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CS 575 Project 2
Functional Decomposition

1. **Program was run on Flip Server**

2. **What your own-choice quantity was and how it fits into the simulation**

   ➔ the chosen quantity is the human population. Humans were added to the ecosystem model to represent the anthropogenic factors that can impact natural processes. Their presence in the simulation aligns with real-world scenarios where human activities directly and indirectly affect both flora and fauna.

3. **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.**

Month	Temperature (°C)	Grain Height (cm)	Precipitation (cm)	Deers	Humans
0	-17.78	7.62	0	3	5
1	4.83	30.12	23.63	3	5
2	11.38	28.59	31.65	4	5
3	13.63	19.99	37.52	5	5
4	23.24	7.31	31.29	6	6
5	21.09	0	16.95	5	6
6	31.09	0	17.76	4	6
7	24.43	0	6.78	3	6
8	22.13	0	0	2	6
9	15.3	0	0	1	6
10	9.91	3.75	5.54	0	6
11	6.36	28.6	17.98	1	6
12	2.53	51.6	19.34	2	6
13	6.34	73.16	29	3	6
14	7.23	84.36	37.59	4	6
15	13.02	76.57	35.95	5	6
16	27.33	63.95	28.21	6	7
17	21.33	48.64	26.56	7	7
18	22.92	30.94	17.45	8	7
19	19.46	10.57	10.05	9	7
20	21.02	0	7.98	8	7
21	9.17	0	3.06	7	7
22	7.36	0	11.78	6	7
23	4.28	5.57	9.71	5	7
24	10.09	3.34	20.6	4	7

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25	9.71	5.56	23.73	3	7
26	9.69	9.57	32.16	2	7
27	13.97	6.01	31.66	3	7
28	26.71	0	26.73	2	8
29	29.38	0	25.03	1	8
30	26.15	0	12.51	0	8
31	24.55	0	2.17	0	8
32	21.89	0	1.59	0	8
33	16.08	1.49	0.77	0	8
34	11.7	4.28	11.59	0	8
35	8.01	22.18	15.67	1	8
36	8.55	37.22	26.39	2	8
37	9.98	43.32	24.21	3	8
38	13.09	37.92	37.17	4	8
39	17.52	35.18	25.16	5	8
40	22.1	15.18	25.39	6	9
41	23.4	0	24.03	5	9
42	25.53	0	9.95	4	9
43	20.34	0	5.06	3	9
44	15.6	0	1.8	2	9
45	16.09	0	1.17	1	9
46	10.76	1.8	4.79	0	9
47	10.34	10.19	15.16	0	9
48	5.94	38	21.82	1	9
49	11.42	41.82	25.51	2	9
50	7.52	56.27	34.86	3	9
51	15.08	49.13	30.43	4	9
52	26.41	39.13	25.62	5	10
53	24.17	26.52	17.24	6	10
54	26.93	11.35	12.99	7	10
55	19.14	0	8.89	6	10
56	23.54	0	7.04	5	10
57	8.64	0	8.11	4	10
58	2.45	2.53	3.43	3	10
59	5.08	20.59	15.27	2	10
60	10.26	25.55	22.49	3	10
61	9.71	29.88	30.27	4	10
62	11.15	25.54	36.73	5	10
63	18.77	12.84	36.74	6	10
64	20.89	0	25.6	5	11
65	25.97	0	24.82	4	11
66	22.53	0	14.18	3	11

67	26.89	0	2.57	2	11
68	18.21	0	0	1	11
69	17.15	0	0.97	0	11
70	9.76	5.44	2.59	0	11
71	8.39	18.93	11.21	1	11

4. A graph showing temperature, precipitation, number of deer, height of the grain, and your own-choice quantity as a function of month number. Note: if you change the units to °C and centimeters, the quantities might fit better on the same set of axes.
cm = inches * 2.54
°C = (5./9.)*(°F-32)
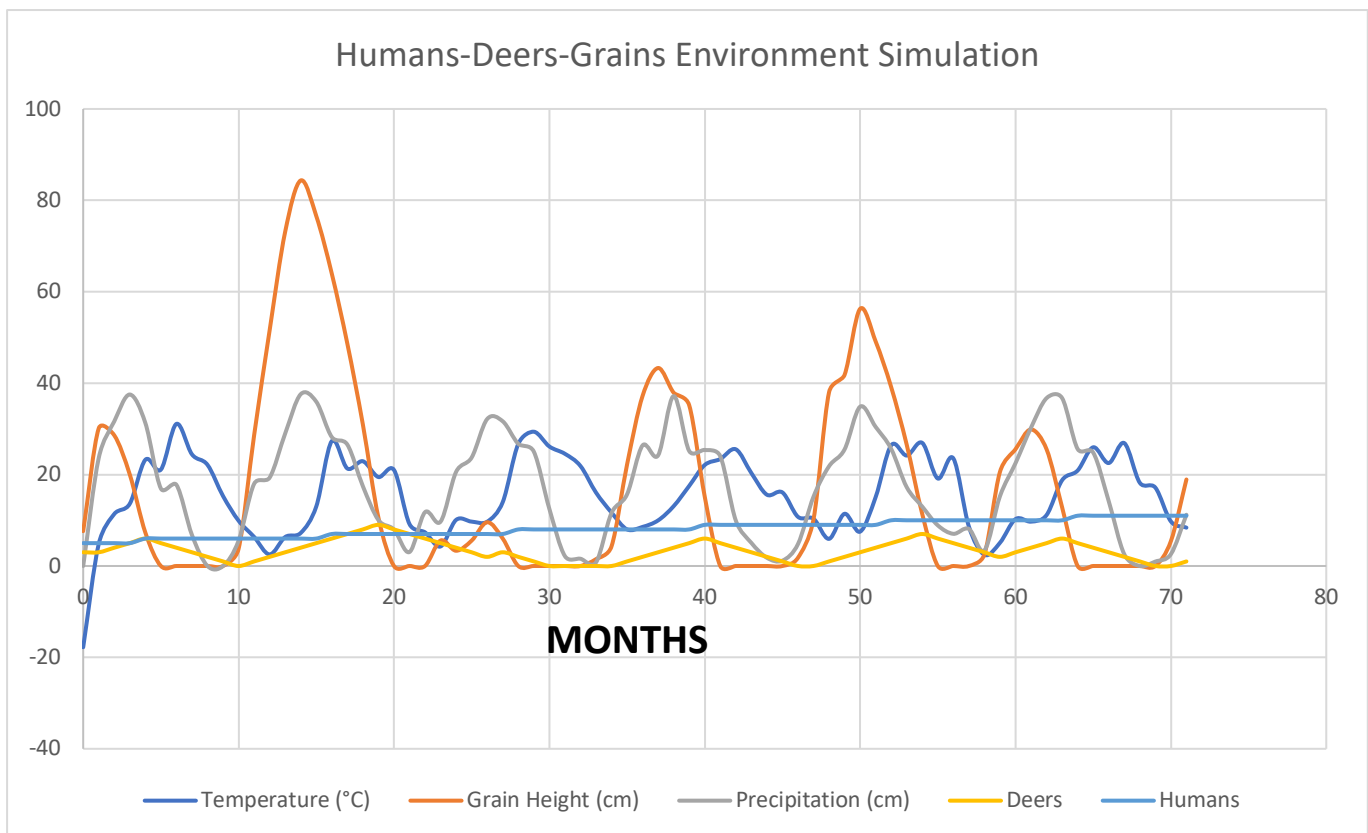
5.A commentary about the patterns in the graph and why they turned out that way. What evidence in the curves proves that your own quantity is actually affecting the simulation correctly?

The graph depicts a simulation over a period of time 2024 - 2029, with the X-axis potentially representing the months or years of simulation time, and the Y-axis showing various measurements in degrees Celsius, centimeters, and counts of deer and humans. Temperature shows a clear periodic pattern with high peaks and low troughs, suggesting seasonal variation. Precipitation also exhibits a somewhat sinusoidal pattern, though with less regularity and amplitude than temperature. Grain height has peaks and troughs as well, which seem to correspond inversely with the deer population; as the deer population rises, the grain height appears to fall, likely due to consumption by the deer.

The human population curve is less variable and appears to have a gradual increasing trend, perhaps reflecting a model of steady population growth. This is an important factor in the simulation, as humans can have a range of impacts on an ecosystem. The fact that the human curve does not show sharp fluctuations suggests that any impact they have is either controlled or cumulative over time, rather than immediate and drastic. Evidence that the human quantity is affecting the simulation can be seen in the gradual changes in grain height and deer population. While not as immediately reactive as the deer to grain availability, the human influence could be contributing to the long-term trends seen in these variables, for instance, a sustained increase in the human population might be expected to eventually lead to a decrease in grain height as more resources are consumed, and possibly also a decrease in the deer population as a result of increased hunting or habitat loss.