

# CS 575

## Project #4

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**1. What your own-choice quantity was and how it fit into the simulation.**

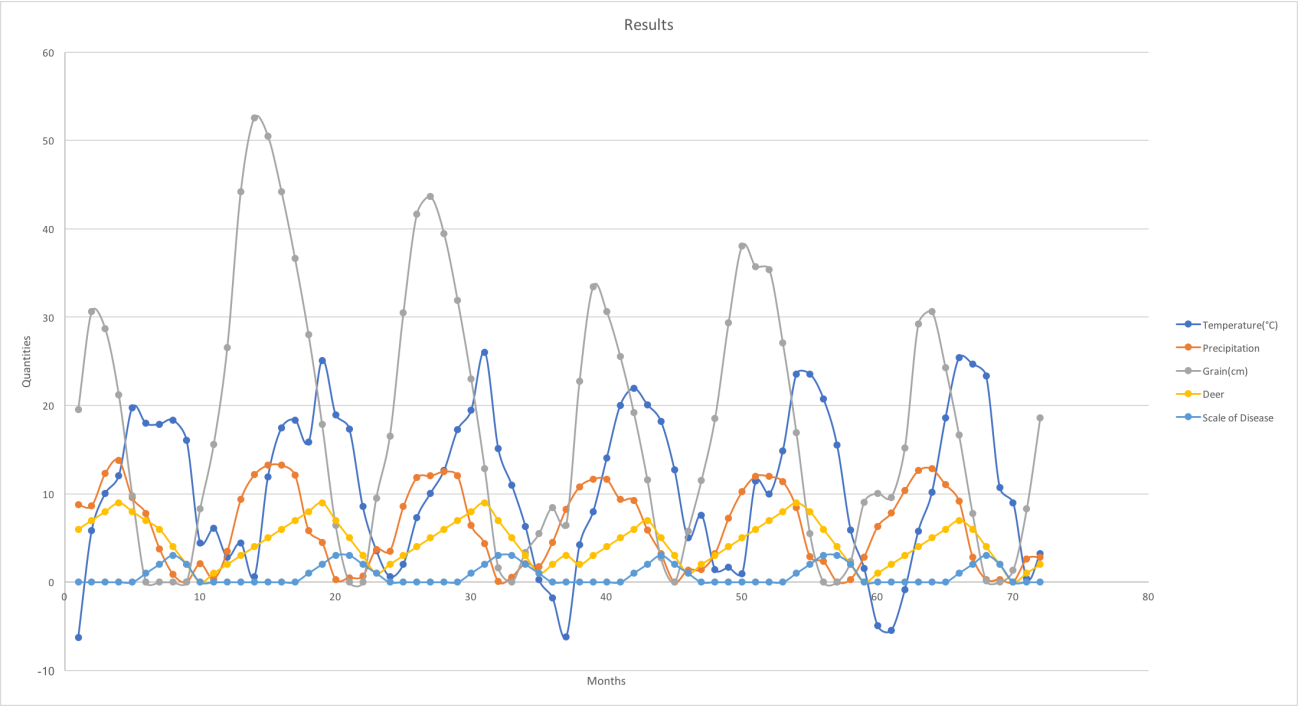
I add a disease into the simulation. In the summer season, this disease will out-break, starting from May. After one month of incubation period, it will start killing deer in June, and begin to scale-down after September. If the amount of deer is greater than five, the scale of the disease gets larger, killing more deer in a month, vice versa. When the amount of deer drops to zero, the scale of disease will also drop to zero because there is no more deer to kill.

**2. A table showing values for temperature, precipitation, number of graindeer, height of the grain, and your own-choice quantity as a function of month number.**

Date	Temperature(°C)	Precipitation	Grain(cm)	Deer	Scale of Disease
2014/1	-6.28	8.75	19.53	6	0
2014/2	5.86	8.67	30.62	7	0
2014/3	10.05	12.33	28.68	8	0
2014/4	12.07	13.79	21.19	9	0
2014/5	19.77	9.58	9.77	8	0
2014/6	17.97	7.79	0.00	7	1
2014/7	17.88	3.79	0.00	6	2
2014/8	18.34	0.87	0.00	4	3
2014/9	16.05	0.00	0.00	2	2
2014/10	4.44	2.06	8.28	0	0
2014/11	6.13	0.36	15.60	1	0
2014/12	2.85	3.47	26.54	2	0
2015/1	4.41	9.35	44.23	3	0
2015/2	0.64	12.16	52.54	4	0
2015/3	11.89	13.23	50.50	5	0
2015/4	17.46	13.25	44.23	6	0
2015/5	18.36	12.14	36.64	7	0
2015/6	15.84	5.87	28.01	8	1
2015/7	25.11	4.48	17.85	9	2
2015/8	18.96	0.30	6.43	7	3
2015/9	17.36	0.48	0.00	5	3
2015/10	8.56	0.68	0.00	3	2
2015/11	3.59	3.69	9.52	1	1
2015/12	0.62	3.52	16.55	2	0
2016/1	2.03	8.54	30.47	3	0
2016/2	7.32	11.84	41.68	4	0
2016/3	10.05	12.04	43.64	5	0
2016/4	12.65	12.51	39.44	6	0
2016/5	17.25	12.03	31.92	7	0
2016/6	19.45	6.46	23.04	8	1
2016/7	26.05	4.37	12.88	9	2

2016/8	15.10	0.06	1.64	7	3
2016/9	10.98	0.59	0.00	5	3
2016/10	6.31	2.09	3.36	3	2
2016/11	0.31	1.76	5.47	1	1
2016/12	-1.80	4.50	8.44	2	0
2017/1	-6.17	8.26	6.41	3	0
2017/2	4.21	10.80	22.75	2	0
2017/3	7.96	11.67	33.45	3	0
2017/4	14.02	11.64	30.65	4	0
2017/5	20.01	9.38	25.58	5	0
2017/6	21.93	9.27	19.23	6	1
2017/7	20.09	5.93	11.61	7	2
2017/8	18.20	3.20	2.75	5	3
2017/9	12.73	0.00	0.00	3	2
2017/10	5.03	1.38	5.75	1	1
2017/11	7.57	1.39	11.54	2	0
2017/12	1.42	3.23	18.55	3	0
2018/1	1.66	7.24	29.39	4	0
2018/2	0.98	10.27	38.06	5	0
2018/3	11.44	12.00	35.71	6	0
2018/4	9.96	11.96	35.38	7	0
2018/5	14.89	11.38	27.08	8	0
2018/6	23.55	8.43	16.92	9	1
2018/7	23.56	2.87	5.49	8	2
2018/8	20.74	2.33	0.00	6	3
2018/9	15.50	0.05	0.00	4	3
2018/10	5.91	0.31	2.34	2	2
2018/11	1.54	2.85	9.06	0	0
2018/12	-4.96	6.30	10.07	1	0
2019/1	-5.46	7.82	9.61	2	0
2019/2	-0.87	10.37	15.17	3	0
2019/3	5.80	12.63	29.21	4	0
2019/4	10.16	12.83	30.63	5	0
2019/5	18.58	11.05	24.31	6	0
2019/6	25.39	9.18	16.69	7	1
2019/7	24.67	2.85	7.80	6	2
2019/8	23.33	0.28	0.18	4	3
2019/9	10.73	0.28	0.00	2	2
2019/10	8.96	0.02	1.34	0	0
2019/11	0.40	2.62	8.28	1	0
2019/12	3.25	2.83	18.63	2	0

3. A graph showing temperature, precipitation, number of graindeer, 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 will fit better on the same set of axes.



#### 4. A commentary about the patterns in the graph and why they turned out that way.

In the graph, dark blue line is the temperature and the orange line is the precipitation. Every year, temperature drops in winter and precipitation drops in summer. For the grain, due to the increase of the temperature and the precipitation, it will grow during the spring time. Because the growth of grain, the amount of deer increases. Yet, more deer needs more grain, as the amount of deer reach to a point, the grains will start decreasing.

In every year's summer, there is a disease spreading among the deer, causing the amount of deer to drop. The bigger the herd of the deer were, the bigger the scale of the disease gets, vice versa. Once the deer are killed by the disease, the grain grows back a little bit faster, which is because there aren't much deer left to consume the grain.

For example, we can compare 2014 and 2015's spring time. In the following chart, at the beginning of 2014, there were 8 deer and 28.68 cm of grain in March, but after a disease, due to the decrease of the deer, the grain was 50.5 cm in March.

Date	Temperature(°C)	Precipitation	Grain(cm)	Deer	Scale of Disease
2014/1	-6.28	8.75	19.53	6	0
2014/2	5.86	8.67	30.62	7	0
2014/3	10.05	12.33	28.68	8	0
2014/4	12.07	13.79	21.19	9	0
2014/5	19.77	9.58	9.77	8	0
2014/6	17.97	7.79	0.00	7	1
2014/7	17.88	3.79	0.00	6	2
2014/8	18.34	0.87	0.00	4	3
2014/9	16.05	0.00	0.00	2	2
2014/10	4.44	2.06	8.28	0	0
2014/11	6.13	0.36	15.60	1	0
2014/12	2.85	3.47	26.54	2	0
2015/1	4.41	9.35	44.23	3	0
2015/2	0.64	12.16	52.54	4	0
2015/3	11.89	13.23	50.50	5	0

