A Brief Journey Into Binary
[Abraham John, Executive Director, AITS/UIT]

My "fluff" article for this issue came about after a conversation I had with one of my friends at work. What I originally contemplated writing would not necessarily have been a "fluff" piece and might have been difficult to understand. Since this newsletter is aimed at educating and informing our readership, her suggestion was something she has always wanted to know – binary. I also started thinking of how and when I would introduce this numbering system to my grandson. Obviously, we will start with something more basic and engaging than this article but something that will convey the idea – after all he isn't quite 3 yet 😊. There is a certain purity in dealing with just numbers that raises us to a different plane.

It also took my thoughts back to my time embedded within what I will always consider my home division (Student Affairs) and the joy of building useful structures to serve the mission of the division and university. To the mathematicians within the readership this article will seem basic but as I indicated earlier, this newsletter is about informing and educating.

For someone who teaches a data communications class, this suggestion by my friend was heaven sent. In this article we will dip our toes into the binary pond and see if we can add a topic that can be used for distractions on a lazy weekend summer afternoon or perhaps wowing others are parties or, quite possibly, be banned from attending parties 😊.

Either way, I hope you enjoy this and perhaps get a chuckle from the introduction. This article is for you "Eileen".

What is a binary number system?
- This is a number system expressed in base 2 numeral – represents values using two digits: 0 and 1. Our normal counting is decimal i.e. base 10. Binary is something that does not come naturally to us but the technology we depend upon would not exist as it does today if we did not have a keen understanding of the topic and were not able to build structures utilizing this numbering system.

Some terminology
- Single binary digit is called a **bit**

- Four binary digits is called a **Nibble/Nybble**

- Eight binary digits is called a **Byte** or more technically correct name would be an **Octet** or it is also sometime referred to as a **Character**
    - Byte vs. Octet – there have been systems where a "byte" was 9 bits and others with 6/7 bit bytes
    - Octet as a term is more prevalent outside North America
    - When we use the word **Byte,** we are always referring to 8 bits

- Sixteen binary digits is called a **Word**

- Thirty two binary digits is called a **Long Word**

- Sixty-four binary digits is called a **Very Long Word**

- And just for fun – in the event you run into a wisecrack cracking jokes about binary and uses the word **Crumb** – the wisecrack is referring to 2 bits

Grouping of bits
- Byte or octet is a group of 8 bits or 8 binary digits

Binary is positional – what does this mean? Look at the table below to get an idea of what this means. We also start counting bit positions with 0. So, an octet or byte is comprised of bit positions 0 – 7. Where you see the "^" symbol,

	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Bit Position	7	6	5	4	3	2	1	0
Bit value	1	1	1	1	1	1	1	1
Calculation	128	64	32	16	8	4	2	1

Final value here would be: 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255 decimal

Now let us convert a decimal (205) to binary using division.
```
205 / 2  = 102 remainder 1
102 / 2  = 51  remainder 0
51 / 2   = 25  remainder 1
25 / 2   = 12  remainder 1
12 / 2   = 6   remainder 0
6 / 2    = 3   remainder 0
3 / 2    = 1   remainder 1
```

Starting with the last quotient which will always be either 0 or 1 and working up the remainder chain – writing left to right - we have….

1 1 0 0 1 1 0 1 – binary which is 205_{10}

Now let us convert the same decimal (205) to binary using subtraction.

Since binary is positional and we're just dealing with 8 bits and we know the values at each of the 8 bit positions if the bit value is 1, it becomes reasonably easy to do this conversion with small numbers using the subtraction method.

205 – 128 (since 128 is smaller than 205) = 77 – **this will turn on bit position 7**

77 – 64 (since 64 is smaller than 77) = 13 – **this will turn on bit position 6**

13 – 8 (since 8 is smaller than 13) = 5 – **this will turn on bit position 3**

*** we can't use bit positions 5 or 4 since 32 and 16 are larger than 13. So, **bit position values for positions 5 and 4 will be 0**.

5 – 4 (since 4 is smaller than 5) = 1 – **this will turn on bit position 2**

*** **bit position 1 will be 0 since all we have left is 1**

Since we only have the value of 1 left – bit position 0 can be turned on to yield a value of 1

Alligators have been around for 150 million years.

So, turning on i.e. setting the value to 1 of all the bit positions we turned on and turning off i.e. setting the value to 0 of all the bit positions we turned off….. we get…….

Bit Position	7	6	5	4	3	2	1	0	
Bit Value	1	1	0	0	1	1	0	1	
Decimal	128	64	0	0	8	4	0	1	205_{10}

Some powers of 2

$2\char`^0$ = 1
$2\char`^3$ = 8
$2\char`^5$ = 32
$2\char`^6$ = 64
$2\char`^7$ = 128
$2\char`^9$ = 512
$2\char`^{10}$ = 1024 – 1 Kb
$2\char`^{12}$ = 4096 = 4Kb
$2\char`^{14}$ = 16,384
$2\char`^{15}$ = 32,768
$2\char`^{16}$ = 65,536
$2\char`^{32}$ = 4,294,967,296 – Ipv4 address space
$2\char`^{64}$ = very large # - 16 Exabytes

Our Fight Song **In** Text	Our Fight Song **In** Binary
Let's give a cheer for U of NT! Cheer for the green and white. Victory's in store whate'er the score. Our team will ever fight. Fight, fight, fight! Shoulder to shoulder we march along, striving for vic-tor-y. Playing the game for the honor and fame and glory of U-N-T! U – N - T Eagles! U-N-T Eagles! Fight, fight, fight!	01001100 01100101 01110100 00100111 01110011 00100000 01100111 01101001 01110110 01100101 00100000 01100001 00100000 01100011 01101000 01100101 01100101 01110010 00100000 01100110 01101111 01110010 00100000 01010101 00100000 01101111 01100110 00100000 01001110 01010100 00100001 00001010 00001010 01000011 01101000 01100101 01100101 01110010 00100000 01100110 01101111 01110010 00100000 01110100 01101000 01100101 00100000 01100111 01110010 01100101 01100101 01101110 00100000 01100001 01101110 01100100 00100000 01110111 01101000 01101001 01110100 01100101 00101110 00001010 00001010 01010110 01101001 01100011 01110100 01101111 01110010 01111001 00100111 01110011 00100000 01101001 01101110 00100000 01110011 01110100 01101111 01110010 01100101 00100000 01110111 01101000 01100001 01110100 01100101 00100111 01100101 01110010 00100000 01110100 01101000 01100101 00100000 01110011 01100011 01101111 01110010 01100101 00101110 00001010 00001010 01001111 01110101 01110010 00100000 01110100 01100101 01100001 01101101 00100000 01110111 01101001 01101100 01101100 00100000 01100101 01110110 01100101 01110010 00100000 01100110 01101001 01100111 01101000 01110100 00101110 00001010 00001010 01000110 01101001 01100111 01101000 01110100 00101100 00100000 01100110 01101001 01100111 01101000 01110100 00100000 01100110 01100110 01101001 01100111 01101000 01110100 00100001 00001010 00001010 01010011 01101000 01101111 01110101 01101100 01100100 01100101 01110010 00100000 01110100 01101111 00100000 01110011 01101000 01101111 01110101 01101100 01100100 01100101 01110010 00100000 01110111 01100101 00100000 01101101 01100001 01110010 01100011 01101000 00100000 01100001 01101100 01101111 01101110 01100111 00101100 00100000 01110011 01110100 01110010 01101001 01110110 01101001 01101110 01100111 00100000 01100110 01101111 01110010 00100000 01110110 01101001 01100011 01110100 01101111 01110010 01110010 00101101 01111001 00101110 00001010 00001010 01010000 01101100 01100001 01111001 01101001 01101110 01100111 00100000 01110100 01101000 01100101 00100000 01100111 01100001 01101101 01100101 00100000 01100110 01101111 01110010 00100000 01110100 01101000 01100101 00100000 01101000 01101111 01101110 01101111 01110010 00100000 01100001 01101110 01100100 00100000 01100110 01100001 01101101 01100101 00100000 01100001 01101110 01100100 00100000 01100111 01101100 01101111 01110010 01111001 00100000 01101111 01100110 00100000 01010101 00101101 01001110 00101101 01010100 00100001 00100000 01010101 00100000 00101101 00100000 01001110 00100000 00101101 00100000 01010100 00100000 01000101 01100001 01100111 01101100 01100101 01110011 00100001 00001010 00001010 01010101 00101101 01001110 00101101 01010100 00100000 01000101 01100001 01100111 01101100 01100101 01110011 00100001 00100000 01000110 01101001 01100111 01101000 01110100 00101100 00100000 01100110 01101001 01100111 01101000 01110100 00101100 00100000 01100110 01101001 01100111 01101000 01110100 00100001

Binary is not how we see the world but, our technology works because of 1's and 0's.

If you are getting misty eyed because you are rolling on the floor laughing at the ridiculousness of this article, might I suggest you read some of the other excellent articles and maybe take swing at the brainteaser 😊 .

All the best from Administrative Information Technology Services (AITS) and University Information Technology (UIT).

Bats always turn left when exiting a cave.

AITS: Drive for Quality of Service
[Alexandra Martinez]

As an IT specialist with internal and external experience, I have observed a variety of organizational structures. Within my experience, I was able to learn how a well-structured company may be inefficient in producing effective outcomes. While another company can produce quality outcomes it can still have a chaotic structure.

To provide a better insight into the different IT organizations that I have experienced before I was employed by UNT AITS, I'm going to compare the pros and cons of two organizations that function differently from each other and produce different outcomes in quality of service and efficiency rates.

The first IT group has an amazing structure on how they deliver IT services. The group has a well-trained team that manages an IT Help Desk which helps with staying organized and improves the rate of efficiency. With a user-friendly interface, they made the process of submitting service requests easy. And, although the group's goal is to provide the highest quality service to their users and constant delivery of improvements, they lacked quality services, knowledge, and training.

They are unable to resolve customer's incidents or service requests in a timely fashion. This resulted in a high rate of customer dissatisfaction. Overall, group 1 only focused on how they can grow and improve themselves and never focused on the department's growth or how they could run more efficiently.

The second IT group was a Managed Service Provider (MSP). This group was an external IT network that allowed businesses to customize the support they need. The MSP's goal was to help their clients' businesses grow, scale, and run efficiently. With this goal, clients knew that when they needed support, IT was always easy to reach and ready to help, which gave the MSP great IT credibility. Although the group was efficient and the quality of service was superb, the MSP had a chaotic structure due to the fact each client had a primary IT administrator, and the documentation was left unorganized. Another factor that affected the structure was the constant change in staff, which left our clients unsure of who their primary administer was.

Within AITS, we focus on helping our departments grow and run efficiently because your IT network should be an asset to your business, not a headache. We provide consulting, planning, design, and implementation services for any technology effort initiated by our departments. Along with any services we provide, we also like to educate our users about what our thought process is or why we tend to do something a certain way. We like to involve our departments because it allows us to have better relationships, and it allows our department to trust their IT network.

When it comes to efficiency, we tend to evaluate the difficulties of a project, and what might affect the project from moving forward. We also evaluate the process of resolving certain service requests. If we find an alternative way, we compare the pros and cons of that process to the process we currently have in place, and we will not change anything unless the outcome is greater than before. All AITS employees are well-trained and knowledgeable IT professionals.

We all have a combination of an academic foundation, technical expertise, and experience. Since the field of IT is constantly evolving, we ensure that our staff stays ahead through diligent research and education as innovative technologies and practices emerge to better serve our user base. This allows us to work efficiently and provide consistency in our quality of services.

From these experiences, I was able to learn what works and what does not work within IT organizations. I am also able to bring the skills and knowledge from my past experiences to my current position to help better serve users and my team. With the knowledge that I have gained my team is able to compare the different processes that other IT organizations are using and seeing how we can improve processes to better suit our needs.

I hope this article gave you a better insight of our IT organization. Our job as an IT organization is to be the backbone to all system functions to ensure that everyone is working in an efficient and productive environment. As technology continues to advance and change, we look forward to utilizing new processes to better service you.

Seahorses are monogamous and mate for life.

Reduce Printing Expenses with UNT's Print Management System
[Richard Sanzone]

UNT has a powerful, feature-rich print management system that can cut printing expenses by reducing waste through optimized print functions. This print management system is available to all UNT departments and can be used with just about any printer that is connected to the network. The underlying technology of the print management system is the PaperCut MF software suite which is widely regarded as a top tier product in the printing industry. Most IT operations at UNT have at least one person with administrator rights to the PaperCut system which provides the ability to implement the following printing features. Everyone is welcome to contact Richard Sanzone directly for any questions related to print management.

Cost-Saving Features of the UNT Print Management System:

1. Quotas

Did you know that the UNT print management system can set print quotas? The quota is effectively a page limit that can be applied to individuals or even groups. The quota can be periodic and can even reset on a recurring basis. Variable quotas are also possible which would allow certain users to have expanded quotas compared to other users. The quota concept can save printing expenses by encouraging users to think about the necessity of each print job which can lead to less pages printed.

2. Duplex Printing Enforcement

Duplex printing is enforceable on any printer that supports duplex printing. Duplex printing can be a set as a default option with the ability to still allow simplex printing or simplex option can be removed entirely. Setting duplex as the default print setting will increase efficiency by reducing the amount of paper used while still allowing users to print the same number of pages.

3. Monochrome VS Color Enforcement

Color toner is generally much more expensive than black toner. Sometimes color printing is necessary but sometimes print jobs are processed as color because the user did not realize the color option was selected. Our print management system has several ways to reduce the amount of print jobs that are processed as color.
a. User Prompts. A pop-up dialog box can ask the user if they really intend for the print job to be color instead of monochrome. This configuration gives the user the opportunity to reconsider the need for color printing which could lead to lower color toner usage.
b. Color Limitations and Restrictions. Color printing can be limited to specific users such as supervisors and managers. Additionally, color print jobs can have page count limitations that can be set as a global restriction or limited to specific users.

4. Reports

A wide range of reports are possible with detailed information such as specific printer usage, duplex vs simplex, color vs monochrome, and usage by individual users or user groups. These reports can be generated manually at any time or they can be scheduled for automatic email delivery.
a. Cost Sharing. User group printing reports are useful for departments who share printing resources because it allows the departments to accurately divide the cost for operating the printers.
b. Individual Printing Summary. User printing reports can be useful by providing supervisors with insight on which employees might need additional electronic document resources to replace physical paper printing.

Rats laugh when tickled and during playtime.

5. Release Controls

Managed-Print-Release is a technology configuration that holds documents in a virtual queue waiting for the user to specifically release the job for printing. This can potentially save printing expenses by cutting down on print jobs that are accidently sent to the wrong printer or print jobs that are inadvertently submitted numerous times. Furthermore, occasionally a user submits a print job only to suddenly notice a typo but it would normally be too late to cancel the print job so they modify the document and print again. With managed release controls, the user can submit multiple print jobs and later decide which submissions to release to the printer and which jobs to ignore. The ignored print jobs will eventually expire and disappear from the print queue.

6. Print Job Redirect

Sometimes an office suite or department area will operate premium printers with toner costs that are much higher than the typical economy printer. The specialty printers are usually intended for special-case print jobs while standard print jobs should be sent to the economy printers. In this case, to avoid users inadvertently sending print jobs to the specialty printer, the print management system can redirect print jobs to the economy printer if certain conditions are met.
Examples when print job redirection would be useful:

a. All print jobs during student class sessions should go to the economy printer.
b. Print jobs from supervisors or professors should go to the premium printer.
c. Print jobs of more than 10 pages should go to the economy printer.
d. Print jobs from the shared public kiosk computer station should go to the economy printer.

There are many more capabilities available to UNT through our print management technology. Please contact Richard Sanzone (sanzone@unt.edu) for more information.

JAMF: We Aspire to be Zero Touch!
[Kris Selby]

Were you aware that here at UNT we have a single tool that can manage all Apple devices and computers on and off campus? That tool is called JAMF although their suite of tools is formerly known as Casper Suite, it was founded in 2002, but don't ask the founders what JAMF means because they won't tell you! The company has continued to grow year after year becoming the go-to name in Apple management worldwide, and actually became a publicly traded stock this year. They primarily operate out of Minneapolis, MN but also have an office in Eau Claire, WI and newly added office in Austin. Internationally they have an offices in The Netherlands in Amsterdam and Emmen, as well as offices in Hong Kong, London, Stockholm, Sydney, and Tokyo. Their reach truly is global!

With JAMF our Apple managers on campus aspire to never have to physically touch your device, instead we use a combination of features created by both Apple and JAMF so that our campus Apple users can be independent with Apple products. When an Apple device or computer is first purchased from Apple or another UNT approved vendor, a member of our Apple Managers group first takes the serial numbers of the devices and enter them into our Apple School Manager management system. Then, the same manager will assign them to the proper department on campus. From there each department is able to specialize how they want their deployment to work. Our Apple Mangers group is comprised of members from AITS, ITSS, HSC, Dallas Campus and each college here at our Denton campus. We distribute software, apps, and even configurations that we create within JAMF to be sent to each individual device or computer. Each device or computer can have its own setup because a faculty member in Art likely won't need the same software as an Administrative Assistant in HR.

If you use an Apple device or computer on campus you may have noticed an icon in your applications called "Self Service". This is another way we use JAMF to be able to get you applications and software that you may need. Our team creates packages to be available to send at any time. This serves as an on-demand service to allow you to download software that you may need on your device or machine that may not have been initially installed. If you ever need an application that isn't available in your Self Service make sure to inform your IT administrative team, if you don't know your IT team you can look it up here: https://it.unt.edu/itsupportbydepartment and they will be able to add the software to your device.

Whether you see us or not, just know we're always working to make sure you have the best Apple experience you can on, or off campus!

If you would like to learn more here are a few sites giving more information about JAMF:

https://www.jamf.com/about/

https://www.youtube.com/watch?v=xycZLU_KQoQ
Also, the JAMF community has an extensive online forum and knowledge base if you really want to dive in:

https://www.jamf.com/jamf-nation/

Dolphins use toxic pufferfish to "get high"

EDUCAUSE and UNT – A Valuable Partnership for Information Technology and Innovative Teaching and Learning
[Dr. Elizabeth Hinkle-Turner]

A Little History

The different institutions of the UNT System have been members of an organization called **EDUCAUSE** for over 20 years. Educause (educause.edu) is a non-profit association that supports those who lead, manage, deploy, and utilize information technology at every level within higher education. **EDUCAUSE was established in 1998** as a merger of the organizations **CAUSE** (College and University Systems Exchange) and **Educom** (which I just found out was formed in 1964, the year I was born!). Educom is perhaps best known as one of the originators of *Internet2*, a consortium formed in 1997 for the advancement of a network dedicated to research, testing and education. UNT is also a member of *Internet2* joining tens of thousands of other U.S. educational, research, and government institutions.

What does EDUCAUSE have to do with me?

Our UNT-Denton EDUCAUSE membership, subscribed to by **University Information Technology [UIT]** and the focus of this article, provides faculty and staff with numerous benefits that can prove to be quite useful in developing long-term and short-term university technology strategies; comparing and bench-marking current and future tech projects against similar plans at comparable institutions; and projecting trends in student needs and attitudes about technology. Other resources from EDUCAUSE can offer advice and insight on teaching with technology; creating social media buzz and events related to campus needs and activities; or designing flexible classroom spaces for a variety of instructional needs.

Here are a few examples of the core benefits to faculty and staff offered by EDUCAUSE as outlined in its membership summary:

- **Access to cutting-edge research, data, analytics and benchmarking services, toolkits, and publications on issues, technologies, and trends in higher education.** The **EDUCAUSE Center for Analysis and Research** (educause.edu/ecar) provides extensive survey data from peer institutions about faculty and student tech needs and trends. UNT often participates in these surveys and the data is available to you once your account is created. The extensive publication library (library.educause.edu) contains literally thousands of articles in an easily searchable database and the organization also provides analytic services (https://www.educause.edu/research-and-publications/research/analytics-services) of data collected from all of its member institutions through its **Core Data Survey** (completed annually by the institutions of the UNT System).

EDUCAUSE
EDUCAUSE CENTER FOR ANALYSIS & RESEARCH

2020 Student Technology Report

The EDUCAUSE 2020 Student Technology Report includes key findings from our analysis of over 16,000 students' responses, as well as concrete next steps your institution can take in response to those findings.

Additionally, we offer opportunities for connecting with peers who are implementing innovative practices in the areas of student success, technology use and environmental preferences, data privacy, online harassment, and accessibility.

See Findings

Example of recent ECAR Student Tech Survey Report

- **Professional Development and Continuing Education** (https://pl.educause.edu/)**.** EDUCAUSE is continually offering seminars, workshops, and webinars to its membership. Most of these are free to members; a few carry an additional charge to registrants. Recently I have taken a deeper dive into the learning series EDUCAUSE is doing in collaboration with another group called **ARiA** (Anti-Racism in Academia partnership - https://aria.uga.edu/) and have attended webinars about the formation and goals of ARiA as well as a workshop specifically geared towards dismantling the framework of institutionalized racism in higher education. Other current workshops and webinars deal with educational technology in these COVID times. Management and leadership skills training are provided through the EDUCAUSE Institute and peer mentoring, as well as volunteer opportunities to contribute to the profession.

The semi-monthly EDUCAUSE Review is usually sent in digital format to your email inbox

- **Topic Communities** (https://www.educause.edu/community). EDUCAUSE Community Groups are open, online communities led by interested members where ideas and expertise can be shared and solutions explored with colleagues from peer institutions. If you need an answer to an educational tech issue you are facing, more than likely there is a Community Group to address it.

- **EDUCAUSE Annual Conference** (https://events.educause.edu/annual-conference)**.** In non-COVID times several of the IT professionals at UNT can be found at the EDUCAUSE Annual Conference. Even if extensive conference travel is not feasible, multiple online events for only a small fee (or none at all) are always available. The 2020 conference was completely virtual due to COVID and it is highly likely that the 2021 conference will be as well (the conferences are generally convened in October of each year). The annual conference with its tens of thousands of participants is a great place to go to workshops, meet with vendors, view exhibits, and generally get creative about tech solutions in higher education. UNT IT professionals have also presented sessions at these conferences as well; it is part of the tradition of IT at UNT.

How do I get to start enjoying all these great things?!

A group of parrots is known as a pandemonium.

Gaining access to your member benefits as an employee of UNT is as simple as creating a profile and logging in to the EDUCAUSE website. If you do not want to create a profile, there are still many articles and publications available to you as a guest but eventually you will run up against the membership wall. Creating a profile simply gets you all of the content; it is very similar to logging in to the *Chronicle of Higher Education* (as an employee of a subscriber institution) to get access to everything. During the profile creation, you will also have the option to fill out things like your particular interests and items that you would like to be notified about; you can choose as many as you like or none at all to minimize your inbox clutter. From personal experience, though, it has been quite rare that EDUCAUSE or its affiliates has sent me a publication that does not have something to do with my job and/or tech interests.

Go to Educause.edu and in the upper right corner, click the LOGIN button
You will be taken to the page above. Click the big maroon button to Log in or create a profile for yourself as a new member

After you create your profile and are all logged in there is actually a Membership Orientation (https://events.educause.edu/annual-conference) page and video that will help get you acclimated to the site and services. This page – **7 Ways to Get the Most Out of Your Membership** (https://www.educause.edu/about/discover-membership/use-membership) is also a quite useful summary.
What if I want to get to some of the more in-depth data and analytics or get more involved in some of the survey work?

If you are a faculty or staff researcher in your area and you want to know more about items like the ECAR and Core Data Surveys mentioned above, contact me (ehinkle@unt.edu) as I am the **Primary Administrator and Ambassador for the UNT-Denton campus membership**. Additionally, if you run into any questions, issues, or roadblocks in your EDUCAUSE experience contact me as well. EDUCAUSE features a terrific tech support team and when I need to ask them a question (which I often do…in fact I asked them TWO today in connection with this article!) or get an issue resolved the turnaround time is very quick and very thorough on their response.

I hope that any and all of you whose lives are touched by educational technology at UNT will explore our EDUCAUSE membership benefits. **UIT subscribes to EDUCAUSE *for you* specifically *to assist you*** with tech teaching and learning creativity and productivity, and we love it when you utilize this great subscription and service!

Japanese macaques play with snowballs for fun.

Here we go again, NextGen TV
[Christopher Horiates]

Not too long ago we had a major upgrade to our TV Broadcast system here in the USA. It was the Telecommunications Act of 1996 which was a bill passed by Congress that mandated that all TV Broadcasts in the USA be off of Analog and onto Digital (ATSC 1.0) with the final date, after three pushbacks, being June 12, 2009. You may remember the questions, confusion, the why, the will my rabbit ears work and all that went along with it. We all seemed to get through that for the most part after some years. What that did was it laid the groundwork for the next big jump in Over the Air (OTA) Antenna TV.

By the way, when's the last time you tried picking up TV over an antenna? There are lots of channels, some with perhaps the best quality you can get as there is no compression and the best part, it's FREE. Try it out.

Already in a city near you, or coming very soon this year, is NextGen TV or ATSC 3.0 for the technical folks out there. Before you start wondering, if you remember the previous upgrade, no you don't need to run out and by a new TV or get a set top box today. This is a voluntary phased rollout with no current federally mandated cutover to where your current TV will become obsolete. Your TV you have now will work and will continue to do so for years to come.

So, what is NextGen TV? Perhaps you have heard of 4K UHD, if so, image getting that over an antenna. The spectrum that this broadcasts at would allow live TV to be viewed in 4K UHD and with true cinematic sound. Football, TV Shows, Live Concerts, just about anything would be viewed as if you are there. Not to get to technical, but this is perhaps the purest form of true 4K UHD as there is little to no compression so therefore no loss in video or sound quality. And for those who fight the low and high volumes levels of different channels, well that's gone, all stations will have a constant volume level.

Now the bad news, did you just run out and by that new 4K TV? Chances are, unless you bought some top end model that cost thousands of dollars, it does not have the correct OTA Tuner built in. Some of the very high-end models have them now, and starting this year more models will begin having them built in. You can buy a tuner box that you can hook up to your TV, but that's about it.

Currently only a few channels are broadcasting, check https://www.watchnextgentv.com/ for channel listings. This service just started and is expected to grow. Obviously, the Pandemic set us back a bit as there were other priorities this past year, but as things normalize, I expect this to pick up steam. So, what can you as a consumer do now? Well, nothing really, unless you really want to run out and buy a very expensive TV or set top box. I just don't see a reason to buy in now. What I will say that if you are going to be in the market for a TV within the next year or two, might not hurt to weigh your options of getting a TV with the new tuner built in. Like anything technology related price will come down over time and as more people buy in and more stations broadcast this service that will drive the prices down even further. Will it become a standard and mandated? Only time will tell.

When you start hearing or seeing advertisements for NextGen TV, remember you might have heard about it here first. It's here, it's going to have growth and the way we watch television over an antenna will never be the same.

An ostrich's legs are so powerful that their kicks can kill a lion.

Want to Buy a New Gaming GPU or Console? Good Luck!
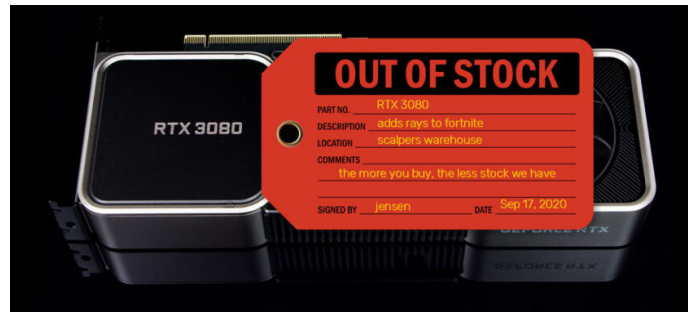## [Patrick Kennedy]

Figure 1 - I still, after months of trying, have yet to score an RTX 3080

If you've tried to buy a new processor, gaming GPU, or even a new game console, you may have noticed that it's not exactly an easy task. In fact, it can feel nearly impossible. Back in November of 2020, my little brother informed me that he had saved up his money and wanted to build a gaming PC. Normally this wouldn't be an issue, but every single GPU being released was instantly out of stock the moment they were offered for sale, only to be scalped on eBay at double their MSRP. In order to buy his RTX 3060Ti and stick it to the scalpers, I had to sit for literal hours refreshing Best Buy's website in 10 different browser windows on launch day, and even then, I was incredibly lucky to get him one. In fact, I wasn't even able to score his CPU, a Ryzen 5 5600X, until February when I got lucky on AMD's website. Obviously, AMD and Nvidia want to sell more hardware, so why is it so hard to buy any?

As is the case with a lot of issues these days, COVID-19 is seemingly to blame. A combination of factors including increased semiconductor demand and production issues due to the pandemic have caused a global semiconductor shortage impacting everything from computer components to automakers. The advent of COVID-19 caused a massive shift in the way people work; more people than ever are working remotely, learning remotely, and playing videogames. More and more people are purchasing devices (all of which use semiconductors) to support their new lifestyles. The World Semiconductor Trade Statistics organization projected a global semiconductor sales increase of 5.1 percent in 2020, and 8.4 percent in 2021. Even if current demand is met, the growing sales will only lead to more issues down the road.
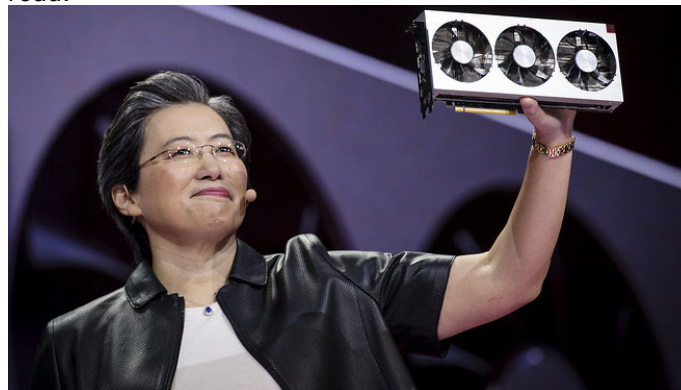

Figure 2 - AMD CEO Lisa Su, master of core counts, slayer of wallets.

It's not just computer component manufacturers that are feeling the squeeze. Automakers lost tens of billions of dollars last year when the shortage of semiconductors caused massive holdups in productions. Other industries such as medical device manufacturers, cloud infrastructure providers, and more face issues from the shortage. The shortage is such a widespread issue that President Joe Biden signed an executive order to find potential gaps in the supply chain in the US. The order contains a 100-day review of critical products that utilize semiconductors, and a wider, more long-term review of different sectors of the economy. The goal is

Axolotl are able to regenerate lost limbs and body organs.

to allow for better insight into the problem for more effective recommendations for policies that can strengthen supply chains quickly.

The reason these semiconductors are so critical is because they are in every electronic device we interact with every single day. Televisions, microwaves, dishwashers, phones, cars, electric toothbrushes, etc. all contain semiconductors. Semiconductors are used to make transistors, microprocessors, diodes, and more; all critical components in the production of devices people use every day. At its core, a semiconductor is a basic concept, but a crucial one. A semiconductor material (such as silicon or germanium) is a material with an electrical conductivity that falls somewhere between that of a conductor (a material that allows the flow of electrons) and an insulator (a material that prevents the free flow of electrons), hence the name *semi*conductor. The simplicity of the concept does not equate to simplicity of manufacturing, however. Nvidia's GeForce RTX 3080 gaming GPU packs a whopping 28 *billion* transistors (a type of semiconductor device) in its GA102 chip with a die size of only 628mm². This requires an incredibly complex manufacturing process, and any change in supply can disrupt it.
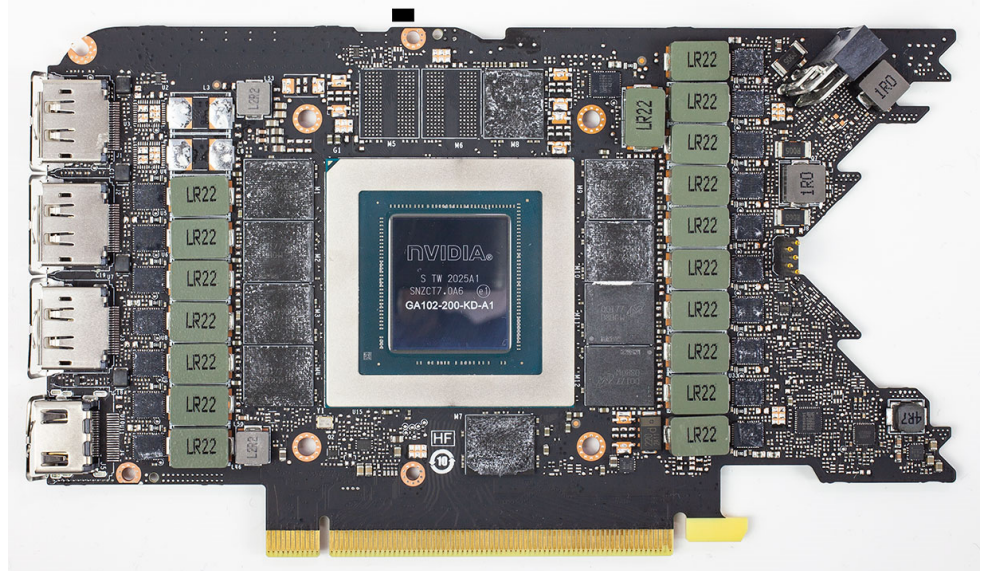
Figure 3 - RTX 3080 without the cooler. The GA102 die is the shiny square inside the blue square.

Unfortunately, it seems that the shortage of Nvidia and AMD's gaming hardware will continue for the time being. Nvidia's most optimistic predictions show the shortage lasting well through April. If you're not interested in buying PC hardware, and would prefer a PS5 or Xbox Series X, you're still going to face an uphill battle, as the Playstation and Xbox both utilize AMD's Ryzen CPU and RDNA2 graphics architecture. If you are impatient like me, and want to try and score something in the near future, I recommend finding a stock alert Discord, following stock update accounts on Twitter (as discord can be slow with notifications), and reading up on how to streamline your checkout process with your desired retailer. It is difficult, but not impossible, and I wish you the very best of luck.

Cows poo up to 15 times a day.

How Submarine Communications Cables Work – Cable Composition
[James Taylor]

In the last issue of the AITS Newsletter, I discussed submarine communication cables and how they are put in place, from end to end, across vast bodies of water. Considering the lengths that these cables traverse and how deeply they are laid, how are they constructed?
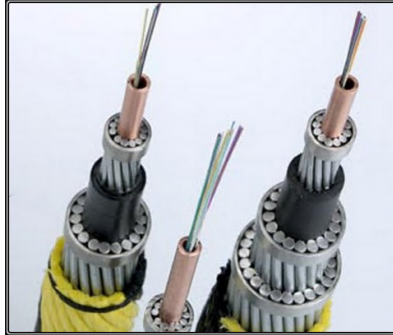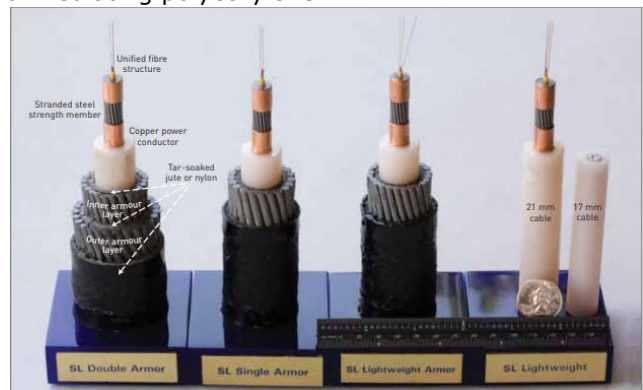

At the very core of submarine communications cables are the pairs of fiber strands made of glass that actually carry the data signal in the form of light. These fibers have a diameter only slightly thicker than that of a human hair. In each pair, one fiber is used for signal transmission in one direction and the other is used for the other direction. Each submarine communication cable can support at least 4 – 6 fiber pairs, though NEC recently boasted of a record 20 pairs of fiber in the cables they manufacture. While that may not seem like a lot, a technology called multiplexing allows for multiple channels of data to be transmitted at the same time using a single fiber.

The composition of the rest of the cable depends mainly on the manufacturer and the depth at which it is intended to lay. The fibers are typically covered with glass cladding of a lower index of refraction to keep the light within the core. They are then individually coated in a layer of carbon or liquid crystal polymer for protection from moisture. Then, the strands are covered by a plastic or steel buffer tube filled with a silicon gel. The buffer tube is covered by multiple bundles of high-strength steel wires and then the whole thing is covered with a copper sheath. Finally, the cable is covered in a thick layer of insulating polyethylene.

All these layers are intended to protect the miniscule fiber strands at the center of the cable from the moisture and pressure of the deep-sea environment. For most of its journey across the ocean, the cable will lay on the sea floor in this form. However, in shallower waters, such as along coastlines, there are more potential hazards to the cable. Cables could be severed or damaged by fishing boats, commercial shipping vessels, or even marine life. To protect the cable from these hazards, one or two alternating layers of galvanized armor wires and tar-soaked nylon yarn or jute will be added to the outside of the basic cable. As a rule, the shallower the depth, the more protection the cable will need.

In my next article, I will wrap up this series on submarine communication cables by discussing signal transmission.

*Follow the link below for a video of a marine life hazard to undersea cables:*
https://www.youtube.com/watch?v=1ex7uTQf4bQ

Sig Sauer BDX and BDX Scope Optics
[Alexandra Martinez]

There are more and more scopes on the market that provide a 6x zoom and BDC reticle system. The Sig Sauer Sierra 6BDX is one of those top-of-the-line riflescopes to fit that bill. Not only is the optic itself impressive, but the BDX system coming with the scope is incredible. Sig Sauer has provided a seamless integration between optics and electronics to make it easier to acquire a target.
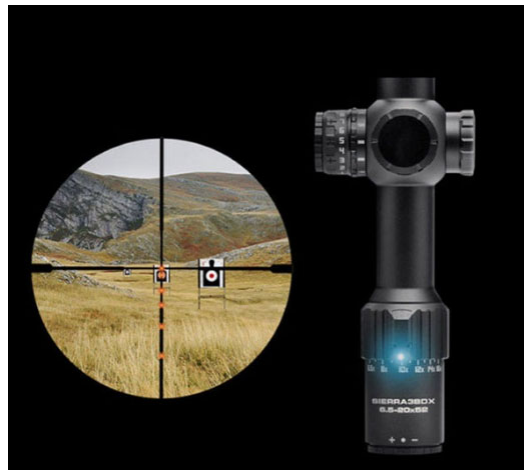
What is BDX 2.0?

BDX 2.0 takes all the advanced Applied Ballistics Ultralight and Bluetooth technology and adds a simplified and easy-to-use functionality to get hunters and shooters on target with unprecedented speed and accuracy. The BDX 2.0 system features nine pre-loaded, user-selectable Ballistic Drop Compensation (BDC) reticles in all SIERRA Riflescopes, eight ballistic groups pre-loaded in KILO BDX rangefinders, and the Quick BOND feature that quickly pair the BDX rangefinders and scopes together as a ballistic system.
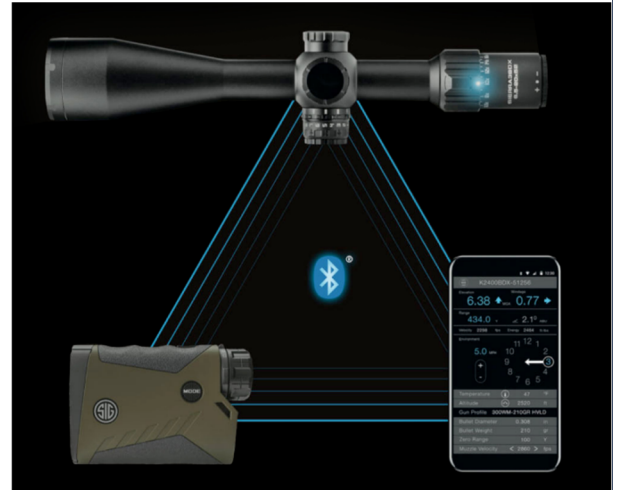
Sig also creates a smartphone app that allows hunter/shooter an easy set-up or if they desire to take their shooting to the next level of accuracy. With the BDX smartphone app, hunter/shooter can also configure their rangefinder and/or riflescope for their exact ballistics and environmental characteristics.

Riflescopes Only

The SIERRA riflescopes come preloaded with 9 different SmartBDC reticles allowing users to customize their riflescope right out of the box. Select the correct group that matches your ballistic characteristics, zero your rifle, and you are ready to go. The SmartBDC reticles provide holds out to 500 yards and scale with magnification to give the users an accurate hold no matter what power setting they desire.

Rangefinders Only

New BDX 2.0 allows users to quickly and easily bond their KILO laser rangefinders to their BDX riflescopes using the new Quick BOND feature. 8 preloaded ballistic groups are already loaded on the rangefinder for the user to be able to use the product right out of the box.

We don't know what Sig Sauer plans are, but the BDX system is a step in the direction that we'll see over the coming years. Electronic components will supplement the optical systems of a rifle scope and improve target acquisition and shooting accuracy.

Swifts spend most of their lives flying in the air and can fly for almost an entire year without landing.

The Right to Repair Movement
[Matthew Mckelvain]

Right to Repair, you may have heard about it recently gaining attention in US and the EU. But what does it actually mean, how did the movement start, where are we at now, and why should it be important to you?

What is the Right to Repair?

In a basic sense the goal of Right to Repair is to allow consumers the ability to repair and modify their own consumer electronic devices, where otherwise the manufacturer of such devices would require the consumer to use only their offered services.

Where did the Right to Repair movement begin?

The concept of the movement first came about in 2012 when Massachusetts passed the Motor Vehicle's Right to Repair Act. This bill required auto manufactures to provide any necessary documentation that would allow anyone to fix their vehicle. In 2018 major automotive trade organizations agreed to abide by Massachusetts' law in all 50 states. Inspired by this, The Repair Association was founded in 2013 to apply the same principles to electronics.

Where are we currently?

Currently electronics manufactures are making it increasingly more difficult for their products to be repaired by anyone other than themselves. Manufactures will use special proprietary screws and components that are difficult to remove or replace. More parts, such as Hard drives, memory, and batteries, are being soldered in or held down by adhesives making it difficult/next to impossible to replace without damaging the device. And now more recently manufactures have made it where their devices can tell when a part has been replaced.

Why should you be interested in the Right to Repair?

Consumers are losing choices when it comes to how they can get their devices fixed. With manufactures starting to be able to tell when a part was not originally sold with the device they can start to refuse to fix issues unrelated to the replaced part. More drastically manufactures could start to make it were their devices will stop working if it detects a part has been replaced. These practices remove choice from the consumer and give all control to the manufacturer.

With a car you have the choice to take it to get fixed at a mechanics shop, dealership, or even do it yourself. When a part needs to be replaced you have the option to replace it with something as cheep or expensive as you would like. If you wanted to upgrade your car with cosmetic or performance parts you are free to do so. Your car will not purposely stop working because a part was not originally on the car when it came from the dealership. The Right to repair is about taking these same choices consumers get to make for their cars and allow them to do the same for their electronics.

If you would like to learn more please go check out The Repair Association at: repair.org

The pangolin rolls up into an armour plated ball so lions cannot eat them.

Mixed Reality in Power Apps
[Sharon Huang]

Introduction

Do you ever want to hang a picture on your wall, and don't know where to hang it, or wonder which picture fits better on your wall? Well, Mixed Reality (MR) can allow you to see the pictures hanging right in front of your wall using your smart phones. Some other applications are like putting objects in a room, or arranging equipment in a factory. Or, gardeners can use Mixed Reality to arrange the garden plants, etc.

Microsoft just added the new mixed reality features to Power Apps in 2020, this pre-release documentation (https://docs.microsoft.com/en-us/powerapps/maker/canvas-apps/mixed-reality-overview) includes the introduction and details about how to make it work.

One benefit of having mixed reality features in Power Apps is you can incorporate it into PowerAutomate (Flow) to automate tasks, and of course to all other apps available to you as well. The possibility is unlimited!

How to

Prerequisites

1. You'll need an MR-capable device.
   To use the components in an app created with Power Apps, the device that runs the app (such as a phone or tablet) needs to have specific hardware and software. The device that creates the app in the Power Apps studio (such as your PC) does not need to be MR-capable. Please check your device capability at https://docs.microsoft.com/en-us/powerapps/maker/canvas-apps/mixed-reality-overview#mixed-reality-capable-devices.

2. Enable the MR features for each app.
   To create an app with MR feature, you need to enable the MR features:

   1. Open the app for editing in Power Apps Studio at https://create.powerapps.com
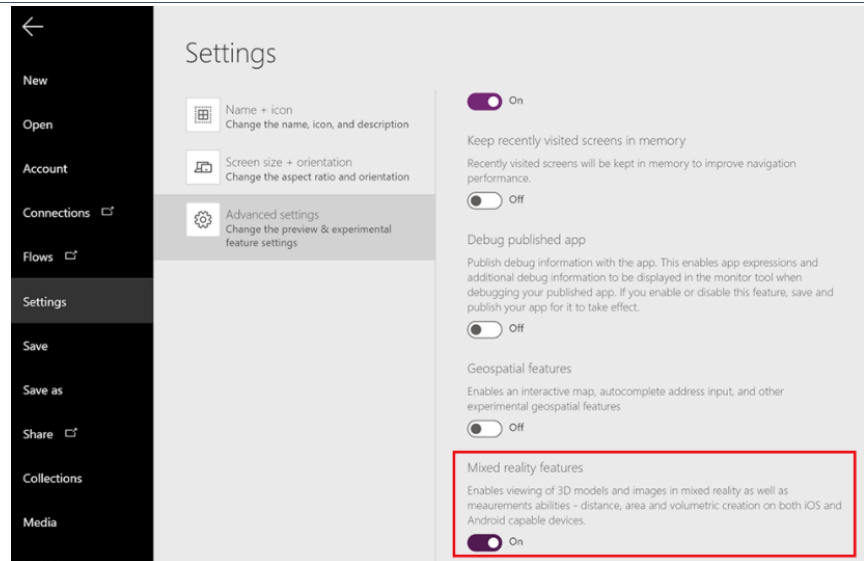
   2. Select **File** from the top menu.
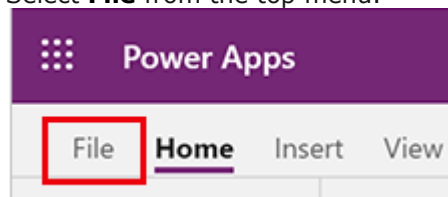
   3. Go to the **Settings** tab, select **Advanced settings**, and scroll down to find the **Mixed reality features** option. Set the option to **On**.
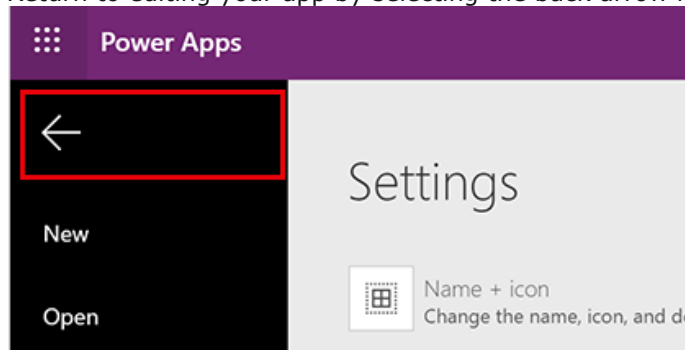
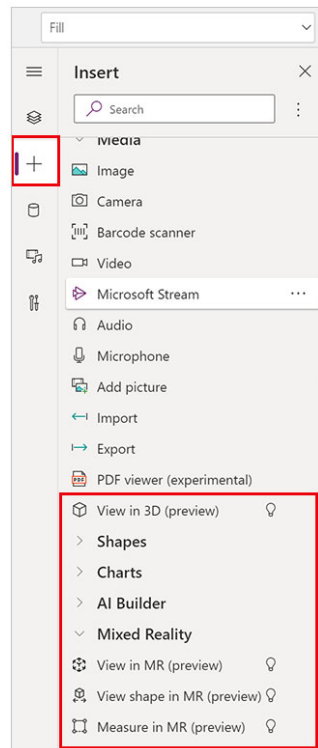The inland taipan is the most venomous snake in the world.

4. Return to editing your app by selecting the back arrow icon.

5. Open the **Insert** pane to see the MR components under **Media** and **Mixed Reality**.
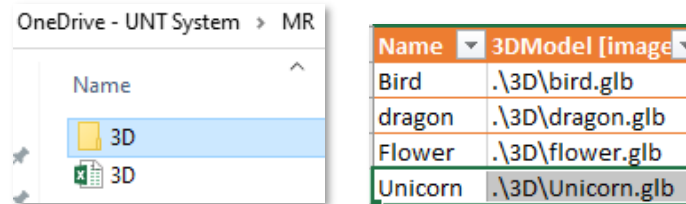
Build your 3D objects

The 3D objects need to be .glb files. You can download some free 3D objects online and covert them to .glb files, or use 3D making software to build your own, Microsoft provide 3D builder for free and come with some free 3D objects too.

After you have a collection of your 3D objects, put the .glb files in a folder, and create a list of the file names and file locations in an Excel file like the image below.

OneDrive - UNT System > MR

Name	
📁 3D	
📊 3D	

Name	3DModel [image]
Bird	.\3D\bird.glb
dragon	.\3D\dragon.glb
Flower	.\3D\flower.glb
Unicorn	.\3D\Unicorn.glb

Build your Power Apps

Please click the hyperlinks to see the Microsoft documentations.

- View 3D content with the **View in 3D** component.
- View images and 3D content in the real world with the **View in mixed reality** component.
- Measure distance, area, and volume with the **Measure in mixed reality** component.
- Create and view predefined 3D shapes with the **View shape in mixed reality** component.

Mixed Reality Demo Project

Please click this link to see my demo project. Or, you can download PowerApps to your phone, so you can see all apps available to you. I made this project very simple, only show one 3D objects you can play with rotating and making it bigger or smaller either on a computer or smart phone. Then a button you can click to view in mixed reality.
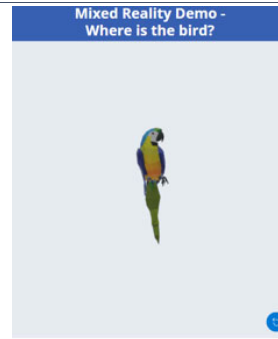
You can view and play with the 3D objects on a computer, but to view in MR, you need a supported device like an iPhone or other smart phone. My iPhone XR can view MR, but my other old iPhones don't work. For Android devices, you'll need to have the ARCore services installed, please check https://docs.microsoft.com/en-us/powerapps/maker/canvas-apps/mixed-reality-overview#mixed-reality-capable-devices for details.

Check out the demo project! Below are some of my screen captures. Let's see where the bird can fly to, Alaska? ☺

This is a screen capture of the demo apps:

Otters hold hands while sleeping.
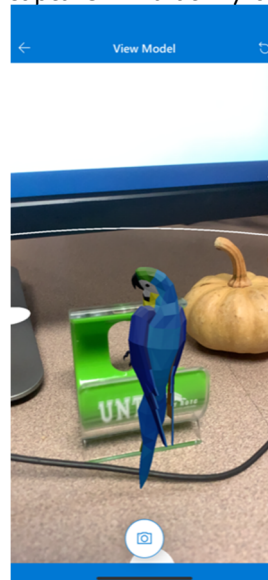
Mixed Reality Demo -
Where is the bird?

You can rotate the 3D objects above, and use two fingers to zoom the object in and out. The 3D object take a while to show, and MR takes even longer, please bear with that.

View in MR

.

MR capture- Bird at my home:
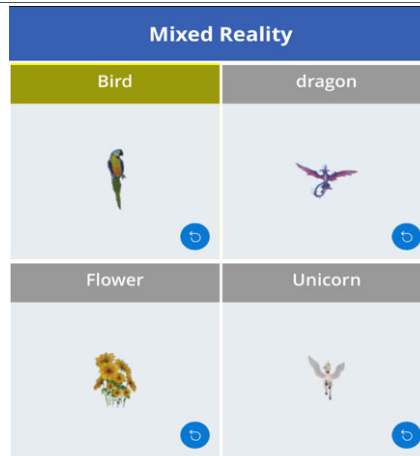

View Model

MR capture- Bird at my office:

View Model

This is another design, you can have a gallery of the 3D objects, and view them in MR individually to see which one fits better in the space too.

The loudest animal is a prawn that is only 2cm long.

Mixed Reality

Bird	dragon
Flower	Unicorn

You can rotate the 3D objects above, and use two fingers to zoom the object in and out. The 3D object take a while to show, and MR takes even longer, please bear with that.

View in MR

Summary

Microsoft is continuing on development of Power Apps, the 3D and mixed reality features are really fun to play with, there are more other cool features too. Power Apps is powerful because it can collaborate with other apps in Power Suite like PowerAutomate and it allows you to connect to OneDrive, SharePoint, all sorts of data resources, and web API. I will recommend UNT to set up Gateway so Power Apps can do SQL queries in the apps, thus it makes data easier to be retrieved from Power Apps, and UNT HSC campus already did so.

There is always something cool and fun in computer technology, let's see Power Apps grow to be more powerful, useful, ad fun!

Octopuses have 3 hearts.

Making High-Tech Highly Accessible
[Ryan Faulder]

One of the core values that drew me to UNT is our commitment to building an equitable and inclusive community for all our students, faculty, staff, and guests. Part of being an inclusive community is providing an environment that considers people of all abilities. When selecting technology and services to deploy on campus it's essential to keep the principle of universal design in mind. Universal design is assuring that anyone who might use your technology has the best experience possible and can access information and technology resources regardless of ability. The below topics are not all-inclusive and are not a complete guide to technology accessibility but should be used as a starting point for better serving the UNT community.

Websites
Web Content Accessibility Guidelines (WCAG) is published by the Web Accessibility Initiative and is one the most widely used and respected standards for making a website accessible. WCAG categorizes conformance into three levels to meet the needs of different groups and situations with level A being the lowest, AA being mid-range, and AAA being the highest level of conformance. Section 508 of the Rehabilitation Act of 1973, as revised in January 2017, requires that all content provided on webpages at UNT at a minimum comply with levels A and AA. Within WCAG 2.0 there are four principles to keep in mind: perceivability, operability, ability to be understood, and robustness. These principles are further explained below.

Owls don't have eyeballs.

Principles	Guidelines	Level A	Level AA	Level AAA
Perceivable	Text Alternatives	✓		
	Time-based Media	✓	✓	✓
	Adaptable	✓		
	Distinguishable	✓	✓	✓
Operable	Keyboard Accessible	✓		✓
	Enough Time	✓		✓
	Seizures	✓		✓
	Navigable	✓	✓	✓
Understandable	Readable	✓	✓	✓
	Predictable	✓	✓	✓
	Input	✓	✓	✓
Robust	Compatible	✓		

WCAG 2.0 Conformance Chart Source: openclassrooms.com

Kiosks and Audio/Visual Technology

Many areas of UNT have digital signage, A/V technology, and touchscreens kiosks deployed on campus; it's important to keep in mind the needs of people with mobility issues and visual impairments when selecting and designing a system.

Work Surfaces
The Americans with Disabilities Act (ADA) Standards require the height of work surfaces to be a minimum of 28 inches AFF (above-finished floor) with a maximum of 34 inches AFF. This could include desks, lecterns, and laboratory countertops and includes any A/V technology attached to the desk. Meaning if there's a keyboard on a stand that's 35 inches but the primary working surface is 30 inches this would still

be out of ADA compliance.

Reach Ranges

A forward or side reach by a user in a wheelchair can be defined as unobstructed and obstructed. An example of an unobstructed forward and side reach is when a person in a wheelchair approaches a wall-mounted informational kiosk or HDMI wall plate either head-on or from their side. Interactive elements can have a maximum height of 48 inches AFF and a minimum of 15 inches AFF. All user interactable areas such as buttons and knobs must be within the minimum and maximum reach distances mandated for that situation. For example, if there's a touchscreen with buttons that stop at 34 inches but there's a non-interactive bezel going above 34 inches this touchscreen would still be within compliance.
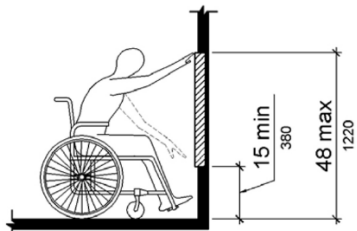

Figure 308.2.1
Unobstructed Forward Reach

Obstructed reach minimum and maximum ranges for forward and side reaches depend on the size of the obstruction that someone in a wheelchair must reach over and are specified in the illustration below.
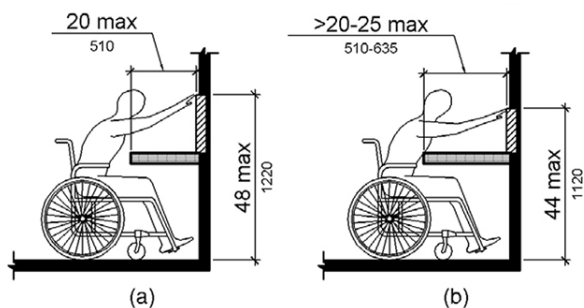

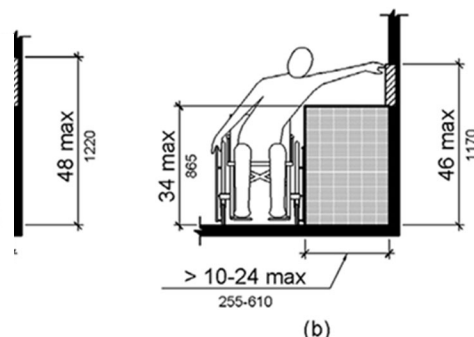**Figure 308.2.2**
Obstructed High Forward Reach

Figure 308.3.2
bstructed High Side Reach

Floor mounted electrical and data receptacles are excluded from these reach range requirements.

Protruding Objects

Protruding objects such as signage displays and TVs are a common source of ADA violations that can easily be prevented. The ADA Standards require that a signage display or other protruding object that will be mounted on a wall be between 27 inches and 80 inches above the floor **and** may not protrude more than 4in from the wall. If the device is mounted higher than 80 inches, then it can protrude further than 4in.
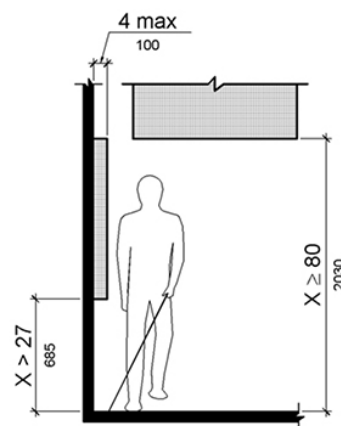
Reach and Protruding Objects Image Source:
https://campustechnology.com/

Figure 307.2
Limits of Protruding Objects

Assisted Listening Devices

The ADA requires assistive listening systems be provided "in each assembly area where audible communication is integral to the use of the space." These standards also dictate the number of receivers with relation to the audience size in addition to technical requirements of the different types of assistive listening systems.

Signal source, e.g. an interpreter´s desk

Modulator

IR radiator

Transmission via infra-red light

Receivers
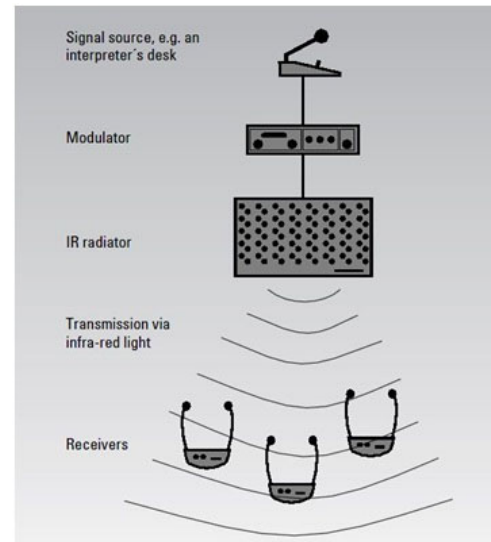
Additional Accessibility Resources

UNT Web Accessibility Policy:
https://policy.unt.edu/sites/default/files/14.008_WebAccessibility_2003.pdf
UNT Office of Disability Access: 940-565-4323 or Apply.ODA@unt.edu
WCAG 2 Quick Reference: https://www.w3.org/WAI/WCAG21/quickref/
2010 ADA Standards for Assistive Listening Devices:
https://www.ftc.gov/system/files/documents/public_comments/2017/03/00020-140394.pdf

Male gentoo and Adelie penguins "propose" to females by giving them a pebble.

How to get High Quality Home Theater Sound at Home on a Budget
[Kris Leonard]

If you're anything like me, the COVID pandemic has definitely put a damper on many of the things I love to do. Going out to a local restaurant or bar with friends, nights out socializing, even concerts and sporting events have all but become a distant memory for many of us who dare not risk exposure for the sake of entertainment. The one thing I find myself longing for the most however, is going to my local theatre, grabbing a giant bucket of popcorn and my favorite drink, and relaxing in a super comfy chair while my senses are overwhelmed by the sights and sounds of Hollywood's latest and greatest blockbuster.

I miss going to the movies. I miss it so much in fact, that a few months into our home-confined, pandemic-induced extended vacation, I decided that the only option was to beef up my home entertainment set-up to get that same theater quality experience in my own home. I already had a fantastic 60-inch television, but the sound quality just wasn't giving me that fun effect of "bullets racing past your head" noise that you get when seeing a movie in true DOLBY surround at the AMC. My biggest hurdle: I didn't have a ton of extra funds to spend on a high end 7.1 surround sound system and high-end speakers. I also am limited on what I can do because I live in an apartment, and I don't think building management would be too fond of me drilling through walls to run speaker cables. So, I set out on my journey to find easy to set up, theater quality sound on a budget.

Modern advances in home theater sound equipment, offer thousands of amazing solutions from a plethora of manufacturers who have spent countless years of development on wireless speaker technology, and has revolutionized the options and flexibility for high quality sound at home. After scouring hundreds of options and spending much time going into retail stores to listen to the difference in quality, I narrowed my choices down to two options: The Sonos family of speakers, and since I am already a lover of all things Apple, I had the idea of using Apple HomePods as satellite speakers. Both solutions offer robust sound with great high- and low-end audio response, and both have impressive sound for relatively compact designs. They also both have Bluetooth capability and offer advanced features such as multi-room sound options that offer voice control throughout the entire home, if you're also looking to add smart home functionality to your home, which is an added bonus.

Pricing for each is somewhat comparable with the standard Sonos One (Generation 2) speaker coming in at around $179, and while Apple's original HomePod comes in at 299.99 but offers the added bonus of Dolby ATMOS technology. In a head to head competition of just simply playing music, I personally found that the HomePod offered superior quality sound to the Sonos One, although I will admit I have a bias toward Apple products and use many of them including the Apple TV in virtually every room in my home. In the end, a case can be made for either option. Sonos has some incredible speakers designed for wireless home theater solutions and, like Apple, their speakers can also be used throughout your home for the days spent cleaning the house and wanting your music playing in every room. In the end, I chose to go with a hybrid of Apple's HomePod and new HomePod Mini since I was already well invested in Apple infrastructure in my home. I will however highlight the Sonos solution options below for comparison sake, or for those who don't care for Apple products.

My solution now consists of 4 speakers. My front two speakers are two original Apple HomePods set in a stereo pair that give me a truly immersive Dolby Atmos experience that would rival any high end 7.1 speaker system on their own. The bass response is truly amazing and the high end is crystal clear. That solution alone would have been plenty for my small apartment, however I really wanted to make sure my neighbors could enjoy my movie listening experience as well, so I also added two HomePod Minis in the rear of my viewing area for a total of four speakers and I am exceedingly happy with the results. If you are someone who already owns

an apple tv, I would definitely recommend this option. In total the entire solution cost me around $800 only takes about 10 minutes of total set up time with no wires or cables to run and each speaker can be moved to separate rooms at will for those days when you feel like playing music throughout your entire home. You can even play separate playlists in each room and bring all the speakers back together the next time you're ready to curl up and watch your favorite movie with truly immersive surround sound.

If you opt to go with Sonos, and hope to get similar or better sound quality as described in my Apple setup, you will need to purchase the Sonos ARC which retails at $799 and is single, soundbar that also is equipped with Dolby Atmos technology. In my testing, I found that this speaker had amazing sound and special awareness, but was a bit lacking in the low or bass end of the spectrum. I personally like the walls to shake during those action-packed scenes. To get this you will also want to purchase the Sonos Sub which adds amazing quality and performance to the overall sound. The pair can be purchased together for $1,498 dollars and will not disappoint, especially in small to medium sized spaces.

All in all, either solution would be a great addition to any home theater set-up and will take your home movie watching experience completely new levels. My pick, as I've mentioned, is the Apple solution. While the Sonos Arc and Sub pair to seem to be a bit more powerful, I like the added flexibility of being able to move my same HomePod speakers around my home for days where I feel more like having a full house dance party instead of a movie watching day. I would have to also purchase the Sonos One speaker at $179 to get that option with Sonos. In either case, the next time you get ready to view your favorite action-packed thriller, you will be pleasantly surprised by your impressively easy to install and economical home theater system. Happy listening!

Reindeer eyeballs turn blue in the winter.

Virtual KIA!
[Matthew Trammell]

When the COVID-19 pandemic arrived, many businesses and educational institutions had to figure out how to conduct their business online. Online retailers had to adapt to a sudden increase in online shoppers. Grocery stores, fast food places, and restaurants had to quickly create or improve existing web and mobile applications in order to allow customers to order food online and pick it up curbside. Food delivery services such as Grubhub, Uber Eats, and Door Dash gained popularity. Other businesses had to transition from primarily an in-person, cash only experience to a virtual Zoom meeting, pay online experience. Personally, it has been frustrating to not visit family as often, to not know if you are carrying the virus or a cold or seasonal allergy, and having to scale back on social activities. Alas, I have found that it is often easier to focus on the negative. Even more so now, I try to stay positive and count my blessings.

I am blessed by my position at UNT that enables me to provide for my family. I am grateful for my wife's position at Krum ISD as a middle school teacher and her role in teaching a new generation. Furthermore, I am blessed by my children, family, extended family, and friends. I am excited to share that amongst this pandemic, my wife and I welcomed our third child, born January 25, 2021! It was a much different experience this time around, with me attending doctor appointments via FaceTime, but we survived and now have our second son! It is hard to believe that he is already two months old! It is indeed a blessing to have kids. I especially enjoy getting to create memories with them.

One of my favorite childhood memories was taking karate with my dad. We moved overseas before I could complete my Jr. Black Belt. By the time that I returned to the States, I had found other interests. Yet, I had not forgotten about karate. I was excited to return to my quest for the Black Belt when the opportunity presented itself. My eldest son was getting closer to the age where he could start karate. I researched several karate dojos and came across an interesting and affordable karate program called Red Tiger Karate. I read the age requirements… the program started at age five! My son was probably between three and four at the time. So, I waited for a period of time that seemed like forever. It was around this time that we started a budgeting application called YNAB, or You Need a Budget. YNAB may be the topic for a future article, because that application completely changed how I felt about budgeting. I highly recommend it. I knew that the total cost for two students, two uniforms, and eight weeks of instruction was $180. So, I divided $180 by 12 months and set aside $15 per month. Thanks, YNAB! Each month, I excitedly watched my Red Tiger Karate category balance grow. Finally, summer arrived! Karate was set to start, but it did not start how I expected it to.

March 2020. COVID-19 arrived. I was certain that it would run its course and be done by the summer. I think that everyone was hoping for that as well. Unfortunately, COVID-19 did not leave. It stayed and flourished. I checked the Red Tiger Karate website and in-person classes were cancelled. However, there was an option to take virtual classes from home, via the Zoom platform. My excitement started to fade as I contemplated waiting for in-person instruction to resume, not knowing when that would happen. Having taking karate, bowling lessons, golf lessons, and ballroom dancing lessons before, it was difficult to imagine how virtual lessons in a sporting event would work. Yes, I did include ballroom dancing as a sporting event. Look up DanceSport. Karate training is a community activity. Being able to train, exercise, and socialize together as a team is empowering. It encourages you to do your best and inspires others to do their best. I never thought that I would be able to do 20 pushups and 20 leg ups in a single session by myself on day one! I may have stopped at 10 pushups. Yet, as a group I did it! It would have been possible to wait for in-person classes to resume, however, my son was ready, and I was eagerly ready… so, I signed us up for virtual Red Tiger Karate for the June 2020 summer semester.

In preparation for your Zoom meeting, first install the Zoom application on your PC or laptop. You can join meetings through the website, however; with Zoom, and most other software; I prefer to use the application. Visit https://zoom.us/ to learn

more about Zoom and to download it. Additionally, you will need a built-in, or external web camera and microphone. Fortunately, the system requirements for Zoom are not stringent. Any relatively new laptop or PC should work. I would also recommend an HDMI out port. When installing new software, it is always good to review the system requirements. Please see https://support.zoom.us/hc/en-us/articles/201362023-System-requirements-for-Windows-macOS-and-Linux. While you are at the Zoom website, you can go ahead click the "Sign up, it's free button", if you need a Zoom account. The download Zoom client link is tricky to find. It is there under the Resources menu. Look in the top right area of your web browser. Left click Resources and then choose the first option, Download the Zoom Client (https://zoom.us/download). Now, download and install the Zoom Client for Meetings on your PC or laptop. Once you install Zoom, launch the application from your Start Menu or Desktop shortcut.

Before moving on, I have a few terms to introduce to those unfamiliar with martial arts. First, a dojo is the school or practice hall where martial arts are taught. You may also be wondering about Kia? What does that word in the title mean? Kia is most widely recognized as the scream when doing an attack or the yell at certain points while performing a kata. A kata is a formal exercise, that consists of specific moves, or techniques, and is used in karate training. Kia is an interesting concept to research. There are several alternative spellings such as Kiai and Hiyah. As you dive deeper into Kia, you will find that the Kia is much more than a yell or scream. It is a projection of one's confidence. It is that sound and look, that stare even that can quicky de-escalate a situation. I read an article called "What is Kiai" and the author references an Okinawan legend about a karate master who uses his Kia to instill fear upon his challenger prior to a duel to the death. The challenger feels sick each time he stands up to fight the karate master. He realizes that he is unable to defeat the karate master and even before a single attack is thrown, he profusely apologizes and stands down (http://the-martial-way.com/what-is-kiai/). If you are thinking about starting karate training, keep in mind that karate is more than just throwing punches and kicks. It is a way of life. It will build character and confidence. I highly recommend it.

Now that you are ready to begin training, it is time to set up our home dojo! Think about your home and the rooms in it. You may already have a space in mind. A living room, game room, or garage perhaps? I chose our living room. Each week, I would move our couch and reclining chairs to the back of the room in order to maximize our floor space. We have a TV mounted on the wall and an entertainment center underneath it. I placed my laptop centered, on top of the entertainment center. My laptop has a built-in camera and microphone. Requirement one. Check. I also have an HDMI out port. Optional requirement. Check. I found it helpful to connect my laptop to our TV via a HDMI cable. Any basic HDMI cable will do. I do not buy into the super expensive HDMI cables. Once, I joined the meeting, I would drag the meeting window to the TV screen so that I could get a large picture of our instructor from inside his dojo space.

You should have the Zoom application up and running. If not, go ahead and do that now. Click the Join a meeting button. Enter the meeting ID or personal link name provided by your meeting host. Your host may also require a password to enter the meeting. Be sure that you have any login information available prior to your meeting so that your meeting day is less stressful! Be sure that your name is correct. If you require both audio and video for your meeting, leave the two respective check boxes unchecked. Once all looks good, click Join. Provided that the host or cohost has started the meeting, you should be good to join! One final Zoom tip. Always test your audio, microphone, and video before proceeding with the meeting. It is best to test everything beforehand so that you are not under pressure to fix it at the last minute! Under the Join with Computer Audio, utilize the Test Speaker and Microphone link.

If your meeting host created a Waiting Room, this is the first stop. You must wait for the host or cohost to admit you into the Main Room. Hopefully by now, your meeting is underway and running smoothly. I still remember our first virtual karate class. I expected a long introduction welcoming us to the class, thank you for joining us today, let me tell you who I am and share my background in martial arts, and here is the class format. Nope! No complaints, I was just surprised how quickly we

jumped in. I learned how class works by watching and participating. Class started with a bow to show respect for the dojo, teacher, and fellow students. Our instructor said a quick introduction and a few announcements. Then, it was straight into group exercises, techniques, and a kata and self-defense session for senior students. Class ended with a final bow.

At first, much of our class was held in what Zoom calls the Main Room. Later as we continued our virtual training, we made use of Zoom's Breakout Rooms feature. We would begin in the Main Room with our group exercises. For techniques, we would go into a Breakout Room based on our belt rank. After going over our techniques we would leave the Breakout Room and return to the Main Room to close. The Breakout Rooms feature in Zoom works well for separating your meeting participants into smaller subgroups. Remember that when you are ready to exit the Breakout Room and return to the Main Room, chose the exit the Breakout Room only button. Otherwise, if you are not careful, you can remove yourself from the entire meeting session and have to awkwardly rejoin the meeting again! I felt that this implementation of Zoom worked well for our karate class. The end of semester belt tests worked similarly. We would get into our Breakout Rooms much faster on those days. My eldest son and I were able to complete two semesters virtually and emerged from the program as Orange Belts!

Fortunately, as we neared the completion of our Orange Belts, things started to improve on the COVID-19 front. Denton was ready to reopen some of their recreation centers. And so, with great excitement, we started the Fall 2020 semester in-person, wearing masks. It was great to finally see the instructors, classmates, and to train together in-person. It was great getting to play some of the games like Sensei Says and Follow the Leader. Exercising with masks was a bit more difficult than I had imagined. Yet, it was fun seeing my son interacting with kids his age, making new friends, and doing a great job focusing and paying attention. He is a much better student in-person. I think we all are, most of the time. Before I knew it, the fall semester came to a close and we earned our Green Belts. Then came the winter semester. Now, we have a chance to test for 1st Blue Belt. Time just keeps moving on!

As I conclude this article, I cannot help but reflect on COVID-19's arrival just a year ago and how it completely changed business, education, and our personal lives. I know that some things have been rough and not ideal at times. I am excited that things are improving, and I hope that they continue to do so. I am thankful for the applications that help us get food and stay connected with others. I am thankful for the businesses and educational institutions like Red Tiger Karate, UNT, and Krum ISD, that have had to adjust their business practices to better serve their customers and students. I am thankful most of all for the support of family and friends. And thank you for allowing me to share this COVID-19 story. I hope that you found it interesting and, perhaps even, a good case study for how you can utilize Zoom in a business setting. Until next time, stay safe!

A single strand of spider silk is thinner than human hair but is also 5 times stronger than steel of the same width – GO SPIDEY!

Every website you have ever visited tracks and sells an imprint of you
[Matthew Berry]

There's a concept in art theory referred to as "Negative Space", the areas around the subject of an image. Generally, you could think of this as the white space around a drawing, and you can even use this to create images that are the true focus of the piece. Thus, making the negative space the subject instead.

Figure 4 Shown here in a famous optical illusion

"Why am I learning about art in a technology newsletter?" We'll get to that, but for right now go ahead and file this negative space information in your brain.
Every website you have ever clicked on, or interacted with in any way, has tracked you. They do this by filing away user data in your browser (referred to as 'cookies') in a searchable swap space. When this was first conceived it was used for session management, but corporations quickly began exploiting this. If you ever want to see who google thinks you are, there's a website for that. If you're new to this, this fact might startle you a bit. But we're just getting started!
Target has accurately inferred that their customers are pregnant without them overtly telling them. Not even through the obvious product choices either, the person was tracked through a series of seemingly unrelated purchases (Unscented lotion, mineral supplements …cotton balls?) which correlated with pregnancy. *And Target was right.*
But that's just things that you know for a fact they're tracking. Did you know that they track how long you hesitate to click a link? Where your mouse is? How long it takes you to read pages? When you leave? Now is a great time for me to mention Google isn't a technology company, **it's a marketing one.**
     "Okay I'm creeped out now but what does this have to do with negative space?"
Have you considered how much information you aren't directly disclosing to these companies, but they deduce anyway? They filter your age and gender based on formulas that infer it based upon what you typically scroll, how fast you read, other odd metrics. What websites you've browsed. They're using the positive space of your browsing habits to figure out who you are to paint you as the negative space picture.

So, what can you do about this? You could try something like https://privacybadger.org/ to block the trackers. Legislation like the GDPR in Europe helps curb some of this. Try to avoid any popular search companies or their browsers that are mysteriously free. Burn your phone, flee to the woods, never walk in front of another camera in public again. Never online shop for the rest of your life. Oh god you don't have a *Facebook,* do you? No, it's fine. I'm sure it'll all work out.

Ants can lift 50 times their own weight.

Solution to last newsletter's brainteaser

After a traumatic experience, Jackson opened his eyes in a hospital. He did not know who he was or what his name is.   There were people there calling themselves his family but he did not recognize any of them. Although things were never the same for him he adjusted to a new life.   He never remembered his life from before and never talked about it.

What had happened to Jackson?

HINT: Jackson wasn't in an accident, didn't suffer from an injury, and did not have amnesia.

Answer: Jackson is a newborn