

6.111 Final Project Checkoff Checklist

Commitments:

- Our project will have a functional 3D graphics module that successfully outputs to VGA. During the checkoff, we will be able to demonstrate a virtual 3D world on screen. The world will consist of a fixed (potentially small) number of triangles that are each drawn using a dedicated triangle module. (Mikhail)
- We will implement basic movement functionality for the player in the virtual world. This will be the core of the game FSM module. We will demonstrate this functionality by hooking up the labkit buttons to the player's translation and rotation in the world: the view angle into the virtual world on the VGA display will shift appropriately in response to the button presses. (Mikhail)
- We will have a gyroscope interfaced with the FPGA. The on-screen view of the world will respond to the changes in the gyroscope's yaw and pitch. We will create a "looking around" effect, where looking left causes the contents of the screen to shift right. However, the user must attach the gyroscope to their head in the appropriate orientation in order for this to work correctly. (Christine)

Goals:

- We should physically attach the gyroscope to a pair of headphones so that a user can wear the gyroscope. (Christine)
- Our project should include a gyroscope coordinate transform module, and the game FSM should allow for a configuration step. We should be able to demonstrate how the "looking around" effect works even when the gyroscope is not in the same orientation as the user's head. Provided the user goes through the configuration steps, the system should work no matter how the user wears the headphones or where the user sits relative to the screen. (Mikhail)
- We should interface an Xbox game controller with the FPGA. We should be able to demonstrate movement using the controller instead of the labkit buttons. (Christine)
- We should have a functional audio generator that plays a bass square wave for between a tenth and a quarter of a second every time the user makes a step in the world, where a step occurs every time a particular quantity of distance is traveled. We should be able to demonstrate this by playing the sound into the headphones worn by the user. (Christine)

Stretch Goals:

- We might be able to implement a bigger world using more triangles by changing the graphics module to incorporate a memory. Instead of having dedicated triangle modules for each triangle, the graphics module would have to process the triangles in series from the memory. (Mikhail)
- We might be able to augment our graphics engine with some form of interesting effect. For example, we might implement lighting or a “fog” effect where colors fade with distance. (Mikhail)
- We might be able to implement and demonstrate a functional audio generator that plays a preloaded footstep sound through the headphones instead of a square wave each time the user makes a step in the world. (Christine)
- We might be able to incorporate more game elements into the world, such as walls, collectible objects, or enemies to defeat. For example, we might make a maze with randomly placed collectibles or avoidables inside it. (Both)