

20 Factor of 7 - Guest Lecture-Zach Weaver

Friday, March 8, 2024 12:12 PM

Today:

Admin
Guest Lecture

Admin

Next Wednesday start Design Preview presentations
Volunteer for Pod Facilitator (sets the schedule) and/or Critique Facilitator (leads the questions, 1 day)
Does anybody use the AI summaries?



Diagram from Nathan Seidle, founder of Sparkfun

Magic Factor of 7

Here is some advice I got from Larry Talbot, my PhD advisor:

"In research, tasks will take you 7 times longer than you think they should"

You may think that you are a reasonably good project planner, that things may take longer than you plan by a factor of 2 or 3, but a factor of 7? Really? Why?

Everyone acknowledges the difficulty of planning when there are many unknowns. Used in project planning and risk assessment. You must consider

- **Known knowns:** things we know we know. You can make reasonable estimates of time regarding these issues. For example, how long it will take to order a material you need, or carry out an assembly step you have done before.
- **Known unknowns:** things we know that we don't know. For example you may know that you will need to learn to use a 3D printer for your projects. 'How to use a 3D printer' is a known unknown.
- **Unknown unknowns.** Things you have no way to predict.
 - ◆ Examples from previous years: A family emergency. A catastrophic laser cutter failure that will take months to repair. A nationwide shortage and backorder of a widget you need. Your friend who was going to help you with 3D printing falls in love and has no more time for you, and there are no more workshops offered this semester.
 - ◆ Example from 2 yrs ago: Covid.

This is a type of epistemology, knowledge about knowledge. "Epistemology is the investigation of what distinguishes justified belief from opinion."

<https://www.google.com/search?q=epistemology&ie=utf-8&oe=utf-8>

Very topical given recent controversies around national news!

There is a fourth category sometimes added: unknown knowns, things we deny

knowing. Unconscious bias, for example.

"Unknown unknowns" was made famous in 2002 by Donald Rumsfeld during the Iraqi War w.r.t WMDs, but has been used by NASA and others since the 1950's.

https://en.wikipedia.org/wiki/There_are_known_knowns

For time management and planning, some use a time order-of-magnitude safety factor:

if it should take 1 second, it will take 1 minute

if it should take 1 minute, it will take 1 hour

If it should take 1 hour, it will take 1 day

and etc, for days, weeks, months, years.

Factors of 60, 60, 24, 7, 30 etc. Perhaps excessive.

This may work, but I have found the Magic Factor of 7 to be remarkably accurate for doing anything new, in research or design.

Zack Weaver

As an ATLAS PhD student in 2014, Zack Weaver helped establish the BTU Lab. In 2015, he left ATLAS to work for an electronics company he co-founded while a student at Carnegie Mellon University. In 2017, he was appointed as co-director of the Boulder Public Library's BLDG 61, a maker space that has received national recognition for helping pioneer the incorporation of similar facilities into public libraries around the country. Zack taught undergraduate and graduate classes for ATLAS for two years as a lecturer before joining the full-time faculty in October 2022. An evangelist for the role maker spaces can play in learning and community building, Zack has a dynamic vision for the role of the BTU Lab in the ATLAS community. Zack earned a BFA from the University of Michigan and an MS in architecture from Carnegie Mellon University. His passion for equity and accessibility in hands-on learning drive him to advocate nationally for public access to technological literacy.

The Joy of Learning and Creating: The Rise of Maker Spaces (KGNU)

[Auto-Meter Reader Feeder Keeps Meter-Maids at Bay \(Hackaday\)](#)

From <<https://www.colorado.edu/atlas/zack-weaver>>

Aesthetics:

This slide doesn't have any...Or does it?







a set of principles underlying and guiding the work of a particular artist or artistic movement

"Engineering", as a university marketing campaign, has told you artists and artistic movements are beneath you.



a set of principles underlying and guiding the work of a particular ~~artist or artistic movement~~



Player Bios | Looney Tunes Bios | The Bad Guys | Trivia Quiz

CAST BIOS

No, his real name isn't Newman.

- Michael Jordan (as himself)
- Bugs Bunny (as himself)
- Wayne Knight (Stan Podolski)
- Teressa Riosch (Usanagi)
- Danny DeVito (voice of Strackhammer)



MICHAEL JORDAN who appears as himself, makes his motion picture feature debut with "Space Jam." Widely considered the greatest basketball player in history, he has parlayed an incredible college and professional career with the North Carolina Tar Heels and the Chicago Bulls into a position as an American icon and one of the most recognized personalities, sports or otherwise, in the world.

Jordan's list of basketball accomplishments is unparalleled in the history of the sport: member of North Carolina's NCAA championship team in 1982 and Atlantic Coast Rookie of the Year, NBA Rookie of the Year and All-American in 1983 and 1984, co-captain of the United States' gold medal-winning team in the 1984 Olympic games, NBA Rookie of the Year and scoring leader in 1985, NBA's Most Valuable Player in 1988, 1991, 1992 and 1995, second NBA player in history to score more than 3,000 points in a season, member of 10 NBA All-Star teams, NBA's scoring leader for eight seasons.

More impressively, holder of the league's best career scoring average (32.3 points per game), member of the "Dream Team" that won the 1992 Olympic gold medal, earned NBA Finals MVP honors in each of the Bulls' championship seasons: 1991-93, 1996, named to the NBA All-Defensive team seven times, voted 1996 NBA Defensive Player of the Year, selected for the All-NBA first team eight times, named NBA All-Star Game MVP in 1988, 1996, and scored NBA playoff record 63 points vs. Boston in 1986.

Jordan retired from professional basketball shortly after his father's death in 1994 to concentrate on a career in professional baseball. After playing one season with the Chicago White Sox AA affiliate, the Birmingham Barons, Jordan rejoined the Chicago Bulls and, in the 1995-96 season, led his team to another NBA Championship, won the league's scoring title and was again named Most Valuable Player of the Year and of the NBA All-Star Game.

BUGSBUNNY (as himself) received an Academy Award for his work in the 1956 theatrical short "Knighty Knight Bugs," and has been nominated for Oscar three more times. He is the star of more than 175 animated shorts, has starred in four full-length television specials and 14 CBS primetime specials. An American icon, Bugs Bunny serves as a constant reminder that to survive in today's world, one has to be shrewd and cool when under stress. In short, Bugs is the instigator of the Looney Tunes family -- an appropriate match for his superstar co-star, Michael Jordan.



WAYNE KNIGHT (Stan Podolski) is probably best known for his role in the blockbuster "Jurassic Park," as well as for his recurring part as Newman, Jerry Seinfeld's postal carrier neighbor on the hit NBC series "Seinfeld." However, his career encompasses a long list of film, television and stage.



1996
SITE



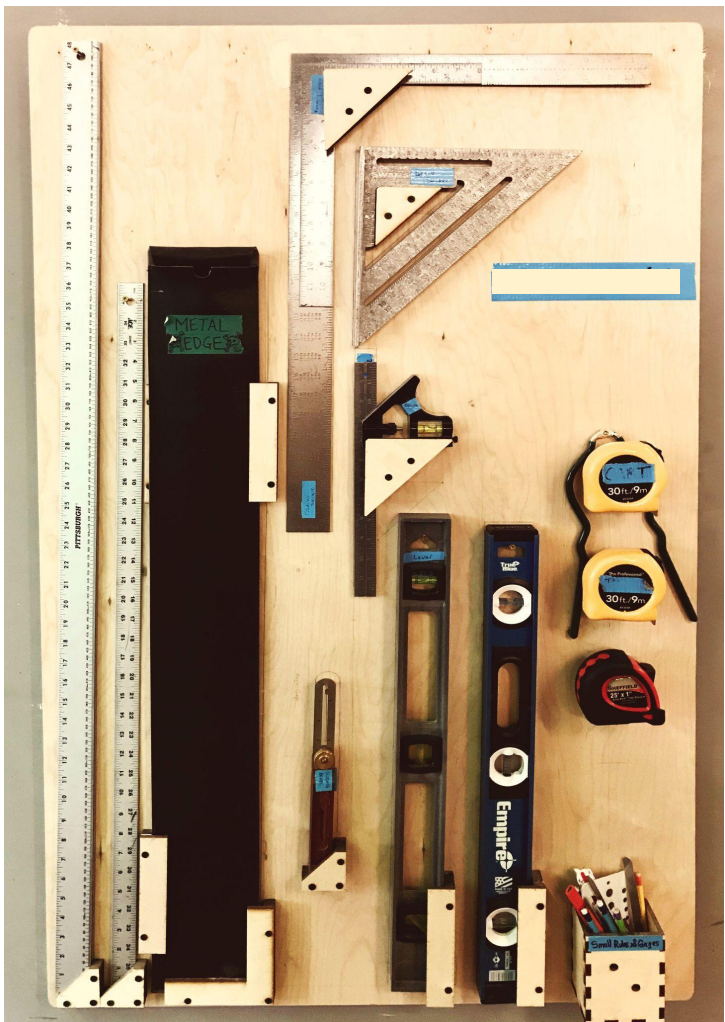
2021
SITE

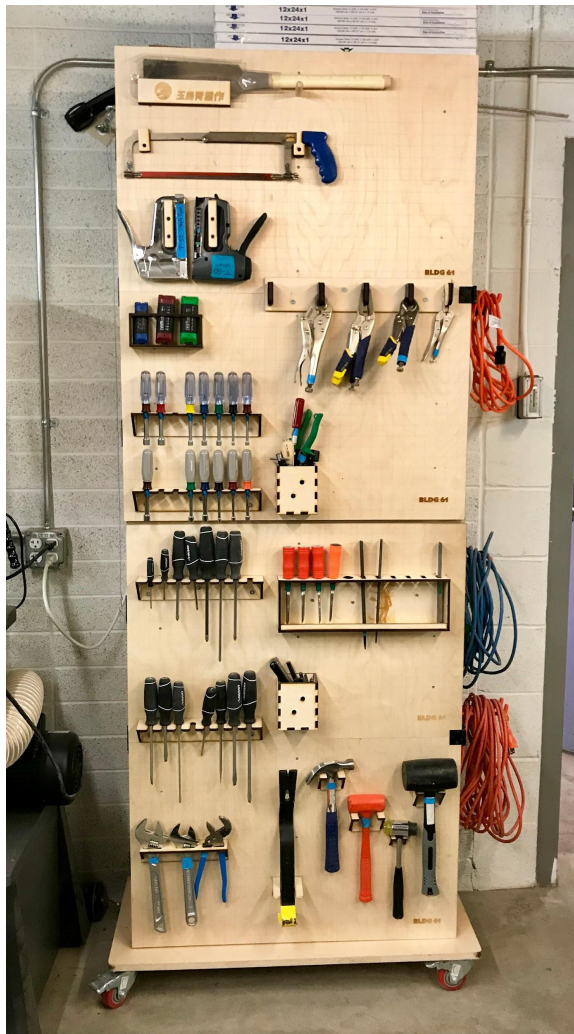
A NEW LEGACY
NOW PLAYING IN THEATERS

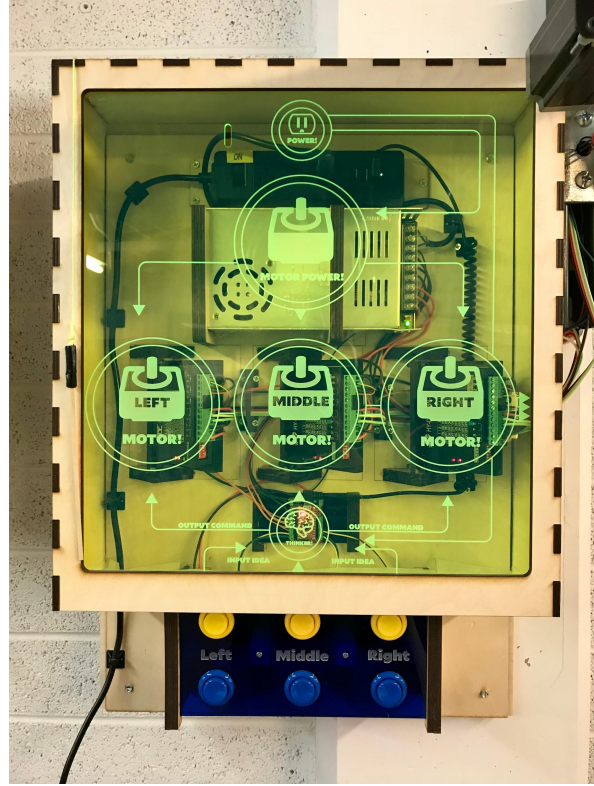
a set of principles underlying and guiding the work of a particular *artifact*.

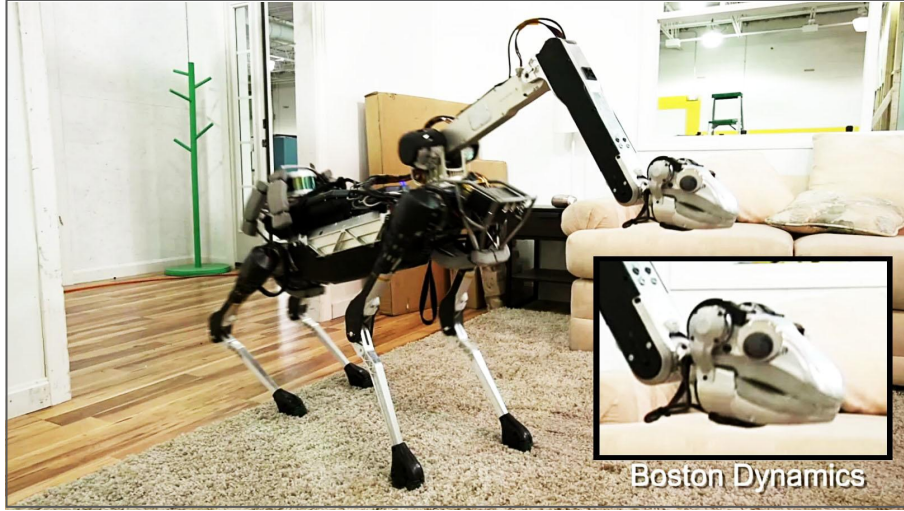
Artifact: an object made by a human being, typically an item of cultural or historical interest.

Aesthetics are practical.









Boston Dynamics

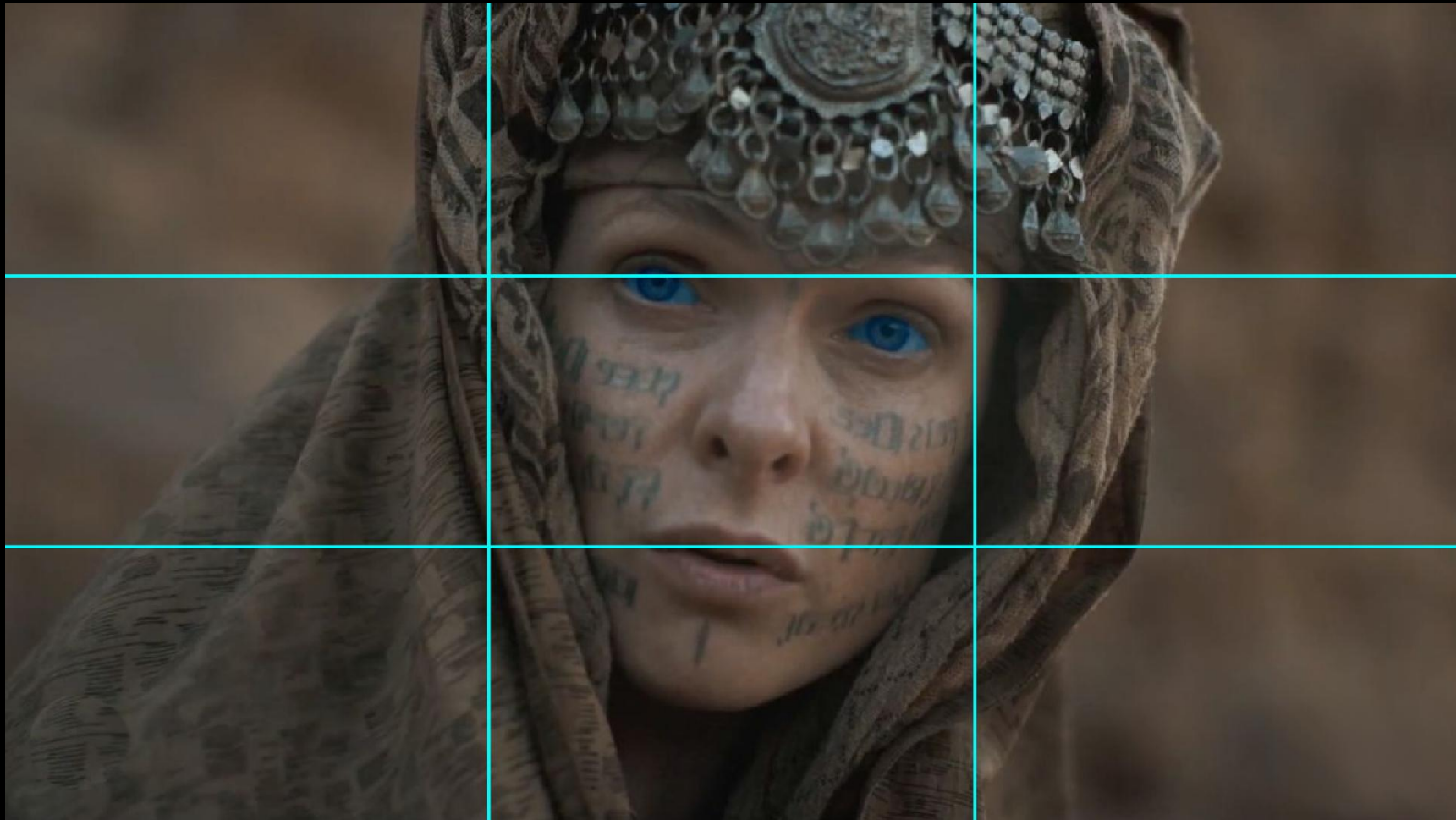
Just...nah.

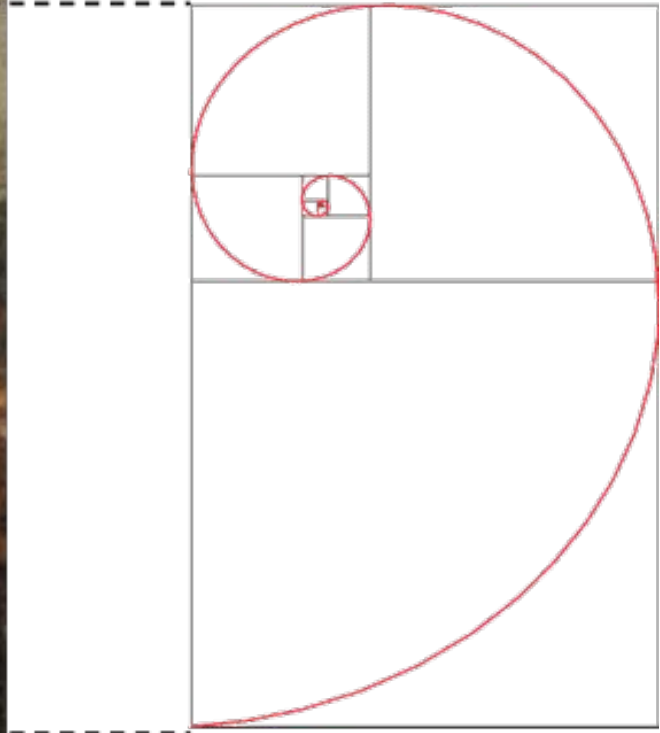
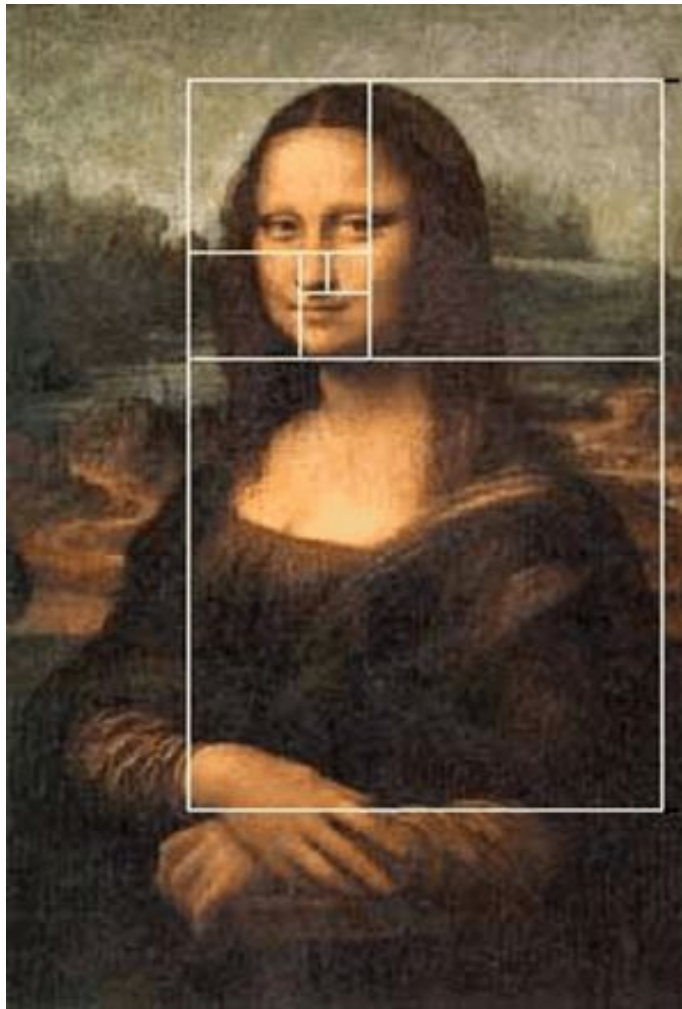


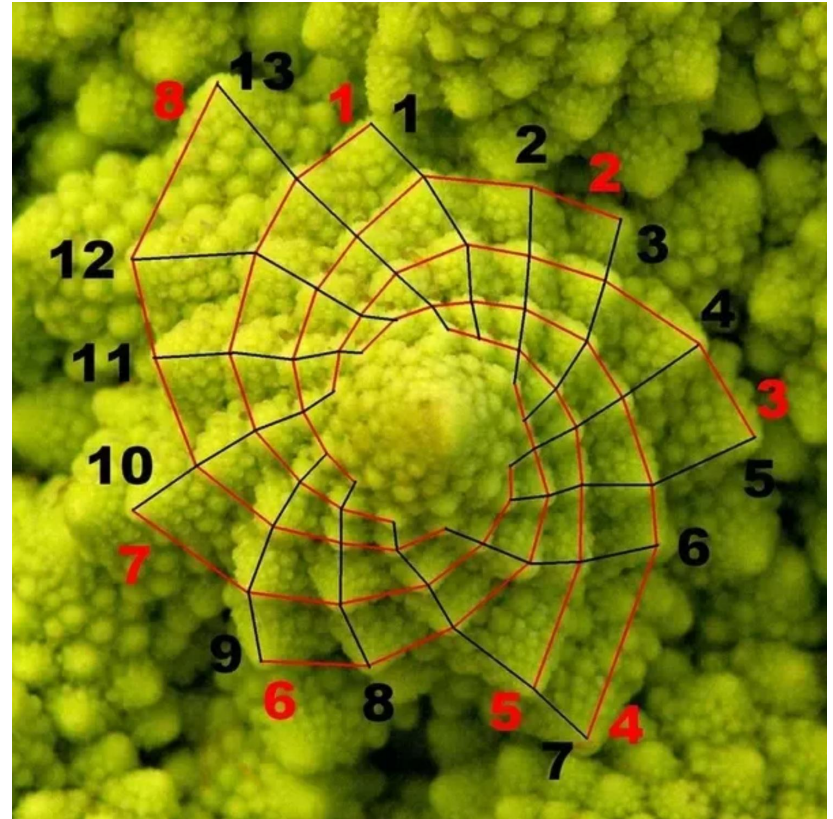
Aesthetics are quantifiable.

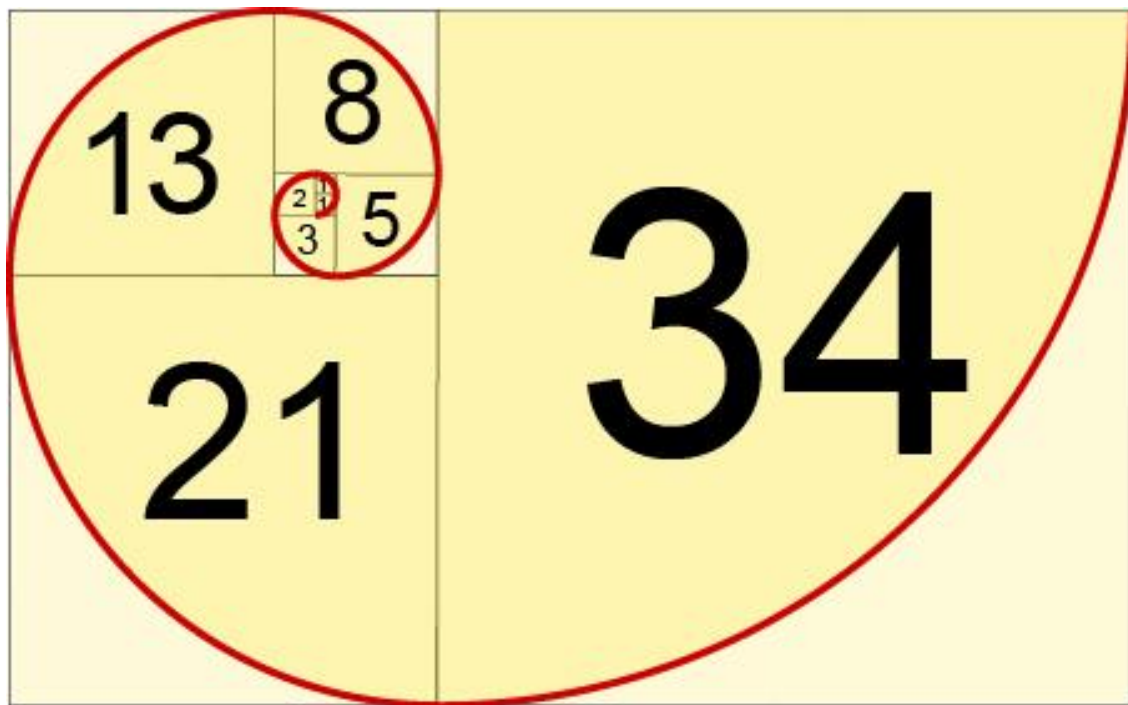


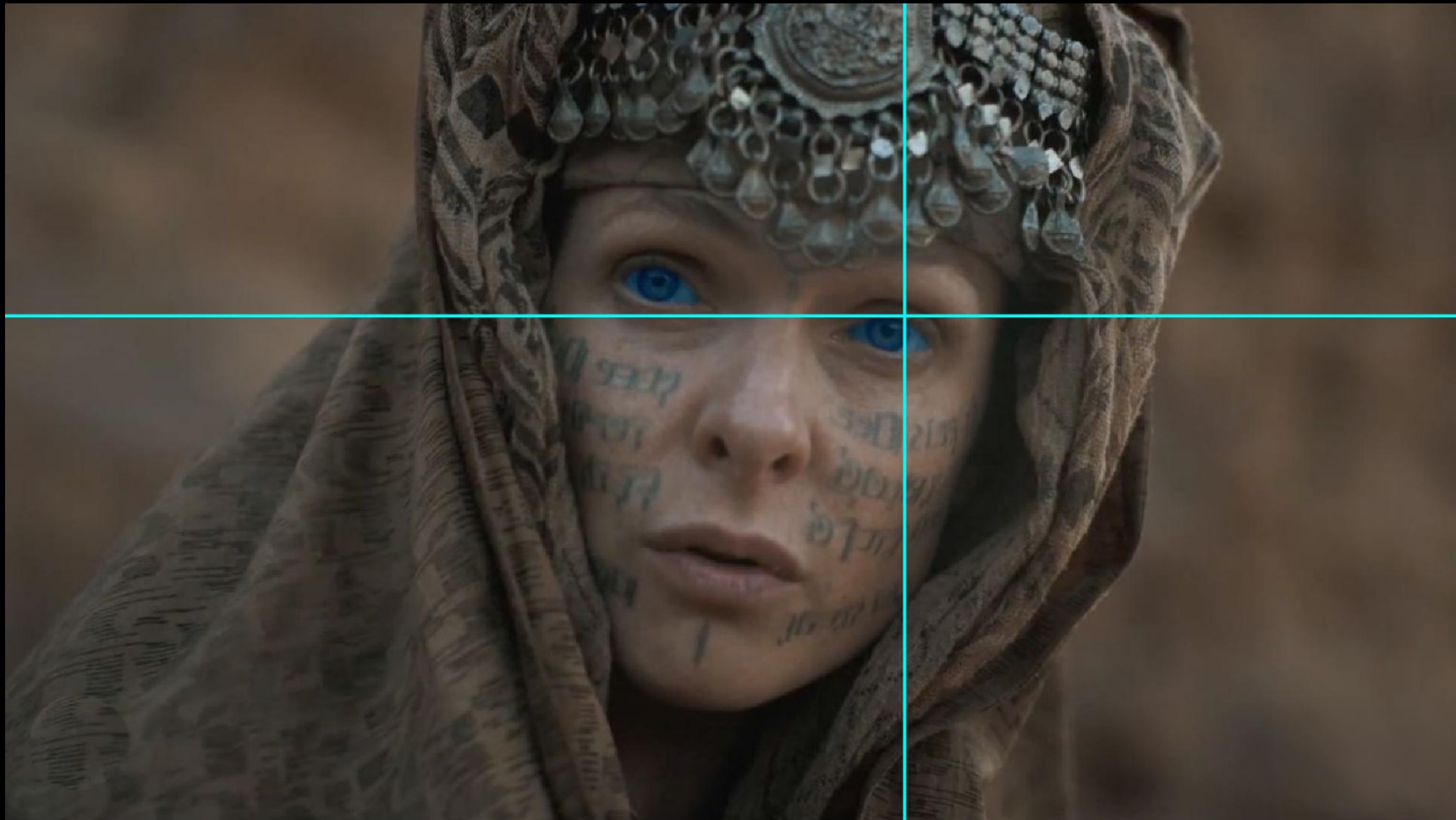






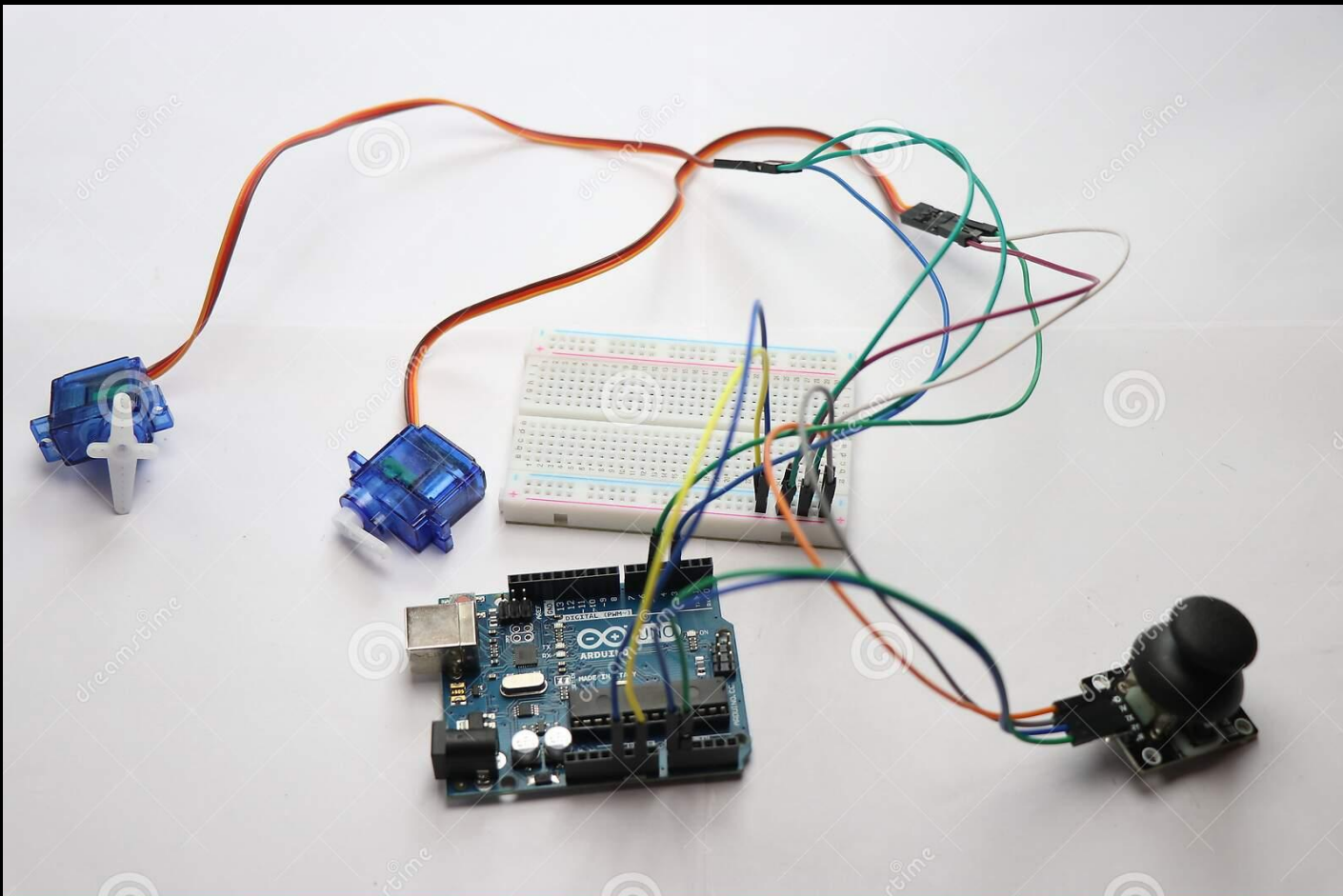


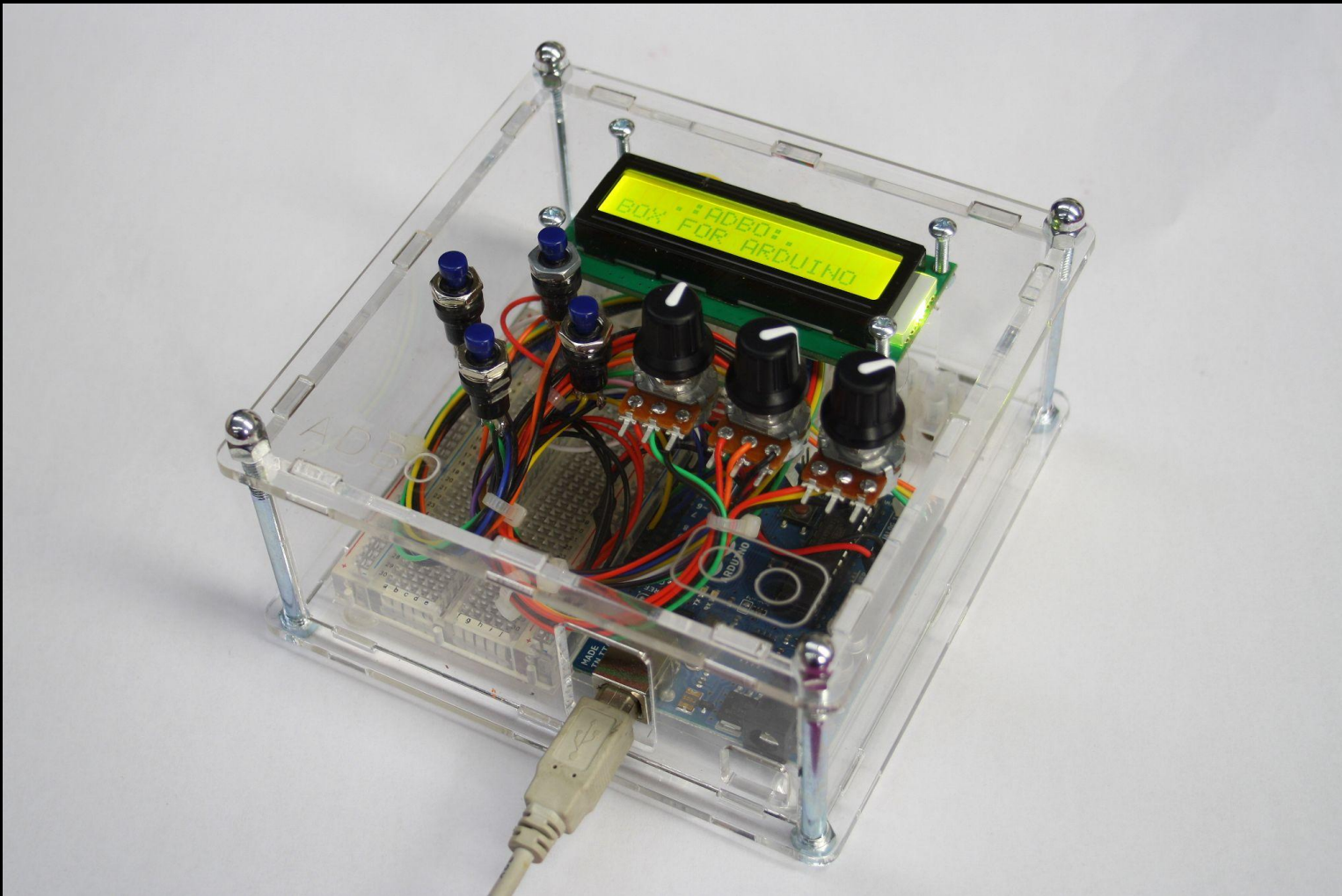




Skeptical?

Aesthetics will get you the job.







So...



Comparison chart

Differences —

Similarities —

Edit

Mac



(1931 ratings)

Cost Macs start at \$599 for the Mac mini desktop, \$999 for the M1 Macbook Air notebook, and \$1299 for the 24-inch M1 iMac. Macs are often more expensive than comparable PCs, but with the M1 models, offer much higher performance.

Manufacturer Apple, Inc.

Development and Distribution Macs are developed and distributed by Apple Inc.

What is it? Short form for "Macintosh" and refers to any computer produced by Apple, Inc.

PC



(1855 ratings)

Compared to a Mac, Windows and Windows-associated hardware is cheaper, and you can build your own for even less money. Comparable computers running Windows can be found around 40% cheaper than a Mac.

Manufacturer Several companies: HP, Toshiba, Dell, Lenovo, Samsung, Acer, Gateway etc.

Development and Distribution PCs are manufactured and distributed by hundreds of manufacturers.

What is it? Refers to any computer running IBM-Based (Windows, Linux, Solaris, FreeBSD) operating systems. stands for "Personal Computer"

Top 5 Companies, Worldwide Traditional PC Shipments, Market Share, and Year-Over-Year Growth, 2022 (Preliminary results, shipments are in millions of units)

Company	2022 Shipments	2022 Market Share	2021 Shipments	2021 Market Share	2022/2021 Growth
1. Lenovo	68.0	23.3%	81.8	23.4%	-16.9%
2. HP Inc.	55.3	18.9%	74.0	21.1%	-25.3%
3. Dell Technologies	49.8	17.0%	59.3	16.9%	-16.1%
4. Apple	28.6	9.8%	27.9	8.0%	2.5%
5. ASUS	20.6	7.0%	21.8	6.2%	-5.7%
Others	70.1	24.0%	85.2	24.3%	-17.8%
Total	292.3	100.0%	350.1	100.0%	-16.5%

Source: IDC Quarterly Personal Computing Device Tracker, January 10, 2023

<https://www.computerworld.com/article/3687228/apples-growth-story-is-consistent-and-sustained.html#:~:text=Just%20look%20at%20the%20data,and%2017%25%20in%20the%20US.>



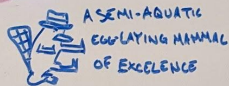
Good engineering, plus ***equally*** good aesthetics: That changes things.

Questions?

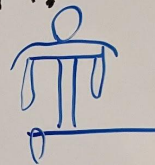
How to find me:



Physical user interfaces
require UI/UX as well.



You big goof balls.



-old guy

us.

FALSE, PERRY THE PLATYPUS 