

Data Structures within the Computer Science Field

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Common Traits


- Store data for ease of access.
- Access data based on current algorithm.
- What would best option be?

FIFO

- “First In First Out.”
- Iterate through all items in structure.
- Examples:
 - Queues
 - Deques*
 - Iteration through other structures.

THIS MONDAY, MEDITATE WHILE YOU WAIT

Mindfulness and a few deep breaths can help you stay calm and positive.



#DeStressMonday DeStressMonday.org **DESTRESS MONDAY**

<https://www.destressmonday.org/mindful-boost-waiting-line/>

LIFO

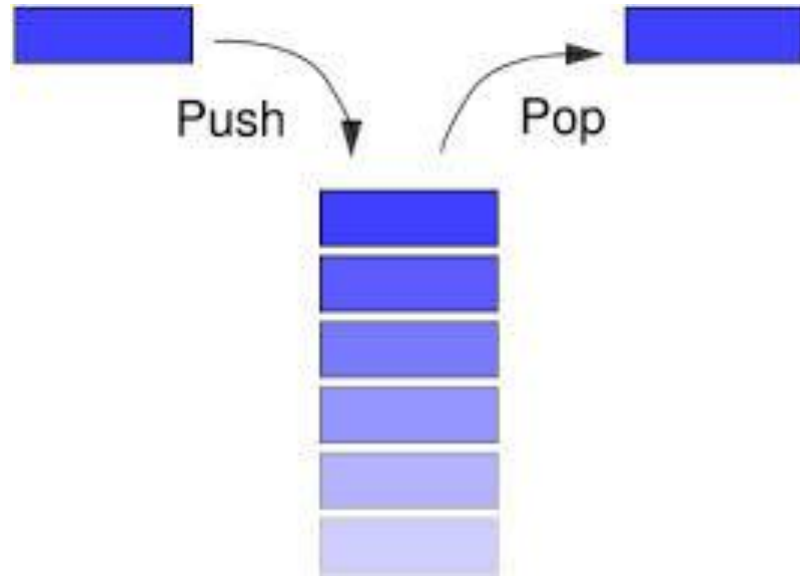
- “Last In First Out.”
- Useful for backtracking.
- Examples:
 - Stacks
 - Deques*



<http://clipart-library.com/clip-art/stack-of-books-silhouette-13.htm>

Stacks

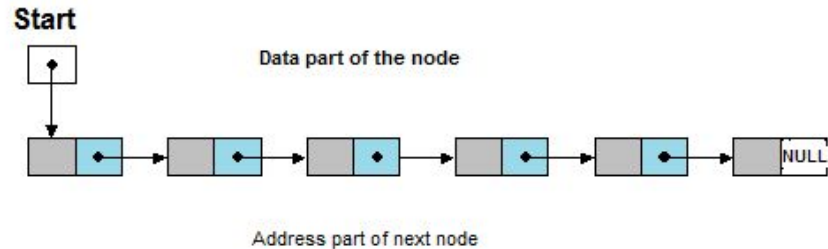
- Task management.
- Recursive data structure.
- Applications:
 - Text editing.
 - Language processing.



<https://everythingcomputerscience.com/discrete-mathematics/Stacks-and-Queues.html>

Vectors

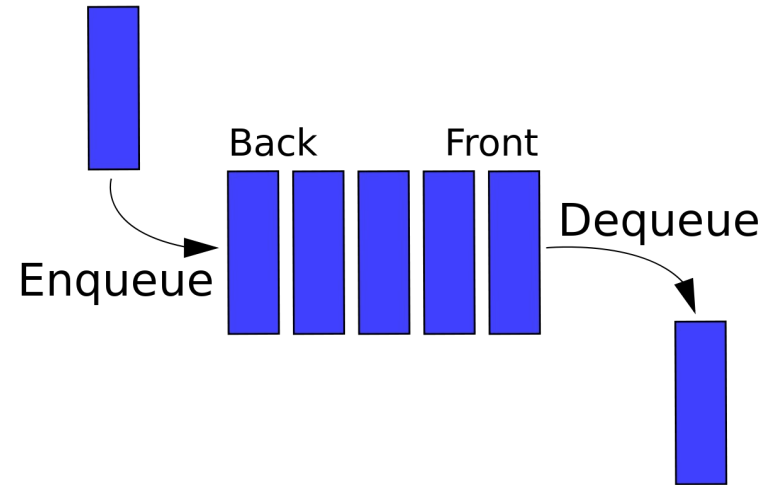
- Data storage.
- Compress data into a structure.
- Dynamically alter size.
- Applications:
 - Bank accounts.
 - Matrices.



<https://www.careerride.com/page/linked-list-for-computer-science-and-mca-students-624.aspx>

Queues

- Iterative Task Management.
- Items await processing in a linear fashion.
- Applications:
 - Most lines
 - Buffering actions



Maps

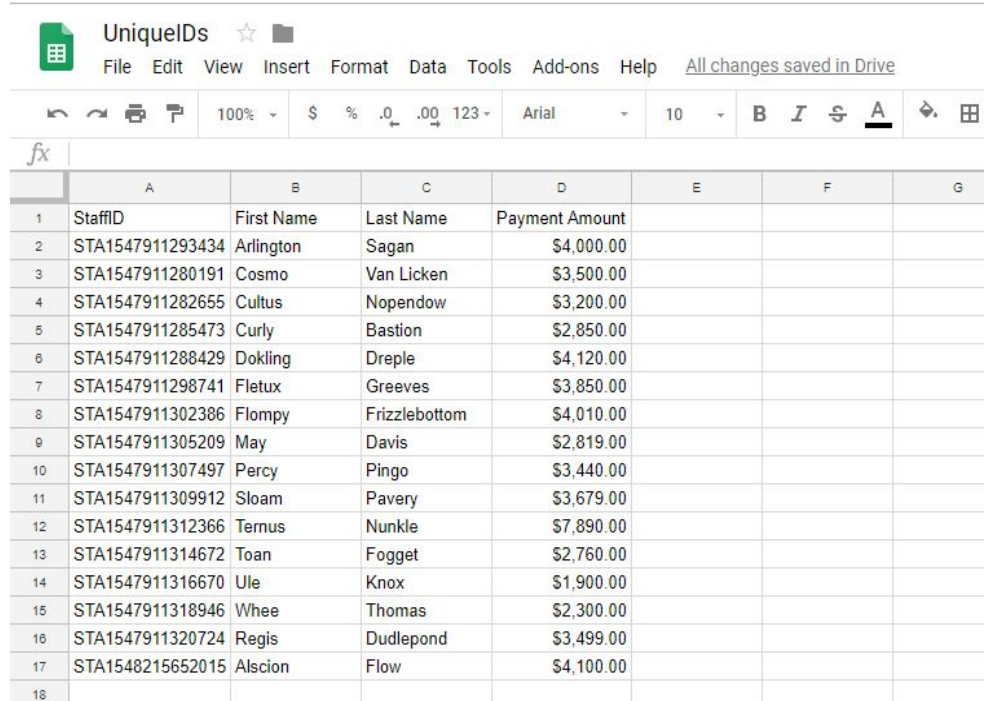
- Unique data storage structure.
- <Key, Value> relationship.
- Unordered Maps.
- Applications:
 - Symbolize relationships.
 - Identifying values to IDs.

key	value
firstName	Bugs
lastName	Bunny
location	Earth

<https://stackoverflow.com/questions/25955749/what-is-a-key-value-pair>

Sets

- Unique data storage structure.
- No repeated values.
- Unordered Sets, Multisets.
- Applications:
 - Storing IDs



The screenshot shows a Google Sheets spreadsheet titled "UniquelDs". The spreadsheet contains a table with 17 rows of data. The columns are labeled A through G. The data in the table is as follows:

	A	B	C	D	E	F	G
1	StaffID	First Name	Last Name	Payment Amount			
2	STA1547911293434	Arlington	Sagan	\$4,000.00			
3	STA1547911280191	Cosmo	Van Licken	\$3,500.00			
4	STA1547911282655	Cultus	Nopendow	\$3,200.00			
5	STA1547911285473	Curly	Bastion	\$2,850.00			
6	STA1547911288429	Dokling	Dreple	\$4,120.00			
7	STA1547911298741	Fletux	Greeves	\$3,850.00			
8	STA1547911302386	Flompy	Frizzlebottom	\$4,010.00			
9	STA1547911305209	May	Davis	\$2,819.00			
10	STA1547911307497	Percy	Pingo	\$3,440.00			
11	STA1547911309912	Sloam	Pavery	\$3,679.00			
12	STA1547911312366	Ternus	Nunkle	\$7,890.00			
13	STA1547911314672	Toan	Fogget	\$2,760.00			
14	STA1547911316670	Ule	Knox	\$1,900.00			
15	STA1547911318946	Whee	Thomas	\$2,300.00			
16	STA1547911320724	Regis	Dudlepond	\$3,499.00			
17	STA1548215652015	Alscion	Flow	\$4,100.00			
18							

<https://yagisanatode.com/2019/01/23/google-apps-script-adding-a-unique-id-in-a-cell-on-edit-of-an-adjacent-cell-using-time/>

Priority Queue

- Similar processing to Queues.
- Prioritized items first.
- Min/Max prioritization.
- Applications:
 - Some lines.
 - Buffering actions.



<https://disneyworld.disney.go.com/fastpass-plus/>

Find the Best Fit

- Use Data Structure that best satisfies needs.
 - Runtimes, Memory usage, dynamic ability, etc.
- Focus on keeping a working program.
- Optimize by changing structures when comfortable.

Questions?

Special Thanks

- Proofreading Presentation Slides
 - Dr. Julian Dymacek
 - Justin Moore
 - Jared Cline
 - Joseph

Works Cited

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- <https://www.cs.cmu.edu/~adamchik/15-121/lectures/Stacks%20and%20Queues/Stacks%20and%20Queues.html>
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