Output:** The software will produce a 3D STEP file, visually displaying the optimized routing paths overlaid with the aircraft geometry input



Qualitative Requirements

- Constraints:
 - Need: curvature, separation, aircraft geometry, restricted triangulated areas
 - Want: thermal, thickness, chafing, accumulation of dirt and lint
- Runtime Environment:
 - Need: any sort of executable
 - Want: web-based
- Algorithm:
 - Need: optimizing
 - Want: scale well to many variables



Quantitative Requirement Specification

Number of Wires	Need: 20	Want: Scalability (100)
Runtime	Need: < 24 hrs	Want: < 3 hrs
Number of Constraint Inputs	Min: 3	Max: As many
Software Tool Size	Need: As small	Want: < 1 GB



Decision Matrix

Easy

Hard

Needs

Command Line Interactivity
Bare Minimum of Constraint
Requirements
Software Documentation

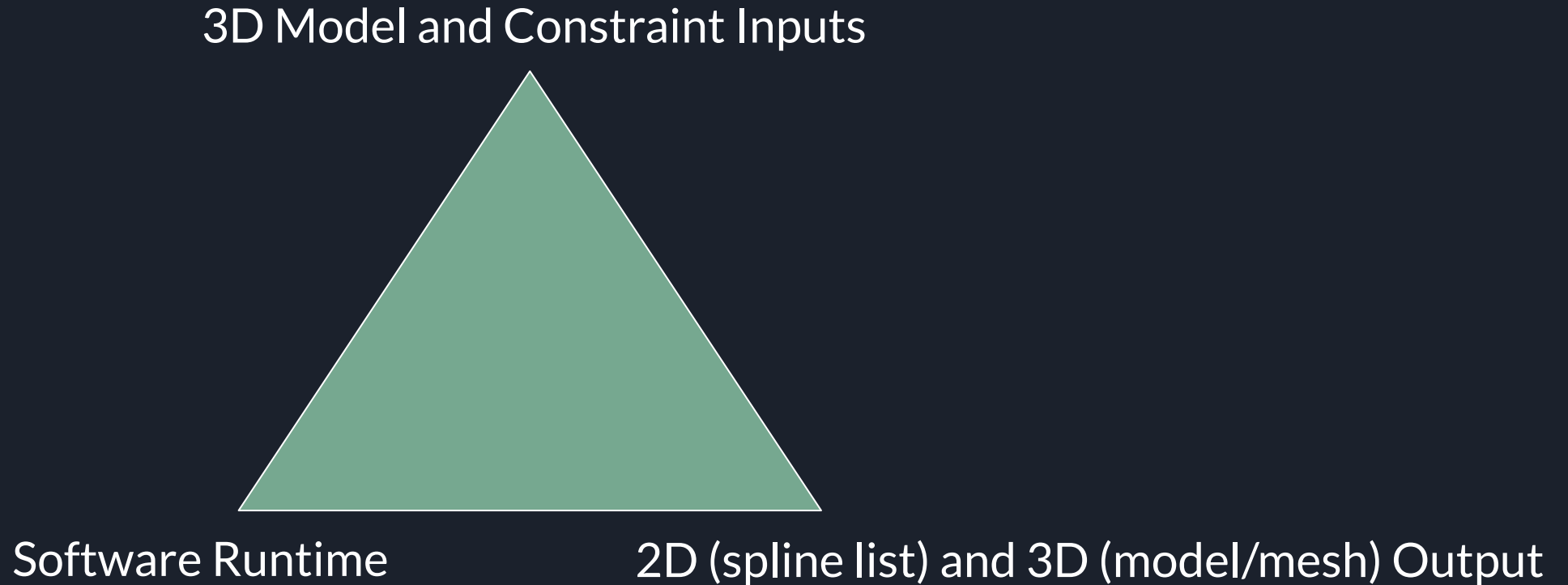
3D Model Input and Output
Schematic
Generation of Spline
Equations for Routing Paths

Wants

Basic GUI
Quantitative constraint
input/2D matrix

Web application
Advanced GUI features
Take in as many constraints as
possible

Compromise Triangle



- As complexity of inputs and outputs increase, our software runtime will take a hit. Thus, there will be a tradeoff between the amount of information our system takes in and gives out versus the compute time.

Feedback Slide



Martin (US), Lindsay

to me, Riley, aanchalsingh2000@gmail.com, molear@utexas.edu, vlebovitz@utexas.edu ▼

5:03 PM (3 hours ago)



All,

Below are my answers in red.

Notes on slides:

- For your Qualitative Requirements slide: I would think that having the output in a STEP file is sufficient. The step file contains all the spline information that a tool like CATIA would need to visualize the output.
- For Decision Matrix slide: I would say software documentation is a need. It is important that the user is provided with instructions on how to use the software. It would also be nice to have a section in the documentation giving background on how the solution is obtained.

Again, happy to chat over anything in my answers or notes that is still unclear. Just let me know!

Lindsay

Questions?

