Andrew Cupps

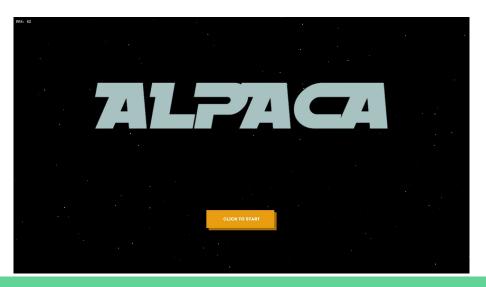
CS Portfolio, September 2022

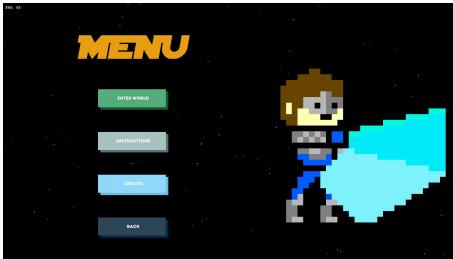
"ALPACA"

Platformer Video Game, Sept-Dec 2021

Project Overview: "ALPACA"

ALPACA is a game I created in Java using the Slick2D graphics library with three other students from September to December of 2021. The game is a third-person platformer in which the player surmounts obstacles, attacks multiple types of enemies with different behaviors, and collects tokens to unlock new gameplay features or stats.



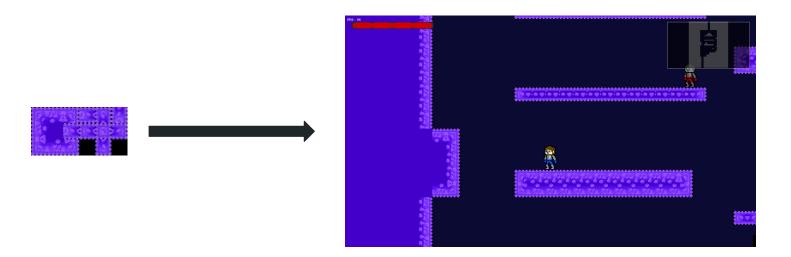


My Role: Backend Developer

As the backend developer for this project, I:

- Created the basic game engine and physics utilized throughout the development process
- Built a system focused on project scalability, allowing for new levels to be created easily by reusing the same commands in level design
- Developed a tiling algorithm which allowed front end developers to render entire levels automatically from a single tileset image (example of this provided on the following slide for clarity).

Overall, I created most of the behind-the-scenes structure for this program which were fundamental to gameplay, level-design, and front-end implementation of graphics.



The algorithm I wrote allowed for the front-end developers of this project to create the tileset image on the top-left and use it to automatically render the texture for any platform or wall on-screen with only a single line. In this example, only one tileset texture is used, but multiple textures can be rendered within any given level.

Using this algorithm, the computer only needs to perform a single calculation at the beginning of each level to accurately determine the placements of each texture for the remainder of the player's stay within that level.

"Schreckliche Seuche"

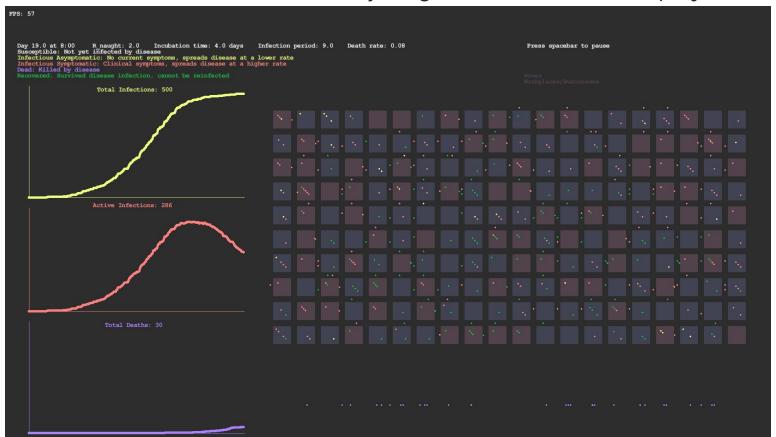
Disease Spread Simulator, Mar-May 2022

Project Overview: "Schreckliche Seuche"

Schreckliche Seuche is a simulation I created with two other students which shows the spread of a disease through a community based on various factors, including population size, population density, pathogen infectivity, and incubation period length among other customizable factors. This is *not* meant to be a game like "Plague, Inc."; it is a simulation to model how various factors affect how a disease spreads through a population.

My Role: Full Stack Developer

For Schreckliche Seuche, I created everything on this screen of the project:



My Role (Continued)

This included:

- Designing and creating an object-oriented simulation for the spread of disease
- Allowing for dynamic changes based on user inputs on other screens of the program in collaboration with other developers
- Implementing a basic pathfinding algorithm to represent people moving throughout their community
- Visually representing the entire simulated population of varying size and density
- Graphically representing data from the simulation with three continuously-updating charts

R Projects

Various projects in R, Aug 2022 - Present

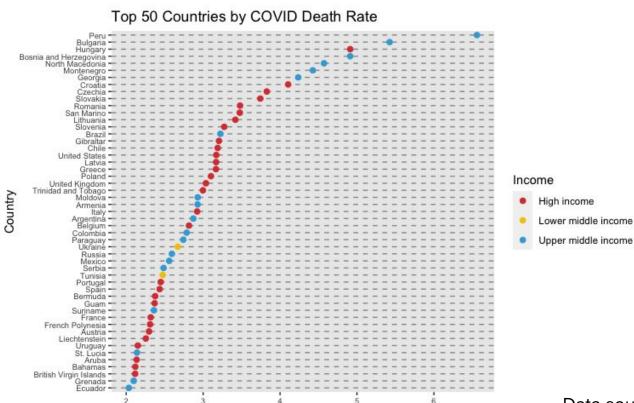
My R Projects

As part of a course at the University of Maryland, I am using the R programming language in RStudio to rearrange, analyze, and visually represent data from CSV files to demonstrate trends and important information on the world around us.

Turning 19,423 lines of this...

Country D	ute	Confirmed C	onfirmedDe Ne	w Cases	New Deaths Income Region	Population	Case_Change	Death_Chang	cpm	dpm	new_cases_p	new_deaths_c	ases_incom d	deaths_incor cp	m_income	dpm_income	Case 7 Day	Death_7_Day	Case 7 Day i	Death_7_Day	cases_region	deaths_regior.cpm_	gion dpm_regio	n Case_7_Day	Death 7 Day Ca	e 7 Day De	ath_7_Dar
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Albania	7/1/22	281470	3501	619	1 Upper middl European Re	2877800	423.71429	0.5714286	97807.353	1216.5543	147.23549	0.1985644 1	16943480	2366759 4	4049.556	891.49632	148689.43	517.42857	56.007426	0.1949018	229181684	2043914 2461	9.68 2195.50	5 378751.43	462.85714 40	6.84275 0	497186
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Angola	7/1/22	101320	1900	0	0 Lower middl African Regio				3082.796				92387646		9819.442	426.31172		60.857143	9.6933522	0.0196425			4781 154.101		22.142857	1.143425 0	.019767
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Aruba	7/1/22	40718	221	0	0 High Income	106766	77		381376.09				21094218							0.6573433		19741	5.00 2155.50		12.285714	0.04275	437100
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Austria	7/1/22	4471152	20057	11385	9 High income European Rep		10083.714					0.6661929 3		2524558 2	54212.66	1998.7112	582527.43	830.28571	461.19127	0.6573433	229181684	2043914 2461	9.68 2195.50	5 378751.43	462.85714 40	6.84275 0	.497186
Azerbaijan	7/1/22	793302	9717	126	0 Upper middl European Reg	10139175	28	0	78241.277	958.362	2.7615659	0 1	16943480	2366759 4	4049.556	891.49632	148689.43	517.42857	56.007426	0.1949018	229181684	2043914 2461	9.68 2195.50	5 378751.43	462.85714 40	6.84275 0	.497186
Bahamas	7/1/22	35975	817	0	0 High income Region of the	393248	23.571429	0.1428571	91481.711	2077.5694	59.940365	0.3632749 3	21094218	2524558 2	54212.66	1998.7112	582527.43	830.28571	461.19127	0.6573433	162421199	2760625 1595	0.33 2711.48	8 226668.86	638.71429 2	2.63447 0	.627346
Bahrain	7/1/22	627327	1493	1471	1 High income Eastern Medi							0.0839554 3								0.6573433					15.571429 18		
Bangladesh	7/1/22	1975682	29154	1893	5 Lower middl South-East As									1320814 2									0.781 390.869		50.285714 10		
Barbados	7/1/22	84562	477	141	0 High income Region of the		148.28571				516.00793	1.9884699 3		2524558 2								2760625 1595					
Belarus	7/1/22	982867	6978	0	0 Upper middl European Re		0		104014.56		0		16943480	2366759 4								2043914 2461					
Belgium	7/1/22	4246078	31918	0	0 High Income European Re							0.4314207 3								0.6573433					462.85714 40		
Belize	7/1/22	64138	680	172	0 Upper middl Region of the							0.3592797 1								0.1949018		2760625 1595					
Benin Bermuda	7/1/22	27216 16162	163 140	0	0 Lower middl African Regio				2244.9522			4.5880925 3	92387646	1320814 2						0.0196425		172618 7743	4/81 154.101		22.142857 12.285714	.143425 0	019767
Bhutan	7/1/22	59729	21	0	0 High income 0 Lower middl South-East As		7.8571429		77408.076				92387646							0.6573433			9.781 390.869		50.285714	702607 0	024976
Bolivia	7/1/22	928450	21955	1732	2 Lower middl Region of the															0.0196425		2760625 1595					
Bosnia and F	7/1/22	378797	15806	81	0 Upper middl European Rei		54.857143					0.3048023 1								0.1949018					462.85714 40		
Botswana	7/1/22	322769	2750	0	Upper middl African Regio							1.8831963 1		2366759 4											22.142857		
Brazil	7/1/22		671700	76045	284 Upper middl Region of the															0.1949018		2760625 1595					
British Virgin	7/1/22	6941	63	0	0 High income	30237	0	0	229553.2	2083.54	0	0 3	21094218	2524558 2	54212.66	1998.7112	582527.43	830.28571	461.19127	0.6573433	3208986	19741		6632.4286	12.285714		
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Bulgaria	7/1/22	1172777	37257	538	2 Upper middl European Rep	6948445	435.57143	1.5714286	168782.66	5361.9191	62.686173	0.2261554 1	16943480	2366759 4	4049.556	891.49632	148689.43	517.42857	56.007426	0.1949018	229181684	2043914 2461	9.68 2195.50	5 378751.43	462.85714 40	6.84275 0	4971864
Burkina Faso	7/1/22	21044	387	0	0 Low income African Regio		0		1006.7321		0		2188532							0.0055249					22.142857		
Burundi	7/1/22	42698	38	40	0 Low income African Regio				3590.8491				2188532		821.3253					0.0055249					22.142857		
Cambodia	7/1/22	136282	3056	3	0 Lower middl Western Paci				8151.339				92387646							0.0196425			9.703 120.760			0.509734 0	
Cameroon Canada	7/1/22	120068 3963763	1931 41968	1429	0 Lower middl African Regio													60.857143		0.0196425	8673944	2760625 1595			22.142857		
Canada Cape Verde	7/1/22	60770	41968	228	16 High income Region of the 0 Lower middl African Regio							0.5753324 3								0.6573433					22.142857		
Bonaire, Sint	7/1/22	10405	37	0	0 Lower middi Amcan Regio		12.142857		396819.34				16147042	102600	9819.442	420.311/2	7510.5714	00.85/143	9.0933522	0.0196425	3208986	19741	4/81 154.101		12.285714	.143425 0	019/6/
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Central Africa	7/1/22	14649	113	0	0 Low income African Regio		0		3033.0675		0		2188532		821.3253			4.2857143			8673944		4781 154.101		22.142857	.143425 0	.019767
Chad	7/1/22	7425	193	0	0 Low income African Regio		0.1428571		452.03115		0.0086971		2188532		821.3253			4.2857143			8673944		4781 154.101			.143425 0	
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Chile	7/1/22	4002538	58525	11845	46 High income Region of the	19116209	9594.7143	25.571429	209379.28	3061.538	501.91512	1.337683 3	21094218	2524558 2	54212.66	1998.7112	582527.43	830.28571	461.19127	0.6573433	162421199	2760625 1595	0.33 2711.48	8 226668.86	638.71429 2	2.63447 0	.6273461
China	7/1/22	5940218	21400	38217	122 Upper middl Western Paci									2366759 4									0.703 120.760			0.509734 0	
Colombia	7/1/22	6175181	140070	0	0 Upper middl Region of the									2366759 4								2760625 1595					
Comoros	7/1/22	8139	160	0	0 Lower middl African Regio		0.4285714		9359.5294		0.4928403		92387646							0.0196425					22.142857		
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Congo (Kinsl	7/1/22	91393	1375	311	4 Low income African Regio Western Paci		0.8571429						2188532 16147042	47286 2 102600	021.3253	60.9583	931.57143 7510.5714	4.285/143	1.2009265	0.0055249	8673944 65301733				22.142857		
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Cote d'Ivoire	7/1/22	83571	8525	108	Upper middl Region of the Lower middl African Region	26378275	88 285714				3 3469101									0.1949018					22.142857		
Croatia	7/1/22	1149575	16070	1047	5 High income European Re							0.8003654 3		2524558 2								2043914 2461					
Cuba	7/1/22	1106045	8529	22	0 Upper middl Region of the				97650.084				16943480	2366759 4								2760625 1595					
Curacao	7/1/22	44545	278	0	0 High income	164100	15		271450.34				21094218	2524558 2								19741	2.22.40.		12.285714		
Cyprus	7/1/22	515596	1075	10879	3 High income European Rep			0.4285714				0.3549654 3								0.6573433		2043914 2461	9.68 2195.50		462.85714 40	6.84275 0	497186
Czechia	7/1/22		40321	1300	3 High income European Rep		894.42857	1.1428571	367453.97	3765.1571	83.521344	0.1067195 3	21094218	2524558 2								2043914 2461					
Denmark	7/1/22	3173556	6471	1790	2 High income European Re	5792203	1772.5714	4.7142857	547901.38	1117.1915	306.02716	0.813902 3	21094218	2524558 2	54212.66	1998.7112	582527.43	830.28571	461.19127	0.6573433	229181684	2043914 2461	9.68 2195.50	5 378751.43	462.85714 40	6.84275 0	497186
Djibouti	7/1/22	15690	189	0	0 Lower middl Eastern Medi	988002	0	0	15880.535	191.29516	0	0	92387646	1320814 2	9819.442	426.31172	30032.286	60.857143	9.6933522	0.0196425	21373817	337922 2945	.846 465.636	8 13515.286	15.571429 18	.623258 0	.021456
Dominica	7/1/22	14852	68	0	0 Upper middl Region of the	71991	4.4285714	0.1428571	206303.57	944.56251	61.515626	1.984375 1	16943480							0.1949018		2760625 1595					.627346
Dominican R	7/1/22	608176	4383	2392	0 Upper middl Region of the				56063.918				16943480							0.1949018		2760625 1595					.627346
Ecuador	7/1/22	909882	35725	0	0 Upper middl Region of the									2366759 4								2760625 1595					
Egypt	7/1/22	515645	24723	0	0 Lower middl Eastern Medi			0.1428571				0.001396								0.0196425					15.571429 18		
El Salvador	7/1/22	169646	4146	0	2 Lower middl Region of the		0		26154.909			0.1541735		1320814 2								2760625 1595					
Equatorial Gu	7/1/22	16087	183	53	0 Upper middl African Regio				11466.267					2366759 4	4049.556	891.49632	148689.43	517.42857	56.007426	0.1949018		172618 7743	4781 154.101	3 3521.1429	22.142857	.143425 0	019767
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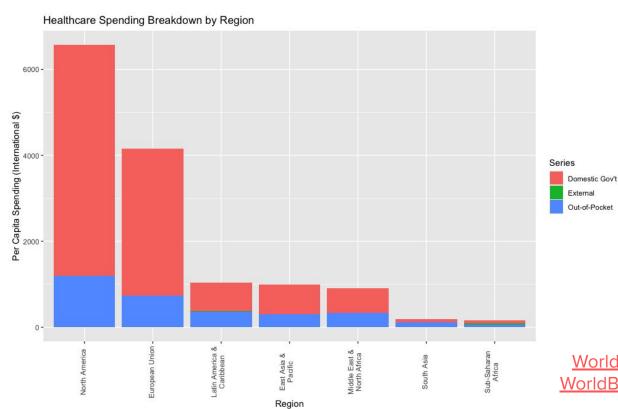
Into this far more readable form, using R



Rate (Confirmed Deaths per 1000 people)

Data sourced from: KFFData

Another example



Data sourced from:

WorldBank - Out of Pocket WorldBank - Domestic Gov't WorldBank - External

Relevant Coursework

- CMSC132 Object Oriented Programming II
 - Data structures and algorithms in Java
 - Design principles and execution for software
- CMSC131 Object Oriented Programming I
 - Credit granted from a score of 5 on AP Computer Science A exam
 - Introduction to programming and design in Java
- MATH246 Differential Equations
 - Solving and using ordinary differential equations
 - MATLAB
- HGLO101 Globalization
 - Data analysis using R

Feel free to contact me!

- Send me an email: <u>at.cupps@gmail.com</u>
- Check out my Github for these projects at <u>github.com/atcupps/portfolio</u>
- Visit my LinkedIn at this link