Juichi Lee

Email: leejuic@oregonstate.edu

CS 475 Parallel Programming

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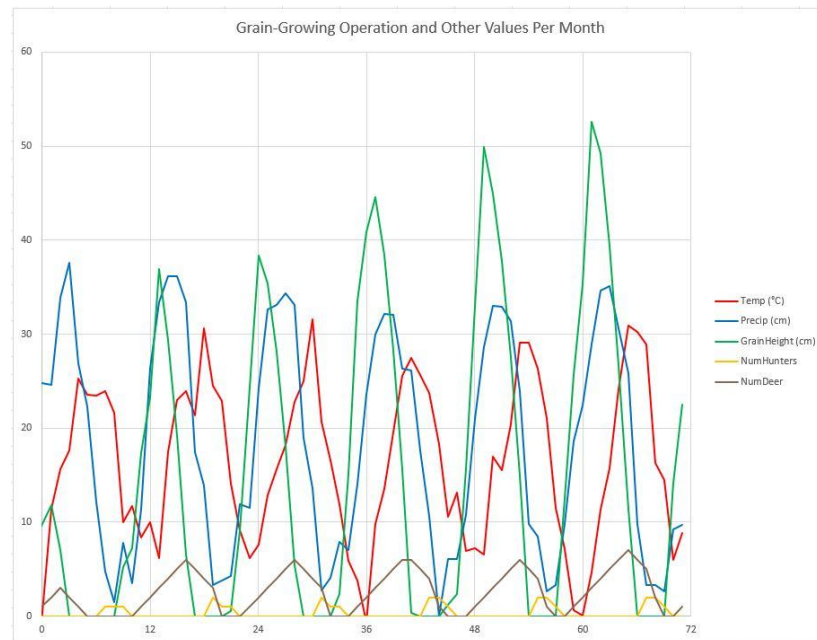Project #3: Functional Decomposition

1. What your own-choice quantity was and how it fits into the simulation.
   - I chose to incorporate hunters to hunt the deer between August and October. For every hunter, there would be one less deer during that month. The number of hunters per month is determined by taking a quarter of the current deer population and adding 1 to ensure that there would be at least 1 hunter every month of the hunting season.
2. A table showing values for temperature, precipitation, number of deer, height of the grain, and your own-choice quantity as a function of month number.

Year	Month	Temp (°C)	Precip (cm)	GrainHeight (cm)	NumHunters	NumDeer
2022	0	-0.73	24.77	9.6	0	1
2022	1	11.42	24.56	11.79	0	2
2022	2	15.61	33.87	7.07	0	3
2022	3	17.63	37.58	0	0	2
2022	4	25.32	26.87	0	0	1
2022	5	23.52	22.32	0	0	0
2022	6	23.44	12.16	0	0	0
2022	7	23.9	4.75	0	1	0
2022	8	21.6	1.53	0	1	0
2022	9	10	7.78	5.2	1	0
2022	10	11.69	3.46	7.18	0	0
2022	11	8.4	11.34	17.31	0	1
2023	12	9.96	26.28	23.28	0	2
2023	13	6.19	33.42	36.94	0	3
2023	14	17.45	36.16	29.4	0	4
2023	15	23.01	36.19	19.24	0	5
2023	16	23.92	33.36	6.54	0	6
2023	17	21.39	17.44	0	0	5
2023	18	30.66	13.93	0	0	4
2023	19	24.51	3.3	0	2	3
2023	20	22.91	3.76	0	1	0
2023	21	14.12	4.27	0.55	1	0
2023	22	9.14	11.91	8.99	0	0
2023	23	6.17	11.48	24.35	0	1
2024	24	7.58	24.24	38.4	0	2
2024	25	12.88	32.62	35.43	0	3

2024	26	15.61	33.12	28.18	0	4
2024	27	18.21	34.32	18.06	0	5
2024	28	22.81	33.1	5.36	0	6
2024	29	25	18.94	0	0	5
2024	30	31.61	13.64	0	0	4
2024	31	20.66	2.69	0	2	3
2024	32	16.54	4.03	0	1	0
2024	33	11.87	7.84	2.38	1	0
2024	34	5.86	7.01	15.06	0	0
2024	35	3.75	13.97	33.44	0	1
2025	36	-0.62	23.51	40.81	0	2
2025	37	9.76	29.98	44.58	0	3
2025	38	13.52	32.18	38.44	0	4
2025	39	19.58	32.1	28.29	0	5
2025	40	25.57	26.36	15.59	0	6
2025	41	27.49	26.09	0.35	0	6
2025	42	25.64	17.6	0	0	5
2025	43	23.76	10.68	0	2	4
2025	44	18.29	0	0	2	1
2025	45	10.58	6.05	1.24	1	0
2025	46	13.12	6.07	2.35	0	0
2025	47	6.97	10.74	15.67	0	0
2026	48	7.22	20.93	32.95	0	1
2026	49	6.53	28.63	49.94	0	2
2026	50	16.99	33.03	44.99	0	3
2026	51	15.52	32.92	37.76	0	4
2026	52	20.44	31.43	27.61	0	5
2026	53	29.11	23.95	14.91	0	6

2026	54	29.11	9.83	0	0	5
2026	55	26.29	8.46	0	2	4
2026	56	21.05	2.67	0	2	1
2026	57	11.47	3.34	0	1	0
2026	58	7.09	9.77	12.47	0	0
2026	59	0.6	18.55	25.64	0	1
2027	60	0.09	22.42	35.29	0	2
2027	61	4.68	28.9	52.6	0	3
2027	62	11.36	34.64	49.24	0	4
2027	63	15.72	35.14	39.4	0	5
2027	64	24.14	30.62	26.7	0	6
2027	65	30.95	25.88	11.46	0	7
2027	66	30.23	9.8	0	0	6
2027	67	28.9	3.27	0	2	5
2027	68	16.29	3.26	0	2	2
2027	69	14.52	2.6	0	1	0
2027	70	5.96	9.18	14.12	0	0
2027	71	8.81	9.75	22.55	0	1

3. A graph showing temperature, precipitation, number of deer, height of the grain, and your own-choice quantity as a function of month number.

Grain-Growing Operation and Other Values Per Month

— Temp (°C)
— Precip (cm)
— GrainHeight (cm)
— NumHunters
— NumDeer

4. A commentary about the patterns in the graph and why they turned out that way. What evidence in the curves proves that your own quantity is actually affecting the simulation correctly?

- The Temp and Precip variables appear to be following cosine and sine wave patterns with slight randomness here and there added by the Ranf function. The GrainHeight appears to generally follow the trend of Temp and Precip; when Temp or Precip reach near the grain's ideal ranges (4.44 Celcius for Temp, 25.4 cm for Precip), the GrainHeight is near or at its peak. Whatever trend the GrainHeight exhibits, the NumDeer shortly followsindicating a sort of lagging relationship between them. For my own quantity, NumHunters, it appears to be affecting the simulation as I envisioned; during the hunting season (which occurs between months 7-10), the number of hunters increase while the number of deer experience a noticeably sharp decline as evidenced in the graph.