Project#3: Functional Decomposition

1. My own choice quantity is inspired by Game of Thrones House Targaryen: Dragons.
   Agent chosen for simulation: Dragons by the function Dracarys. The dragons eat deer(one per month) who eat grain that grows as per the environmental factors like precipitation.
   In case the number of dragons is less than the number of deer, and there's a difference of 4 between them, the population of dragons will increase by 1 per month.
   In case the number of dragons is greater than the number of deer, we kill all the dragons.

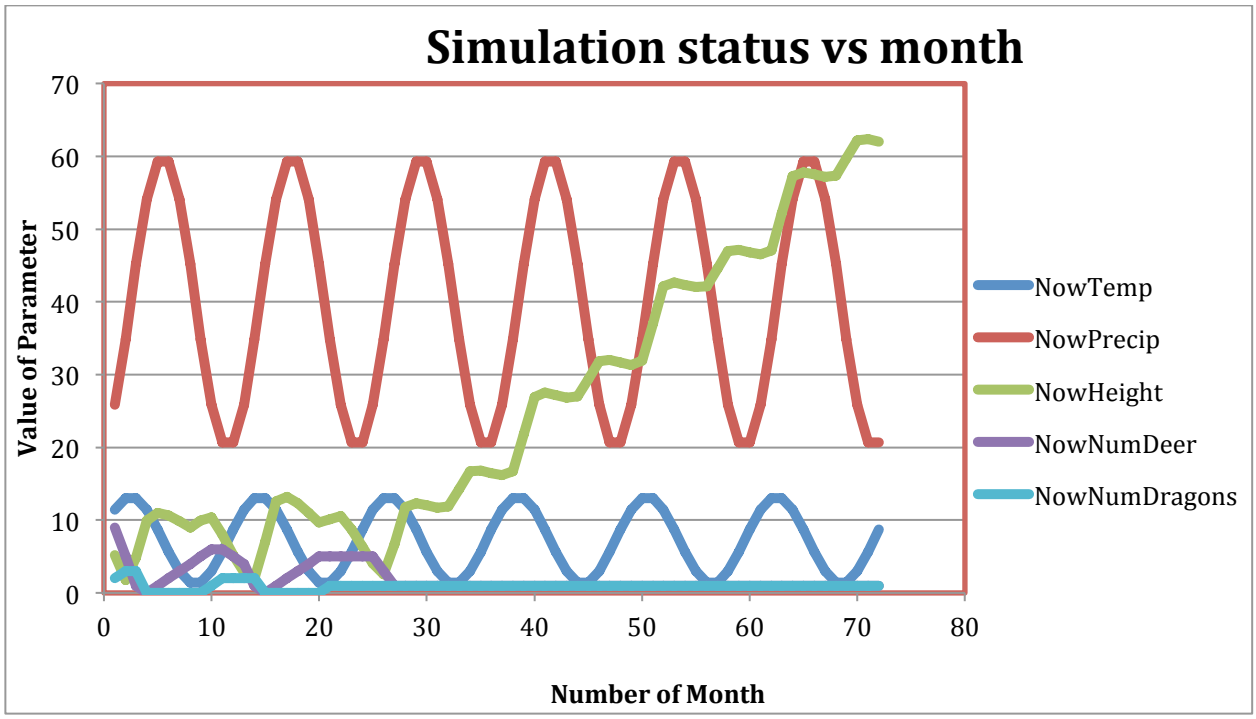
2. Table:

Month	NowTemp	NowPrecip	NowHeight	NowNumDeer	NowNumDragons
1	11.44	25.87	5.19	9	2
2	12.99	34.83	1.75	5	3
3	12.99	45.19	4.85	1	3
4	11.44	54.15	9.94	0	0
5	8.75	59.33	11	1	0
6	5.65	59.33	10.69	2	0
7	2.96	54.15	9.85	3	0
8	1.4	45.19	9	4	0
9	1.4	34.83	9.92	5	0
10	2.96	25.87	10.35	6	1
11	5.65	20.69	8.01	6	2
12	8.75	20.69	5.17	5	2
13	11.44	25.87	2.86	4	2
14	12.99	34.83	1.92	1	2
15	12.99	45.19	7.02	0	0
16	11.44	54.15	12.61	1	0
17	8.75	59.33	13.17	2	0
18	5.65	59.33	12.36	3	0
19	2.96	54.15	11.01	4	0
20	1.4	45.19	9.67	5	0
21	1.4	34.83	10.09	5	1
22	2.96	25.87	10.52	5	1
23	5.65	20.69	8.68	5	1

24	8.75	20.69	6.34	5	1
25	11.44	25.87	4.02	5	1
26	12.99	34.83	2.59	3	1
27	12.99	45.19	6.69	1	1
28	11.44	54.15	11.78	1	1
29	8.75	59.33	12.34	1	1
30	5.65	59.33	12.02	1	1
31	2.96	54.15	11.68	1	1
32	1.4	45.19	11.84	1	1
33	1.4	34.83	14.26	1	1
34	2.96	25.87	16.68	1	1
35	5.65	20.69	16.84	1	1
36	8.75	20.69	16.5	1	1
37	11.44	25.87	16.19	1	1
38	12.99	34.83	16.76	1	1
39	12.99	45.19	21.86	1	1
40	11.44	54.15	26.95	1	1
41	8.75	59.33	27.5	1	1
42	5.65	59.33	27.19	1	1
43	2.96	54.15	26.85	1	1
44	1.4	45.19	27.01	1	1
45	1.4	34.83	29.43	1	1
46	2.96	25.87	31.85	1	1
47	5.65	20.69	32.01	1	1
48	8.75	20.69	31.67	1	1
49	11.44	25.87	31.36	1	1
50	12.99	34.83	31.92	1	1
51	12.99	45.19	37.02	1	1
52	11.44	54.15	42.11	1	1
53	8.75	59.33	42.67	1	1
54	5.65	59.33	42.36	1	1
55	2.96	54.15	42.02	1	1
56	1.4	45.19	42.17	1	1
57	1.4	34.83	44.59	1	1
58	2.96	25.87	47.02	1	1
59	5.65	20.69	47.18	1	1
60	8.75	20.69	46.84	1	1
61	11.44	25.87	46.53	1	1
62	12.99	34.83	47.09	1	1
63	12.99	45.19	52.19	1	1

64	11.44	54.15	57.28	1	1
65	8.75	59.33	57.84	1	1
66	5.65	59.33	57.53	1	1
67	2.96	54.15	57.18	1	1
68	1.4	45.19	57.34	1	1
69	1.4	34.83	59.76	1	1
70	2.96	25.87	62.19	1	1
71	5.65	20.69	62.35	1	1
72	8.75	20.69	62.01	1	1

3.



4. The precipitation is represented by sine curve. As can be seen by graph the value of precipitation follows a sine curve. The Temperature is also cyclic in nature mostly like precipitation; it is a function of month. The Height of Grain seems to increase over time as the animals decreases and there are no more deer left to eat the grain. The dragons seem to eat deer quickly in the first few months and as the deer die off, and can be seen by the graph the number of deer and number of dragon remains constant as per the logic of our code. The curve of grain height proves that the agents in code are actually affecting the quantities correctly.