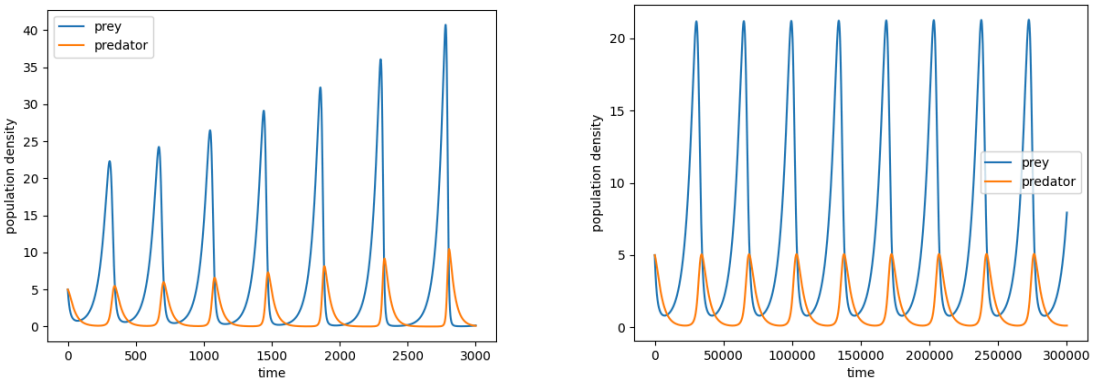
1. For the first task, look at the graph generated with these new parameters. What has changed from the graph of Figure 3?

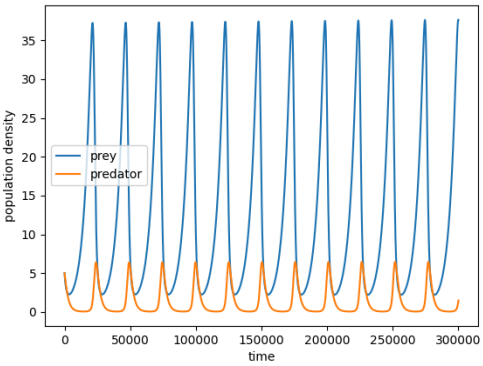
In the first graph, which is the graph of Figure 3, the prey population density starts lower but eventually reaches nearly 40, showing a gradual increase in peak population density over time. The predator density shows a similar increasing trend.
In the second graph, with modifying parameters, the graph have changed with the prey population density oscillates between 0 and approximately 20, while the predator population density stays mostly between 0 and 5, forming consistent oscillations in both prey and predator populations, which is the aspect could not be found in the graph of Figure 3.



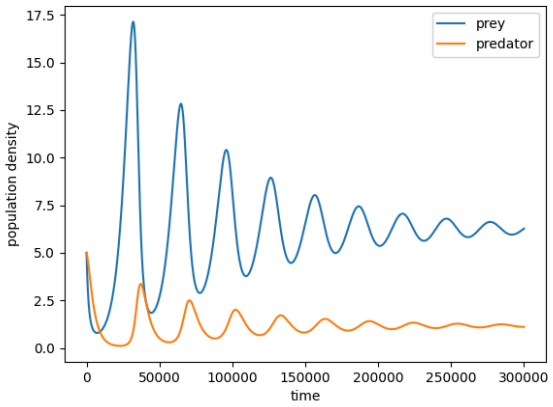
※ The graph on the left is the first graph and the one on the right is the second graph.

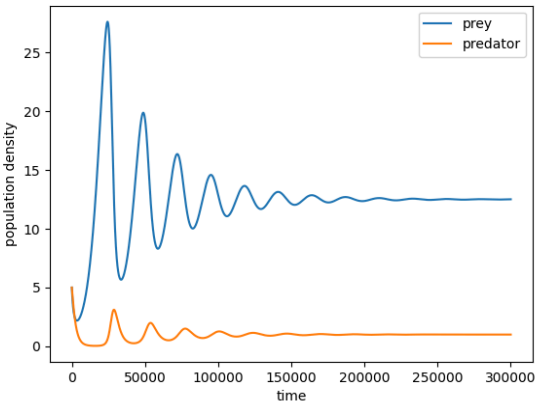
2. To model how hunting can kill more wolves, double the death rate of the wolves in the previous question's setup from 0.00025 to 0.0005. Graph the resulting data with your code. How does the model predict that increasing the death rate of wolves affects the ecosystem? Do the predator and prey population densities seem to go up or down on average, and by how much? Do they change in a different kind of pattern? Can you explain why any changes happen?

The model predicts that increasing the death rate of wolves will create an overall higher average of wolves in the ecosystem, with the peaks increasing by almost 15 and the valleys increasing by 2. However, the overall pattern of the graph changes, going from about 9 oscillations to 12 over the same amount of time. This likely occurs because the consistent hunting of wolves creates less competition between predators, so they experience stark spikes in population that rapidly decline as they're hunted, instead of slowly declining as they run out of food.



3. Repeat the same comparison with the same parameters as the previous question, but this time use popWithCC to generate the data. Use a carrying capacity of 50.
Additionally, how does this new model's data look compared to the model without carrying capacity?





※ The graph on the left shows the data with the predator's death rate of 0.00025, and the one on the right shows the data with that of 0.0005.

The model without carrying capacity shows a graph where the populations of prey and predators exhibit either consistent oscillations, as in the figure on the right in Question 1, or a constant increase, as seen in the graph on the left. The point is in either graph, the populations are constantly changing as time goes on. On the other hand, the model with carrying capacity indicates that the change of prey or predator populations is becoming more steady as time goes on. More specifically, in the case with the predator's death rate of 0.00025, the prey population density gets stable at around 6.3, and the predator population density gets stable at around 1.3, as the time of 3000000 passes. This is because the model with carrying capacity takes into account the balance between a population's growth and the environment's ability to sustain it.