



Project 3 Writeup

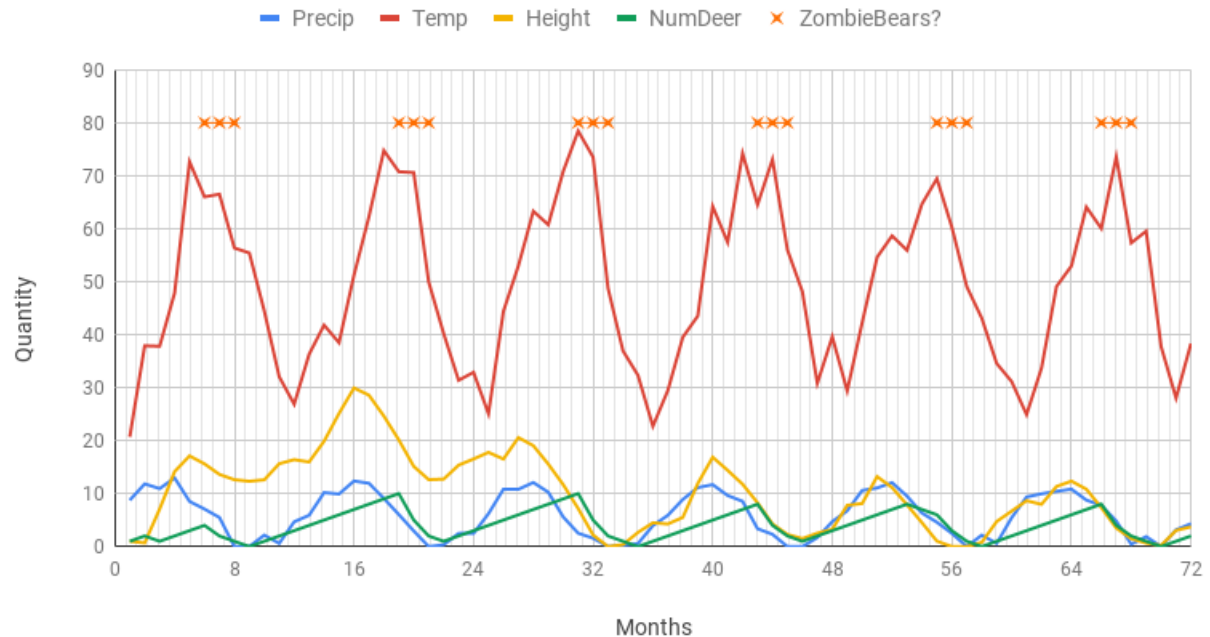
1. **My Choice Quantity** I added Zombie Bears to the simulation. Rather than represent these Zombie Bears as a quantity, however, I represented only whether the Zombie Bears attack. If they attack, the halve the population of deer. These Zombie Bears are very picky about the weather, preferring to sleep when it is cold or rainy. As such, they only wake and attack during when the weather exceeds 60 degrees and the precipitation is less than 10 inches.

2. Data

Month	Precip	Temp	Height	NumDeer	ZombieBears?
0	8.75	20.69	1	1	
1	11.83	37.9	0.69	2	
2	10.94	37.81	7.09	1	
3	12.96	47.85	14.15	2	
4	8.52	72.63	17.11	3	
5	7.08	66.01	15.61	4	Attack
6	5.49	66.5	13.62	2	Attack
7	0	56.35	12.62	1	Attack
8	0	55.41	12.32	0	
9	2.16	44.47	12.6	1	
10	0.6	32.05	15.64	2	
11	4.67	26.87	16.4	3	
12	5.91	36.3	15.97	4	
13	10.19	41.8	19.88	5	
14	9.92	38.48	25.12	6	
15	12.37	51.22	29.93	7	
16	11.95	62.24	28.58	8	
17	9.09	74.74	24.63	9	
18	6.05	70.75	20.13	10	Attack
19	2.95	70.59	15.13	5	Attack
20	0	49.94	12.63	2	Attack
21	0.33	40.21	12.73	1	
22	2.48	31.38	15.37	2	
23	2.49	32.89	16.53	3	
24	6.21	25.07	17.78	4	
25	10.82	44.4	16.52	5	
26	10.81	53	20.57	6	
27	12.09	63.3	19.04	7	
28	10.26	60.74	15.57	8	
29	5.59	70.82	11.68	9	
30	2.52	78.44	7.18	10	Attack
31	1.58	73.49	2.18	5	Attack
32	0	48.73	0	2	Attack

33	0.22	36.93	0.37	1	
34	0.56	32.33	2.67	0	
35	3.96	22.72	4.49	1	
36	5.9	29.47	4.27	2	
37	8.89	39.51	5.5	3	
38	11.13	43.51	11.89	4	
39	11.69	64.2	16.87	5	
40	9.64	57.43	14.39	6	
41	8.54	74.19	11.77	7	
42	3.37	64.53	8.27	8	Attack
43	2.31	73.07	4.28	4	Attack
44	0	56	2.28	2	Attack
45	0	48.13	1.51	1	
46	1.69	30.82	2.53	2	
47	4.7	39.6	3.26	3	
48	6.76	29.4	7.79	4	
49	10.59	42.25	8.13	5	
50	11.06	54.62	13.21	6	
51	12.07	58.65	11.14	7	
52	9.52	55.92	7.88	8	
53	6.33	64.65	4.51	7	
54	4.59	69.44	1.03	6	Attack
55	2.49	60.3	0	3	Attack
56	0	49.05	0	1	Attack
57	2.16	43.12	0.8	0	
58	0.6	34.56	4.73	1	
59	5.44	31.15	6.69	2	
60	9.36	24.91	8.65	3	
61	9.96	33.69	7.97	4	
62	10.42	49.08	11.34	5	
63	10.84	52.96	12.35	6	
64	8.77	64.08	10.83	7	
65	7.78	60.04	7.35	8	Attack
66	4.82	73.57	3.49	4	Attack
67	0.45	57.31	1.49	2	Attack
68	1.88	59.53	0.65	1	
69	0	37.76	0.24	0	
70	3.15	28.04	3.04	1	
71	4.32	38.34	3.74	2	
72	5.84	38.5	8.37	3	

Deer, Grain, ZombieBear Simulation



3. Commentary

The height of the grain, represented by the yellow line, depends on two key factors: first, the amount of deer, and second the weather conditions. Higher deer quantities should reduce the height of the grain as there are more deer grazing the land. But ideal weather conditions (i.e. when temperature is close to 50 and precipitation is close to 6) will tend to increase the height of the grain. The graph illustrates that we tend to see peaks in the height graph around temperatures of 50 and with precipitation around 10. We notice that it tends to be the case that as temperature is in decline around 50, the precipitation is rather low. It is for this reason that we would expect the growth rate to be hampered, which is evident in the graph at months 8, 20, and 32 for example. The height of the grain is also affected negatively by the number of deer. We see that as the number of deer increases as represented by the green line, we see a decline in the grain height.

The number of deer is affected by one of two things: whether the number of deer is greater than the height of the grain or whether the Zombie Bears attack. In cases where the Zombie Bears do not attack, we notice that when the height of the grain is greater than the number of deer (i.e. the yellow line is greater than the green line), the green line shows a steady increase by one deer per month, which matches expectation.

The orange X's in the above graph represent whether the Zombie Bears attacked. As can be seen in the above data, they attack only when the the temperature exceeds 60 and the precipitation drops below 10. Moreover, For each attack, the NumDeer variable halves. In the graph we see a precipitous drop in the green line for each Zombie Bear attack.

The temperature and precipitation are determined by a sine wave function with some added randomness, which matches the periodic patterns we see in the red and blue lines.