Name: Wei-Chen Kao

Project Name: Functional Decomposition

1. I set my own function as Beasts, this function will impact the number of deer because they will attack deer. Since those beasts also need to drink some water, so when the precipitation is too low, beasts cannot survive. When deer become less, then beasts will die because they don't have enough deer to eat.

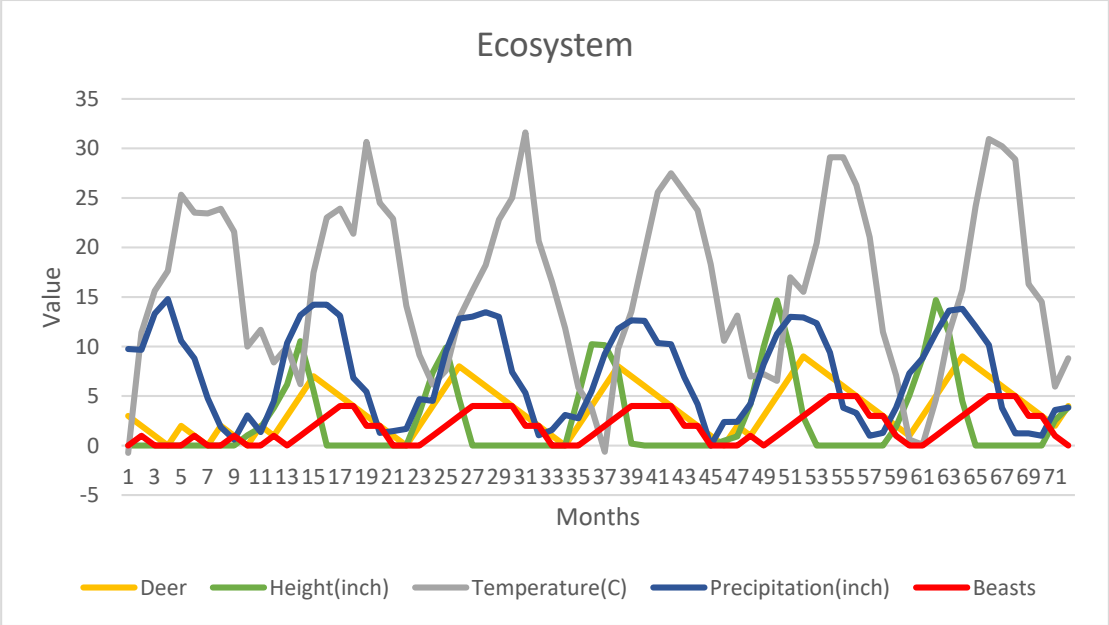
2. Table

	Deer	Height(inch)	Temperature(C)	Precipitation(inch)	Beasts
1	3	0	-0.73	9.75	0
2	2	0	11.42	9.67	1
3	1	0	15.61	13.32	0
4	0	0	17.63	14.79	0
5	2	0	25.32	10.58	0
6	1	0	23.52	8.79	1
7	0	0	23.44	4.78	0
8	2	0	23.9	1.87	0
9	1	0	21.6	0.6	1
10	0	1.04	10	3.05	0
11	2	1.82	11.69	1.36	0
12	1	3.81	8.4	4.47	1
13	3	6.16	9.96	10.34	0
14	5	10.54	6.19	13.16	1
15	7	5.57	17.45	14.22	2
16	6	0	23.01	14.23	3
17	5	0	23.92	13.11	4
18	4	0	21.39	6.83	4
19	3	0	30.66	5.44	2
20	2	0	24.51	1.28	2
21	1	0	22.91	1.46	0
22	0	0	14.12	1.68	0
23	2	3.32	9.14	4.69	0
24	4	7.37	6.17	4.52	1
25	6	9.9	7.58	9.53	2
26	8	4.73	12.88	12.82	3
27	7	0	15.61	13.01	4

28	6	0	18.21	13.47	4
29	5	0	22.81	12.99	4
30	4	0	25	7.42	4
31	3	0	31.61	5.33	2
32	2	0	20.66	1.04	2
33	1	0	16.54	1.57	0
34	0	0	11.87	3.09	0
35	2	4.99	5.86	2.76	0
36	4	10.23	3.75	5.5	1
37	6	10.13	-0.62	9.25	2
38	8	7.62	9.76	11.78	3
39	7	0.2	13.52	12.64	4
40	6	0	19.58	12.6	4
41	5	0	25.57	10.34	4
42	4	0	27.49	10.23	4
43	3	0	25.64	6.89	2
44	2	0	23.76	4.18	2
45	1	0	18.29	0	0
46	0	0.49	10.58	2.38	0
47	2	0.93	13.12	2.39	0
48	1	4.17	6.97	4.23	1
49	3	9.97	7.22	8.23	0
50	5	14.66	6.53	11.27	1
51	7	9.71	16.99	12.99	2
52	9	2.86	15.52	12.94	3
53	8	0	20.44	12.35	4
54	7	0	29.11	9.39	5
55	6	0	29.11	3.82	5
56	5	0	26.29	3.28	5
57	4	0	21.05	1	3
58	3	0	11.47	1.28	3
59	2	1.89	7.09	3.82	1
60	1	5.07	0.6	7.29	0
61	3	8.87	0.09	8.83	0
62	5	14.69	4.68	11.38	1
63	7	11.36	11.36	13.63	2
64	9	4.49	15.72	13.81	3

65	8	0	24.14	12.03	4
66	7	0	30.95	10.15	5
67	6	0	30.23	3.81	5
68	5	0	28.9	1.24	5
69	4	0	16.29	1.23	3
70	3	0	14.52	0.99	3
71	2	2.54	5.96	3.59	1
72	4	3.85	8.81	3.83	0

3.



4. In the above graph, temperature and precipitation are calculated by the given factors and the given forms. So, I will focus on the grain height, deer, and beasts. The first year (month 1~ month 12) is still initializing, and the reason is that I set the initial number of grain height = 1, and the number of deer = 1. That is why grain cannot grow at the beginning of the simulation. Hence, I will start observing the graph in second year (month 13). When the precipitation is greater, the grain of height grows higher, and can simultaneously afford more deer to survive. This situation will also attract beasts (meat eater) appear. Beasts won't exceed the number of deer because without deer, those beasts cannot survive. In my code, Beasts parameter will accelerate the death of the deer. When the height of grain is less than number of deer, the number of deer will reduce 1 in next month, at the same time, if the beasts are greater than deer, number of deer will reduce 1 again. So, the maximal decrement of

the deer in a month can reach to 2.

When deer become more, we can easily observe that beasts grow up as well as grain height become lower. This can also explain why there are period time that make the height of grain maintain 0. When deer are too less, then grain can grow up again, and will attract deer come to this ecosystem and indirectly attract beasts come back again. This situation will go into a cycle if the temperature and precipitation are both normal. (The part “normal” means there is no accident happening, such as hurricane, climate change, or typhoon.)

Since my height of grain and the precipitation are using “inches” rather than “centimeters”, those two lines are not changing violently compare to the professor’s sample on the webpage. But, this situation doesn’t matter because I can still observe that each factors impact each other.