



UCSAS 2024 DATA CHALLENGE

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Today's Topics



- Introductions
- Data Challenge Problem
- Olympic Men's and Women's Gymnastics Competition Format
 - Competition days
 - Medals available
 - Team composition
- Data Sets
- Timelines and Important Dates
- Your Questions

Introductions



- Jun Yan - Professor of Statistics, University of Connecticut
- Brian Macdonald - Senior Lecturer and Research Scientist in Statistics & Data Science, Yale University
- Zefang Min - Graduate Student in Statistics, University of Connecticut
- Elliot Schwartz - Data Analytics Consultant, United States Olympic & Paralympic Committee (USOPC)

Data Challenge Problem



- **OBJECTIVE:** Identify the group of 5 athletes who will enable the Team USA Olympic Men's and Women's Artistic Gymnastics teams to maximize medals won in Paris 2024



PARIS 2024



Data Challenge Problem



- **ANALYTICS:** Develop an analytics model that can be used to identify and compare the expected medal counts with various combinations of **5** team members
 - Men: 8 medal events
 - Team all-around
 - Individual all-around
 - Individual apparatus (“Event Finals”) – floor exercise (FX), pommel horse (PH), still rings (SR), vault (VT), parallel bars (PB), and high bar (HB)
 - Women: 6 medal events
 - Team all-around
 - Individual all-around
 - Individual apparatus (“Event Finals”) – vault (VT), uneven bars (UB), balance beam (BB), and floor exercise (FX)

Paris 2024 Olympic Gymnastics Competition Format



	24 07	25 07	26 07	27 07	28 07	29 07	30 07	31 07	01 08	02 08	03 08	04 08	05 08	06 08	07 08	08 08	09 08	10 08	11 08
Sport	D-2	D-1	DO	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
Artistic Gymnastics				○	○	●	●	●	●		●	●	●						

Legend

Q	Qualification	F	Final
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Schedule

Event ↓ / Date →	Sat 27	Sun 28	Mon 29	Tue 30	Wed 31	Thu 1	Fri 2	Sat 3	Sun 4	Mon 5	Thu 8	Fri 9	Sat 10
Artistic ^{[8][9]}													
Men's team all-around	Q		F										
Men's individual all-around	Q				F								
Men's floor	Q							F					
Men's pommel horse	Q							F					
Men's rings	Q								F				
Men's vault	Q								F				
Men's parallel bars	Q									F			
Men's horizontal bar	Q									F			
Women's team all-around		Q		F									
Women's individual all-around		Q				F							
Women's vault		Q						F					
Women's uneven bars		Q						F					
Women's balance beam		Q								F			
Women's floor		Q							F				



Antwerp 2023 World Gymnastics Competition Format



Date	Competition
30.09	Qualifications day 1 - Men
1.10	Qualifications day 2 - Men & women
2.10	Qualifications day 3 - Women
3.10	Men's Team Final
4.10	Women's Team Final
5.10	Men's Individual All-Around Final
6.10	Women's Individual All-Around Final
7.10	Apparatus Finals day 1
8.10	Apparatus Finals day 2

Same format as Paris 2024 Olympic Games

Liverpool 2022 World Gymnastics Competition Format



Date	Start Time	Estimated Finish Time	Event	Details
SAT 29 OCT			Women's Qualifications	
SUN 30 OCT			Women's Qualifications	
MON 31 OCT			Men's Qualifications	
TUE 1 NOV	18:30	20:47	Women's Team Final	
WED 2 NOV	17:40	20:35	Men's Team Final	
THU 3 NOV	18:45	20:58	Women's All-Around Final	
FRI 4 NOV	18:00	20:51	Men's All-Around Final	
SAT 5 NOV			Apparatus Finals - Day 1	
	13:30	14:09		Men's Floor Exercise Final
	14:10	14:40		Women's Vault Final
	15:22	16:02		Men's Pommel Horse Final
	16:02	16:48		Women's Uneven Bars Final
	16:48	17:18		Men's Rings Final
SUN 6 NOV			Apparatus Finals - Day 2	
	13:30	14:11		Men's Vault Final
	14:11	15:00		Women's Balance Beam Final
	15:25	16:08		Men's Parallel Bars Final
	16:08	16:53		Women's Floor Exercise Final
	16:53	17:34		Men's Horizontal Bar Final

Same format as Paris 2024 Olympic Games, Women first

Paris 2024 & Antwerp 2023 Competition Format



- Qualifications – 5-4-3 (5 team members, “4 up, 3 count” – 4 compete on each apparatus, 3 scores count)
- Team All-Around
 - Top 8 countries qualify
 - Competition format – 5-3-3 (same 5 team members, “3 up, 3 count” – 3 compete on each apparatus, every score counts)
- Individual All-Around
 - Athletes must compete on all apparatus to qualify
 - 24 athletes qualify, maximum of 2 athletes per country qualify
- Individual apparatus
 - 8 athletes qualify on each apparatus, maximum of 2 per country
 - Men’s and Women’s Vault – 2 different vaults required in Qualifications and Event Finals

Tokyo 2020 (2021) Olympics Competition Format



- Qualifications - **4-4-3 + 2** (4 team members, “4 up, 3 count” – 4 compete on each apparatus, 3 scores count **AND 2 individual athletes who did not count toward team results**)
- Team All-Around
 - Top 8 countries qualify
 - Competition format - **4-3-3** (same **4** team members, “3 up, 3 count” – 3 complete on each apparatus, every score counts)
- Individual All-Around
 - Athletes must compete on all apparatus to qualify
 - 24 athletes qualify, maximum of 2 athletes per country qualify (**including individual athletes**)
- Individual apparatus
 - 8 athletes qualify on each apparatus, maximum of 2 per country (**including individual athletes**)
 - Men’s and Women’s Vault – 2 different vaults required in Qualifications and Event Finals

Paris 2024 & Antwerp 2023 Team Composition



- All-Arounders vs. Event Specialists vs. a Mix
- Optimize for Team Event medal or not?
- Example - Liverpool 2022 World Championships

Qualification

3		USA - United States of America		40.765 (11)	41.966 (2)	41.933 (4)	43.366 (4)	43.432 (4)	40.833 (6)	252.295 Q			
301 HONG Asher	D	6.000	13.866	5.600	13.300	5.900	13.900	6.000	14.433	6.000	14.600	5.100	13.200
	E	7.966	-0.1	7.700		8.000		8.533	-0.1	8.600		8.100	
302 MALONE Brody	D	5.900	12.766	5.700	13.433	5.900	13.700	5.200	14.333	5.700	13.966	6.300	14.433
	E	6.966	-0.1	7.733		7.800		9.133		8.266		8.133	
304 NEDOROSCIK Stephen	D			6.400	15.233								
	E			8.833									
305 WALKER Colt	D	5.300	10.433			5.000	13.566	5.600	14.600	6.200	14.866	5.600	13.200
	E	5.233	-0.1			8.566		9.000		8.666		7.600	
306 WHITTENBURG Donnell	D	6.400	14.133	5.000	12.833	6.000	14.333	0.000	0.000	5.800	13.666	5.300	11.900
	E	7.733		7.833		8.333		0.000		7.866		6.600	

Rank	Bib	NOC Name							Total
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Team Final

5		USA - United States of America		40.265 (8)	38.265 (5)	42.265 (3)	42.833 (4)	42.865 (4)	39.199 (7)	245.692			
301 HONG Asher	D	6.000	13.933	5.600	13.566	5.900	14.033	6.000	14.533	6.000	14.533		
	E	8.233	-0.3	7.966		8.133		8.633	-0.1	8.533			
302 MALONE Brody	D	5.600	12.866	5.800	11.733	5.900	13.766	5.200	14.400	6.000	13.966	6.300	14.366
	E	7.266		5.933		7.866		9.200		7.966		8.066	
304 NEDOROSCIK Stephen	D			5.100	12.966								
	E			7.866									
305 WALKER Colt	D							5.600	13.900	6.200	14.366	5.300	11.700
	E							8.400	-0.1	8.166		6.400	
306 WHITTENBURG Donnell	D	6.300	13.466			6.000	14.466					5.400	13.133
	E	7.166				8.466						7.733	

Data Sets on Github (Link on Website)



- data_2017_2021.csv & data_2022_2023.csv
- Actively updating both data sets - data scraping takes time
- Last competition whose results will be included in data_2022_2023.csv will be 2023 World Championships (Antwerp, ends October 8, 2023)
- If you notice anything wrong in the data, please email me at elliott.schwartz@usopc.org
- “Entrants can use any additional data that they choose as long as that data is publicly available, but the additional data need to be included in the final submission for reproducibility”

Data Sets on Github



- Each row of data corresponds to 1 gymnast's performance on 1 apparatus in 1 Round (Phase) at 1 competition
- Different competitions have different formats
- An individual gymnast may have 2 or more versions of their name in the data set

LastNa	FirstName	Gender	Countr	Date	Competition	Round	Location	Apparatus	Rank	D_Scor	E_Scor	Penalty	Score
AAS	Fredrik	m	NOR	23-26 Feb 2023	FIG Apparatus World Cup 2023	qual	Cottbus, Germany	HB	39	4.6	6.7		11.3
AAS	Fredrik	m	NOR	23-26 Feb 2023	FIG Apparatus World Cup 2023	qual	Cottbus, Germany	PH	44	4.4	7.8		12.2
AAS	Fredrik Bjornevik	m	NOR	1-5 Aug 2023	2023 FISU World University Games	qual	Chengdu, China	FX	54	4	8.566		12.566

- Vault: Apparatus will be VT, VT1, or VT2
 - VT indicates that only 1 vault was performed
 - VT1 may indicate that only 1 vault was performed OR it could indicate the 1st of 2 vaults that were performed
- $D_Score + E_Score - Penalty = Score$
- A score of zero *almost always* indicates that the gymnast did not compete on that apparatus

Timelines and Important Dates



- 08/04/2023: USOPC Data Challenge released
- 09/14/2023, 7 PM ET: Training/code session for the USOPC Data Challenge
- 01/15/2024: USOPC Data Challenge submission deadline
- 02/15/2024: USOPC Data Challenge finalists notification
- 03/15/2024: Abstract submission deadline
- 04/05/2024: Registration deadline

Judging



A panel of judges from across academia and the sports industry will judge your submissions based on the following:

- How original is the analysis?
- How applicable is the analysis?
- How appropriate were the methods used?
- How well did you communicate your findings? This includes both written text and visualizations. How did the use of facts, data-supported narratives, anecdotes etc. buttress your storytelling?

Questions



Also email me at elliott.schwartz@usopc.org