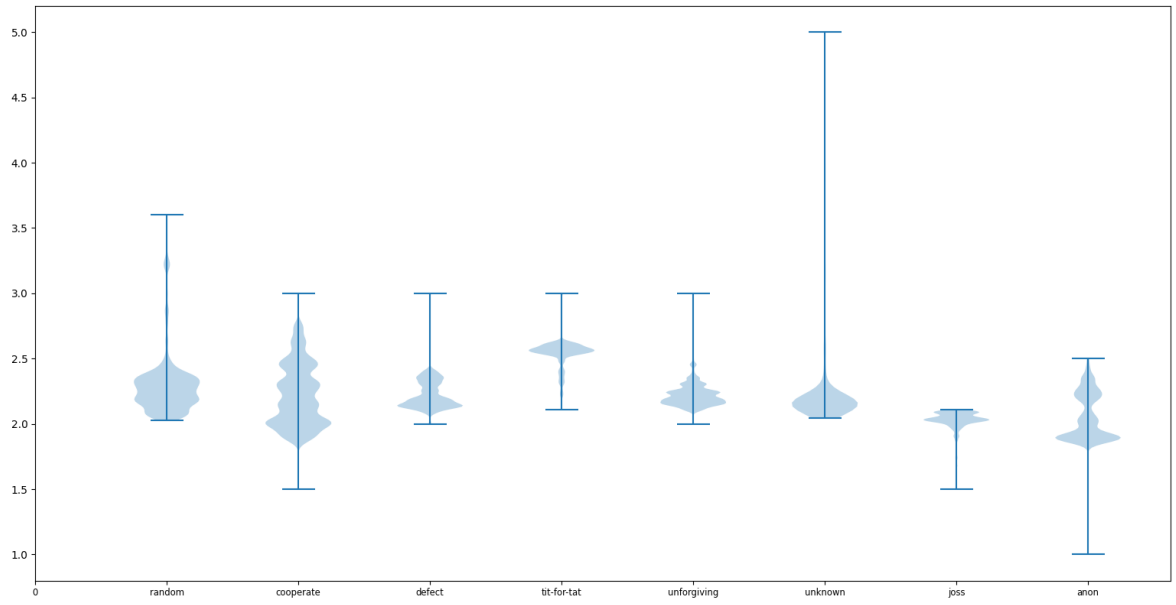
First Task. Recreate a modified Axelrod tournament due to your variant. You need to implement the strategies needed and then create a tournament with a variable number of players. Launch for 10000 ticks and fix payoffs of each type, then build a boxplot with payoff distribution for each type.

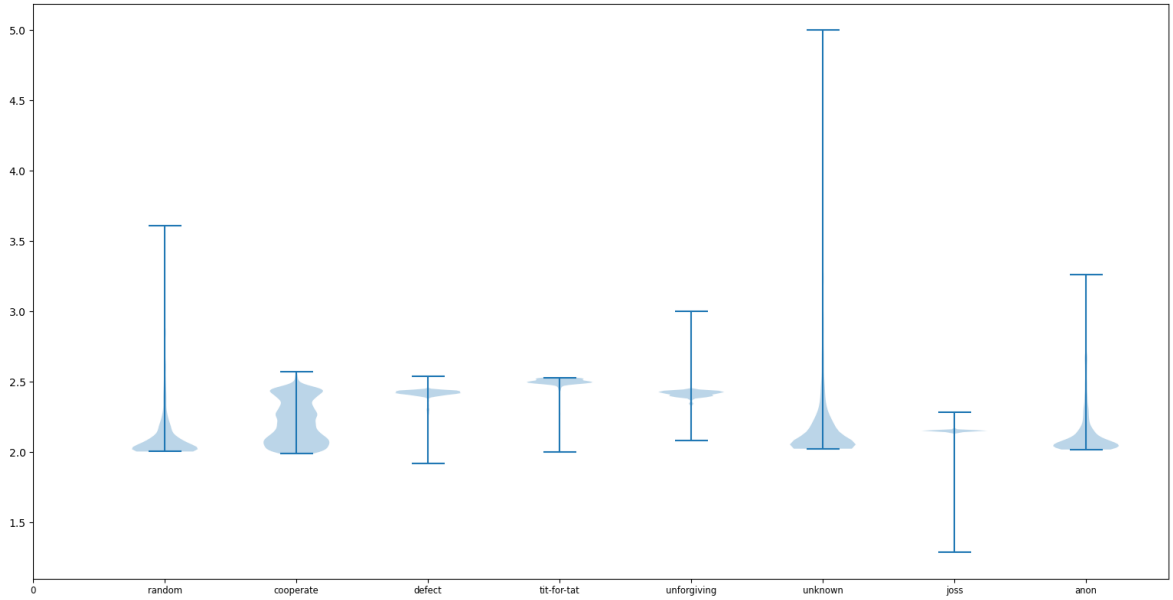
I created 2 other models.

Results: I ran behavior space for different number of players of each strategy:

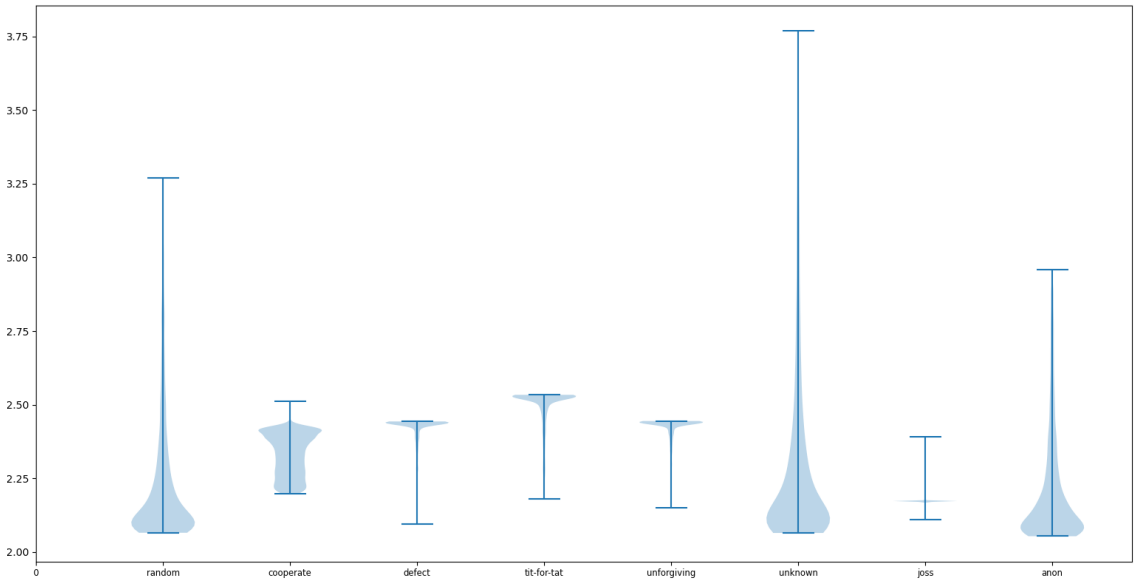
1 player for each strategy:



10 players for each strategy:



100 players for each strategy:



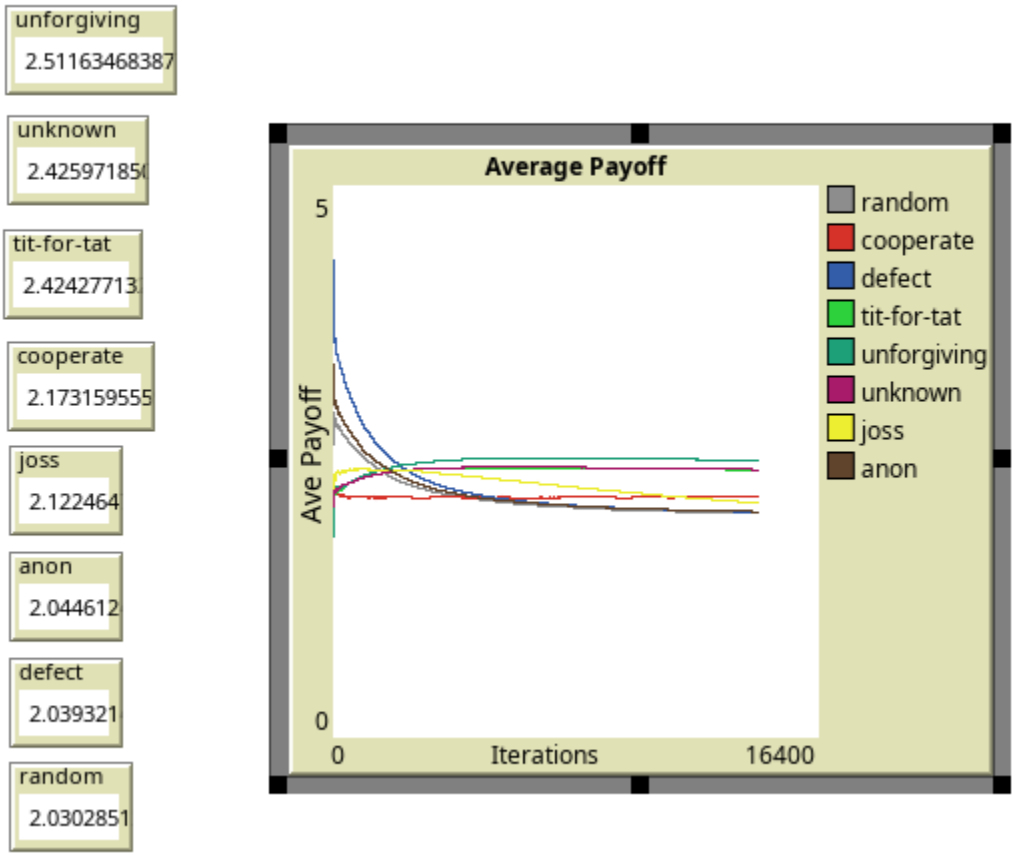
1. For one player strategy
   We can see that variance of payoff is pretty big for most of strategies.
   This graph shows the distribution of payoff for each strategy from minimal to maximum value. At first sight it may seem that variance is really big, but actually in this kind of graph (violin plot) the more values are at some point the wider the plot gets. So if we count only the diapason that is at least a little wide, we can see that variance is may not be that big in some cases.

   It might seem that unknown strategy is good bt actually most of it is near the bottom line of plot, so its not. Actually the one strategy that is kind of better that others is tit-for-tat. We can see that the wide part is above the wide parts of other plots. So, for one player per strategy it would be reasonable to choose tit-for-tat strategy.

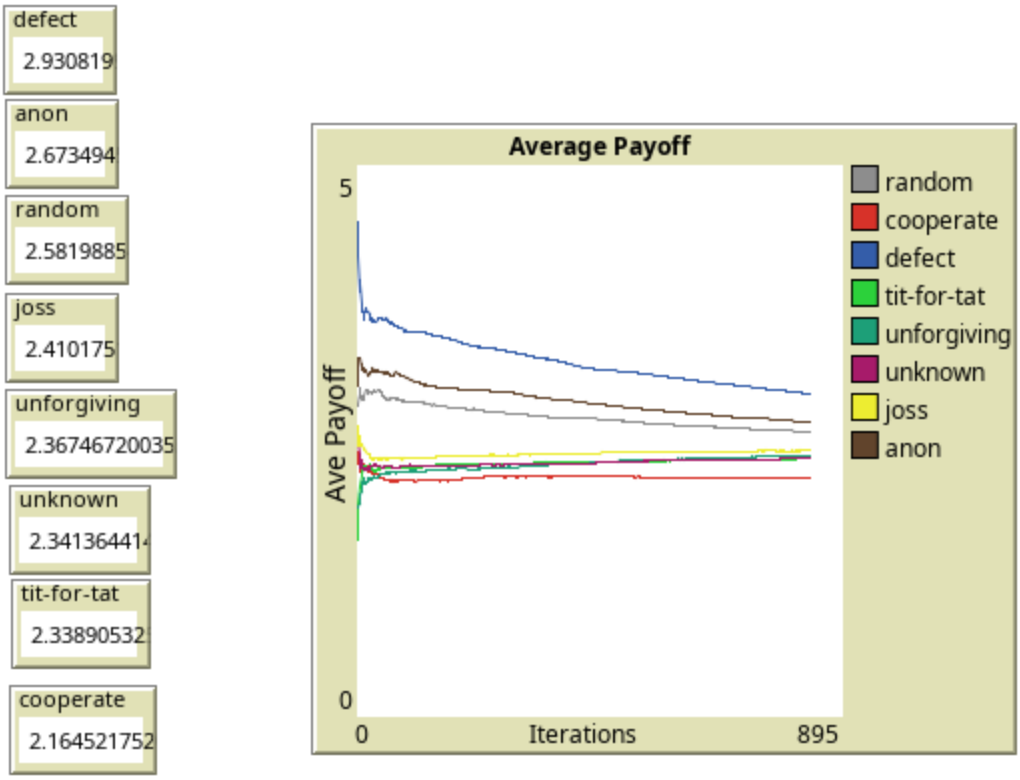
2. For ten players strategy.
   Some results are close to the one-plater strategy and some differ. The ones that are worth mentioning are tit-for-tat, defect and unforgiving. Her, tit-for-tat is slightly better than two others, which are approximately on the same level. The variance of unknown strategy is even bigger here, still the most values are around minimal point.

3. For 100 players strategy.
   Its actually pretty similar to the previous one. Unknown, random and anonymous got even bigger variance once more. Tit-for-tat strategy shown even better results, but defect and unforgiving are still on the same level.

In conclusions I would say that for any amount of players tit-for-tat would be a good choice.

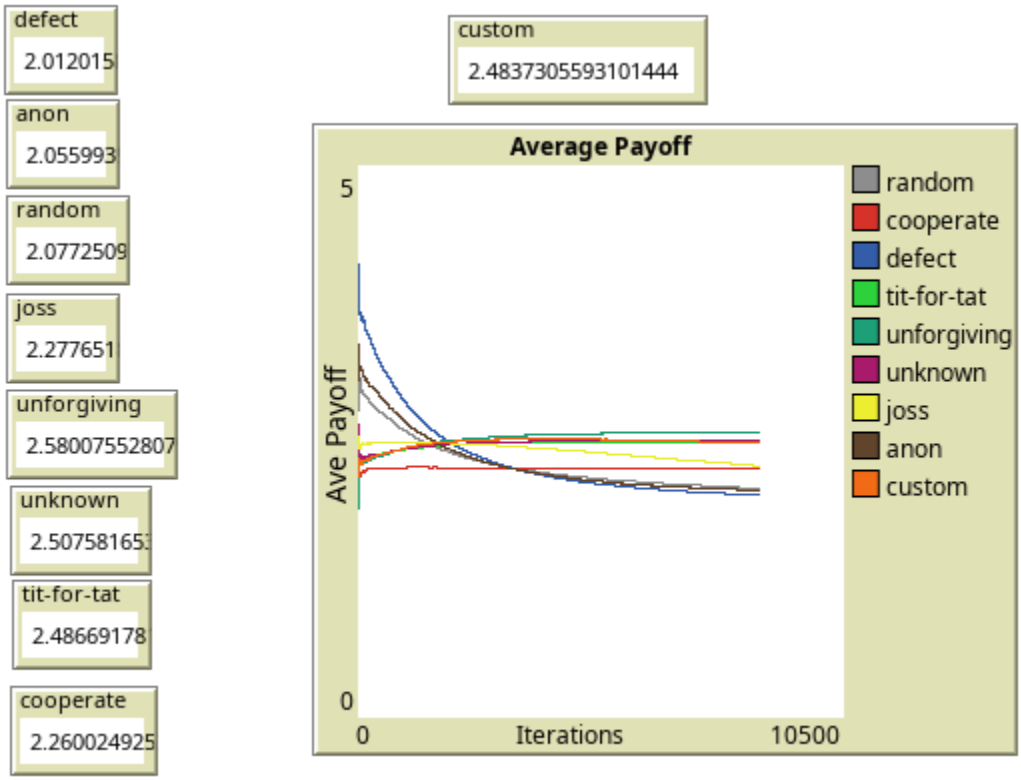


We can see that the best long-term strategy is unforgiving. The unknown strategy is also good, as well as cooperating and tit-for-tat strategies.



But in the short term strategy defecting is the best way therefore we can see that it keeps decreasing and as we can see on the first graph it show very bad results.
Here unforgiving and unknown are rather bad then good, however they show a very good result

My strategy



The result after 10k ticks.
In my strategy I used the result of previous games of the partner. If he didn't defect this game, but defected twice in a row before then defect.
The result of is pretty good after long-term game (10 000 ticks)