**Design Decisions**

This section will discuss design decisions in the project, including software, hardware, and development tool.

1. Operating System – Android

The Alternatives include Android and IOS. After deep consideration about the system mechanisms and market factors, the application will be built on Android, the most popular mobile operating system all over the world. The main reason is that Android is an open-source OS. There are various of development tools and existed application based on Android, which can be take advantaged to simplify the work. Another important point is the mechanism. IOS has a very strict background management and sandbox mechanism which might limit the background running efficiency and access permission to the other memory space. Additionally, different from IOS development, which is limited in Mac OS X, Android application can be built in any environment. That makes the work more convenient.

1. Application Development - Native Development

There is no development framework will be used to build the application. The biggest reason is multiple open-source libraries provided by equipment manufacturers can be used, so that not need to build device connection from scratch. Additionally, there is mature tool chain in native development, which is efficient for group work.

1. Heart Rate Sensor - Polar H10

Polar H10 is a chest strap whose heart rate sensor can precisely monitor heart rate in real time. It will be integrated into the system to gather heart rate status of the user. Polar provided Polar SDK, which is a fully functional development library. It can be used to build connection between mobile and the chest strap using Bluetooth and collect data from its built-in memory.

4. Development Tool – Android Studio

The development tool we chose is Android Studio. There are two main reasons. Firstly, Use Android Studio IDE can simplify the development. It provides grammar detection, package management, refactoring tool, and project build tool. Secondly, we used Intellij IDEA in Developing maintainable Software module this autumn semester. They are both produced by JetBrains company and have the same user interface and operation logic, which will reduce our study cost in tools.

5. Order of system module implementation

In our project, there are two parts in the implementation stage: developing a simulator and a real mobile application. We decided to develop the public parts first. The data processing module and report analysis module are both in two parts and will be implemented first. Then we will complete the simulator first for the test of algorithm and system. After that, we will focus on the connection between mobile application and wearable devices, which belongs to the data capturing module.