The Cyber Security Engineering curriculum brings you through a wide-spanning and diverse set of courses that are aimed to mold your mindset into that of an engineer. The way they do this is by starting with the basics like math and introductory coding classes that teach us logic and how to use it to come up with solutions to complex problems. Also, during this time, we got eased into working in small groups where we would collaborate on something like coding problems that challenge us to put our heads together when coming up with solutions. This all provides us with a good foundation that more complex classes can build upon, leading to a strong logical and technical base. Other than the technical and logical skills we gain, we are also introduced to the concept of ethics, specifically in the cyber security world. However, in this field, ethics can get a little spotty, and it is hard to determine where to draw the line when it comes to criminal attacks or simply what should be acceptable in cyberspace. But this course teaches us how to go about looking at these issues and how we can come up with the best solution possible with the given information. All of this together not only provides us with the ability to comprehend professional and ethical responsibilities but also to pull from our internal resources that we have collected over the years and formulate our own opinions and solutions to the always-arising issues we face.

As great as the material provided to us in class is, reaching past that and using external resources can be a game changer. While this can be anything from checking out a book at the library to reading an online article, I believe using others around you is an amazing external resource. There are so many people in this school and in any given major that you have the ability to explore tons of different perspectives, which may lead you to a conclusion you didn't once think of. The great thing about this, too, is that it can go both ways. You are not only able to pick the brain of those around you but also provide the insight you've gained as well, which leads to a better understanding on both sides. Not utilizing your peers and professors while in such a vast learning space would surely be a handicap in the long run.

Even with all these in and out-of-classroom learning materials hanging around Iowa State, there are still other resources we can utilize to continue learning throughout life. A great and fun learning resource I like to utilize every so often is a series of events called SecDSM. These events are always packed full of those within the information security industry and provide a great opportunity for both socialization and learning. Along with being surrounded by endless networking opportunities, they also host speakers to talk about security-related practices or topics while providing food and drinks for absolutely free! Finding a favorable event or group to participate in is a surefire way to keep you learning through life and staying up to date in your field.

All this learning must be for something, right? Absolutely, as it provides us the ability to solve more complex problems and tackle challenges. As your knowledge builds upon itself, you will find yourself in situations where you are pulling from resources that you may have seen as useless at one point, putting information together to make forward progress on a task. I, for example, remember the start of my internship this previous summer, going in thinking it'd be a totally fresh learning experience. Although this was not totally the case, as I found myself relating a lot of the teachings at my internship to those that I'd already experienced in class or

as part of some other learning experience. I once swore up and down that the application development class they made me take would be totally worthless and was just another pointless hurdle I'd have to overcome to make it to the end, but this wasn't the case. I found myself using classes like that, that I once deemed unhelpful, to progress my learning and attack the challenges provided by my mentor.

Looking back at the start of my college journey, there isn't much I would change, but there are some things I wish I realized sooner. The number one thing I think of when I say this is involvement with learning clubs and optional events. Iowa State has a huge variety of clubs and events that go on every semester and provide amazing opportunities for growth. I was never the type to participate in any type of learning outside of the classroom, but this changed in the past year. The realization that learning doesn't have to be something "bad" or a bore overcame me, and I found myself having fun in all of these events and groups that I couldn't have seen myself in a mere year ago. Reaching out and making that initial participation opens up a whole new world that was once invisible to you. Continuing these experiences is sure to not only teach you something new but help you form connections and friendships that you may just have around forever.

Now that you have all this information and experience in your field, it's time to apply it and start seeing some results. A recent experience I had this previous summer, at my internship, had me alter a process and create a data pipeline to send specific security data from a data collection Python process to a database service called Snowflake. Before starting on this, I had very little experience working with databases as well as some of the other tools we utilized such as AWS S3, basically a container for data. I started easy, reviewing the Python code and figuring out what exactly this process does and how it routes the data to the previously used database service. This provided me with a base of knowledge that I could now build off of. Next step: send this information to an S3 bucket where it can then be collected by Snowflake. This part involved learning another set of code that I used to create the S3 bucket. Once I tackled that, I began working on the Snowflake database, which involved learning a whole new language, similar to SQL, that allowed me to create the necessary pipeline used to pick up data from the S3 bucket and store it in specified tables. So, looking back at the steps I took, I began with familiarizing myself with the material and learning the basics of what I was working with, then determined the steps I would need to take to get the data from one place to the other, then moved up one step at a time until the system was complete. This is a classic example of analyzing your situation, assessing the information you have to come up with a solution, then acting on it to make the solution real. This was definitely not an easy process to create at the time, but it is one that I will now remember forever, and one that will be sure to come in handy one day.

There have also been times where the work I am doing isn't completely clear and it's a lot more theory involved than normal. In cyber security, we go through some core classes that start by teaching us the basic protocols, how networks are created and structured, and much more. This then leads to another class which involves penetration testing on computers where we are eventually tasked with creating a penetration test report for a made-up company. Just then, I was able to apply all this previously acquired knowledge on things like ports and network

scanning to successfully locate vulnerabilities within the network. This experience overall opened my eyes to the connections between everything we've been learning, and getting to apply this theoretical knowledge was very eye-opening.

As I progress in my degree path, it is evident to me that I don't think the same as I did a year prior. As classes become more complex, I am forced to continuously find different ways of viewing problems and coming up with solutions. It began with a much more base level of thinking, going from "here's my problem" to "what would fix this" with little to no steps in between. As my mindset develops, I began to question everything a little more and look deeper into it before jumping to conclusions. Not only just trying to think of a solution, but actually pulling the problem apart and figuring out what the root cause is and how to strategically solve it for good rather than put a bandaid over it and have another problem arise a week later. This developed mindset has done me plentiful good when problem-solving, and I find myself coming up with much better solutions when actually taking my time and putting some thought into it. Sometimes speed is not always the best route, sometimes one problem manifests as another, and you don't learn that until taking a deeper look, but you will never know unless you put in the time and effort.

As I wrap up my college career, it is hard to envision how these next few years will go. I don't know where I'll be, nor do I know what position I'll exactly end up in. But this is the beauty of growing, as there is no telling where your path will lead until you follow it. Even though this is the case, there are some things that I am sure I am going to want to do as far as furthering my education and knowledge in my field. To start off, I plan on taking online courses that are related to my future role, possibly like the ones LinkedIn or other similar sites have to offer. I also plan on taking advantage of the environment I am in and taking part in any learning opportunities, whether they are large or just a simple one-on-one with a more experienced worker in my field. If I continue to use my resources and those around me to build, I will then one day be able to pass my knowledge down and guide the next generation as they have guided me.