

## Final Project Proposal

1. **The Big Idea:** What is the main idea of your project? What topics will you explore and what will you generate? What is your **minimum viable product**? What is a **stretch goal**?

The main idea for the project is to create augmented reality and project holograms in the real world space. We plan to create a virtual reality app and use Google Cardboards to visualize virtual objects in the real world. We will explore mobile app design, Open CV, Google Cardboard development, and virtual reality design. We will also be looking into augmented reality, but we're not entirely sure about where to look, as more research is required.

Our minimum viable product will be a camera that tracks a post-it note on a table, and projects a 3D cube where that post-it note is located. The 3D cube will rotate as the camera rotates, get smaller when the camera gets further away, etc, just as if there were an actual 3D cube located where the post-it was.

Our stretch goal is taking the MVP further by adding a personalized aspect to it by allowing for users to put in multiple self-made CAD models and seeing it augmented in the real world. We also want to have interactions with the augmented reality, such as motioning for things to move and levitating objects. Finally, the end end goal would be to make this collaborative, where people can both see the augmented reality over networks and do things together with the augmentations.

2. **Learning Goals:** What are your individual learning goals for this project?

Our learning goals for this project include:

1. Learning more about mobile app development by exploring other programming languages
2. Use networking to allow for collaborative design
3. Learning how to import a CAD model within our display frame, and correspondingly manipulate the model's view to achieve the proper perception.
4. Learn about virtual reality and how to project virtual objects into the real world.
5. Implementing 3D graphical visualization
6. Learning more about Open CV and how to use it as a tool for more complex applications
7. Learn how to identify different components of graphics in ways similar to facial recognition.

3. **Implementation Plan:** This will probably be pretty vague initially. Perhaps at this early juncture you will have identified a library or a framework that you think will be useful for your project. If you don't have any idea how you will implement your project, provide a rough plan for how you will determine this information.

We will first figure out how to track a post-it note via Open CV. We will be able to grab all the necessary aspects of the post-it note in order to know which angle and distance the camera is looking at the post-it note (Finding the color of the post-it and outlining the edges). Using the geometry of the post-it, we can then calculate and project a 3D object (many different 2D frames, which change as the geometry of the post-it changes). We will then implement multiple post-its, as well as different colors for different objects. We can then figure out how to import solidworks CAD models (unknown how to implement). Alongside all of this, we can figure out how to utilize the camera on our phones and implement our code (java) and tracking into our phones.

4. **Project schedule:** You have 6 weeks (roughly) to finish the project. Sketch out a rough schedule for completing the project. Depending on your project, you may be able to do this in great specificity or you may only be able to give a broad outline. Additionally, longer projects come with increased uncertainty, and this schedule will likely need to be refined along the way.

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
W1				3/23	Proposal		
W2			Tracking post-it complete				
W3				MVP due			Multiple Post-its working
W4					App Working	Google Cardboard Working	CAD Models Due
W5							Interaction Due
W6							Networking due
W7					Project Due	Partay!	Sleep

5. **Collaboration plan:** How do you plan to collaborate with your teammates on this project? Will you split tasks up, complete them independently, and then integrate? Will you pair program the entire thing? Make sure to articulate your plan for successfully working together as a team. This might also include information about any software development methodologies you plan to use (e.g. [agile development](#)). Make sure to make clear why you are choosing this particular organizational structure.

In the beginning, we will split up the work. Two of us will work on the app part (figuring out how to program on an android phone, and getting Open CV to work with the android). The other two will work on getting the post-it tracking to work on our computers (python). Along the way, we will check up with each other making sure we are each meeting our goals. After we reach our MVP due date, we can come back together and teach each other what we learned and what we have accomplished. After this date, we will work together to integrate the different aspects together (CAD model, multiple post-its) within the android.

6. **Risks:** What do you view as the biggest risks to the success of this project?

The main risk is the learning curve involved in this project. We have to learn a lot in order to understand how the different parts work. Programming on an android phone is a big hurdle and integration with the mobile app with Google cardboard will be challenging. There could also be potentially problems with our stretch goals, such as CAD models, interactions, and networking, being too complicated.

7. **Additional Course Content:** What are some topics that we might cover in class that you think would be especially helpful for your project?

Some additional extremely helpful topics would be courses on augmented reality and identification of real components using visual packages. Mobile development would be nice as well. Some advanced topics on OpenCV would be good too.