

Project Summary

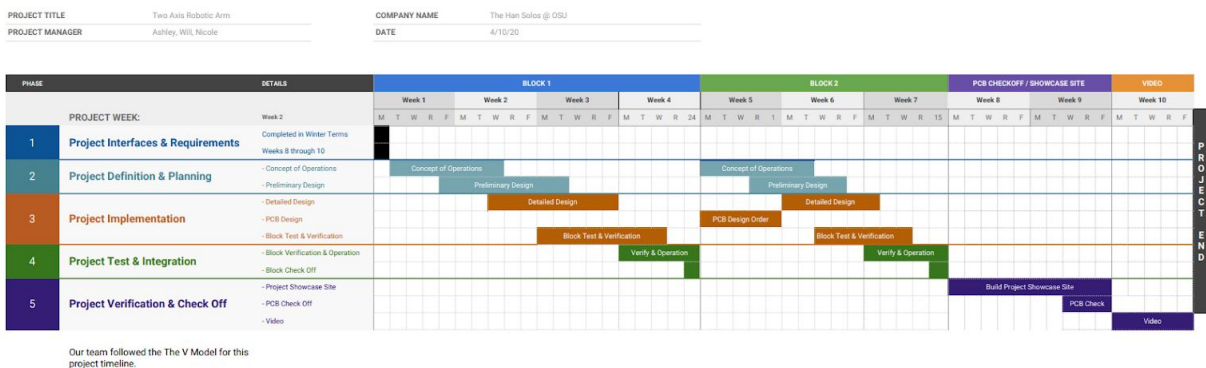
Design Problem

The team was tasked with development of a two-axis SCARA robotic arm that draws a 10" straight line 4" per second to within an accuracy of .25" on an 8.5" x 11" sheet of paper. The robotic arm was to be inexpensive and manageable to manufacture as well as controlled by either G-Code commands or by a human interface device. The system was also designed to secure and use different types of writing tools (i.e. pen, pencil, crayon).

Team Approach

We devised design blocks from our engineering and customer requirements. These design blocks were divided amongst the team based on individual interests. Ashley was most interested in software design, so she was given the GUI and the control code. Will was most interested in robotics and electromechanical design so he got the End Effector and the Motor Driver blocks. Nicole was most interested in everything, so she was given the Enclosure/Body block and the HID block, which let her do just that. The team's approach is further outlined in our project timeline:

PROJECT TIMELINE



Key Lessons Learned by the Team:

The unique working conditions required by the COVID-19 pandemic have directed the quality of teamwork during this project. We have learned that resources such as classrooms, labs, instructors, teacher assistants, and classmates are invaluable to the success of a project. This project also reaffirmed to the team that prior experience with some aspects of project development, either with design, software, or specialized knowledge, provide incalculable assistance to the group's progress. Our team also learned how to quickly get to grips with unfamiliar software tools, such as Fusion 360 and Eagle PCB, for the purpose of mechanical modelling of the robotic arm and circuit design, respectively. Further, the downsides of unintentionally downloading malware in the course of troubleshooting were also driven home.