2–3-page presentation of a project done at school and relate that to data security, cyber security, and information security.

ENGINEERING ROBOTIC VEHICLE DESIGN PROJECT

In an engineering course I took early on in college, we were tasked with a semester long project to develop a remote controlled or autonomous robotic vehicle using the programming language Arduino. Several tasks were given out in the form of sprints, and we spent time working on implementing obstacle avoidance and line tracing abilities to our vehicle, preparing it for a competition at the end of the semester. This encompassed, the robot navigating through an obstacle course picking up wooden pillars, and returning them back to the starting platform, and the team with the most collected pillars within five minutes, won the contest.

The class was split up in several teams, and each team consisted of one leader, two quality assurance engineers, and one software engineer. As typical agile methodologies specifically scrum have a duration of two weeks, each job role switched every two weeks, allowing for each team member to participate in each role more than once. The leader's job was to ensure all team members stay on task and complete all work planned during the sprint. The software engineer focused mainly on implementing code in Arduino following the instructor's comments and feedback. The quality assurance engineers focused on the current state of the robot, whether it's performing the structural design effectively or testing its ability on a singular line or platform, these engineers make sure the vehicle meets the requirements of each sprint and operates up to expectations.

The competition consisted of several teams competing with one another in a tournament style contest. Where the winners of round one move on to round 2 and the championship. Our team breezed through rounds one and two and but when it came to the final round, our robot struggled to move in the direction we wanted it to. This was assumed to be an issue with a sensor at the front side of the vehicle. But ultimately in the end, we had more wooden pillars on our side of the obstacle course and achieved first place in the class competition.

Now when we talk about cybersecurity in this context, there are many different things to consider. The robot's connection needs to be properly secured with the remote control, meaning we need to implement more safeguards to make it more difficult to hack into otherwise this opens up several possibilities of an attack. Including an adversary taking remote control over the robot, influencing it (by feeding it wrong input) changing the direction it is supposed to go, which could potentially result in disruptive or harmful actions. Or they could take control of the camera, which can introduce privacy violations. Another important concept to note is application security. Are we writing code that is secure and accepting input that is properly sanitized? Should we use multi-factor authentication to lower the risk of a successful breach? These are other important discussions we need to have to improve robot vehicle security.

If the robot was scaled to be in a larger environment and used in a confidential area, this opens up risk to sensitive data, potentially violating the Confidentiality in the CIA triad if a breach occurs.