**Study Log – Jessica Bender**

CSC435 – Distributed Systems

DePaul University Winter Quarter 2021 – Dr. Clark Elliott

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# Thank You!

Hello, Thank you so much for a wonderful winter quarter. There were some tough times this quarter, but I learned quite a lot in this class. I especially liked that the class was not too heavily code based and I could focus in more on actually reading and retaining the concepts of this class. Even though it most likely will not be required for me to keep a study log in other courses, I want to continue it. In the beginning of the quarter, I outlined everything that I needed or wanted to do in the class. Then as the quarter went on, I was able to just fill in all the sections. This has become such a wonderful study tool so thank you! Hopefully, I will get to take another class with you in the future.

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# ****Twenty Concepts****

## ****ONE****

**Info Here…**

## ****TWO****

**Info Here…**

## ****Three****

**Info Here…**

## ****Four****

**Info Here…**

## ****Five****

**Info Here…**

## ****Six****

**Info Here…**

## ****Seven****

**Info Here…**

## ****Eight****

**Info Here…**

## ****Nine****

**Info Here…**

## ****Ten****

**Info Here…**

## ****Eleven****

**Info Here…**

## ****Twelve****

**Info Here…**

## ****Thirteen****

**Info Here…**

## ****Fourteen****

**Info Here…**

## ****Fifteen****

**Info Here…**

## ****Sixteen****

**Info Here…**

## ****Seventeen****

**Info Here…**

## ****Eighteen****

**Info Here…**

## ****Nineteen****

**Info Here…**

## ****Twenty****

**Info Here…**

# ****Discussion Forums****

## ****Hello Back Responses****

### ****Replies to my post:****

* No, I still have no idea what the meal was exactly. I know it was a type of gnocchi but not sure what the sauce was. Wish I had taken a photo of the menu so I could stop guessing what it was. I have tried to make it at home so many times by looking up different gnocchi recipes. However, I have not found the right one. Guess I need to go back to Italy to try and find out.
* Hi Linh, I trained all summer. I used to be a gymnast in high school and did yoga in undergrad so I staid fairly active over the years just not any major cardio, so it was not easy! But if you try anything is possible.

I had the gnocchi in Pollenzo Italy at some small pizza place.

Top of Form

* I got into film photography in high school as well and it has been draining my wallet ever since! I just started my first "Adult" job and having adult money is not helping I swear I have no idea where my paycheck goes every month.
* I like iOS programming so far! I have always like Web and App dev more. Seeing everything come to life on a screen is just more appealing to me for some reason. Running everything on the command line just does not do it for me.   
  Also Highly recommend taking the test in your free time! Let me know what you get :)

### Reply to Tsvety Sotonov****:****

* Hi Tsvety, Pleasure to meet you! I think you are also in the iOS class with me this quarter. Pleasure to have you in not one but two classes this quarter. Should be a good one.

### Reply to Haider Khan:

* Pleasure to have you in class. I would love to hear any technical books you suggest reading. I am always looking to continue my learning on the summer and winter breaks.
* Thanks for the suggestions! I’ll be sure to check them out over the summer :)

### Reply to Rachel Jacobsohn:

* Loved reading your background! I too also like the bake this year since we could not see a lot of family for the holidays, I made about 400 and delivered them to my family and friends! I wish I could bake more but I never have an excuse to bake and I cannot eat a who cake myself. Actually, I probably could but I shouldn't.

### Reply to Devin Garrett:

* Hello, pleasure meeting you virtually! I also went to DePaul for my undergrad in CS and am now getting my masters SE. I also absolutely love React. It has to be my favorite thing I have learned ever. I also really enjoy what you had to say about life goals. Mental health is a big thing for me along with building relationships with people. I like how you put time with money I have not really thought of it that way, but I agree with your reasoning. I have always had the mindset that I would not give someone the time of day if they were not worth my time or were hindering my life in any way. I also Love Ariana Grande! cannot wait to get to know you more in this class and maybe future classes!

### Reply to Jessica Wilson:

* Hi Jessica! Im also a Jessica I prefer Jess however lol! Congrats on the upcoming wedding! That is so exciting. Hopefully COVID-19 is cleared up enough for all your friends and family to enjoy the day with you! I have to also say I am an extremely picky eater. My basics are chicken and pasta. My boyfriend is getting tired of eating only chicken and pasta with me though so I told him as a goal for 2021 is I will try one new food of his choosing a month. Glad to meet you!

### Reply to Zeying Yu:

* Congrats on this being your last quarter!

### Reply to Kyle Mastrangeli:

* Hi Kyle! Correct me if I am wrong but your name looks very familiar were you in SE350 in Spring 2020? That class was fun...   
  Anyways, it is a pleasure meeting you virtually, I also enjoy running. I just got really into it this summer, running my first ever 5 and 10k along with completing a challenge to run 200 miles in 3 months! Running has been a good way for me to stay active. If your sprint career does not pan out, you should get into long distance running I know people (my parents being one of them) who run marathons for years and years.

## General Postings / Course Discussion

### Posts:

* Hello,

I was looking for a schedule/ list of when we should have all readings done by and what those readings are. I see there is associated quizzes for reading chapters. However, I see that chapters 1-3 quiz is due on January 27th but according to the check in posted in the news we should have them read already. Thus, I am confused when you suggest having the rest of the readings done in order to stay on track with the class?

I looked in the syllabus for this and it states that exact list of readings is available on the course website, however I am struggling to find that. Can anyone point me in the correct direction?

Also, what readings do you recommend reading in the Recommended background text, Computer Networking: A Top-Down Approach?

Thanks in advance for the help!

* I was looking at the extra credit opportunities and found the research study participant interesting. I was trying to request an account here <https://depaulurparticipant.sona-systems.com/student_new_user.aspx> but I do not see our class listed as an option? Thanks in advance for the help!
* Hello, I saw for week 1 lecture check it was due on Sunday (yesterday) however looking ahead, I do not see any due dates on the other lecture checks. Should I assume they are always due on Sundays?

Thanks! Just want to make sure I do not miss a date by accident.

### Reply to Extra Credit Opportunities, can someone advise?

* <https://condor.depaul.edu/~elliott/435/hw/>

Here is the exact link :) If you are interested in the [Research subject participant](http://www.cdm.depaul.edu/academics/research/Pages/Instructions-for-Participants.aspx). They are doing a study this weekend on News on Social Media. I just did the study today and it was very interesting! And the girl who conducted it was very nice.

## JokeServer (and Inet)

### Posts:

* Hi this is not specific to the JokeServer or Inet but does anyone use VScode? For some reason every time I save a file it deletes random things in my code see screenshot from Inet code. Does anyone know why? or how I can fix this? Thanks in advance
  + Also, not sure why my things are in so many colors. I.e., why is class all purple but the last letter?
  + I’m using another editor for now but I prefer VScode its just acting funky today will see if I can fix it :Top of Form)
  + I think this was the issue! It looks like one of the extensions I installed to run java was installed incorrectly so when I uninstalled it and reinstalled vscode seems to be working fine now! Thank you.Bottom of Form

### Reply to Anyone Using Eclipse IDE:

* In case anyone is looking for any other IDE to use other than eclipse(I personally do not prefer it). I recommend IntelliJ for java as a student you can get a free education license <https://www.jetbrains.com/shop/eform/students> I also really like VScode it puts the code into very pretty colors. :)

Going to also put this here if anyone is looking for a source control github is a go to. Here is a link to get GitHub pro for free as a student <https://education.github.com/discount_requests/student_application> + if you get the GitHub student developer pack there are a lot of other developer perks! <https://education.github.com/pack>. These are the free perks I found as a student developer.

* I second gitbash. Not only does it allow you to get use to Linux commands, but it makes pushing/ pulling from git a lot easier in my opinion. It displays what branch in git you are in blue parentheses. I find this very helpful as I am pushing things up to my git throughout the day or week, I tend to forget what my branch I'm currently using is called.   
  Here is the link to download it if anyone need it! :) <https://git-scm.com/downloads>

### Reply to Turn it in:

* A little late to the topic as the assignment is past due. But, for future assignments adding extensive comments will also help bring down your score. I wrote comments on what each line of code stating what the code is doing/why I am using it. Not only does it help you learn the code better, but it will also bring your score down significantly.   
  But like everyone else said even one line of code can be flagged, so just make sure everything is your own, but comments should help bring it down if you are worried about the high numbers.

### Reply to Favorite Joke?:

* I am awful with jokes, so I was looking up jokes to use for this assignment and I came across:

I invented a new word! Plagiarism!

and it made me giggle.

## Network Labs

### Post: One Page Write-up Question

* I am a little confused on what details to include in the one pager and what not to. Am I supposed to strictly write what I did, or should I also write about what I found i.e. observations I noticed, as for those answers are different then then my answers for the labs questions? If I were to include these observations in the write up it would be a lot longer than one page. Should I be saving the observations to be put in my study log and keep what this one pager to what I did and keep the length to one page?

### Post: Something Interesting I noticed

* I noticed when filtering by UDP that it also displayed a protocol called MDNS or Multicast Domain Name System. I found this interesting because it listed all the Google homes, Google home minis, Google chrome casts and the Google nest we have in our home. But we also have some Amazon Echo’s, Dots and Amazon fire sticks that were not picked up. Only google products were. I tried to google why this was the case. It was hard to find a solid answer. The only thing I found was that amazon products have a secret key that doesn’t allow them to be captured.

This filter also showed a DHCP or Dynamic Host Configuration Protocol for discover, where I work. I thought it was cool to see on there because I am doing this assignment on my personal computer not work computer. But it is still able to capture that because both computers are on the same network.

### Reply: DNS Lab keeps returning timed-out request:

* I am also having this issue I have tried editing the firewall and using windows and Linux (though gitbash) and no luck.

### Reply to- Deliverables:

* From what I understand, Just the one page writes up attached to the bottom of our checklist.

### Reply to - Network IntroLab Cannot find HTTP packets:

* I am also using wireless.

(Photo)

these are the options I have. I was able to get Microsoft: WIFI to show the information needed for the intro and the first lab so far.   
I was also very confused because the screenshots on the examples are older than the Wireshark I downloaded. Hope this gives some direction.

### Reply to - The Importance of Checksum:

* Thanks for the information! This was new information to me and I found it interesting how some checksums were verified and some were unverified. In my case almost all my pockets came back unverified. I did some investigation on why they might be unverified. I saw something that was posted on Wireshark that explained it would be unverified because th3e dissector never even tried to verify it.

It also gave definition for what Bad, Good and Not present status meant. I found it very insightful.

<https://www.wireshark.org/lists/wireshark-dev/201607/msg00022.html>

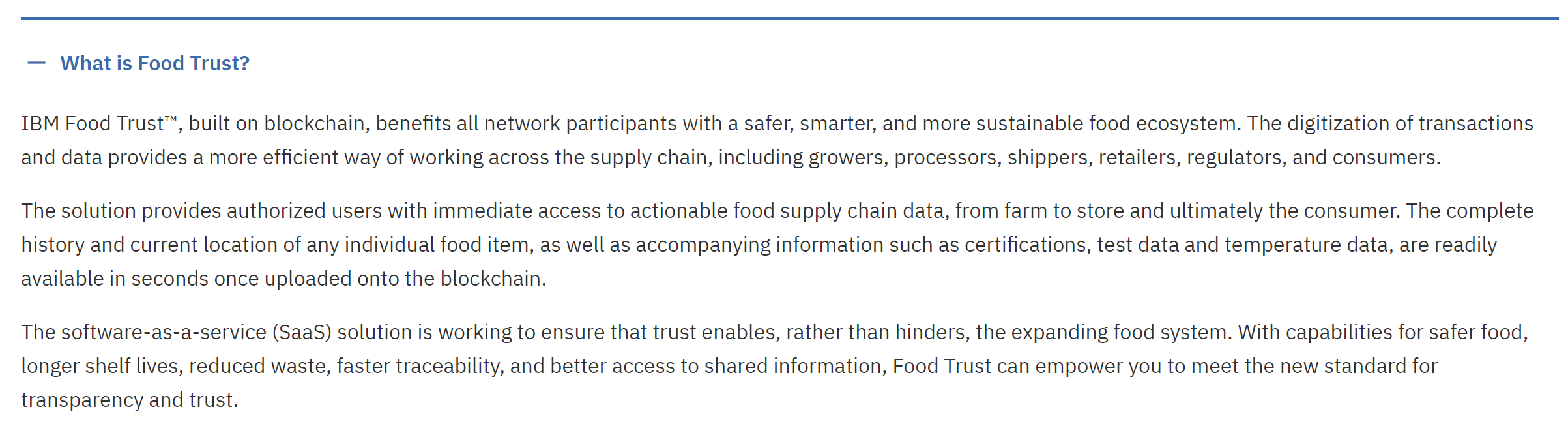
## MyWebserver & MiniWebserver

## Blockchain

### Reply to Blockchain Question:

I read that IBM uses a Food Trust blackchain to track outbreaks of e Coli, salmonella, and much more.

Here is a website on it that I found very interesting.

<https://www.ibm.com/blockchain/solutions/food-trust> 

## Fun Random Thoughts

### Posts:

* Wanted to share this in case anyone else was interest. I found this bed desk on amazon and I think it was my favorite purchase from the pandemic! It makes late night homework so much better. It is useful for doing homework on the couch in your bed and even on the floor. I am always looking for different spots in my home to do work and school this has made it so easy. Easily holds a laptop and notebook and has a stand your textbook.

Highly recommend.

<https://www.amazon.com/gp/product/B07JZCND72/ref=ppx_yo_dt_b_asin_title_o04_s02?ie=UTF8&psc=1>

### Reply to Study Break:

* I am a little late to the reply but I am going to have to try this recipe for my mom. She just started a no dairy and no grains diet! I'll have to surprise her and make it one weekend.

### Reply to Electives Taken:

* I am also taking 471 and highly recommend (you do need a mac only catch).

## Chapter One

### Posts:

* I just wanted to jump on here and share my thoughts on chapter one in our Distributed Systems textbook. In chapter one the design goals section really spoke to me. It gave me a more in-depth reason for why I am taking this class other than it was required on my degree progress report. The specific goal that stood out to me the most was scalability. I am only 23 so I have not witnessed the invention of the internet and the first home computers, but I have seen phones go from flip phone to miniature computers that can fit in our pockets. Growing up my father was an electrical engineer for Motorola, working on the cell phone to be exact. It was always interesting to me to see the newest phone being brought home to be tested. We had small smart phone we had large smart phones, we had smartphones that were touch screen only and we had some that had a slide out keyboard. I think there was some type of new phone every 4-6 months in our home. It is crazy to look back on and see how everything use to be stored and now everything is on a small device and in the cloud. Seeing technology change as a kid made this section very intriguing to me. I saw phone go from big to small back to big with the iPhone 6 plus and now small again with the iPhone 12 mini. This section reminded me how that memory relates to my current field and this class. With technology being so vast it is often easy to forget there was still limitations that can lead to flaws in our code.
  + I wish we could remove our phones batteries. My phone is always dead. Off topic but I also am not a fan the design choice of having only the charging port. I miss my headphone port. Because my Bluetooth headphone are also always dead. Too many things to remember to charge at night.

But I think if there was a way to connect your phone to a charger and the keyboard, mouse and monitor then it wouldn't be too bad battery wise. But there is also the fact that most phone go bad after a year or two while computers have a much longer lifespan.

### Reply to DS Administration:

* I think the biggest nightmare would be losing all your data. The purpose of this class is to learn how to organize our data so it does not get lost but losing it will always be a big fear of mine no matter what. I have had too many times where I have lost documents due to a whole flash drive crashing. I do not want to lose data in anyway weather it’s in code or on a flash drive. It is a nightmare!

## Chapter Two

## Chapter Three

## Chapter Four

## Chapter Six

## CDK Chapter 7 Security

## CDK 2 / Hadoop / NAT / Bluetooth / Etc.

# ****Readings****

## ****Distributed Systems****

### ****Chapter One: Introduction****

**Before the invention of m**icroprocessors and high-speed computer networks, computers operated separately and were rather expensive and quite massive compared to our modern-day computers.

**Microprocessors –** Processes logic and control in a small number of circuits or even a single circuit. Another word for it could be a CPU.

**LANs –** Stands for Local-area networks.

**WANs –** Stands for Wide-area networks.

The key difference between LANs and WANs is LANs is computers all located in the same building or facility. Whereas WANs can be millions of computers across the globe. Data connected with LANs can move at a rate of billions of bits per second. In contrast WANs rate is a lot slower moving at about 10 thousand bits per second to about 100 million bits per second.

**Topology –** How computer networks are laid out. Explains how computers are connected to each other.

**Because of the invention of m**icroprocessors and high-speed computer networks in the 1980s computers now have a distributed system.

#### **1.1**

**Distributed System –** gives the illusion to its users that it is using a single coherent system. When in fact, there are multiple elements that are communicating across many types of machines.

When it comes to distributed systems there are two noteworthy characteristics. One, a single coherent system, and two, multiple computing elements, also known as a node. We are able to give off the illusion of a single system by having the node communicate through a distributed system.

Nodes are autonomous and act independently from each other thus having sperate disturbed systems. There are also various types of nodes. They can range from our desktop computers to our MacBook’s to as small as our Google Pixel’s. Nodes problematically run on their own time zones. This can mess with the nodes communication in a distributed system.

**Open Group –** nodes can freely communicate because they are openly allowed to join the distributed system.

**Closed Group –** Invite only. Nodes are not able to freely enter or exit the distributed system. They are only allowed to talk to the other nodes in the system.

Admission control is difficult because you need to verify the node, ensure it is a good node communicating with the correct group, and make sure there are no confidentiality issues between members and nonmembers.

**Overlay Networks –** two types: Structured and Unstructured. Unstructured overlay is random whereas Structured overlay is organized in a logical ring or even a tree. However, both overlays are always allowing two nodes to communicate.

**Peer-to-Peer Networks–** preforms a commonly known overlay class. More…

A user should not be able to tell that their system is using the computer network to transfer data. This is because a single coherent system appears to the user that it is a single system. However it does not actually achieve a single system, it just appears as it.

**Distribution Transparency –** doesn’t allow the user to see where data is being stored or if it is being used to provide a better user experience. This is because to the user the way data is being handled is not important for their experience.

**Middleware –** a layer in distributed systems to separate computers and the applications. Middleware in distributed systems is comparable to operating system in a computer but, middleware is for the network. It allows two computers to show the same application and communicate both together and separately.

**RPC –** Stands for Remote Procedure Call. Is a services that appears as if a function that was executed an a remote computer was done on the users local computer. This is done though middleware.

**Atomic Transactions –** Provides an all or nothing concept. Either the middleware invokes all the services, or it invokes none of them.

**Web Services / Mashups –** Many web services use parts of old code and mash them together to get the necessary product. With the use of middleware, web services are able to organize how their functions are generated to the users.

#### **1.2**

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#### **1.3**

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#### **1.4**

**Text Here…**

### ****Chapter Two: Architectures****

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#### **2.1**

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#### **2.2**

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#### **2.4**

**Text Here…**

#### **2.5**

**Text Here…**

### ****Chapter Three: Processes****

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#### **3.1**

**Text Here…**

#### **3.2**

**Text Here…**

#### **3.3**

**Text Here…**

#### **3.4**

**Text Here…**

#### **3.5**

**Text Here…**

#### **3.6**

**Text Here…**

### ****Chapter Four: Communication****

**Text Here…**

#### **4.1**

**Text Here…**

#### **4.2**

**Text Here…**

#### **4.3**

**Text Here…**

#### **4.4**

**Text Here…**

#### **4.5**

**Text Here…**

### ****Chapter Six: Coordination****

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#### **6.1**

**Text Here…**

#### **6.2**

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#### **6.3**

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#### **6.6**

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#### **6.7**

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#### **6.8**

**Text Here…**

## ****Computer Networking****

### ****Chapter One: Computer Networks and the Internet****

**Text Here…**

### ****Chapter Two: Application Layer****

**Text Here…**

### ****Chapter Three: Transport Layer****

**Text Here…**

### ****Chapter Four: The Network Layer****

**Text Here…**

### ****Chapter Eight: Security in Computer Networks****

**Text Here…**

# ****Network Labs****

Additional information & findings that was not included in the original lab write up.

## Wireshark Intro Lab & Setup

## IP Lab

In the questions on the lab, they asked us to investigate the fragment offsets for the 3 different pocket sizes. For my offset I noticed that for 56 the offset was 0 but for 2000 and 3500 the offset was the pocket size -20. For the replies however, there was a new section for the 2000 and 3500 with the IPv4 fragments. Each fragment is divided up by 1480 bytes and then the remainder.

## DNS Lab

I noticed while comparing results that the information in the ipconfig was all the same as the data captured in the Wireshark. I also tried this with our course website to see if the data was the same. I saw that it was almost the same. The only difference I noticed with this was the Time to Live was slightly lower in the ipcongig command than it was in the wireshark.

For the second part of the lab, I observed that the command nslookup [www.mit.edu](http://www.mit.edu) the first query was PTR type, and the other two queries were Type A. The first ones name also had the source IP address in reverse. The second one had mit.edu.poly.edu in the name. Then, the last one had just mit.edu for the name. I also noticed that the third response had Additional records, Authoritative namesevers, Answers and Queries while the second response only had Authoritative namesevers, Answers and Queries, and the first response only had Answers and Queries.

For the second nslookup command I noticed that the first and second response were like the first nslookup command. With the first response only having queries and answers, and the second one having queries, answers and Authoritative namesevers. But unlike the first command this ones third response had queries and answers and Additional records but does not have Authoritative namesevers. This one also had the first query type as PTR but the other two Types were NS.

For the last command the first and third responses had all 4(Additional records, Authoritative namesevers, Answers and Queries) but the second one only had Queries and Authoritative namesevers. The types for this lookup, like the last two lookups have PTR as the first type and A as the second and third type.

## HTTP Lab

As I was answering the questions, I got to one question that asked me according to the Wireshark when the file was last modified. The answer was very close to the time that I opened the document. As I continued the lab they explained why.

I had to run the fifth file two times because the first time I did not read far enough in the lab to see they gave you a username and password. By running it incorrectly the first time, I was able to find some interesting information. The first one I ran gave back an unauthorized request and the second one gave back the expected result. This was an interesting comparison because unauthorized request I made gave back all HTTP protocols but when I entered the username and password it also returned an OCSP response. OCSP stands for Online Certificate Status Protocol. Within this I can see new data including the tbsResponce data, and signature algorithm to name a few. Whereas in the unauthorized I can only see the Line-based text data with the unauthorized message the site gave me.

For the successful file five I can also see a few new differences that are different from the first four files in the OCSP. I can see a date field. This field shows me the date and time that I entered the site and it also gives an expires date. I can also see the Last modified field like the last files in the HTTP. It has the same time and date as the first four files.

## ****TCP Lab****

## UDP Lab

## ****SSL Lab****

# Programming Assignments

## InetServer

For this assignment I took the classes that were given and ran them on my terminal to see how to even run the java programs since it has been a while since I have run any java. I also wanted to use the given classes to see how the program was supposed to run before I coded it on my own. Then, I copied the code given into my own java files. As I wrote the code, I wrote extensive comments to help myself fully understand what was going on.

There were a few new terminologies for me in the code. I did have to reference docs.oracle.com as for some of this code was new to me and I wanted to fully understand what I was trying to code. The first one I did not know was java.net import. I learned that .net imports apps used for computer networking. It allows us to use things like ServerSocket in our code.

Another term I was unfamiliar with was PrintStream. I found out that this allows us to write output data. PrintStream is a package in the java.io directory. It is the only output stream that does not throw ioexception. It also invokes a flush method automatically.

Socket and ServerSocket are other new terms for me in this class. However, when writing the code, I remembered seeing the terms in our class notes. I went back to my Chapter 3 notes and noted how the ServerSocket and Socket go hand and hand. I was then able to apply that knowledge to my code.

There were also a few terminologies I have used before but did not fully understand. So, I used this assignment to my advantage to learn what that code was. The first one was import java.io. This allows us to use things in our code like ioexception and bufferedreader. This allows us to throw exceptions and allows us to read a user’s input and produce a specialized output for the user based off the input.

## JokeServer

I started out with

## Mini Webserver

First, I ran the code in MyListener and MyTelnetClient to understand how the network communicates with my code. I then took the code from MyListener and made a new MiniWebserver file. From there I looked at every line of code to ensure I knew what the program was doing. I also added my answers to the required questions. Next, I ran the WebAdd html file and entered a name and two numbers. I noticed when I submitted the file my name and the two numbers I selected were displayed in the query where you would normally search things on google. I learned from my web application class that the url can contain a lot of useful information for websites. I knew then I could fetch the answers from the url and display them in the page’s html.

http://localhost:2540/WebAdd.fake-cgi?person=YourName&num1=4&num2=5

First, I had to separate out the three different queries answers: Name, Num1, Num2. I took the BufferedReader variable in and read its contents. I printed that onto my html to check I was fetching the correct information.

Next, I replaced all the & symbols with = symbols so the string would be easier for me to split. After splitting the string I was able to isolate out the name and the first number, however, with the second number it had for example 5 HTTP following. Thus, the 5 was not isolated. I went back and also replaced the HTTP with an = so it could be isolated.

After I had the name and the two numbers, I was able to add the two numbers together and was able to produce a string to send to the page. I sent Hello \_\_\_ the sum of \_\_\_\_ and \_\_\_\_ is \_\_\_.

**For the original turn in of this assignment I was not able to get to get to implementing a new copy of the input form.**

## Blockchain

## HostServer

# Lectures

## Week One

### Chapter 1 Part 1

**CDK**

**Societies**

**Processes**

**Threads**

**Open Systems**

**$200,000**

**IDL**

**Fully Distributed algorithms**

**Scale up**

**Synchronous calls**

**Clients**

**Severs**

**Asynchronous calls**

**Transactions**

**Semaphores**

**IPC**

### Chapter 1 Part 2

**Context Switching**

**Atomic Action**

**Test / Set**

**UUID/GUID**

StandsforUniversally Unique Identifier or Globally Unique Identifier. An example would be a URL. Could be a string or a number.

**Shared Memory**

**Middleware**

**Open systems**

**UDP**

**TCP**

**Messages**

**RPC / RMI / MOM**

**Health Care Example**

### Inet

## Week Two

### Chapter 2

**Layered Architectures**

**Object-based Architectures**

**Data-centered Architectures**

**Event-based Architectures**

**Heavy Client**

**Heavy Server**

**Peer-to-Peer Architectures**

**DTH**

Stands for Distributed Hash Table.

**Bit Torrent**

**Torrent**

**Leechers and Senders**

### JokeServer

### Chapter 3 Part 1

**Deamons / Nameservers**

**Superservers**

## Week Three

### Chapter 3 Part 2

### MyWebserver

### Chapter 3 Part 3

## Week Four

### Chapter 4 Part 1

**RPC**

### Blockchain Part 1

**Work**

**Verifying Blocks**

### Chapter 4 Part 2

## Week Five

### Chapter 4 Part 3

### Blockchain Part 2

### Blockchain Part 3

## Week Six

### CDK7 Security Part 1

### CDK7 Security Part 2

### Midterm Review

## Week Seven

### Chapter 6 Part 1

### Chapter 6 Part 2

## Week Eight

### ****DHCP NAT ATM Mobile IP Agents Hadoop Part 1****

### HostServer

## Week Nine

### ****DHCP NAT ATM Mobile IP Agents Hadoop Part 2****

## Week Ten

# Further Research

# ****Extra Credit****

## University Institutional Research Board (IRB) Training:

### ****COVID-19: Back to Campus (Fall 2020):****

#### COVID-19: An Introduction

In this module I learned about Zoonotic Infections and how they can get transmitted to humans and how it relates to covid-19. I also learned that the science indecency has known about coronavirus for a few years now. It is not new! That is something I did not know I thought it just came about in 2019.

I heard rumors about the coronavirus being from someone who ate a bat in china. This video confirmed that that could be a possibility, but it is also possible that coronavirus was transmitted from a bat to another animal we eat normally, for example, cows and pigs. It is interesting to think that coronavirus lives naturally in bats but can be so harmful and contagious to humans.

Before Covid-19 there was 2 other coronavirus outbreaks one in 2002 that killed 10% of the infected and one that started in 2012 and is still ongoing that has so far killed 35% of its infected. Compared to the number of deaths Covid-19 has had vs the two other coronavirus the rates are much much lower. However, Covid-19 is a lot more contagious making the number of deaths greater than the percentage.

#### COVID-19: Prevention Strategies

Covid-19 is spread mainly from person to person, by interacting with others. Covid-19 is a respiratory infection meaning it can be transmitted to you when someone coughs sneezes or even talks too close to you. It is also possible that the various can be caught by touching an infected surface. Covid-19 can be spread before the infected know they are sick.

Ways we can slow the spread is staying out of crowded places and distasting your self-others. We can encourage people to work and do school remotely. If meetings must be conducted in person, ensure there it is big enough for people to social distance. We can also make halls or isle one way to avoid close contact. We should also make sure we clean meeting room surfaces after every meeting. Additionally, we should encourage all attendees to wear a face covering.

By having one way aisle and not having people work across from each other we can avoid face to face interaction and reduce the risk of spreading COVID-19.

Proper hygiene is also an effective way to help slow the spread. This includes washing your hands, avoiding touching your eyes, nose and mouth, and using hand sanitizer.

Cleaning vs Disinfecting. Cleaning is removing of dirt and bacteria while disinfecting kills the bacteria with chemicals. It is recommended to always clean a surface before disinfecting it. It is recommended when using a disinfectant to spray a towel and not the surface directly. This is because the bacteria can spray off the surface into the air.

#### COVID-19: Moving Forward

Reminders:

* Wash your hands.
* Use hand sanitizer.
* Physically distance yourself.
* Do not touch your eyes nose or mouth.
* Wear a face covering.

If you have been exposed?

* Notify you employer or institution.
* Modify your systems.
  + Call your provider.
* Stay home; isolate yourself.

Stay at home

* Make your space more comfortable.
* Provide yourself with technology to allow you to do work from home.
* Make yourself a covid-19 survival kit with essentials like your medication.

Mental Health

* Continue to get sleep, exercise, eat healthy, and keep your routine.
* Take time to celebrate things (i.e., graduation, birthdays, and anniversaries). Be creative. They might look different than usual but does not mean they cannot happen.
* Focus on things we can control.

### ****COVID-19: Insights for Higher Ed Leaders:****

#### COVID-19 Strategic Planning: Insights and Advice for 2021

#### COVID-19 Strategic Planning: Campus Health and Safety Operations

#### COVID-19 Strategic Planning: Restarting and Continuing Research and Lab Operations

### ****Faculty/Staff/Outside Collaborators/Students:****

#### Students in Research

#### Defining Research with Human Subjects – SBE

#### Assessing Risk - SBE

#### History and Ethical Principles - SBE

#### The Federal Regulations – SBE

#### Informed Consent – SBE

#### Internet-Based Research – SBE

#### Privacy and Confidentiality – SBE

#### Research with Prisoners – SBE

#### Research with Children – SBE

#### Research in Public Elementary and Secondary Schools – SBE

#### International Research – SBE

#### Unanticipated Problems and Reporting Requirements in Social and Behavioral Research

#### Conflicts of Interest in Human Subjects Research

#### FERPA: An Introduction

#### FERPA for Researchers

#### DePaul University

### ****Participating in Vaccine Research:****

#### Participating in Vaccine Research

Human Subject is A living person participating in a research.

Treatment is the use of approved drugs to help prevent or cure an illness. Whereas research is the gathering of information to conclude to a treatment.

Vaccine allows people to develop immunity to a disease. Most vaccines take about four years to develop. Less 10 percent of drugs pass FDA approvable. The COVID-19 vaccine could be the fastest developed vaccine ever.

As a subject you have the right to know the risks and benefits of the research. You are also allowed to withdraw from the study at any point.

To join a vaccine research, you can join a registry or look for trial at your local universities and hospitals.

### ****Remote Contact Tracing:****

#### Remote Contact Tracing Basics for COVID-19

#### Investigating and Tracing a Case’s Contacts

#### Contact Tracing Ethics and Responsibilities

## MyWebServer

## Research Subject Participant

Out of all the studies I did I thought the first one, Truth in News, was the most impactful. I think the researcher was so nice and conducted the research well! However, all the studies made me reflect on my life

### Truth in News

For this study they were collecting data on how people interact with news given on social media. They were mainly looking how I validate if a news source given on twitter is valid new or fake news. They gave me three different news sources on twitter with all linked articles. The first one in my opinion did not look very reliable. It was very short and was not a website I recognized. The second source they gave me I also did not recognize however I thought it looked a little more reliable then the first one. It was a lot longer and had a lot of information and quotes. The third article they had me look at was from the Washington post. That was a site that I knew. I thought because it was a well-known site it could be reliable. I thought this study was well conducted they only suggestion I gave them was to use other social media outlets other than twitter. For example, Facebook, Instagram and Tok-tok.

### VIRTUAL User Interviews - Habit-Building Mobile App

I completed this study on February 2nd, 2021 at 12pm. For this study I was asked if I have used any apps to successfully build a habit. I am one of those people who have way too much going on in my head, so I jump though very quickly. Even when writing this I paused in the middle of a sentence or thought and jumped to a different section. So, if I do not have some guidance in my routine it will accidently get skipped. Over the summer I started using an app called fabulous. It has been a game changer for me it allows me to put in a time to start a morning routine and a time to start a night routine. I can also build a routine that works for me. For example, in both of my night and morning routines I have brush teeth. I know That is something simple to remember but for some reason I cannot remember it and next think I know its 3pm. So, this app helps me to remember to do it. It also has a timer feature so I can ensure I am brushing my teeth for the whole 2 minutes. So, for this study I told them all about that app.

They also asked me if I had three weeks to finish a project that had 3 parts how would I tackle the assignment. I honestly go through phases where I procrastinate too much and save things for the last day or I am really on top of things. If I lived in a perfect world, I would have done one part every week. But that would not always be the case.

### Social Media Anxiety

I completed this study on February 2nd, 2021 at 6pm. For this study I was asked how social media and anxiety go hand and hand. As someone who struggles with anxiety, I truly believe that social media has a big impact on anxiety. As I told the researcher, there are so many stigmas we have to live up to on social media. We need to be pretty and skinny. And seeing that constantly on our feed can definitely cause some anxiety.

### Managing Smartphone Screen Time - Observation Study

I completed this study on February 3rd, 2021 at 5:30pm. For this study I was asked how I would help a friend who was struggling with managing their screen time. Because of this the friend is falling behind in all their classes. I remembered back in undergrad I took a class that had me write a paper on a app. The app I chose was a screen management app called forest. The point of the app was to grow a forest. You could set a time for like 60 min to not use your phone for. During the 60 min a tree will grow. However, if you use your phone you kill your tree and have to start all over. I thought that that app was so cleaver. I stopped using it because my phone broke and I just never reinstalled it. However, after doing this study I realized I maybe should put it back. I was also asked how much time on average I spend on my phone. I looked in my phones screen time settings and I was averaging about 8 hours per day weekends and about 5 hours per day on weekdays. This does not even include the YouTube and Netflix I watch on my laptop. That is an excessive amount of screen time for someone who works full time and is taking 2 master’s class. This study really made me reflect and realize that I am maybe not using my time to the best I can.

### Social Media Misinformation

I completed this study on February 3rd, 2021 at 8:45pm. This study was very similar to the first study I did on Truth in News. However, with this one they did not show me any new on social media it was all just screenshots of articles. They then asked me to try and verify if the articles were trustworthy. To very that I googled the articles title and the author if it was available in the screenshot. I tried to see if I could find the exact article that was used in the screenshot to try and verify it. The first article they showed me I was not able to find anywhere on google so I deemed it unreliable. The second one they showed me I found the article right away and I also found that the author had a few other pieces published on multiple sites. I deemed this one to be very reliable. The last one they showed me I was able to find right away on google. However, I did not see anything else. Thus, out of all 3 articles I found the 2nd one the most reliable. I did find it strange that they were looking for how I verify news posted on social media but did not give me anything that was posted like the first study did. I think that it would have been useful for them to do that to get the full effect of the purpose of their study.

# Books Referenced

Maarten van Steen and Andrew S. Tanenbaum, *Distributed Systems*, Third Edition – Version 01 (February 2017). Published by Maarten van Steen.

James F. Kurose and Keith W. Ross, *Computer Networking A Top-Down Approach*, Sixth Edition – International Edition (2013). Published by Pearson.

# Websites Referenced

docs.oracle.com

citiprogram.org