Overview
Our sponsor approached us with the task producing a software solution to successfully carve an image into wood using an CNC Shark HD4 machine. An additional task was to adapt the machine to produce a 3D model of a propellor (despite its intention for 2D use), to replace an existing deteriorated one.

Objectives
Our team was split into two groups - 2D carvings and 3D carvings.
For 2D Carvings:
  - Identify existing software to create CNC toolpaths from an image
  - Develop a process to prepare an image for carving (typically removing the background and extraneous features)
For 3D Carvings:
  - Identify existing software to generate CNC toolpaths from a 3D model
  - Develop a process to produce certain 3D carvings using the CNC Shark HD4 machine
Both the 2D and 3D teams also had the goal of developing an instruction set for our sponsor to reference post-capstone.

Approach
For 2D Carvings:
  - Survey experts and conduct research on the best image-to-toolpath software
  - By trial-and-error, develop the best process for preparing an image for carving
For 3D Carvings:
  - Survey experts and conduct research on the best 3D CAD software
  - By trial-and-error, develop the best process for producing certain 3D carvings using the machine
Both the 2D and 3D teams also created an effective instruction set outlining how to consistently produce 2D and certain 3D carvings respectively, using feedback from our sponsor.

Outcomes
- Two instructions sets outlining how to successfully complete a 3D or 2D carve, given a model or image respectively
- A consistent process for preparing an image for 2D carving
- A consistent process for producing 3D carvings from certain images
- Proper software and toolbits for both 2D and 3D carving