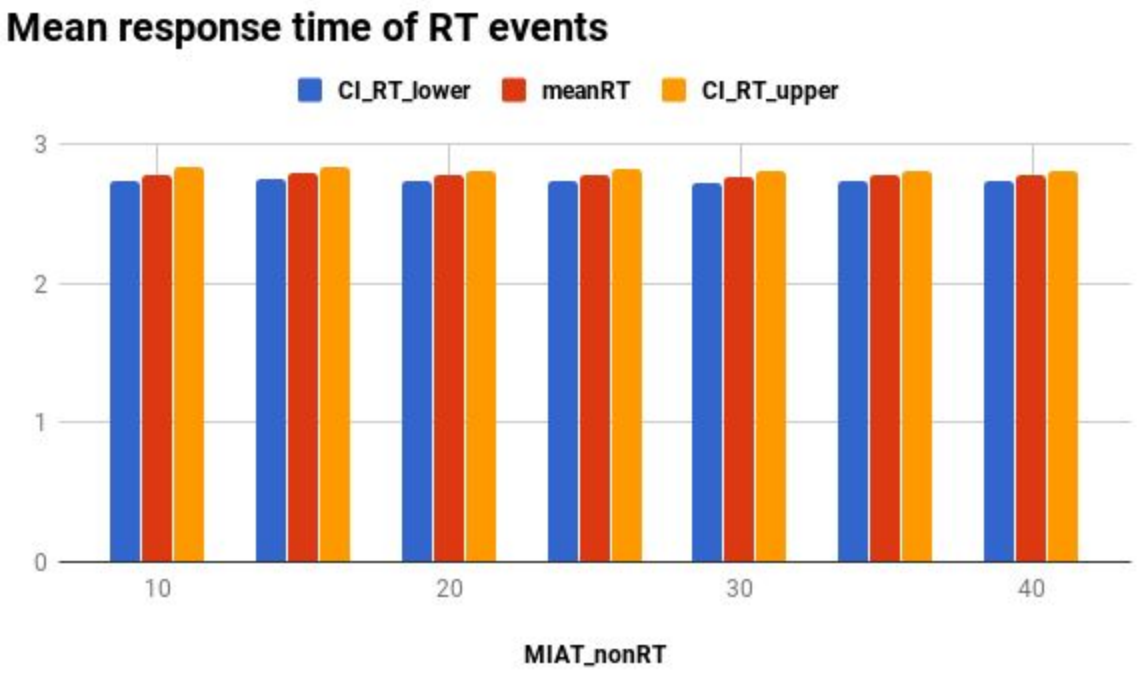
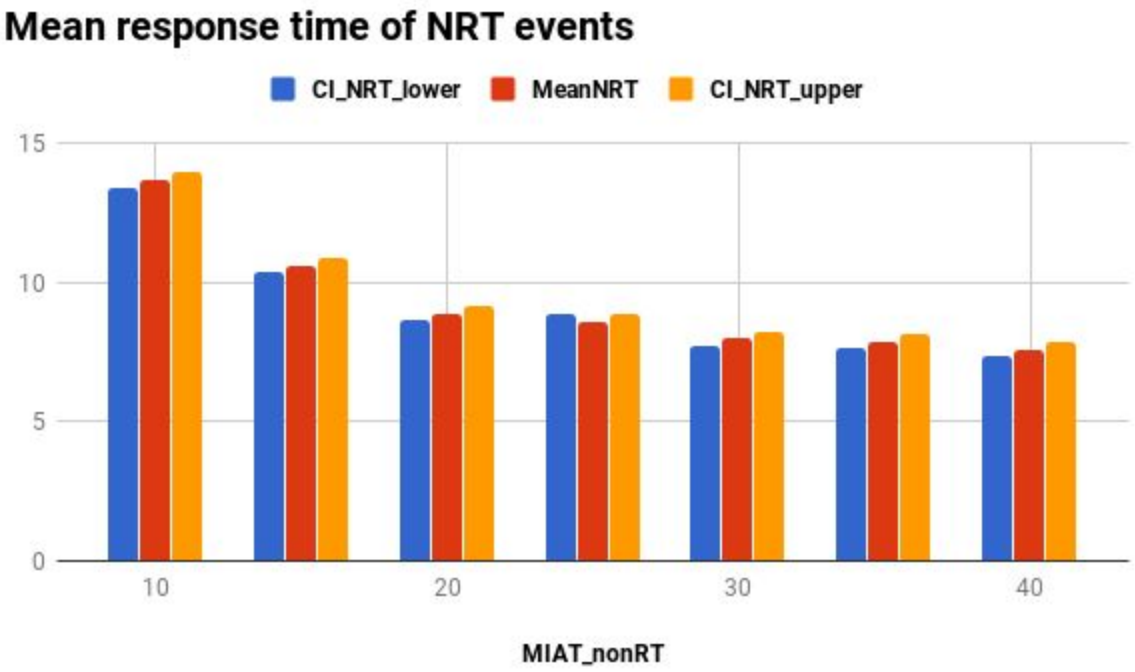
TASK-3

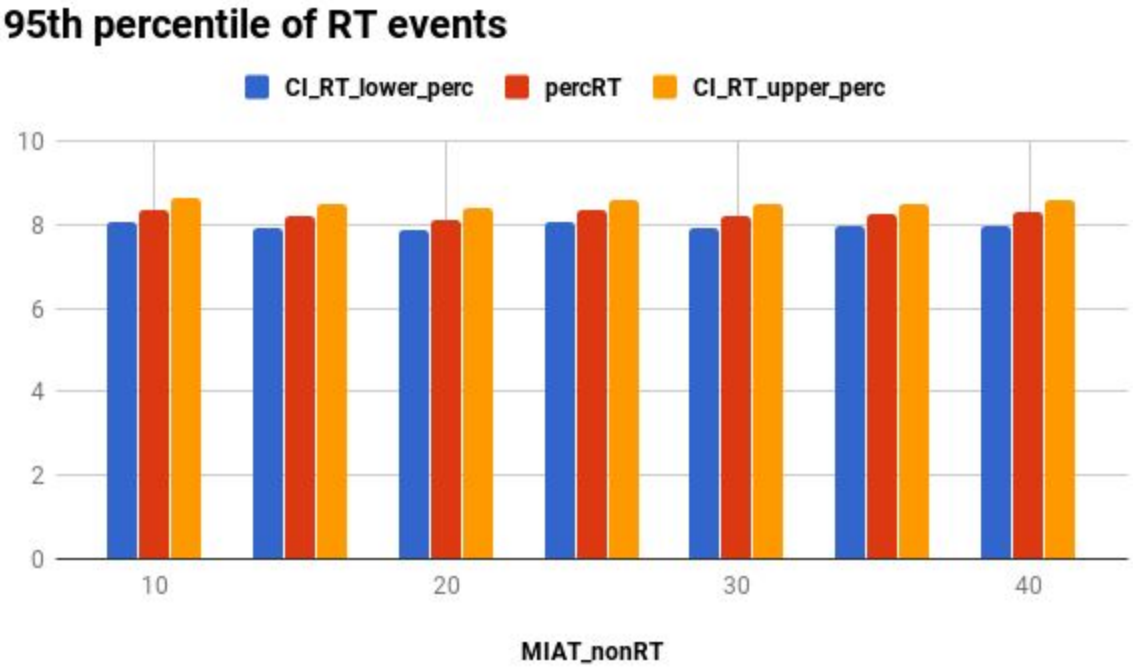
Graphing the results on the mean response times of RT and NRT events including the confidence intervals, as a function of MIAT_NRT, we get the following graphs -



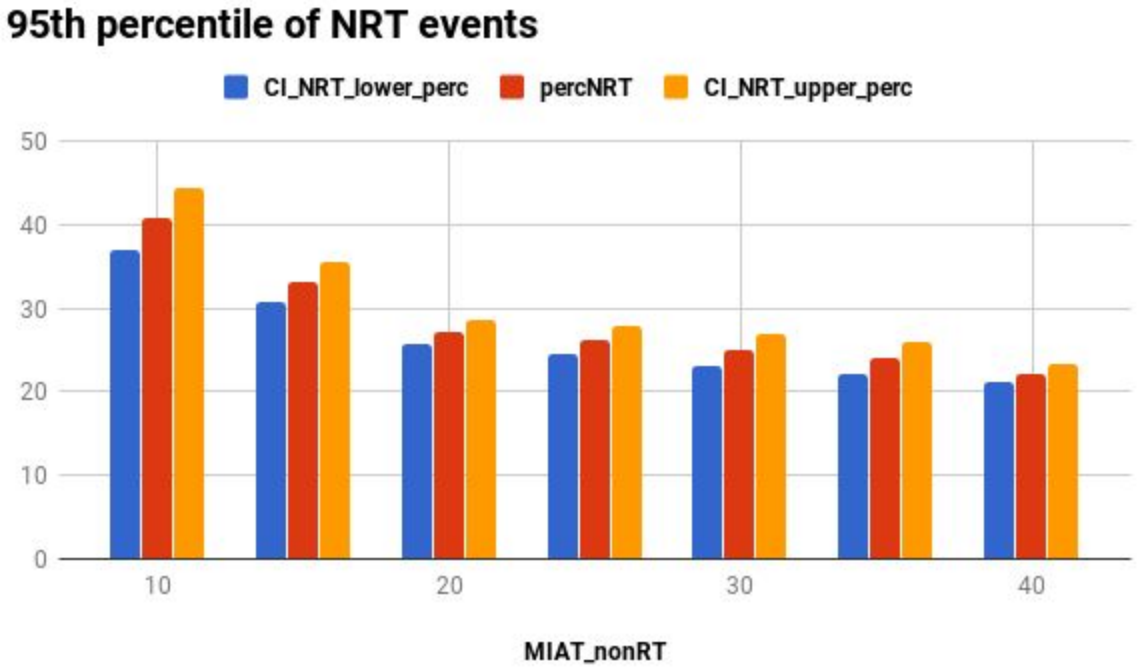
- The above graph shows the change of the mean response time of RT events calculated in batches of 1000 over 50 batches, over values of MIAT_NRT ranging from 10 to 40.
- We observe that, as expected, the mean response time lies in between the lower and upper bound of the confidence interval.
- We also see that the mean response time does not change much with variation in MIAT_NRT, as RT events are always processed immediately over service completion or arrival of NRT events unless the server is busy serving another RT event. Since the RT event is processed almost immediately, we don't see a variation in the mean response time of RT events. The change in the arrival time of NRT events has no impact on RT events as RT events are always given preference and processed immediately.
- Another implication of preference being given to RT events is that the mean response time of RT events will be less than that of NRT events.



- The above graph shows the change of the mean response time of NRT events calculated in batches of 1000 over 50 batches, over values of MIAT_NRT ranging from 10 to 40.
- We observe that, as expected the mean response time lies in between the lower and upper bound of the confidence interval.
- We see that there is not much deviation of the response time from the mean as the confidence interval is very close to the mean.
- The response time of NRT events is more than RT events is because RT events are given preference and NRT events are made to wait and preempted which leads to an increase in response time of NRT events.
- We observe that the mean response time of NRT events decreases as MIAT_NRT increases. This is because as MIAT_NRT increases, NRT events occur less frequently and there is more gap between the arrival of 2 NRT events. This implies that there are less NRT events which have already arrived and waiting to be served. The NRT queue which would fill up quickly if events arrived more quickly, will now have less NRT events to service in the same time period.



- The above graph shows the change of the 95th percentile values of RT events calculated in batches of 1000 over 50 batches, over values of MIAT_NRT ranging from 10 to 40.
- We observe that, as expected the 95th percentile value lies in between the lower and upper bound of the confidence interval.
- A **95th percentile** says that **95**% of the time data points are below that value. The 95th percentile of our data is the value of the response time that has 95% of the data below it.
- Since RT events are processed immediately, we see that the response time and hence the 95th percentile does not vary much with MIAT_NRT. The change in the arrival time of NRT events has no impact on RT events as RT events are always given preference and processed immediately.
- Another implication of preference being given to RT events is that the 95th percentile of response time of RT events will be less than that of NRT events



- The above graph shows the change of the 95th percentile values of NRT events calculated in batches of 1000 over 50 batches, over values of MIAT_NRT ranging from 10 to 40.
- We observe that, as expected the 95th percentile value lies in between the lower and upper bound of the confidence interval.
- We see that the 95th percentile of response time of NRT events will be more than that of RT events as the 95th percentile is calculated from the response time which is more for NRT events.
- We also see that the 95th percentile of NRT events decreases as MIAT_NRT increases. This is once again dependent on response time of NRT events which follows the same pattern. The response time decreases as the arrival of NRT events is more spread out and hence do not get queued a lot. This leads to a decrease in 95th percentile value as the response time also decreases.