Assignment 3: Our IT Project

Introduction to Information Technology

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# Team Profile

**Team Name:** Hammerhead

**Team’s Website:** http://bit.ly/ITassHammerhead

**Team’s Git repository:** <https://github.com/s3728207/Hammerhead.git>

**Commons:** Some of our group member have trouble with using Git repository, and because this assignment are quite similar with last one and we didn’t have much changes,so we mostly keep using Google drive for sharing files. As we limited use in Git repository, we discovered that it is a really efficient tool for group work. Once we finished some work or have some changes, we simply need to put the files in the designated folder, then push it, so other people can reach it by pressing pull. Also the history showed us who shared the files and when which can be used for Coordinating team work.

### Group Process

Our group worked so well in assaginment 2, we used google drive to upload files and share any information. We first divided the assaginment into five individual task and we finished each task before a agreed date and check the work each before the due date.we gather together at the tutorial once a week. The only thing we want to change in the assaginment 3 is we decided to use Git repository and Google drive at the same time to help us accomplish the assginment because we need to get firmiliar with Git repository and it is indeed a usefull tool and considered Google drive is the most common tool that we will make nearly zero mistake, so we will use these two at the same time.

### Career Plans

**Common Elements:** First, we all have a concensus which knowlage related to our goals is the most important at the moment, we all agree that we need to build our essential skills at university to help us achieve the job we want.the one thing in common is the design skill is qutie usefull in all our plans.Second, we all agree with building experience after graduate is the second important thing.

**Differentiates:** we have quite different career path planed, so the skills needed is different, it can roughly divided into two kinds, sofeware skills and hardware skills. Some of us dreamed about being a hardware developer and designer and some of us want to become a software engineer in game develop or AI develop. In this case, the first differentiate is skills we need to master before graduate. The second is still about the skills, some of us plan to learning further degree in order to process further knowlage because they want to be well-prepared before heading to next step.The third differentiate is the plan for future.there are roughly three plan. One is become a regular employee for some big company such as google in the future, the other is to establish his own company. the last one is to develop advanced IT technology in a likeminded team.

**About Career Plans:** our career plans are quite similar, learning skills, building relevent expirences and become a professional in the future. The differentiate is the number of steps, most of our plans stop at the step becoming a professional but there is another plan is to establish a company.

# Project Description

## Overview

### Topic

Our project is to create a pair of lens which can project holographic to the real world. The lens will be small enough for us to carry around every day. The project aims at productivity and gaming possibilities. Demonstration with holographic will be fantastic and gaming in the real world will be a real fun.

If the project is successful, we aim at taking place of VR helmets for the future. Design companies would benefit the most from our project using the real-time holographic demonstration. Productivity will be pushed beyond the limit after the main part of the project is completed.

### Motivation

The main motivation of our project is movies about future technologies and the current problems we have. Holographic technology is important because it takes possibilities to a new level. Lots of new products relating to virtual reality is coming out these days. They all focus on creating that ‘real’ experience which went the wrong way. Holographic will merge that ‘virtual’ together with the real world, making us focus on the real thing. If I was able to work on this project, I would show him the concept of holographic and how it can change our lives. I would show him the holographic projected and demonstrate how it merges with the real world.

### Landscape

Similar products are VR helmets. They are widely available these days. They are main competitors for our project as well. The main difference between our project and VR helmets is the core technology. Instead of letting the viewer to drown into the image shown on a screen, our project aims at projecting holographic object images to the real world. With a VR helmet you will not be able to see the real world but with our project, we are using it with the real world.

## Detailed Description

### Aims

The aim of our project is to implement holographic technology onto a normal sized pair of glasses. We need to prepare a lot of things before we can do this.

First, we need to develop a software which is as efficient as possible. This is to make sure that we need minimal hardware power to push the whole device. Many manufactures often ignore the importance of software. In fact, it is very important for a device to run smoothly and efficiently. User experience is also most affected by software. By developing a great software, we won’t have to face the problem of trying to put high performance chips into our small-sized lens.

Next, we need to come up with energy efficient and small-sized chips in order to fit into a pair of normal sized glasses. Performance is important since we have to project complex holographic objects, but we also need to consider the heat generation and battery consumption. Creating a chip that has best performance to energy ratio is a significant part of our project.

Battery is also a huge concern for us since we have to make sure that the device is able to last at least one day for best user experience. We might consider using new technology instead of the popular Li-iron batteries to provide small size and huge capacity.

After all these small goals are achieved, we will be able to carry out the first sample of our project.

### Plans and Progress

Our project is a pair of lens with the ability to project holographic objects. This project idea actually came from a bunch of movies taking about future. At the beginning, me and Bowen talked about what we can potentially do. We are all interested in gaming and cool technologies, so this idea became our goal.

At first, we are not sure if we are doing VR or some other technologies since it is not that easy to distinguish between them. We focused on VR at the very beginning. Later, considering that VR technology is already there, and VR helmets are affordable and practical these days, we decided to try something new. Holographic went into our eyes at this point. We finally decided on holographic because it is a technology that has came out earlier but not fully developed. I have seen Michael Jackson being brought back to life using holographic technology. I have to say that it was so real that nobody could believe their eyes. With this technology we can bring a lot of other things to life, making new possibilities and extend the boundaries.

Then we discussed how are we going to implement this technology to something we can use every day. We first considered using the same form as VR helmets, making something that stays on a person’s head to project the object. Later we thought that a helmet would be too bulky to carry everyday (and it won’t be comfortable to wear all day too). We did some research afterwards and our eyes laid down on Google Glasses. Yes, a small form factor projector would be nice to carry around all day. So, we confirmed that we will be making a pair of glasses to put the holographic projector on.

Since our project is a product that is not possible without future technology revolutions to provide proper hardware for us to use, we cannot do much at this stage. We can only do preparations to equip ourselves to be ready at any time. We made our plans to draw out the prototype of our project. Me and Bowen did some research on the technology and listed out the hardware we need. At this stage, our project is limited to a simple mock up since we are still not that skilled to do any further. Most of the part of the project will be completed in the future.

For our project, we need a designer, a hardware expert and a software engineer. To acquire all the knowledge we need, we need to focus on different directions as individuals during university studies. I believe that after three years of study, we will be well equipped to be ready to do something huge. And I assume that new technologies will come out these years to provide us with efficient chips and batteries. No matter how well the technology evolves, we always have to make sure that we have an efficient enough software to use for our project. This is to minimize the hardware requirement and reduce possible tackles during the design.

The following detail is how we have decided on our project so far:

It will be in a form of a pair of glasses at this stage. In the future, we plan to make it as small as a clip and users will be able to clip it to wherever they want.

It has a battery life of 16 hours under intense usage.

I can project holographic to any possible area it can reach.

The content projected is sharable and users can decide whether the content is public or private.

We plan to make different versions to accommodate to different needs since the ‘PRO’ version will definitely cost a lot which might make it impossible for normal users to afford.

We will work with game studios to include some interesting holographic game at launch.

We will try to make partnership with Intel because they are the leader in producing power efficient chips. Will might try to get an exclusive version of chip for us if possible.

The glasses will run on its own system designed by us and will be compatible with most of the popular platforms on the market (Windows, Mac, Linux, IOS, Android etc.).

The glasses will be paired using the latest Bluetooth technology and Wi-Fi if accessible.

The plan will likely to be changed since technology is evolving rapidly. We will keep on this track at the moment and try to deliver it.

### Roles

For our project, we need the following roles:

Lead Developer: Person who takes charge of management and supervising. This person is important because he determines how smoothly the project will run and how easy it will be for us to overcome possible obstacles.

Designer: Person who is competent in engineer design and precise operations. He has to be rich in hardware knowledge to make sure that the design does not face a lot of technical issues. The designer will affect what type of chip, battery and potential material we will use for the project.

Software Engineer: Person who develops the operating software for our project. The software need to be efficient so that the hardware requirement can be minimized.

Hardware Expert: Person to help encounter possible hardware obstacles. To come up with new hardware design and optimal passive cooling solution for the chip.

### Scope and Limits

Considering the whole project, the most difficult part for us to encounter is the hardware part. Today’s technology is not enough to produce such tiny but powerful chip for us to put on the lens. What we decided to do is to make a larger version of the holographic lens. In this way we will be able to use available chips on the market to at least finish the software part and determine how it actually operates.

As for the hardware part, we might not include it in our project since there are large companies that make new chips with updated technologies every year. We don’t have to start our own hardware business like that.

### Tools and Technologies

Java JDE 10

Autodesk AutoCAD

Holographic Technology

Intel chips with GPU on board

### Testing

I will test my project base on user experience. I will choose different type of users (designers, office workers, general home users, gamers) and approximately 50 each. This is to find out which type of user benefit most from our project and what can we possibly improve in our design. The goal is to make sure that our project will make life easier and fun. So, it’s very important to study based on user’s feeling. Our project will be successful when users are able to easily accommodate to the design and concept.

### Time frame

|  |  |
| --- | --- |
| Week 1 | Decide on specific parts of the project, Discussion |
| Week 2 | Work on the detailed design concept and draw the draft for the design |
| Week 3 | List out the materials and technologies we need and allocate the roles |
| Week 4 | Designer: Focus on the internal design for the project  Hardware: Assist on the designer in terms of choosing the proper hardware  Software: Find out what users need and what detailed functions we need |
| Week 5 | Designer: Draw the internal design  Hardware: Study on available hardware to select the optimal  Software: Find out whether the functions required are practical and how can we apply on the project. |
| Week 6 | Designer: Draw the internal design  Hardware: Study on available hardware to select the optimal  Software: Separate different sections of the software and start working on them |
| Week 7 | Designer: Draw the external design  Hardware: Test the selected hardware to see how well they work together  Software: Come up with the software UI design first draft |
| Week 8 | Designer: Refine the external design  Hardware: Further testing and changing the hardware  Software: Start coding on the software for a simplified version |
| Week 9 | Designer: Finish the first draft of the complete design  Hardware: Work with designer to implement all the hardware designs  Software: Finish the first draft and do some basic testing on the software |
| Week 10 | Together: Build up a first draft of the project and test compatibility |
| Week 11 | Together: Tweaking and testing to make sure everything works smoothly |
| Week 12 | Select the targeted users to test our first sample of the project |
| Week 13 | Collect and analyze the obtained user data to see potential issues |
| Week 14 | Tweaking and testing to fix small issues discovered during testing |
| Week 15 | Work on the final report for the project |
| Week 16 | Final report for the project and release what we have accomplished |

Risks

On the software part, we are still beginners. So, we are not sure what Java can do at the end. We decide to use Java to start our project because it is most widely used in the world. There might be problems when we meet some software issue where Java cannot accomplish. We will then have to learn something new.

On the hardware part, the main risk is that we do not know when the technology will evolve to the point where we can find proper chips and batteries we need. Our project cannot be produced without the support of proper hardware, so we will have to wait and see.

### Group processes and communications

Communication is definitely an important part of a project. We decide to meet up face-to-face twice a week. Our main way to communicate is through WeChat, a Chinese communication platform that is widely used around the world. Project updates will be made through GitHub and Google Drive. Having group members not responding to communications is hard to deal with. I would keep trying to get in contact twice a day. If he/she still not respond to it, I might consider kicking him/her out of the project. A person like this will definitely slow down the project process as we do not know whether the work allocated will be done properly.

# Skills and Jobs

### Hardware engineer

design and develop holographic lens and its subcomponents.Lead resolution of cross-functional issues including those architecture issues such as performance, power consumption, thermal behavior, production issues such as quality, failure analysis, manufacturing, and development issues,such as schematic design, PCB layout, and overall system integration.

### software engineer

Design, develop, test, deploy, maintain and improve holographic lens’ operating system and its based software.

### product manager

Define overall strategy, product roadmap and technical/feature specifications for this whole new product based on long-term product vision, user needs, technical.

### UX engineer

Explore product concepts to find promising directions addressing user needs.Build prototypes to assist in user research, using low- to high-fidelity techniques and/or build design tools.

# Group Reflection

### As a group:

As a group, we didn't use Git repository to do our assignment. We first distribute work for each at the tutorial two weeks ago and we agree to put our work on Google docs, once we all finished our part, we could simply fix and discuss on Google docs.it went pretty well actually, we finished the IT works and IT technologies at the first week and it didn’t really leave much of the work.

The first thing might need to be improved should be coordination because different people have different schedules, that make some people feel irritated when they finished the work a lot earlier. Next time if we can start our work earlier it could have been better. Second, we should use Git repository to do our work because it shows the audit trails which can help us to recognise each one’s contribution, it can really help the Feedback section and Reflection section.

One thing that surprised us is Git repository. We didn't realise there is such convenient tools for teamwork, thus we didn't have trails for what work each one of us has done until this assignment. Git repository is a really helpful tool for teamwork.

One thing we learnt about group is work can be a lot easier as a group but can be a  
trouble as well. Once a work has been distributed to a lot of people, separated  
to different part, each part can be focused by only one person, it is not just  
efficient but also less burden

### Bowen Zhang:

I think I did well for this assignment, I’m pretty good at programming but have flaws in writing, so I ask other member to check on whatever I wrote and it went well. The first thing that could improve is my writing skills, I wrote team profile, participate in project description and skills and jobs. The other thing can be improve could be collaboration, we all from same countries but we didn’t have much of experience for working as a team. We had some coordinate problem, not big problem but also needs to improve. One thing that surprise me is we have Git repository which is really a good tool for teamwork, I intend to use it but some of our group member has difficulty using it, so we only use it limited. One thing I have learnt about groups is it makes work a lot easier but a lot harder as well. I can do all the work by my own, it means I must communicate with others. Five people have five different thoughts, five different opinions and five different lifes. That makes things better and complicated at the same time.

### Cheng Chen:

For this assignment I have done pretty well. Since I have more experience in writing academic reports and essays, I helped other members on how to find sources and formats. Something good is, we went pretty well on track and kept everything organized. We did not run into any trouble in terms of content and sharing. Work were distributed to each member before we start. Most of us including me finished all the work well before the deadline we set making it easy to finish all the work in time. The major aspect we need to improve is teamwork. All of our group members come from China where we are strongly encouraged to focus on personal abilities. Nearly no teamwork was involved in our studies in China. We sometimes have trouble reaching each other and due to that I am the only one living in city, we were unable to have a meeting after class. This did not cause a lot of trouble but it is definitely something we would like to improve. One thing that surprised me is GitHub which I did not realise how it works until we finished all the work. Our team did not use GitHub for this assignment. We used Google Docs for collaboration instead. Later I discovered how well GitHub could perform and I have to say that I regret not having it checked beforehand. One thing I learned from group work is communication. Communication is so important that nothing can be achieved without it. During the work of the assignment, one of our group member is constantly missing and we could not reach her which caused a little bit of trouble. We could not make progress with any of the members so communication plays an important role in teamwork. Overall, we all did a great job for the assignment.

### Junhao Zhang:

In this assignment, I realized the importance of group work. In previous days I always liked to do the work alone. But now I have opened a new world in my mind. I have never take part in team work before come to college. That makes me don’t very adapt it at the begin of the assignment. After I work together with my team member, I have changed a lot. For example, I have learned some skills about build website from Bowen. But I think I can improve more, such as typing speed. I have see my team members typing very fast. I think this is a skill that I must upgrade, otherwise my work efficiency will be lower than others. The progress of assignment is still relatively smooth. There is not much problem except the initial run-in. I did my best to do everything that I did. As for the workload, we assign tasks to everyone according to the actual situation. We had a good discussion about this when we were in class, and there was no ambiguity. Regardless of the final score, I think we will not feel regret as we do our best work. After all, we tried hard.

### Xinyi Zeng:

In this assignment, I think I have performed well as I can. Because our group project idea is about holographic lens. I have learned so much about hololens. So I have done lots of research to learn more about hololens. And identify the features of Microsoft Hololens. My group members also do it well. Like Cheng chen, he needed to conclude all the essays that we wrote. It is amount of work. So I think he have done very well with our group work. By doing this assignment, I think we practice our team associated skill well. Furthermore, I still need to improve myself in many areas.

Teamwork is a good way to enhance everybody’s collaboration ability. Through this learning from others, I think i can do better next time.

### Ziqi Zuo:

When I am doing my assignment work, the searching I have done went well. There is quite a lot of information online of the IT project that I need to do. And most of the information is easy for me to understand. But I still need to improve the expression of the information in my own language. When I am doing my work, I am surprised about how much one Bitcoin worth and how many people are using Bitcoin right now. Bitcoin is so expensive that I have never thought before. For my group, everyone is well prepared for the assignment and knowledgeable with the title. They do really good jobs for their parts of works. And they finish the work really quick and well made. Thus I think I need to speed up while I am doing the work because I am really slow compared to them. And I think I might need to do more communication with my group members as well.