INTERNSHIP FINAL PAPER

Democratic Governors Association

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Employer / Agency:
Democratic Governors Association

Course:
CYSE 368 / Internship

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Term:
Spring 2026

Date:
April 19, 2026

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1. Introduction

I chose to work with the DGA as a way of applying some of my coding skills in a professional environment. Unlike the classroom, mistakes in a professional environment can result in more than just a lower grade for a project. As a junior student majoring in cybersecurity, I was looking for an internship that would expose me to working with data. The Democratic Governors Association seemed like an organization that could provide that for me. Additionally, learning about how technology plays a role in the political world is an interest of mine, so I felt that this internship would provide an excellent opportunity for me to explore that field of study.

The Democratic Governors Association was established in 1983 as one of the leading organizations in the United States that is dedicated to electing and supporting Democratic governors. Their main efforts include conducting political research, analyzing voter data, creating communications efforts, and providing support to the campaigns of the Democratic governors and their campaign managers. The DGA functions as a centralized data and resource hub for the Democratic gubernatorial campaigns and governors running across the nation. They work with the campaigns to ensure that they have access to accurate data and research for their campaigns. As an organization that relies on technology and data to support its goals and campaigns, I believe that this organization provides an exceptional opportunity for individuals with my background and skills to contribute to their efforts.

The DGA has a flexible work arrangement that is both in-person and remote-based. While this posed some challenges when I first joined the organization, it worked out well for me during my time with them. During my orientation, I was introduced to the DGA, their systems, and some of the software that I would be using during my time with them. I was also made aware of the importance of discretion when working in a political organization. The atmosphere within the DGA was very welcoming when I joined the organization. As soon as I was given some of my first assignments, I became aware of the importance of some of the campaigns that were taking place and dedicated more focus to my work.

Prior to the internship, I worked to review the Memorandum of Agreement that I would be signing and identifying four learning goals for the internship. The first goal would be to learn some new coding skills. The second would be to improve my data analysis skills. The third was to work on some of their research projects. The fourth was in developing my professional skills within this political and research organization. Each of these goals will be reviewed in the sections following this interview.

2. Management Environment

The management structure of the DGA in general was relatively flat and flexible. My direct supervisor was the primary supervisor of my efforts, but I was also able to have regular communication with many of the other members of the organization. Interns were not kept at arm's length from the organization; I had direct access to many of the senior members of the organization. Therefore, the environment was primarily collaborative rather than hierarchical.

One of the main aspects of the DGA that I appreciated was the way that I was given responsibilities but with a degree of flexibility to determine how to complete those tasks. As a remote intern, I had to manage my own schedule and deadlines to ensure that I was meeting each of the requirements of the project independently of anyone else in the organization. This was different from my usual experience as a student requiring deadlines for its assignments, but I became accustomed to managing my time more effectively as a result of the internship.

When I experienced any problems with the project, I was generally able to contact my supervisor for assistance. However, my supervisor generally did not provide answers or solutions to the problems that I experienced. Instead, I was generally expected to work through the problems myself and to present solutions to my supervisor. This aspect of the internship was probably the most valuable for my development within the organization. By the later portions of the internship, I was requesting assistance from my supervisor significantly less often than I was during the beginning of the internship.

While meetings with the team were infrequent, they helped provide context for the tasks that I was to accomplish. They helped provide a sense of purpose to some of the tasks that I performed. Overall, then, the management of the DGA as an organization was structured in a way that treated interns with respect and provided a space for us to grow as individuals within the organization.

Beyond the work that was assigned to each individual member of the organization, the DGA also had a culture of collaboration in the sharing of knowledge within the organization itself. Each member of the organization was open about discussing the work that they were performing and the context of their work. While my responsibilities were somewhat separate from the other departments of the organization, spending time to observe and become familiar with the work of the organization as a whole still added to the value of my internship.

One element of the management environment that I did not anticipate was how it would change my relationship with uncertainty. Within my education, tasks typically had scopes that were defined in advance for me to complete; there were rubrics to follow, deadlines to meet, and a definition of the task requirements to follow. At the DGA, however, I was often given tasks with an expectation of the outcome of the task, but without any definition of the method by which I was to accomplish that task. Over time, though, I recognized that ambiguity as an element of the DGA's approach to its interns - I was to define the process by which I would accomplish the task, and that aspect of the task was the value that I was to provide to the company.

3. Major Work Duties, Assignments, and Projects

Data Cleaning and Script Writing

For the first 50 hours of my internship, I spent most of my time performing data cleaning and writing Python scripts to automate many of the tasks that were repeatedly performed each phase of the project. Much of the data I accessed was stored within multiple spreadsheets, and I wrote scripts to automatically extract the relevant information from those spreadsheets. Though data cleaning might not be the most exciting phase of a project, it is a critical part of ensuring that the data used to make decisions is accurate.

For this first phase of the internship, I had to consider whether others would be able to read and utilize the code I wrote, whether it would hold up to data in formats different from the example data I tested it on, and whether my comments were sufficient to allow others to understand my code. I found that I had to rewrite some of my scripts during this phase with these considerations in mind, and these changes to my scripts remained throughout the remainder of the internship.

Web Scraper Development

During the second 50 hours of my internship, I began working on building a web scraper for the organization. This web scraper was to be used to automatically download an entire database of the organization's members. This was the most technically challenging phase of my internship both in my education and my career. To build this scraper, I had to gain an in-depth understanding of the organization's database in advance of writing the code, and I had to learn Python libraries I was not very familiar with that would allow the scraper to perform its tasks.

My initial web scraper experienced a variety of failures while I was attempting to build it. Each instance in which the scraper failed required a thorough investigation to determine the cause of the failure, and I generally experienced a cycle of creating the scraper, introducing an error, and troubleshooting to fix the error. These failures taught me a great deal about the relationship between the web scraper and the database it was designed to extract information from. Furthermore, I had to ensure that my web scraper would account for various potential edge cases in the database, such as members whose names or other data fields were formatted differently from the majority of the members in the database. The consideration of these potential errors and how to account for them helped to give me a better understanding of the complexity of building a scraper that was to be used in production. Overall, though, my web scraper was successful in performing its tasks and would provide the organization with an efficient means of gathering data on external organizations and individuals.

Code Space Maintenance and Troubleshooting

Beyond the development of new applications and tools for the organization, I was also responsible for maintaining the organization's current code spaces. These code spaces were to be kept up to date with the software that the other members of the organization utilized, and I was to troubleshoot any errors that would appear within those code spaces. While the work I performed in this phase of the internship was less visible than some of the other projects I undertook, it was still essential to maintaining the organization and its members' ability to complete their tasks.

Offline Application Development

The third 50-hour phase of the internship included working to develop a fully functional offline version of an application that the organization utilized online. To develop this application, I had to gain an understanding of how the organization's current online application functioned, and to build the offline application to perform the same tasks with the same efficiency as the online version. When I released this application for the organization's use, it was able to open files larger than those that could be opened by the previous offline application, and it processed that information in less time than the previous offline application. Thus, this application was a valuable development during the internship and one of the highlights of my internship specifically.

Research and Tool Evaluation

In addition to the technical applications that I developed for the organization, I also performed a variety of research tasks. For instance, I compiled research on the members of the organization's opposing political party. Additionally, I assisted the organization's research department in evaluating various open-source tools available on GitHub that could be potentially integrated into one of their projects. Furthermore, I also performed tasks like verifying data within their Excel spreadsheets. Each of these tasks allowed me to contribute to their efforts and to show that my technical skills could be applied to non-technical organizations as well.

One aspect of the work that is worth noting is that the projects were not undertaken in isolation from one another. The data that was cleaned in phase one of the project was utilized to build the web scraper in phase two, and the web scraper was the application that was to display data for the offline application. Thus, each of these aspects of the project existed in a relationship with each of the others, which allowed me to gain an understanding of how software is often developed as a system comprised of various different components, each of which must perform its tasks in order for the software to successfully fulfill its intended role - a perspective that is not typically gained within the educational environment.

4. Use of Cybersecurity Skills and Knowledge

Though not always in an obvious way, the mindset of cybersecurity was present in nearly all of the work that I did during my internship. As an organization that handles sensitive information, the DGA expects that all individuals with access to that information treat it with care. Thus, while the concepts of cybersecurity were covered within my coursework, my experience at the DGA allowed me to concretize those concepts and understand how such a professional expectation for the handling of information is the mindset of cybersecurity.

My strongest technical skills entering the internship were Python and data structures—both of which I learned during my coursework at ODU. Furthermore, I have some understanding of the secure coding practices that should be applied to ensure the integrity of the data stored in the system. These skills were utilized during the internship; my ability to write Python code during the first week indicated my ability to contribute to the project early, as well as my use of my knowledge of data structures to perform some of the data cleaning tasks required of me.

Those skills I had to develop during the internship included learning how to utilize new libraries during the development of the web scraper, as well as working under time pressure to complete such a project. My additional skill to develop during the internship was proficiency with software environments and dependencies—a skill that relates to cybersecurity work. Additionally, I had to develop my understanding of data security when developing the offline application for the DGA, particularly in relation to how the sensitive information would need to be handled without the usual protections provided by the network.

Application security was another area in which my cybersecurity knowledge was beneficial. When creating the offline application, while the same in many respects as the online application, I had to take into consideration the fact that the application did not employ the same security protections as the online application. Thus, I had to ensure that the offline application accounted for considerations like secure storage of the data that the application utilized, handling of errors from the application, and the responses of the application to different inputs - all of which are considerations that had to be made at the creation of the application rather than addressed later in its development.

Beyond the technical skills and knowledge, I have gained from my studies, working within such a politically sensitive organization has allowed me to learn about the importance of the human element in the cybersecurity industry. Regardless of the amount of technical skills that an individual may possess within the cybersecurity field, these security measures are only as important as the individuals that utilize those techniques of protection. At the DGA, discretion and professional judgment were recognized as important as any technical safeguard. Working within such an organization requires a certain standard of discretion and behavior from the individuals within the organization - something that is unrelated to any technical skills that they may possess.

Finally, I had to develop my understanding of data ethics and privacy through working with the political data of my opponents and performing research on such candidates. Such a skill is not one that can be learned in the classroom, but through gaining experience with handling sensitive information responsibly. Thus, I have become a more thoughtful individual regarding the implications of some of these data applications.

5. ODU Curriculum Preparation

In reflecting on my time at ODU, I believe that ODU has prepared me well for the technical demands of this internship. My coursework in areas like programming, data structures, algorithms, and cybersecurity has provided me with a foundation that I have been able to utilize right from the first week of the internship. I have constantly used the problem-solving techniques that I learned during my computer science courses throughout my time at the DGA. This type of thinking is not often recognized during my classroom education, but becomes more visible when applied to tasks and projects within the internship.

My skills in Python, which I learned within my academic computer science classes, have been directly applicable to my efforts to create the cleaning scripts, the web scraper, and the offline application for the DGA. In each of these projects, I was not starting from point zero. My educational background in Python enabled me to effectively begin contributing to these efforts early in the internship.

In contrast, however, I recognize that there were some technical skills gaps in my preparation. Skills like maintaining production code environments, managing software installations within a shared technical infrastructure, and modifying code that was written by another developer are all skills that are lacking in my background and experience. At ODU, I am routinely tasked with creating projects from scratch. At the DGA, I have had to become accustomed to modifying existing codebases rather than creating new projects from the ground up.

Another of the skills gaps that I noticed was in my familiarity with software dependencies and managing environments. At ODU, most of the software that I wrote was to be used in isolation on the individuals machine. At the DGA, however, the software that I wrote was to be used in a variety of environments by a variety of individuals within the organization. Thus, my experience with debugging and resolving issues that may occur within those varied environments, as well as managing the software dependencies of those environments, was a gap in my skills that would have been helpful to fill with a course or module on those topics.

Finally, I was also tasked with performing research efforts for the organization, which is an area of skills that I do not possess in my current background. Performing political research, reviewing different sources of information, and presenting gathered information in a clear and understandable format is a task that I had to learn how to perform while at the DGA. While I have learned how to perform these efforts, I feel that having some background in these efforts prior to the internship would have been of great value to my career. Thus, I would suggest to ODU the addition of courses that cover these topics—particularly related to maintaining codebases that already exist within an organization, rather than creating new projects from the ground up. Such changes would make ODU students more effective from the moment that they begin to participate in internships and careers in these fields.

6. Learning Objectives Fulfilled

Objective 1: Develop Practical Coding Skills

This objective was fully met. Arguably, this was the single biggest skill that I developed during my internship. The first 50 hours of the internship were devoted to learning about scripting and automation. Following that initial phase, I began to work on the significantly more complex project of building a web scraper. Finally, I began to develop the offline application that would be used to display the data that was gathered from the web scraper. Each of these projects required me to actually develop my coding skills to create tools that would be used by the organization - a much higher bar than just handing in an assignment.

Objective 2: Enhance Data Analysis and Interpretation

This objective was also met during my internship at the organization. Much of the data analysis that I performed during my time at the organization was technical in nature and related to the data cleaning and scripting that would be performed to prepare the data for analysis. However, I was also tasked with performing research projects that required a more abstract form of data analysis - reading through political information and determining what was relevant to the project. Such a skill was not something that I had foreseen as something that I would be able to develop during my technical internship, but which certainly helped to make me a more complete data analyst for the organization.

Objective 3: Support Real Research Projects

This objective was also met during my internship. As I stated above in the discussion of this objective, I had assumed that I would be performing some of the research projects in support of their completion by the researchers at the organization. However, I was also involved in the development of two of their major projects: the web scraper and the offline application that displays the web-scraped data. Furthermore, I also contributed to their research projects by performing various research tasks myself. Thus, I was certainly able to make a contribution to the organization's outcomes and their research projects.

Objective 4: Professional Development in a Political/Research Environment

While more difficult to quantify than any of the other objectives, this last objective may have been the most important. For example, managing my time to ensure that I could successfully complete each task, proactively communicating with the other members of the research team about my projects and the status of those projects, and presenting my projects to other members of the organization were all skills and efforts that I had to make during my time at the organization. Overall, I certainly developed a comfort in a professional environment. Furthermore, I also learned more about the type of environment that I would like to work in after graduation.

7. Most Motivating and Exciting Aspects

The most motivating aspect of this internship was seeing the impact that my work had upon the organization's operations. For instance, when the web scraper successfully downloaded the organization's entire database, or when the offline application that I created outsprinted the previous application's runtime and file-handling software, it was clear that my efforts began to make an impact upon the organization's operations. These results are something that are not typically visible after the completion of most academic projects. Here, the completion of a project was merely the beginning of its use by the organization, which is a motivating aspect of the internship.

The variety of the projects that I was tasked with throughout the internship were also a source of motivation for me. For instance, while some of my projects included data cleaning, web scraping, and application development efforts, others included code maintenance, political research, and evaluation of other software or tools. This variety in the specific tasks that I performed for the organization allowed for me to continuously learn something new from each project, which is another reason that I enjoyed my time at the organization. Many of my peers have described their internships as performing the same types of tasks, so I appreciate the variety that I experienced throughout my time at the office.

Furthermore, while the tasks relating to the research were considered less important than the technical aspects of the project, it was still surprising to find that I was motivated to perform these tasks. Tasks like compiling information about the politicians who opposed the politicians discussed in the article or the use of open-source tools to assist in the project required a different kind of thinking from the technical components of the project. However, the ability to perform these tasks indicates that I can contribute to the project in more ways than I had thought possible for myself.

Working within the organization added a dimension to the work that I did not anticipate. While I went into the internship with an understanding that the main focus of the work would be technical, the knowledge that this organization was focused upon supporting Democratic governors across the country provided a sense of the relevance of the work that we were doing. Thus, I began to take the work more seriously. Furthermore, I also gained a better understanding of the various ways that a technical individual can contribute to an organization. Prior to this internship, I generally considered that any career in coding would be within the technology industry. However, the experience with the DGA has had a significant impact upon my understanding of other potential industries in which a technical individual can work.

8. Most Discouraging Aspects

Some of the most discouraging moments of the internship occurred when encountering technical problems that could not be resolved. There were instances within the internship when bugs could not be resolved or projects that seemed to be nearly complete began to fail. Each of these instances tested my patience. One of the difficult lessons of the internship was how to manage frustration with these types of problems and to learn to approach the problem from a different direction altogether - a lesson that I found to be among the most lasting from the internship overall.

The remote format of the internship generally enabled the work, but in some cases, it made certain challenges more difficult. For example, if a coworker was struggling with a particular problem, it was common to have a quick conversation with that individual to discuss the issue and potentially find a solution. With the remote work arrangement, however, the employee would have to send a message to the coworker, adding more time to what is inherently likely to be an extended period of frustration. Thus, working through a challenging problem in isolation can be more draining than working through the same problem in a shared office workspace with coworkers.

Another of the frustrations that I experienced occasionally with this type of learning was with the visibility that I had of the strategy behind the tasks. I understand what each task required of me, but I did not have a clear sense of why those tasks were performed. I would have benefitted from having a brief explanation of why each task was necessary and how it related to the overarching goals of the organization. This information would have been of great value in maintaining my motivation to complete each of these assignments.

There were also periods where it seemed like there was little to no progress being made. During the debugging phases of the web scraper, for example, there were days where there was no progress made at all. In an educational environment, the amount of effort that is invested in a task is generally rewarded with the same measure of progress. In a professional environment, however, a week of work can often yield no perceivable progress at all. It was important for me to focus on creating progress during these periods, even though there is no guarantee that I will create any visible progress at all.

Despite these frustrations, it was during these periods of challenges and difficulties that I ultimately experienced the majority of my growth. It was during these periods of isolation and difficulty that I was able to grow my skills in developing the type of resilience and self-sufficiency that are some of the most transferable skills that I have gained from this internship. While I would have preferred to have had an internship that ran more smoothly without any frustrations or friction, such an internship would have provided me with less preparation for my future in a technical profession.

9. Most Challenging Aspects

The web scraper was the most challenging of the three tasks for a variety of reasons. It was the most complex system that I had developed up to that point in my career, and I encountered various difficulties during its development. The system failed in a variety of ways during the development phase; each failure required me to determine the cause of the failure in order to make corrections to the system. Each of those failures required me to become familiar with new techniques and libraries for Python that I had not used before.

Beyond the difficulties of the technology itself, I found that this task was also cognitively challenging for me in ways that I had not experienced before. I had to think about the system as a whole during its development, to determine the various potential failures of the system, and to make decisions about how to redesign the system for robustness once I had determined these potential failures.

Adding on, one of the challenges that I feel was underappreciated throughout the internship was reading and understanding the code that had not been written by me myself. For instance, during the work to maintain the code spaces, I had to read code that had been written by previous developers of the software, but which had no documentation regarding its intended functions. Reading and understanding code that was written by others requires a certain patience and analysis skills that are not often required of software engineering students in their studies, but which are important in contributing to projects that have previous developers.

The development of the offline application was a challenging task for somewhat different reasons. The major challenges with this task emerged not during the debugging of the application, but during its design. I had to think about how to replicate the functions of the online application in an offline application, while also improving the performance of that application. I had to determine at various points in its development that another incremental approach would not yield the improvements in performance that were required for the application. Thus, I had to stop in the middle of developing a system, and redesign the application from a higher level of abstraction. Knowing when to take such a step is a skill that is difficult for someone to develop, and I had to encounter a few challenges along the way in order to find strategies for overcoming this difficulty.

Finally, the final major challenge that I encountered during my internship was managing my various responsibilities. I was simultaneously working on three projects: the development project, the maintenance tasks, and the research tasks. Transitioning from one project to another took a mental adjustment that I had not anticipated, and I had to work to establish a routine in which I could remain effective in all three of these projects. Finding a routine for focusing on one task at a time rather than all of them simultaneously was a skill that I had to develop during my internship, and which I have still found to be of use to me after the internship.

10. Recommendations for Future Interns

Based on my experience at the Democratic Governors Association, there are several things that I would encourage future interns for this position or a similar one to consider prior to beginning the internship.

First, have a solid foundation in Python. There is relatively little of a ramp-up period prior to beginning to actually complete the work for the organization, so having a basis in being able to write well-documented, functional code will make a significant difference. Python libraries like pandas and libraries for web scraping will be of specific use, but having a foundation in writing code that can be easily read and maintained by others will be of significant benefit.

Second, have experience in becoming comfortable working independently. Many of the tasks will come without specific instructions for how to complete them or what the solutions to the tasks will be. Therefore, the ability to research and figure out how to best approach the work and solve these problems for itself is more important than any specific skills. Having a personal methodology for debugging projects before beginning the internship will help to make the more difficult of those tasks somewhat manageable.

Third, ensure to become familiar with the mission of the DGA and the political environment in which the DGA functions prior to the beginning of the internship. Understanding the purpose behind the work that is to be performed will lead to better decisions during the internship period. Professionals who are able to understand the purpose of their work will create better results than those who do not consider this step to be important.

Fourth, professional communication skills are valuable even in a technical position. The ability to communicate with non-technical individuals about the work that is to be performed, to pose questions, and to provide updates to supervisors regarding the work is highly valued. The ability to effectively communicate is one of the weaknesses of most professionals with strong technical skills but excellent communication skills.

I would also recommend that you have some familiarity with version control systems (specifically Git). Much of the code that I worked with was stored within shared repositories, and having even a basic understanding of how to use these systems would have helped to save me some time in the initial weeks of the internship. Yet such a skill is easily learned through free resources available online, so having some familiarity with version control systems will allow the future intern to focus upon the work rather than the tools necessary to manage that work.

Finally, enjoy the variety of tasks that will be assigned to interns. The work that will be performed at the DGA ranges from data to application development to research. The ability to embrace this variety rather than wishing for more focused work is a sign of a true intern who is committed to gaining as much experience as possible during the internship period.

11. Conclusion

This internship with the Democratic Governors Association was one of the most valuable experiences I have had at ODU. I have spent the past 150 hours working on various projects, learning new technical skills, and gaining an understanding of what is required of those in a technical position within an organization.

For my time at the DGA, I have become interested in both coding and data analysis as potential careers for myself. Furthermore, I have also gained an understanding of the various contexts in which those skills could potentially be applied within the career paths I have considered for myself.

The most important takeaway from my time at the DGA was in understanding that technical skills are only valuable in relation to the purpose for which those skills are employed. Any code that is written is not evaluated according to some standard rubric but based upon whether or not it performs its functions for the organization and its people. I intend to employ this same standard of evaluation for both my classroom and professional work moving forward.

I have become more familiar with the concept of challenging projects as those that often yield the most knowledge regarding how to complete future projects. The ability to persist in the face of challenging or difficult projects is a skill that can be learned through experience, and one that I have gained through this internship at the DGA. As a student, I often ignored the feeling of challenging projects or tasks due to the expectation of an immediate resolution to the challenges encountered; however, that such feelings are normal and productive in the learning process.

For the remainder of my time at ODU, I intend to focus both on my education regarding software architecture, managing dependencies in software builds, and working within existing codebases. In addition, I also plan to continue to develop my communication skills and knowledge regarding teamwork, which I have recognized as even more important than I had previously understood. The ability to effectively utilize technical skills without the ability to communicate with others effectively is a limitation of those with such skills, and a recognition of such a potential limitation indicates the importance of continuing to develop that aspect of my skills.

Furthermore, I have also experienced a shift in my thoughts regarding my career path. Prior to this internship, I was the most interested in working in the private technology sector. Now, however, I am also interested in working within the public sector, in organizations like the DGA, governmental organizations, or even within research environments. These potential careers have interest in me as a result of this internship, and the observation of the various ways that technical skills can have an impact within these areas. Thus, I believe that the DGA internship has helped to give me an understanding of the type of work for which I would like to spend my career. This goal for my career is, therefore, the most valuable takeaway from this internship.