

The design patterns that Team 7 has decided to utilize are the Builder, the Abstract Factory, and the Prototype design patterns. The team has utilized the Builder pattern via the use of the Unreal Engine. The Unreal Engine provides the user with a 3D GUI where the user can move and place objects within a 3D environment. The Unreal Engine also provides a simplified GUI where users can design object and class functions. Instead of the programmers having to meticulously code where an object will be and the environment in which that object will move and inhabit, the Unreal Engine handles this kind of work for the programmers. The Unreal Engine essentially allows the programmers to drag and drop instances of an object into the 3D environment and not have to rewrite large chunks of code per each instantiation. The team's use of the Abstract Factory pattern appear in the weapon systems used by the Player Character. The weapon that the Player Character uses has a variety of beam types, with each beam type having their own unique appearance and effects on both the enemies and the environment. It would be inefficient to create concrete classes for each beam type. Thus, there will be a generic beam abstract factory class that can create different types of beams and beam type combinations based on input (collecting upgrades and/or the user switching to a specific beam). The team's use of the Prototype pattern involves the Project 3 enemy designs. The enemy designs of Project 3 will be simple in their design, both in physical appearance and in their AI. The physical appearance of the enemies will at minimum be one of the existing object meshes that are in the project. The enemy appearances can later be upgraded to different, more detailed meshes, which can include animations. The enemy AI will at minimum be simple patrolling AI that do not react to the Player Character's proximity. These AI can later be upgraded to react to the Player Character's proximity to them, to have more complex patrol routes, or to pursue the Player Character. These minimum requirements will allow the team to produce a prototype in a short timespan that also clearly conveys the current functionality of the project and the direction it will take for improving in quality.