



FAMU-FSU
College of
Engineering

Fluid Power Vehicle Challenge – T506 Design Review 1

Ethan Mercado and Gabriel Vazquez

October 17th, 2024

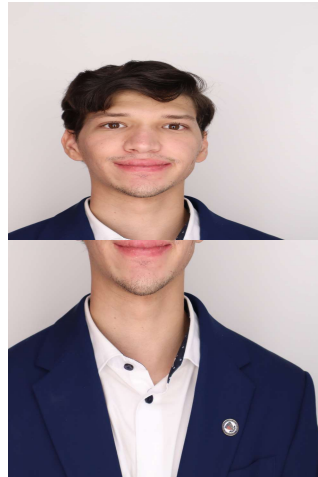
Team 506: Introductions



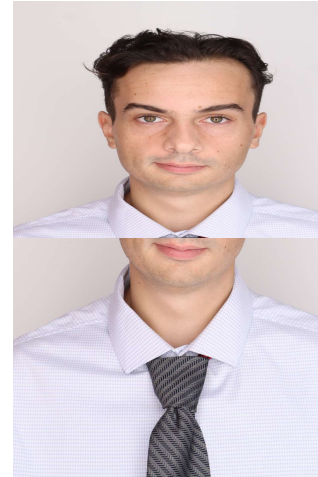
Adonay Almanza-
Enriquez
Controls Engineer



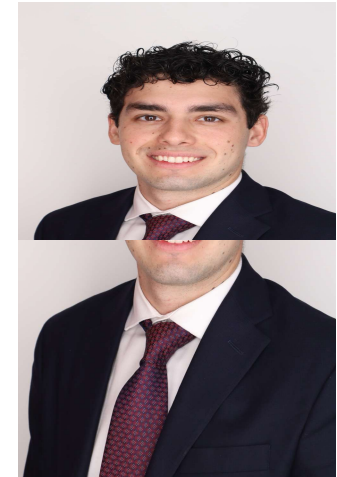
Trace Flowers
*Modeling & Simulation
Engineer*



Daniel Garmendia
Quality Engineer



Ethan Mercado
Systems Engineer



Gabriel Vazquez
Design Engineer

Gabriel Vazquez



FAMU-FSU
College of
Engineering

Sponsors and Advisors



Hakeem Rhodes
Dow Sponsor



Marcus Rideaux
Dow Sponsor



Mohd Yousuf Ali, Ph.D.
*FAMU-FSU College of
Engineering Advisor*



Dr. Shayne McConomy
*FAMU-FSU College of
Engineering Advisor*

Competition Mentors



Cory Fisher
Sun Hydraulics



Objective

The objective of the project is to design a fluid-powered vehicle with the aim of competing in the competition organized by the NFPA (National Fluid power Association)

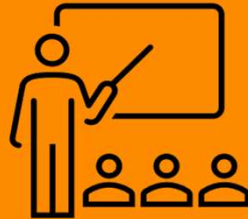


Markets

National Fluid
Power Association



Education



Retail



Key Goals

Meet the requirements
and safety guidelines of the
challenge



Complete all the races and
place first in at least one
award category



Produce comprehensive
documentation for future
team's success



Challenges

Sprint Race



Endurance Race



Efficiency Race

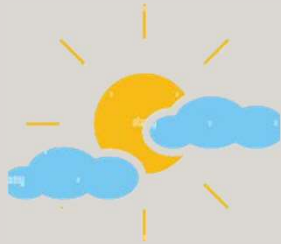


Assumptions

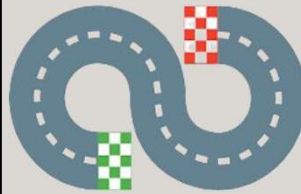
Hydraulic Fluid
Provided



Favorable
Weather



Optimal
Environment



Able-Bodied
Operator

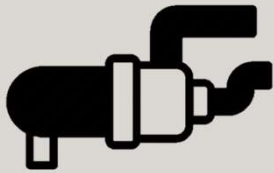


Designed For
Competition
Only



Vehicle Requirements

Use of Hydraulics



Energy Storage Device



Two Pressure Indicators



Regenerative Braking



Maximum weight of 210 pounds



Disqualifications

Insufficient Braking



Lack of Stability



Poor Visibility



Dangerous Protrusions
& Design Features



Zero Tolerance for
Active Leaks



Unsportsmanlike
Conduct



Scoring

Midway Review & Final Presentation

15

Regenerative Braking

3

FPVC Mentorship

4

Sprint Race

1st - 3 pts
2nd - 2 pts
3rd - 1 pt

3

Efficiency Race

1st - 3 pts
2nd - 2 pts
3rd - 1 pt

3

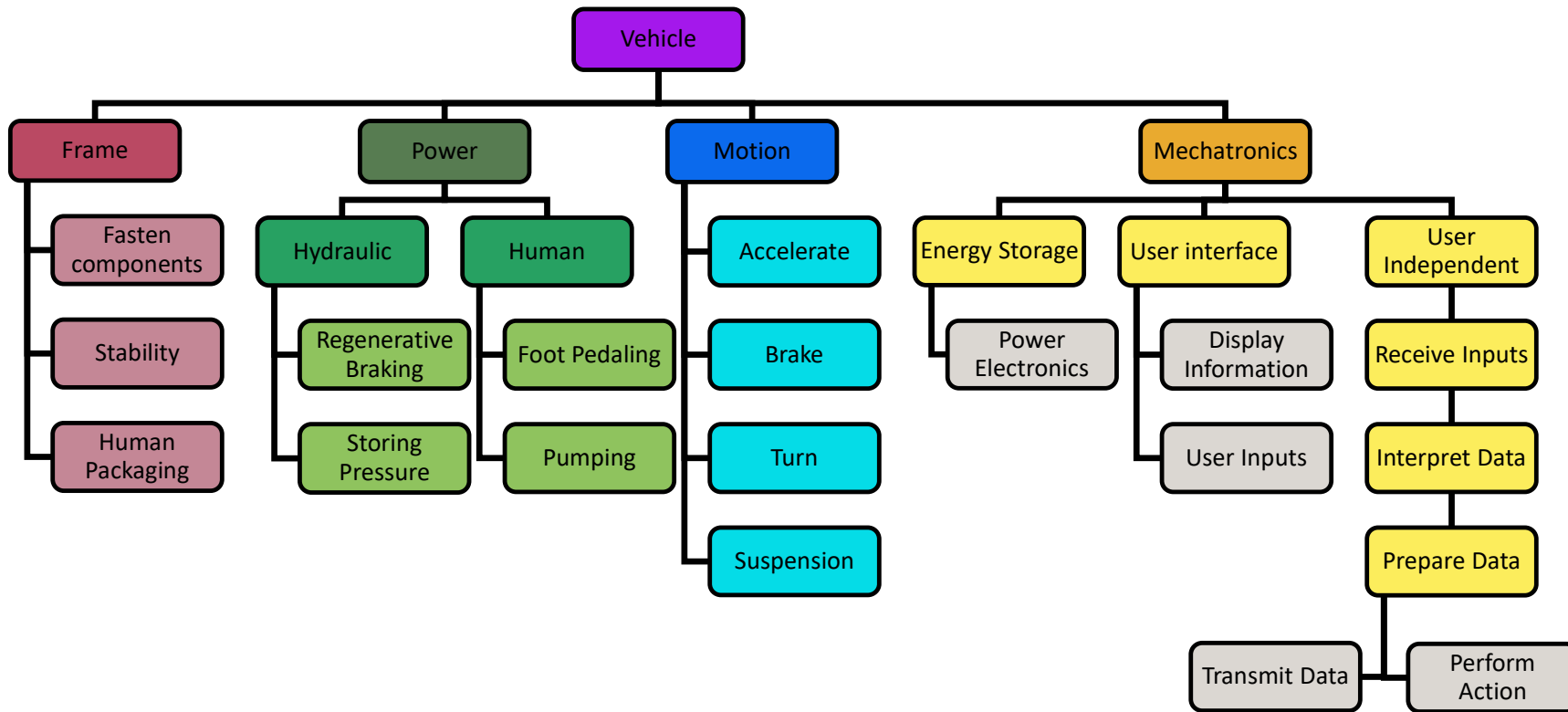
Endurance Race

1st - 3 pts
2nd - 2 pts
3rd - 1 pt

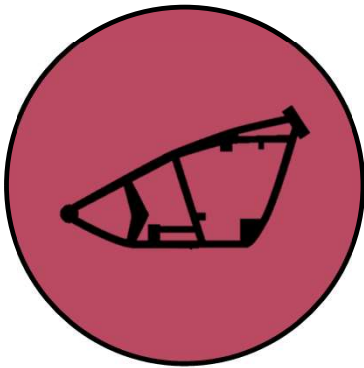
3



Functional Hierarchy Chart



Subsystems



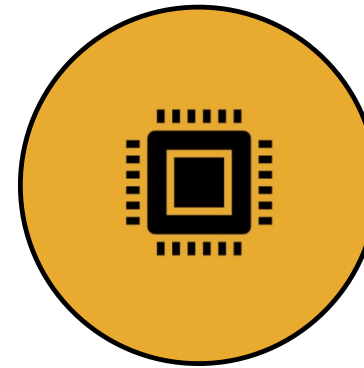
Frame



Motion



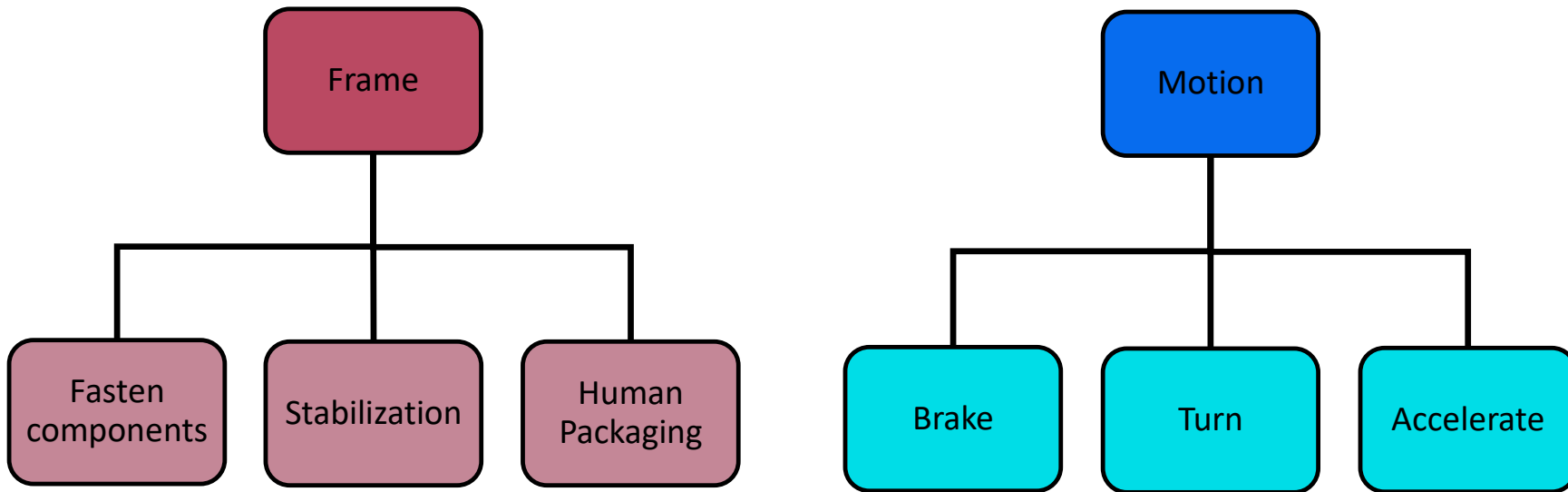
Power



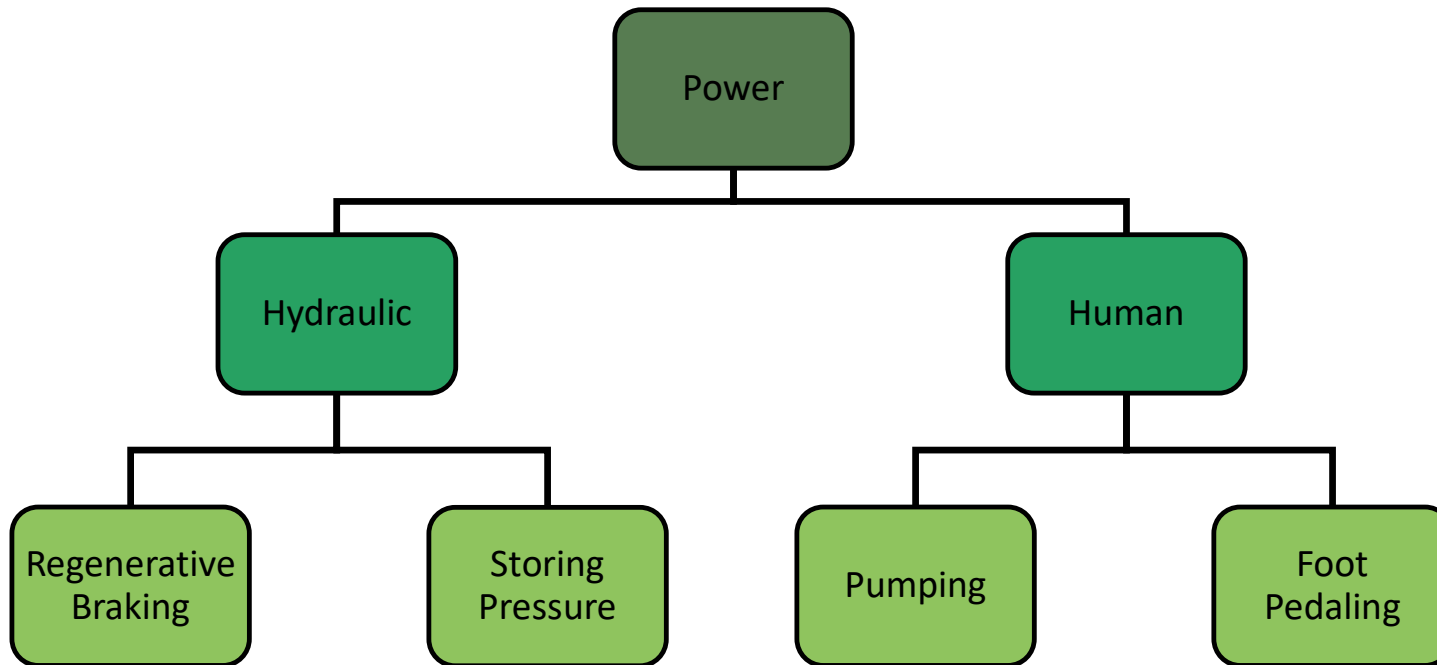
Mechatronics



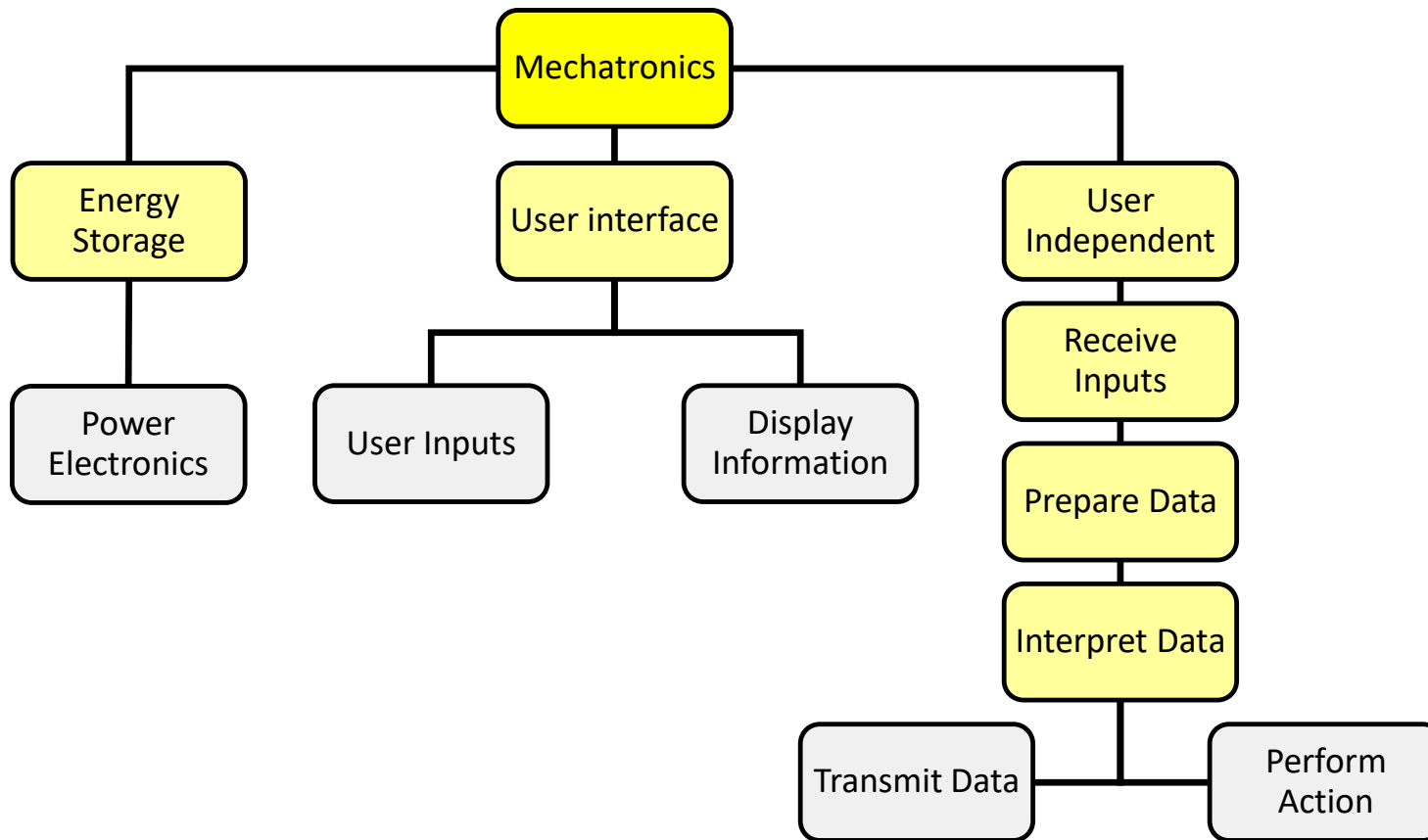
Frame and Motion Functions



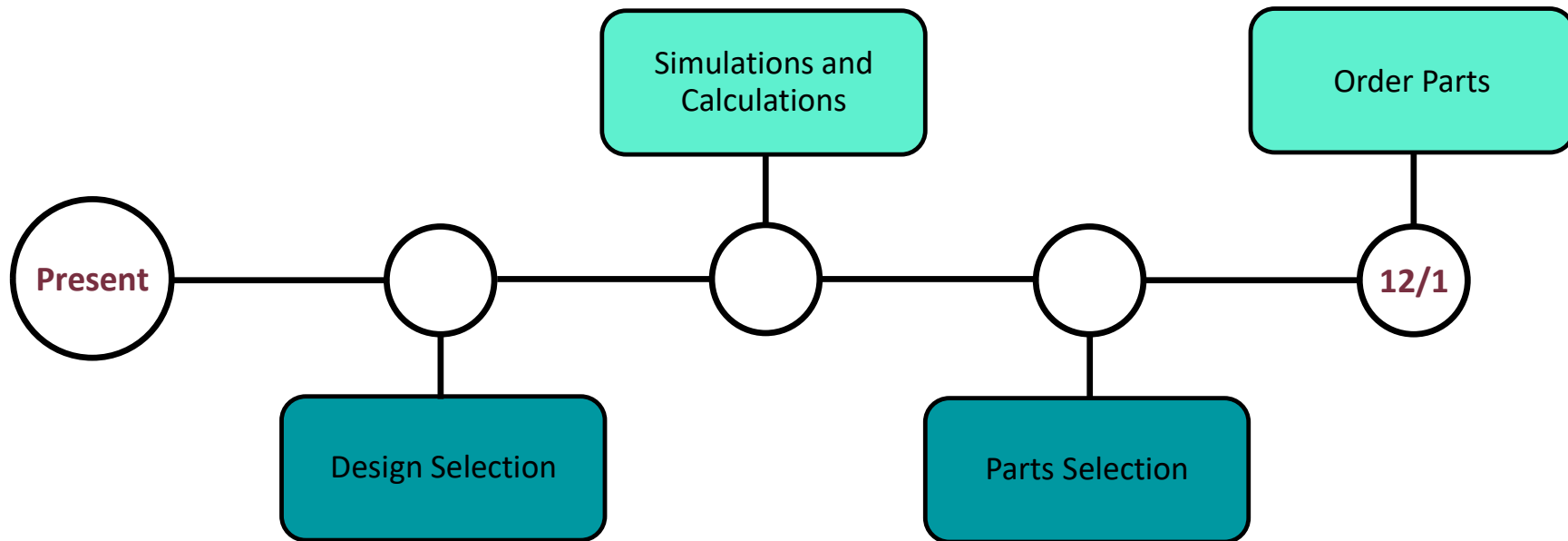
Power Functions



Mechatronics Functions



Future Work



References

- OpenAI. (2024). ChatGPT (October 2024 version). Retrieved from [Large language model]: <https://chat.openai.com/>
- Oquendo_Chandler, M., Luken, D., Von Hoene, J., Kohli, B., Stathis, E., & King, C. (2018). University of Cincinnati NFPA Fluid Power Vehicle Challenge Project Report. Retrieved from Scholar@UC: <https://scholar.uc.edu/downloads/j6731412w?locale=en>
- Pluta, M., Geraghty, S., Kaas, J., & McCarthy, J. (2024). 2025 NFPA Fluid Power Vehicle Challenge: Overview, Rules, and Awards. National Fluid Power Association. Retrieved from NFPA Foundation: <https://nfpafoundation.org/wp-content/uploads/2024/08/2025-FPVC-Overview-Rules-and-Awards-v.4.pdf>
- Torrey, J., Trujillo, A., Londono, K., & Chan, B. (2019). Fluid Power Vehicle Challenge: Final Design Review. California Polytechnic State University. Retrieved from Digital Commons Cal Poly: <https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1597&context=mesp>
- Widmann, J., Gray, M., D'amour, R., Lopez, A. A., Ferrandino, C., & Dietz, J. (2024). Cal Poly Fluid Power Vehicle Challenge Final Design Review. California Polytechnic State University. Retrieved from Digital Commons Cal Poly: <https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1853&context=mesp>

Inspiring Quote

“Just as hydraulics transforms pressure into power, so too can we harness our challenges to elevate ourselves beyond the limits of possibility”

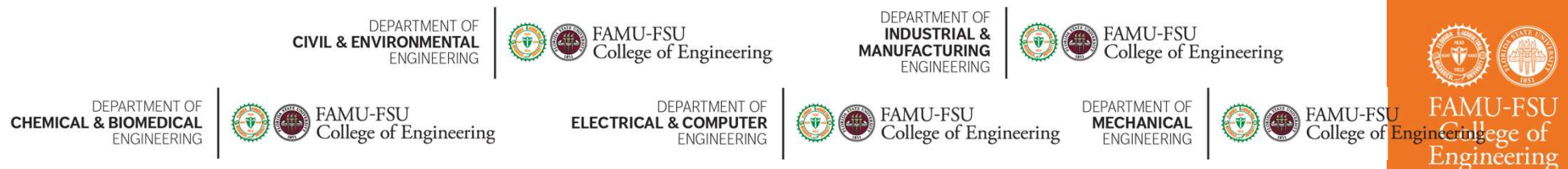
-ChatGPT



Back Up Slides

Slide Headline

- Try to keep text at 16 pt minimum.
- Try to put as few words as possible on the slide if you're using for a presentation.
- Mix and match the backgrounds as shown in this template or just use one throughout.
- You can put department/unit logos in slide master at Horizontal 0.89" Vertical 6.44" From top left corner



Font Check

- This is 10-point
- This is 15-point Times
- This is 20-point
- This is 25-point
- This is 30-point
- This is 35-point
- This is 40-point
- This is 50-point
- This is 60-point

23

College of Engineering Color Palette

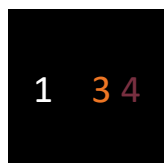


Garnet

Pantone: PMS 195 C

RGB: 120, 47, 64
Hex: #782F40

CMYK:19, 90, 50, 55



Black

Pantone: Black C

RGB: 0, 0, 0
Hex: #000000

CMYK:0, 0, 0, 100



**Fang
Orange**

RGB: 238, 118, 36
Hex: #EE7624

CMYK:2, 66, 99, 0



White

Pantone: PMS 000C

RGB: 255, 255, 255
Hex: #FFFFFF

CMYK: 0, 0, 0, 0



Accent Color Palette



Tardis Blue

RGB: 0, 59, 111
Hex: #003B6F

CMYK:



Corn

RGB: 251, 236, 93
Hex: #FBEC5D

CMYK:



Timberwolf

RGB: 219, 215, 210
Hex: #DBD7D2

CMYK:



Rubine Red

RGB: 206, 0, 88
Hex: #CE0058

CMYK: 0, 100, 43, 12



Imperial

RGB: 104, 40, 96
Hex: #682860

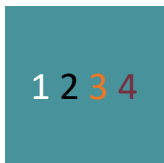
CMYK:



Gainsboro

RGB: 220, 220, 220
Hex: #DCDCDC

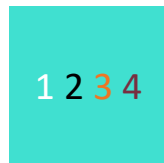
CMYK:



Asagi-iro

RGB: 72, 146, 155
Hex: #48929b

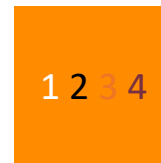
CMYK:



Turquoise

RGB: 64, 224, 208
Hex: #40E0D0

CMYK:



American Orange

RGB: 255, 139, 0
Hex: #FF8B00

CMYK:



Analogous	F7AB19	D67F15	EE7624	D64615	F73119
Monochromatic	6E3610	F0A16C	EE7624	6E4931	BASB1C
Triad	A14508	4BED3B	EE7624	250CED	2010A1
Complementary	A1470C	FF8C40	EE7624	0098A1	24E2ED
Split Complementary	28A164	2FED8D	EE7624	0848A1	1871ED
Double Split Complementary	EDAC2F	3BED93	EE7624	0C6AED	ED2F18
Square	ED660C	C7ED3B	EE7624	0CE1ED	A418ED
Compound	BA7E09	87724A	EE7624	60EFCF	09BA61
Shades	AD551A	6E3610	EE7624	FA7625	D46820

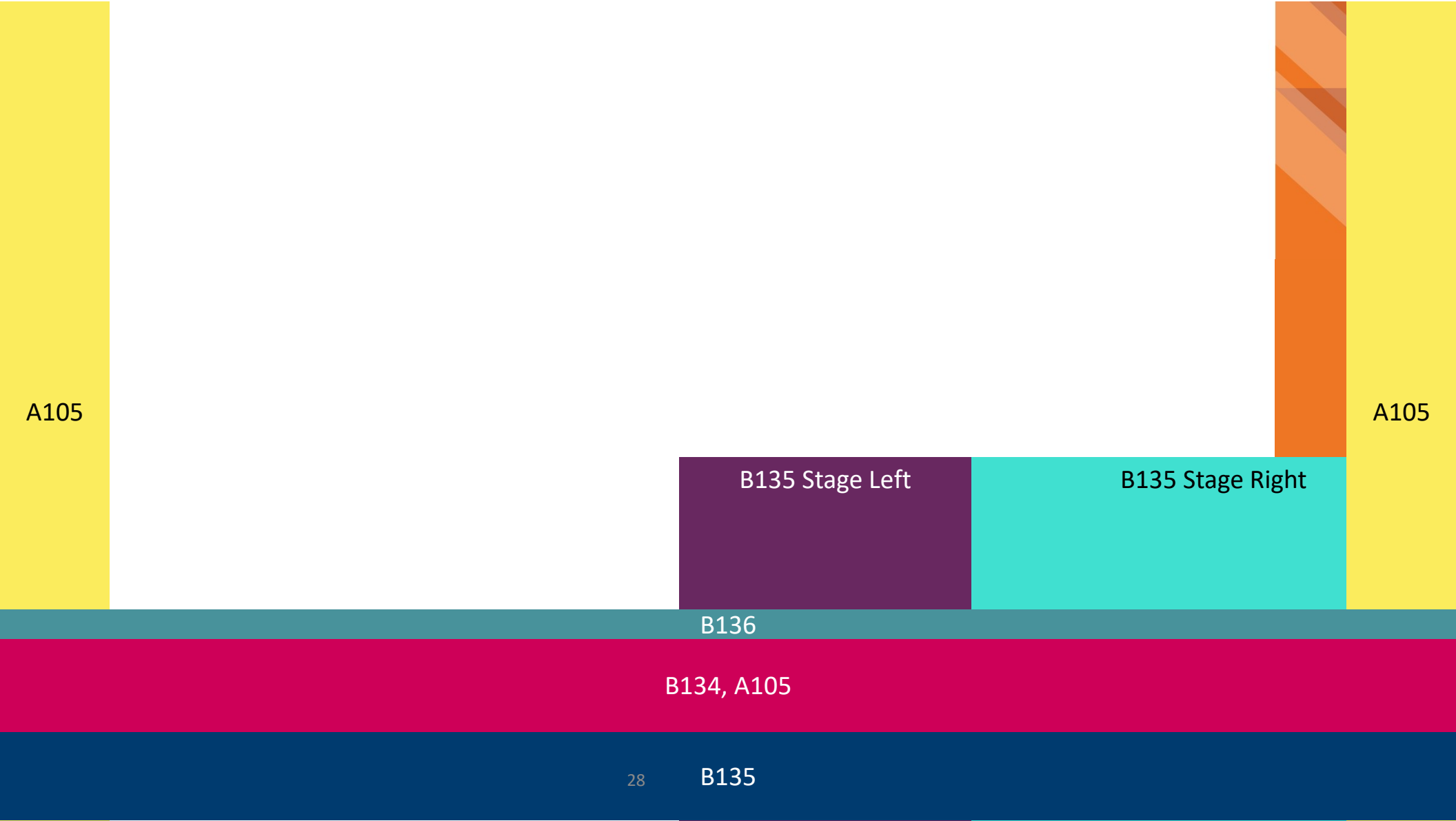
<https://color.adobe.com/create/color-wheel>



Analogous	85412D	8F3831	782f40	8F3176	792D85
Monochromatic	C44D69	8E626D	782F40	C48796	451B25
Triad	C43959	78743B	782F40	236178	43A2C4
Complementary	C43959	C46078	782F40	25C43D	2F783A
Split Complementary	93C460	577835	782F40	39C49D	297861
Double Split Complementary	784435	5A783B	782F40	237860	6E2978
Square	782337	78683b	782F40	237830	293978
Compound	AB4D32	DEBAAF	782F40	5D8555	70AB32
Shades	38161E	C44D69	782F40	853447	5E2532

<https://color.adobe.com/create/color-wheel>





A105

B135 Stage Left

B135 Stage Right

A105

B136

B134, A105

28

B135

Border Line
Border Line

Middle of Slide

Middle of White Space

Border Line

Center of White Space

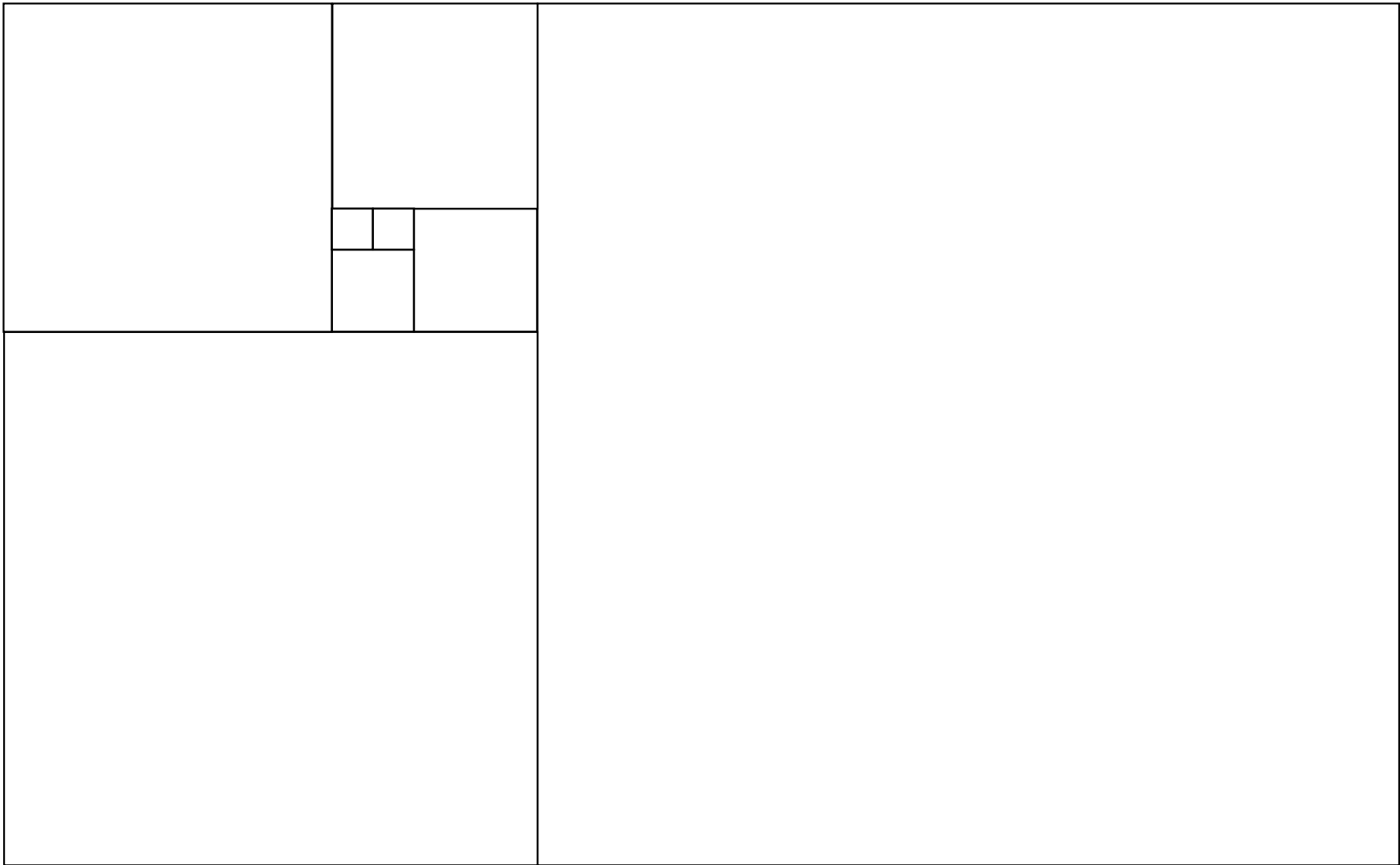
Center of Slide

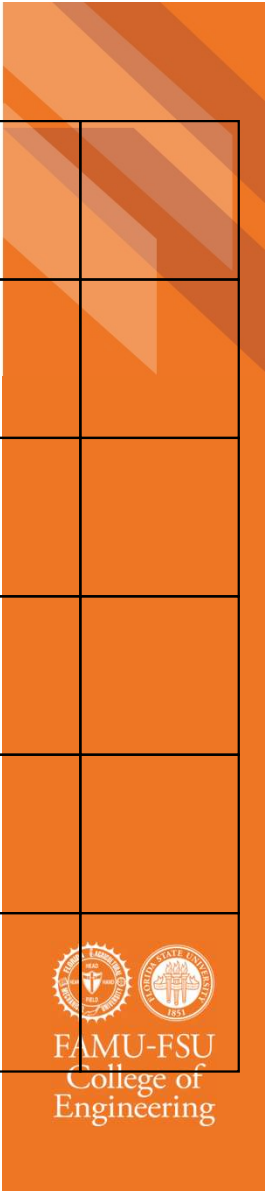
Border Line

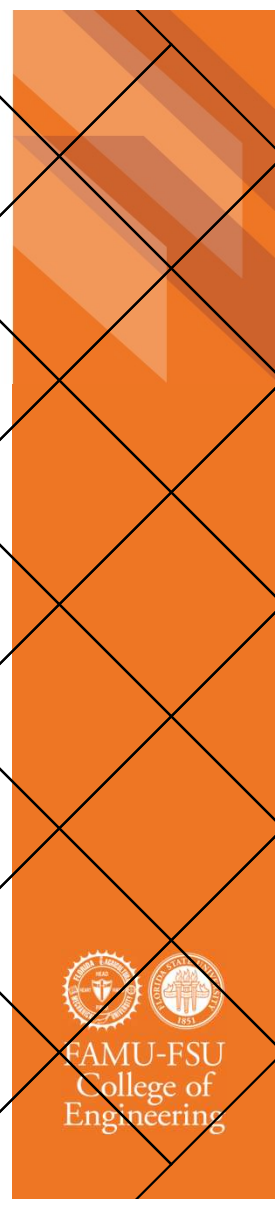
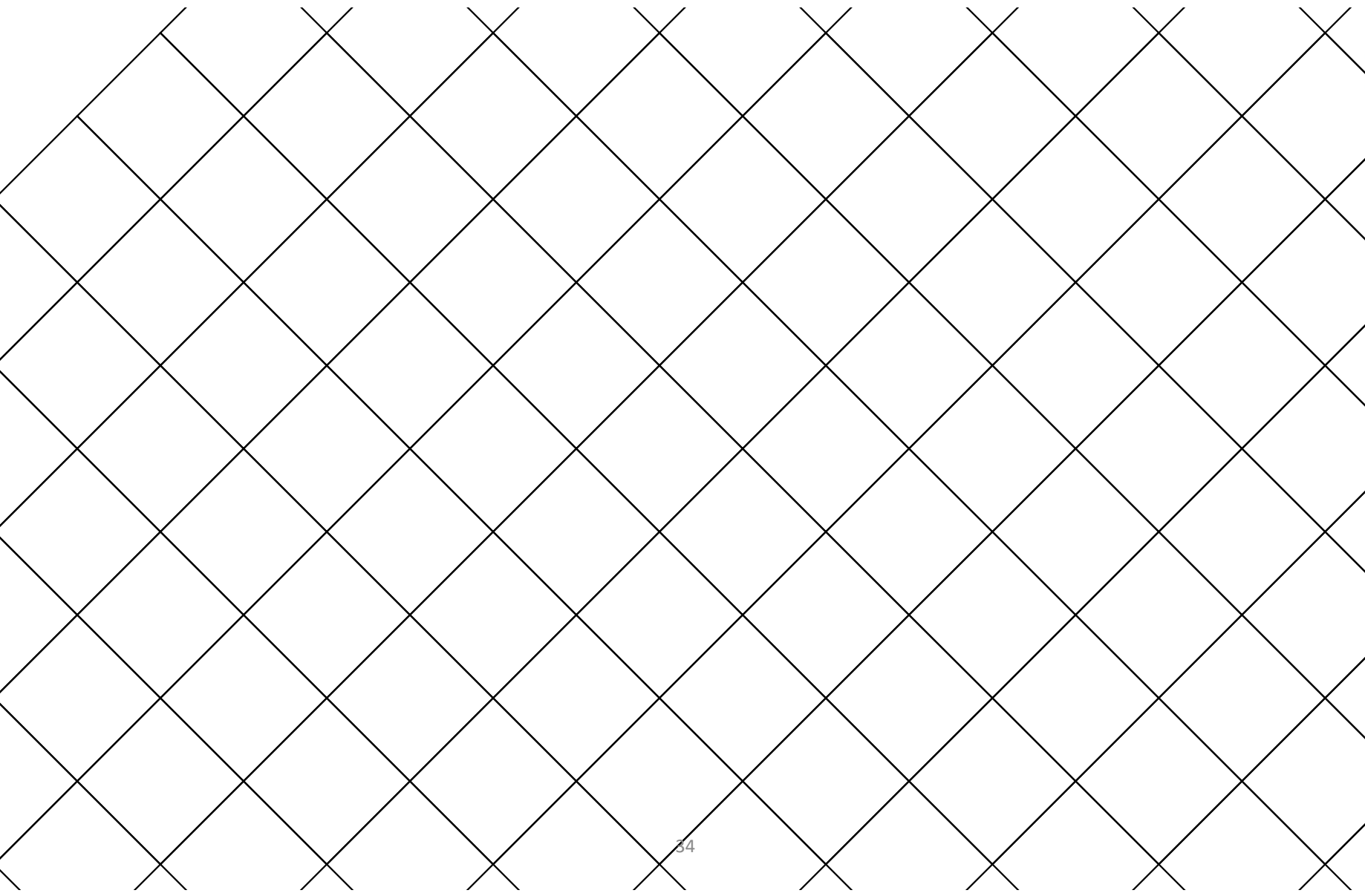
Edge of Branding











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