Introduction to Parallel Programming

Project 3

Functional Decomposition

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

I have used MyAgent function uses a random function to generate an arbitrary value to increase the item generation. It is done alternately for grass and deer growth.

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Month** | **Height** | **NumDeer** | **Precip** | **NowTemp** | **MyAgent** |
| 1 | 12 | 10 | 10 | 5.555556 | 0 |
| 2 | 12 | 16 | 10 | 5.555556 | 0.000943 |
| 3 | 0 | 11 | 13.48409 | 14.34568 | 0.668629 |
| 4 | 0 | 3 | 14.65268 | 17.62729 | 1.718076 |
| 5 | 5.154064 | 1 | 10.69988 | 24.90659 | 1.957075 |
| 6 | 2.737943 | 3 | 8.589455 | 24.88341 | 1.787816 |
| 7 | 3.185637 | 3 | 5.93262 | 27.89915 | 1.260003 |
| 8 | 0 | 0 | 3.000996 | 24.29089 | 1.799718 |
| 9 | 0 | 3 | 3.119527 | 17.51757 | 0.960717 |
| 10 | 2.306299 | 3 | 3.088459 | 12.43592 | 0.669726 |
| 11 | 0 | 1 | 3.500395 | 8.286271 | 1.280174 |
| 12 | 16.53074 | 4 | 4.582528 | 5.469036 | 1.216072 |
| 13 | 23.71344 | 10 | 8.502069 | 6.028305 | 1.061795 |
| 14 | 0 | 12 | 10.0243 | 8.344065 | 0.842973 |
| 15 | 0 | 6 | 12.9618 | 11.80553 | 0.465642 |
| 16 | 0 | 1 | 13.83239 | 17.11792 | 1.286009 |
| 17 | 2.619978 | 2 | 9.721664 | 24.32105 | 1.927819 |
| 18 | 5.266811 | 0 | 9.394835 | 25.89218 | 1.067233 |
| 19 | 0 | 3 | 7.125669 | 26.96526 | 1.818287 |
| 20 | 4.39739 | 1 | 2.836106 | 22.76914 | 0.265506 |
| 21 | 1.073473 | 4 | 0 | 19.62722 | 1.428971 |
| 22 | 0 | 0 | 1.035306 | 13.76109 | 1.328519 |
| 23 | 4.935735 | 4 | 3.915833 | 8.421338 | 0.169424 |
| 24 | 8.167397 | 4 | 5.281649 | 3.81066 | 0.489786 |
| 25 | 15.68363 | 8 | 8.442088 | 5.475629 | 0.029483 |
| 26 | 6.307468 | 11 | 11.69306 | 6.601543 | 0.118357 |
| 27 | 0 | 7 | 11.06377 | 14.31469 | 0.678741 |
| 28 | 0 | 2 | 12.08475 | 17.44355 | 1.720203 |
| 29 | 5 | 2 | 10.64904 | 24.97982 | 1.456392 |
| 30 | 0 | 4 | 10.37018 | 27.23377 | 1.211766 |
| 31 | 2.189258 | 2 | 5.098696 | 27.78525 | 0.312777 |
| 32 | 2.09902 | 4 | 1.707799 | 24.23554 | 1.491205 |
| 33 | 5 | 0 | 0.517722 | 16.90192 | 1.814096 |
| 34 | 2.073383 | 3 | 1.325512 | 13.94061 | 0.591597 |
| 35 | 9.454975 | 1 | 2.593345 | 6.068908 | 1.252481 |
| 36 | 22.64289 | 5 | 5.955543 | 3.903351 | 0.494251 |
| 37 | 33.57911 | 8 | 9.814388 | 5.28876 | 1.867569 |
| 38 | 33.90084 | 13 | 10.16525 | 9.28669 | 0.261539 |
| 39 | 0 | 12 | 14.15441 | 12.33993 | 1.634885 |
| 40 | 0 | 7 | 14.23944 | 18.69462 | 0.693594 |
| 41 | 0 | 2 | 10.02018 | 22.94405 | 0.388767 |
| 42 | 4.046524 | 1 | 8.32076 | 26.38672 | 0.232612 |
| 43 | 0 | 0 | 5.031087 | 27.45382 | 1.406197 |
| 44 | 5 | 3 | 4.722543 | 23.9373 | 0.621644 |
| 45 | 5.241602 | 0 | 0.149417 | 17.9065 | 1.290339 |
| 46 | 0 | 2 | 2.057854 | 12.37663 | 1.704819 |
| 47 | 7.427434 | 3 | 3.877924 | 7.471532 | 0.407915 |
| 48 | 7.503495 | 8 | 3.468636 | 4.641342 | 0.755261 |
| 49 | 13.58441 | 5 | 7.981697 | 4.650355 | 1.099257 |
| 50 | 25.24151 | 10 | 11.04136 | 8.486803 | 1.665496 |
| 51 | 0 | 12 | 14.31961 | 13.2329 | 0.448382 |
| 52 | 0 | 6 | 10.95444 | 18.23658 | 1.351142 |
| 53 | 5 | 0 | 12.07721 | 22.33148 | 1.408206 |
| 54 | 5 | 0 | 7.60578 | 26.10544 | 0.528758 |
| 55 | 3.187584 | 3 | 5.299065 | 25.53644 | 0.075017 |
| 56 | 0 | 0 | 0.84357 | 21.8052 | 1.076779 |
| 57 | 0 | 1 | 1.903881 | 17.28389 | 1.810191 |
| 58 | 4.730062 | 3 | 2.873912 | 12.49918 | 1.218031 |
| 59 | 4.171312 | 4 | 1.551541 | 7.698517 | 0.106131 |
| 60 | 6.767644 | 4 | 3.813586 | 5.173198 | 0.370591 |
| 61 | 10.07383 | 8 | 8.191933 | 4.564107 | 1.336447 |
| 62 | 7.025218 | 10 | 11.93418 | 6.153973 | 0.137097 |
| 63 | 3.35402 | 6 | 14.61286 | 11.08607 | 1.799845 |
| 64 | 0 | 2 | 12.47746 | 18.87648 | 0.674758 |
| 65 | 0 | 2 | 12.14648 | 24.71962 | 1.211593 |
| 66 | 0 | 3 | 10.34868 | 27.54514 | 1.754245 |
| 67 | 5 | 2 | 4.307655 | 24.70624 | 1.901498 |
| 68 | 3.217391 | 3 | 3.937877 | 23.736 | 1.946558 |
| 69 | 0 | 1 | 1.893912 | 16.96894 | 1.340198 |
| 70 | 0 | 2 | 2.42088 | 12.80181 | 0.549799 |
| 71 | 5.621455 | 2 | 3.211875 | 7.531552 | 1.299853 |
| 72 | 8.664659 | 8 | 7.250262 | 5.468989 | 0.865299 |

1. A graph showing temperature, precipitation, number of deer, 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 might fit better on the same set of axes.

This will make your heights have larger numbers and your temperatures have smaller numbers.

1. A commentary about the patterns in the graph and why they turned out that way. What evidence in the curves proves that your own quantity is actually affecting the simulation correctly?

According to the graph, temperature and Precip are randomly generated independently in a graph. Grass height is calculated using temp factor, precip factor. Deer count is calculated based on how much grass is available. My agent is a randomly generated value that helps in growing the grass and deer population alternatively.

If the value of grass is less than the deer count, the deer count is reduced and the grown grass is also reduced back to the same as the remaining deers eat the grass to stay alive. If the deers are less and grass is high, the grass value increase and deer count also increases. The MyAgent value is used to increase the value of the grass and deer count alternately.