In this project, our group achieved a great success, which I am proud of. In this project we implemented a ghost hunting game using both phone and Arduino. Some of my ideas about hci did not come to reality because my vision for the project was too large and our group's level was limited, resulting in a longer development process than I had expected. These ideas include not limited to using questionnaires, hardware measurements to collect user data, building cloud server storage to build and process user profiles, and applying machine learning data analysis to user data analysis. This report focuses on my other area of interest, software engineering, and more specifically, project management.

First of all, one of the problems revealed in this project was the communication between me and my group members. My teammates and I had a lot of good thoughts, but we couldn't successfully communicate them to each other. For example, Aster, who has experience with unity, was thinking from the perspective of game design and technical difficulty. And I wanted to apply the knowledge of HCI, so I thought about it from the perspective of hci and feasibility. Before the first draft deadline of the project, Aster's idea was to design multiple independent peripherals and put the peripheral console on the cell phone, doing so because he thought multiple independent peripherals would bring the user a more enriching experience. On the contrary, I think multiple independent peripherals will reduce portability and bring burden to users; in addition, the feasibility of connecting multiple peripherals is also problematic, so my idea is to integrate multiple peripherals on one device, which also includes mapping the phone's screen to the device's screen to provide a more fluid user experience. And Aster thought my idea of mapping the phone screen to the Arduino screen was unrealistic. Due to the lack of communication between both of us, we thought our ideas were adopted by each other and delayed reaching a consensus, resulting in the project proceeding late.

The next issue was the documentation work. As I had planned, this project needed proper documentation to be logged. This is because Arduino and unity multi-device multi-threaded interaction needs to consider timing and port arrangement, pin design, which needs traceable documentation. At the same time, the documentation can record the ideas of our team members, which can facilitate communication on the one hand and record some good inspirations on the other. Also, the project is less predictable, we will encounter many difficulties that we can not anticipate and have to make changes to the project framework, the documentation can help us control the project. However, due to the lack of time and the additional workload it would have imposed on the team members, I did not stick to my own ideas. This did cause a lot of inconvenience to the project. For example, the tft screen we used had no corresponding description, we needed to manually test the output grayscale, scan mode, color data alignment data, scan direction and so on. And without documentation, these details are quickly forgotten, leading us to need to retest. There are many problems like this, repeated many times, wasting a lot of time.

In addition, another decision that I regret is the plan to use unity for game development. It is true that unity3D is the mainstream game engine, and its Assets store provides many excellent materials and plugins. However, unity3d itself has poor support for mobile development, including no function library to support calls to mobile hardware, no good phone UI adaption, and no good real-world testing tools, all of which make project development very difficult. For example, unity does not provide Bluetooth function, for this reason I need to write it on Android Studio and package it into jar package to unity for use. When there is a problem in Bluetooth, I need to launch Arduino IDE, Android Studio, Unity 3D and Visual Studios at the same time to troubleshoot the error, which brings a lot of inconvenience. And also what I thought one benefit of unity is the artistic resources, however, it turns to reversed because Unity could not do different-size screen adaptation.