

Explain the experience you've gained in telecommunications and networks – placement, project in small groups during your education, etc... What have you been assigned to do? Have your experiences been rewarding? (from 1 to 2 pages at the most).

During my education, I made lots of projects which brought many experience for my future professional project. All these projects were made in the context of telecommunications and networks security.

Firstly, during my second year of Bachelor, I made my first security-oriented project. It is called Pretty Good Privacyⁱ (PGP) and consists to send and receive encrypted messages. I have learned two types of cryptography: the symmetric and asymmetric encryption. Put simply, when two people want to send messages, they use the same key for the symmetric cryptography. While the asymmetric cryptography uses two keys per person: the private key to decipher messages and the public key to encrypt messages for you. In this case, when you want to send an encrypted message to your friend, you have to use his public key.

In the case of my project PGP, the user has public keys of his contacts. Then, when he wants to send a message, he creates a symmetric key which uses to encrypt the message. Then, the user enciphers the symmetric key with the public key of his contact. Finally, he sends to the encrypted symmetric key and the encrypted message to the contact.

This project allowed a better understanding of different cryptographic algorithms during my Master.

Moreover, during my third year of Bachelor, with five others students, we made an application of steganography StegXⁱⁱ. This domain is the predecessor of cryptography. Instead of using keys to encrypt data, steganography allows to hide data in other data. Nowadays, with all file formats, there are several techniques to hide data.

In the case of our application, we can hide any data in pictures, sounds and videos of few formats. I was assigned to make algorithms hiding data in BMP and PNG images. The first method is the LSB algorithm and it consists of modifying least significant bits of pixels to hide bits of data. Indeed, human eyes don't notice this difference. The second method takes the advantage of the fact that data is not interpreted by any image-viewing softwares. So, after using the app to hide data in a picture for example, you just have to send this picture. Then, the receiver will have to use the app to extract your message.

Thanks to this project, I could learn low-level computer science. Also, I realized of the usefulness of this domain in Forensics especially.

Furthermore, in this year, I participated with other students to TRACSⁱⁱⁱ (Tournament of Intelligence and Analysis at CentraleSupélec) organized by DGSE (equivalent of NSA in the USA). This tournament (named Capture The Flag) was a one-day project during which we solved IT security problems. These challenges were about cyber security, data science, cryptanalysis and social engineering. I was assigned to solve challenges about forensics and reversing (studying an executable to understand his function) because these fields are my strong points. My team was not rewarded but we came in the top 30 out of 90. I was very proud of my team because it was my first experience in this concept of projects.

Finally, my last project just started for few weeks. This year, we learned Web Security and Social Engineering. Social Engineering consists of finding information about someone on Internet like social networks or Google. Especially, we can make special requests (Google Dorks^{iv}) to discover sensitive information. So, with another student, we are making an application to automate these searches. During this project, I am assigned to collect information about the person to investigate. This project is very interesting because I didn't know Google dorks before studying Social Engineering.

In conclusion, during my school years, I have done many projects but any internship. They brought me lots of experience and I could learn myself lots of aspects that I couldn't learn with classic lessons at school. Unfortunately, I didn't win any awards for this but I am still proud of my projects. Maybe, they will provide solutions for my professional life.

ⁱ <https://github.com/Heisenberk/ProtectMail>

ⁱⁱ <https://github.com/Heisenberk/StegX>

ⁱⁱⁱ <https://tracs.viarezo.fr/>

^{iv} <https://www.exploit-db.com/google-hacking-database>