**CS575 Project 3**

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

I chose to use monster to be MyAgent(). Each monster will eat two deer.

If the number of monster >= (number of deer / 2), the number of monsters will increase by one.

If the number of monsters < (number of deer / 2), the number of monsters will decrease by one.

**2. 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** | **Year** | **NumMonster** | **NumDeer** | **G\_Height** | **Temperature** | **P\_Height** |
| 1 | 2022 | 0 | 1 | 16.6884 | 3.52459 | 20.8573 |
| 2 | 2022 | 0 | 2 | 35.69 | 2.89625 | 33.5665 |
| 3 | 2022 | 1 | 3 | 49.6846 | 12.5054 | 35.1965 |
| 4 | 2022 | 0 | 4 | 44.4642 | 13.2295 | 27.735 |
| 5 | 2022 | 1 | 5 | 36.1639 | 28.2194 | 32.4972 |
| 6 | 2022 | 2 | 6 | 23.4639 | 27.3028 | 21.5088 |
| 7 | 2022 | 3 | 7 | 8.22388 | 29.992 | 10.6488 |
| 8 | 2022 | 2 | 6 | 0 | 26.0307 | 3.09263 |
| 9 | 2022 | 3 | 5 | 0 | 20.6386 | 1.59223 |
| 10 | 2022 | 2 | 4 | 0 | 14.2165 | 7.20671 |
| 11 | 2022 | 1 | 3 | 0 | 5.40993 | 4.6158 |
| 12 | 2023 | 0 | 2 | 3.73447 | 3.46187 | 14.2585 |
| 1 | 2023 | 1 | 1 | 16.9325 | -0.629377 | 26.799 |
| 2 | 2023 | 0 | 2 | 24.2898 | 2.28661 | 32.0361 |
| 3 | 2023 | 1 | 3 | 37.5715 | 16.5961 | 32.1655 |
| 4 | 2023 | 0 | 4 | 30.1295 | 13.4714 | 37.3445 |
| 5 | 2023 | 1 | 5 | 21.277 | 20.0429 | 32.1832 |
| 6 | 2023 | 2 | 6 | 8.58503 | 22.3349 | 24.7791 |
| 7 | 2023 | 3 | 5 | 0 | 28.8369 | 18.7712 |
| 8 | 2023 | 2 | 4 | 0 | 19.8946 | 7.00126 |
| 9 | 2023 | 1 | 3 | 0 | 18.0965 | 7.84456 |
| 10 | 2023 | 0 | 2 | 0 | 12.1328 | 0 |
| 11 | 2023 | 1 | 1 | 0 | 12.9664 | 5.88848 |
| 12 | 2024 | 0 | 0 | 0 | 6.83049 | 9.02656 |
| 1 | 2024 | 0 | 0 | 12.5458 | 1.83684 | 21.4068 |
| 2 | 2024 | 0 | 1 | 30.438 | 3.2317 | 27.6969 |
| 3 | 2024 | 0 | 2 | 49.5168 | 15.9719 | 30.6354 |
| 4 | 2024 | 1 | 3 | 44.7324 | 21.5261 | 35.8382 |
| 5 | 2024 | 0 | 4 | 37.1139 | 23.2694 | 27.2258 |
| 6 | 2024 | 1 | 5 | 26.9542 | 27.4308 | 16.8909 |
| 7 | 2024 | 2 | 6 | 14.2542 | 29.7449 | 12.3704 |
| 8 | 2024 | 3 | 5 | 0 | 26.8135 | 4.71644 |
| 9 | 2024 | 2 | 4 | 0 | 22.4293 | 7.64164 |
| 10 | 2024 | 1 | 3 | 0 | 15.7606 | 4.8966 |
| 11 | 2024 | 0 | 2 | 0 | 11.4231 | 11.6888 |
| 12 | 2025 | 1 | 1 | 0 | 7.10554 | 9.50491 |
| 1 | 2025 | 0 | 0 | 9.74447 | 5.23257 | 26.3694 |
| 2 | 2025 | 0 | 1 | 32.1164 | 6.78843 | 27.7311 |
| 3 | 2025 | 0 | 2 | 48.5482 | 11.3644 | 35.9239 |
| 4 | 2025 | 1 | 3 | 47.5487 | 15.5431 | 34.799 |
| 5 | 2025 | 0 | 4 | 40.297 | 22.6524 | 24.6619 |
| 6 | 2025 | 1 | 5 | 30.1375 | 23.2204 | 19.7898 |
| 7 | 2025 | 2 | 6 | 17.4378 | 23.4525 | 12.5863 |
| 8 | 2025 | 3 | 6 | 2.19792 | 26.8294 | 5.12142 |
| 9 | 2025 | 2 | 5 | 0 | 21.4894 | 0.857965 |
| 10 | 2025 | 1 | 4 | 0 | 18.1948 | 4.40922 |
| 11 | 2025 | 2 | 3 | 0 | 8.82005 | 7.10001 |
| 12 | 2026 | 1 | 2 | 0 | 8.53558 | 10.7819 |
| 1 | 2026 | 0 | 1 | 4.46368 | -0.332722 | 24.0613 |
| 2 | 2026 | 0 | 1 | 12.8067 | 4.34227 | 26.4552 |
| 3 | 2026 | 0 | 2 | 33.0795 | 15.6836 | 29.6026 |
| 4 | 2026 | 1 | 3 | 28.3708 | 16.3115 | 28.037 |
| 5 | 2026 | 0 | 4 | 20.9868 | 24.0522 | 27.7122 |
| 6 | 2026 | 1 | 5 | 10.8268 | 22.0208 | 23.6095 |
| 7 | 2026 | 2 | 4 | 0 | 31.3986 | 17.8294 |
| 8 | 2026 | 1 | 3 | 0 | 19.3693 | 12.0613 |
| 9 | 2026 | 0 | 2 | 0 | 13.1866 | 0 |
| 10 | 2026 | 1 | 1 | 0 | 12.9351 | 4.4953 |
| 11 | 2026 | 0 | 0 | 0 | 13.1338 | 7.79752 |
| 12 | 2027 | 0 | 0 | 1.2248 | 6.82894 | 15.6134 |
| 1 | 2027 | 0 | 0 | 17.6155 | 3.29023 | 25.9379 |
| 2 | 2027 | 0 | 1 | 39.4999 | 8.03625 | 32.7992 |
| 3 | 2027 | 0 | 2 | 50.7857 | 10.2699 | 29.544 |
| 4 | 2027 | 1 | 3 | 53.1188 | 18.1182 | 35.6155 |
| 5 | 2027 | 0 | 4 | 45.5443 | 19.6533 | 28.7016 |
| 6 | 2027 | 1 | 5 | 35.3968 | 29.7671 | 17.2964 |
| 7 | 2027 | 2 | 6 | 22.6968 | 26.0617 | 9.19562 |
| 8 | 2027 | 3 | 7 | 7.4568 | 27.8891 | 4.91583 |
| 9 | 2027 | 2 | 6 | 0 | 20.495 | 0 |
| 10 | 2027 | 3 | 5 | 0 | 16.2489 | 0.445878 |
| 11 | 2027 | 2 | 4 | 0 | 5.59056 | 6.92804 |
| 12 | 2028 | 1 | 3 | 2.74929 | 3.22504 | 11.8848 |

**3. 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.**

**Chart

Description automatically generated**

**4. 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?**

The number of deer and monsters will start to decrease every year around July and August to about December, when the grain height drops to zero, because the number of deer is significantly tied to the grain height, and the number of monsters is related to the number of deer. Because of the grain height, the number of deer and monsters will increase from around January to around July, and the cycle will repeat itself each year. We can also notice from the curve that the curve starts to fall around month 6 and then starts to increase around month 10. Every year, the max number of deer is seven, while the number of dinosaurs is three.