Nick Pepperling
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CS475

HW4: pthreads: Functional Decomposition ("Grainville")

1.) My own choice quantity was a simulated hunting season. This operated based on a random chance (1 in 10) that the human citizens of Grainville grew tired of eating just grain, in which case they open a hunting season during a month where they hunt deer. If a month is chosen as a hunting season, between 0 and 5 deer can be killed. This quantity did not play into my simulation all that much. Many of the 72 months were selected as a hunting season, but most yielded zero deaths of deer. Clearly the citizens of Grainville are poor hunters. The months in which deer were killed, a small spike of grain growth occurred.

2.) Table Data.

	Precipitation	Temperature (Celsius)	Grain Height (cm)	Grain Deer	Dead Deer
0	7.1	3.0	16.3	1.0	0.0
1	9.0	6.7	16.3	2.0	0.0
2	10.9	10.1	14.5	2.0	0.0
3	12.3	12.6	14.5	3.0	0.0
4	12.1	18.0	0.0	3.0	0.0
5	8.4	22.2	0.0	3.0	0.0
6	2.5	21.9	0.0	2.0	0.0
7	3.0	13.8	0.0	1.0	0.0
8	0.0	9.1	0.0	0.0	0.0
9	2.2	2.8	8.8	1.0	0.0
10	3.1	2.3	8.8	2.0	0.0
11	5.0	-3.0	0.0	4.0	0.0

12	9.4	-0.8	3.2	4.0	0.0
13	10.3	5.2	14.9	4.0	0.0
14	13.4	6.0	14.9	5.0	0.0
15	13.0	11.2	10.4	5.0	0.0
16	12.0	13.1	0.0	5.0	0.0
17	8.2	17.3	0.0	5.0	0.0
18	2.7	19.1	0.0	3.0	0.0
19	0.0	17.4	0.0	2.0	0.0
20	1.8	18.1	0.0	2.0	0.0
21	0.4	4.5	6.8	2.0	0.0
22	1.8	5.0	6.8	3.0	0.0
23	2.6	-0.4	3.0	2.0	0.0
24	8.4	4.1	3.0	1.0	0.0
25	10.8	4.8	16.3	3.0	0.0
26	10.5	9.2	5.9	3.0	0.0
27	13.1	17.1	0.0	1.0	0.0
28	9.6	22.2	0.1	0.0	0.0
29	9.4	22.8	0.0	0.0	0.0
30	5.9	22.5	0.0	0.0	0.0
31	3.0	16.7	0.1	0.0	0.0
32	0.1	17.4	0.0	0.0	0.0
33	1.9	12.1	0.0	0.0	0.0
34	2.3	6.4	1.6	0.0	0.0
35	4.9	-1.5	5.0	0.0	0.0
36	6.8	2.4	5.0	1.0	0.0

37	9.0	-0.9	14.8	3.0	0.0
38	10.5	6.2	5.4	2.0	1.0
39	11.8	8.7	7.1	2.0	0.0
40	11.0	22.7	7.1	3.0	0.0
41	8.6	19.4	0.0	3.0	0.0
42	3.4	18.4	0.0	1.0	0.0
43	0.4	15.0	0.0	1.0	0.0
44	1.4	8.7	5.4	1.0	0.0
45	0.0	12.1	5.4	0.0	1.0
46	2.9	-0.7	2.6	1.0	0.0
47	5.0	4.5	2.6	2.0	0.0
48	5.9	2.2	12.0	2.0	0.0
49	8.6	2.4	12.2	4.0	0.0
50	11.6	3.8	14.5	4.0	0.0
51	12.8	13.7	0.0	4.0	0.0
52	12.2	14.1	0.0	3.0	0.0
53	6.1	25.1	0.0	2.0	0.0
54	2.7	26.3	0.0	1.0	0.0
55	0.0	13.1	0.0	0.0	0.0
56	0.6	17.6	0.0	0.0	0.0
57	0.0	3.4	0.0	1.0	0.0
58	2.0	0.6	5.3	1.0	0.0
59	5.2	-1.3	4.4	1.0	0.0
60	8.6	-0.4	6.8	3.0	0.0
61	11.8	3.0	6.8	2.0	0.0

62	12.3	9.9	4.9	2.0	0.0
63	13.1	15.6	0.0	2.0	0.0
64	11.6	22.0	0.0	0.0	0.0
65	9.5	25.2	0.0	0.0	0.0
66	4.4	22.6	0.0	0.0	0.0
67	3.3	21.5	0.0	0.0	0.0
68	0.7	10.1	0.0	0.0	0.0
69	1.0	4.1	9.0	0.0	0.0
70	0.7	0.2	3.5	2.0	0.0
71	3.3	0.7	3.5	0.0	1.0

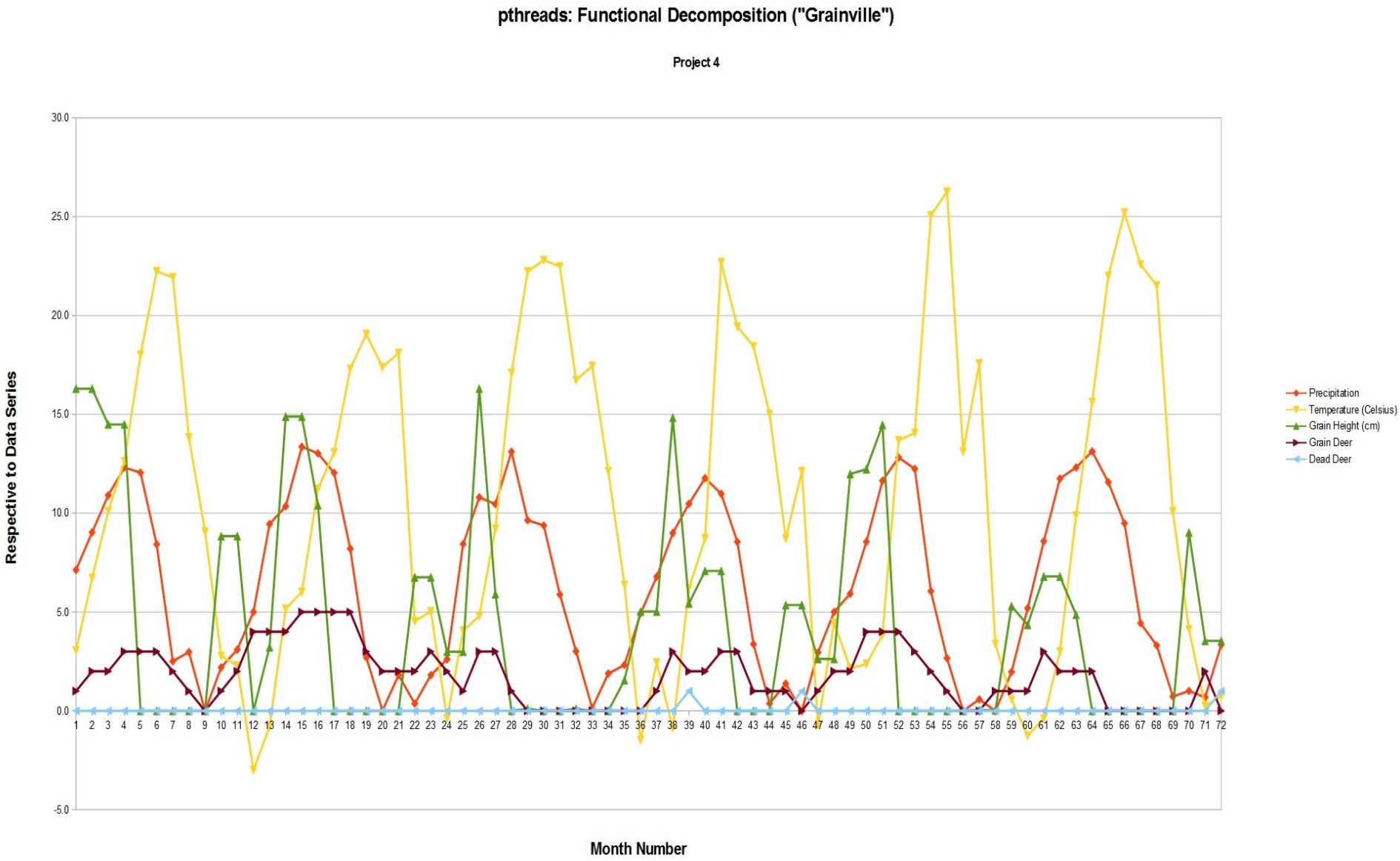
The above table shows the month number in the leftmost column and the various simulation properties in the topmost row.

3.) The data graph is on the back page.

4.) The most obvious patterns visible are the sin like curves among the temperature, precipitation, and grain height curves. They generally follow the same pattern. More specifically:

- Periods of high temperatures are often followed by higher grain height.
- The amount of grain growth very closely follows the pattern of precipitation.
- Lower temperatures and lower grain height clearly lead to a decline in deer population.
- Periods of high deer population generally lead to a fast drop in grain height, which is quickly followed by a decline in deer population.
- A killed deer, of course, causes a drop in deer population which is the quickly followed by an increase in grain growth.

These numbers followed as I expected based on the code. Grain growth is dependent upon temperature and precipitation, and everything else was generally dependent on grain growth. The growth a drop of deer population and grain growth followed its design.


pthreads: Functional Decomposition ("Grainville")
Project 4
Respective to Data Series
Month Number
Precipitation
Temperature (Celsius)
Grain Height (cm)
Grain Deer
Dead Deer
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72