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Software Engineering

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Design Reflection

This design reflection is a bit unique, as the problems I was tasked with solving didn't fully come to fruition. But, while I was unable to complete the second portion of the assignment, it was a worthwhile experience nonetheless, as it required me to iterate extensively, try various methods, and gain a better understanding of the concepts at hand. To begin, the addition of a second railway track required a look into the structure of the state pattern, since adding a new track introduced additional constraints to the system. The biggest addition was the need to specific direction, which wasn't previously a part of the model since we were only dealing with one train. The logic needed for each direction was similar, but compared to the initial model, it was more challenging, as we had to account for both trains at all times, not individually. If I had a bit more time, I would have liked to construct a Train Factory similar to that of the Car Factory, that way if we added more tracks, we wouldn't have to refactor again.

As for the second part of the assignment, I was able to make the car exit onto the side road and dissociate from its original road, entering a new queue for the center road, but was unable to perform the functionality that allowed these middle cars to merge into the other road (I believe I programmed my cars to travel east). The main part of this involved giving a notion of memory to the roads, since the roads themselves didn't really have a concept of what cars were on their roads. I implemented this by creating a new object called TJunction that essentially was in charge of keeping linked lists for certain segments of the roads. Additionally, I employed the use of the observer pattern to make sure cars didn't wait for a car that had turned, and also to make sure that multiple turned cars don't stack up on each other, and that they follow the same following distance rules.

Mayor Pete's Traffic Simulator

If Mayor Pete approached me for my program as a basis for a traffic simulator, the City of South Bend might be in rough shape. As I mentioned in my review, scalability was not something that I actively focused on, so the addition of an additional road, railway, or simply a location shift of one of the current roads would likely break the program. During my construction, I stuck to the design requirements and acquired quite a bit of technical debt. This was a learning experience for me, and I haven't worked with so many classes and programs before… had I had more time, I would have liked to make this much more scalable and cleaner, as that is what future projects will likely require.