UNIVERSITY OF ALASKA ANCHORAGE

INTERNSHIP REPORT:
FEDERAL BUREAU OF INVESTIGATION

COMPUTER SCIENCE 395:
INTERNSHIP IN COMPUTING

KENRICK MOCK
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BY
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Over the past summer, I had the great privilege of interning with the Federal Bureau of Investigation, as a participant in their Honors Internship Program. A total of 57 interns worked for 10 weeks at one of three locations : FBI Headquarters in Washington, DC, the FBI Academy in Quantico, VA, or the Criminal Justice Information Services (CJIS) Division in Clarksburg, WV. All of the interns began the program together in Washington, DC, where we met for two days of orientation and briefings. We then proceeded to each of our assigned locations to begin work.

As one of the seven interns assigned to the CJIS Division, I believe we were able to do some of the most meaningful work of all the interns in the program. CJIS is a unique division within the FBI, performing many critical tasks for the bureau, as well as many other law enforcement agencies across the nation. CJIS is home to several of the bureau's critical systems, each of which I will briefly outline.

One of the most important operations at CJIS is their Integrated Automated Fingerprint Identification System (IAFIS). Every day, the FBI receives over 55,000 fingerprint card requests. IAFIS has dramatically improved the processing of fingerprint submissions; responses to electronic criminal submissions are made within two hours of receipt, and within twenty-four hours for civil submissions. Given a full or partial set of fingerprints, this system produces a ranked listed of possible candidates which are then studied by a professional fingerprint examiner to find the proper match.

The National Crime Information Center (NCIC) is a computerized index of documented criminal justice information available to criminal justice agencies nationwide. This system handles over 2.5 million requests daily, allowing more than 34,000 law enforcement agencies to have access to more than 39 million records. The

information made available by this system ranges from criminal records to trial proceedings to crime scene photographs.

The FBI's National Instant Criminal Background Check System (NICS) is a computerized system designed to immediately identify individuals who are prohibited from purchasing firearms by conducting a search of available records; the majority of these searches are complete within 2 ½ minutes. During its first year of operation NICS handled over 4.4 million requests.

In order to participate in this internship, I was required to undergo an extensive background investigation in order to obtain a Top Secret security clearance. As such, I was privy to information and was assigned tasks of a Top Secret nature. While this paper will be able to explain, in general, the duties I performed during my internship, there are many of the details which I cannot divulge. In fact, this paper itself was required to receive an official approval before its submittal.

During my time working at CJIS, I was assigned to the Technology Integration and Support Unit (TISU). This unit performs a wide range of duties, including software development, network connectivity and security, and handling help desk calls throughout the building. While I had the opportunity to work in each of these areas, my primary assignment throughout the summer was a software development project. Paired with another of the interns, we were to design, develop, document and distribute a complete database application for one of the other departments in the building. Assigned to us were two senior software developers; while they were not actively working on the project with us, they were there for us to ask questions, and they usually sat in on the meetings with our users. As a sort of mentor, they helped us gain a greater understanding of the software development process.

To begin our project, we were given just a single page memo from the other department, with only a vague description of what they wanted. It is the philosophy of the software engineers in our department that since the software being developed is always for other departments within CJIS, the customer should be an integral part of the software development process. This meant frequent meetings with our users, instead of having a detailed requirements specification from the beginning. This methodology was much different from what I had just been exposed to the previous semester in CS 401, Software Engineering, but it seemed to work well for this type of organization.

For our project, we had to build both the front and back-ends for a database using Microsoft Access and Visual Basic. We were required to implement a number of security features, including user authentication and only allowing certain options to be available to specific sets of users. Tracking of changes was also required; a separate table was kept that logged every change made to the database, including the time, date, and user making the change. Throughout the development of our database application, we created two sets of documentation: a user manual and a maintenance manual for whoever had the task of maintaining our system after we were gone.

Regular meetings with our users were an integral part of the software development process for us. As previously mentioned, there was no real specification of requirements given to us, so we had to rely almost entirely on personal communication with our customers. This also meant that our system was in a nearly constant flux: as soon as we had it just how they had asked for, they would come up with a new feature for us to add, or decide they wanted something done differently. There were a few times that a "small change" they asked for actually required a large amount of the project to be changed in order to make it all work together properly. Changes like this usually

required adding new fields to some of the tables and then changing our queries to use those new fields.

Toward the end of the project, we had some difficulty in getting our customers to test the system on their own computers. At the beginning of the final week of our internship, we installed the system on our users' computers and asked them to test it. It was not until the last day of the internship that we got any feedback from them. At that time, we made a few final changes and then handed it over for someone else to put the finishing touches on. Even though this approach to software development was quite different than what I had become accustom to, it did result in a final product that pleased our customers.

While most of our project went smoothly, there were a few problems encountered along the way. Both my partner and I had taken classes on database design, but neither of us had put that to any practical use. Once our initial design was complete, we quickly found that it would have to change; there was not too much trouble with the structure of the tables and the relationships between them, but we often found that new fields had to be added in order to allow certain queries. Another thing we learned quickly is that while normalization is great in theory, it is not always practical in every situation. We found that it was entirely possible to go too far with normalization, so that we were no longer accurately representing the relationships between the data.

One trick we learned was the use of temporary tables. For instance, there was a table from another database we were linking to across the network. This caused noticeable delays when running queries against the table. Our solution to this was to run a query when the database first opens that brings in all the data from the linked table and stores it in a local table. The only downside to this is that any updates made to the linked

table are not seen until the next time the database is opened. This is a problem that we analyzed and decided that since updates on the linked table do not occur often, this would be an acceptable solution. While we did hit a few snags working on our project, we were able to solve each of them, and learned a few "tricks of the trade" along the way.

Aside from our software development project, we were also given the opportunity to assist with a number of other projects throughout the summer. For instance, we spent several afternoons installing new workstations and configuring them on the network. I also spent one afternoon helping to convert a number of older workstations from token ring to Ethernet. There was one night that another of the interns and I were asked to come in late to help move and reconfigure a few of the main servers.

Each of the interns was assigned several days throughout the summer to work the help desk. Basically, this meant going around the building responding to calls that had come in from employees having trouble with their computers. Most of these problems were pretty easy to solve: dirty mouse, fuzzy monitor, problems printing, and what I like to refer to as the "smoking keyboard incident." When we received a call from a woman telling us that her keyboard was smoking, we were pretty skeptical, but we went up to her desk to check it out. When we arrived, we could see no smoke, but there definitely was a burning smell. We never could figure out what had caused the keyboard to smoke (especially since it was still working properly!), so we jokingly told her that she had been typing too fast and gave her a new keyboard.

On another day, we had the opportunity to run some fiber optic and CAT-5 cable through the building. The group of four interns were given a work order for several network connections, and we had to work together to complete it. We ran the entire length of cable, from the switch all the way to the employee's workstation. Once the

cable had been run, we had to terminate both ends and test it before connecting the workstation to the network. I found it quite interesting to work with the hardware side of the network. Filling this work order was both enjoyable and a great learning experience, one that was much different from anything else we had done.

In addition to my work at CJIS, this internship provided me with several opportunities to learn about many different aspects of the FBI. Aside from several trips to FBI Headquarters in Washington, DC, we were able to spend time at the FBI Academy in Quantico, VA, touring the laboratories and special agent training facilities there. We also attended a number of briefings, where we gained a greater understanding of the type of work that the FBI does. On another occasion, we toured the Pittsburgh field office, where we got to see the types of cases they worked there, as well as learning about and practicing a number of evidence collection techniques. Lastly, we went to the firing range where we were taken through the course that special agents in training must pass.

My internship this summer was both a unique and rewarding experience. I had the opportunity to put the knowledge gained from my classes to use in a real-world setting, while working for an exceptionally prestigious organization. The experience gained this summer has been invaluable to both my academic and professional life. As a result of this positive experience, I will definitely be looking into a career with the FBI after graduation.

To: Whom It May Concern   August 6, 2003
Re: FBI Honors Intern Program – Brandon Douthit-Wood

During the approximate period of 6/03 through 8/03, Mr. Brandon Douthit-Wood worked under the title of Information Technology Specialist as part of the FBI Honors Intern Program. In performing his assigned tasks, Mr. Douthit-Wood acted with professionalism and integrity. I can attest to his conscientious work ethic and reliability during that time period.

Mr. Douthit-Wood was assigned to a software development project to automate a business process and improve organization efficiency for a large customer base. In addition, he worked on several smaller projects to provide LAN connectivity for various customers. Finally, Mr. Douthit-Wood was also tasked to serve on several Help Desk rotations. In meeting these accountabilities he was exposed to a diverse array of information technologies and related tasks.

In every instance, Mr. Douthit-Wood adroitly addressed his responsibilities. He consistently demonstrated sound software development skills and completed all of his assignments in an expeditious fashion. Mr. Douthit-Wood also exhibited the ability to grasp the conceptual aspects of software development and enterprise level business processes, and assimilated this knowledge into his work. His assignments required intensive and effective communication with a range of assorted people. Without exception, Mr. Douthit-Wood fostered productive working environments by communicating in a professional and courteous fashion. He effectively met and exceeded all assignments and expectations, producing products and services that will meet the requirements of our customers.

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