Simulation of CPU Scheduling Algorithms

Task : Generate the Arrival time and Burst Time and compare various process scheduling strategies

Process :
1. Calculate Arrival Time by generating inter-arrival time from exponential distribution
    Range : (0,20)
    Distribution:
    $$IAT \sim -(1/\lambda)ln(X); \quad X \sim U(exp(-10\lambda, 1)$$
    $$BT \sim U(1, 20)$$
2. Algorithm :
    (i) Non-preemptive First Come First Serve (FCFS)
    (ii) Non-preemptive Shortest Job First (NPSJF)
    (iii) Preemptive Shortest Job First (PSJF)
    (iv) Round Robin with time quantum δ = 2 time units (RR)
    (v) Highest response-ratio next (HRN)

Order : NPSJF <= PSJF <= HRN <= FCFS <= HRN (Based on experiments done)

Theoretical Lower Bound : Turn Around Time (TAT) = completion time - arrival time
   The minimum possible turnaround time for any process = its CPU burst time
   => LB(Avg(TAT)) = Avg(CPU burst time) = (1+20)/2, (has been taken from uniform distr.)
   => LB(Avg(TAT)) = 10.5
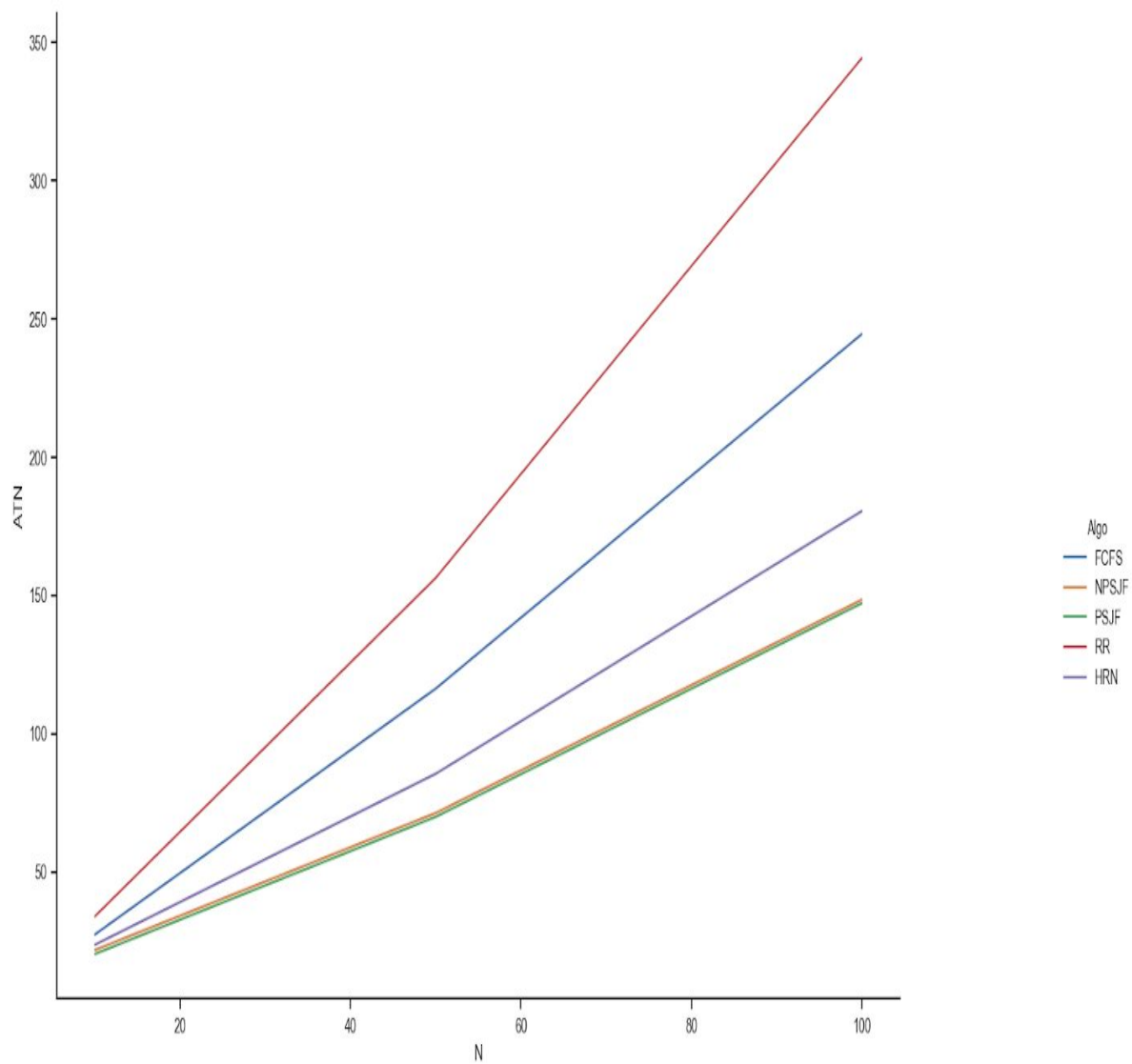   Which is satisfied by our simulation, demonstrated through fig. 1

Fig-1: Line Plot for the average value of ATN (over 10 iteration) for all the Algorithm
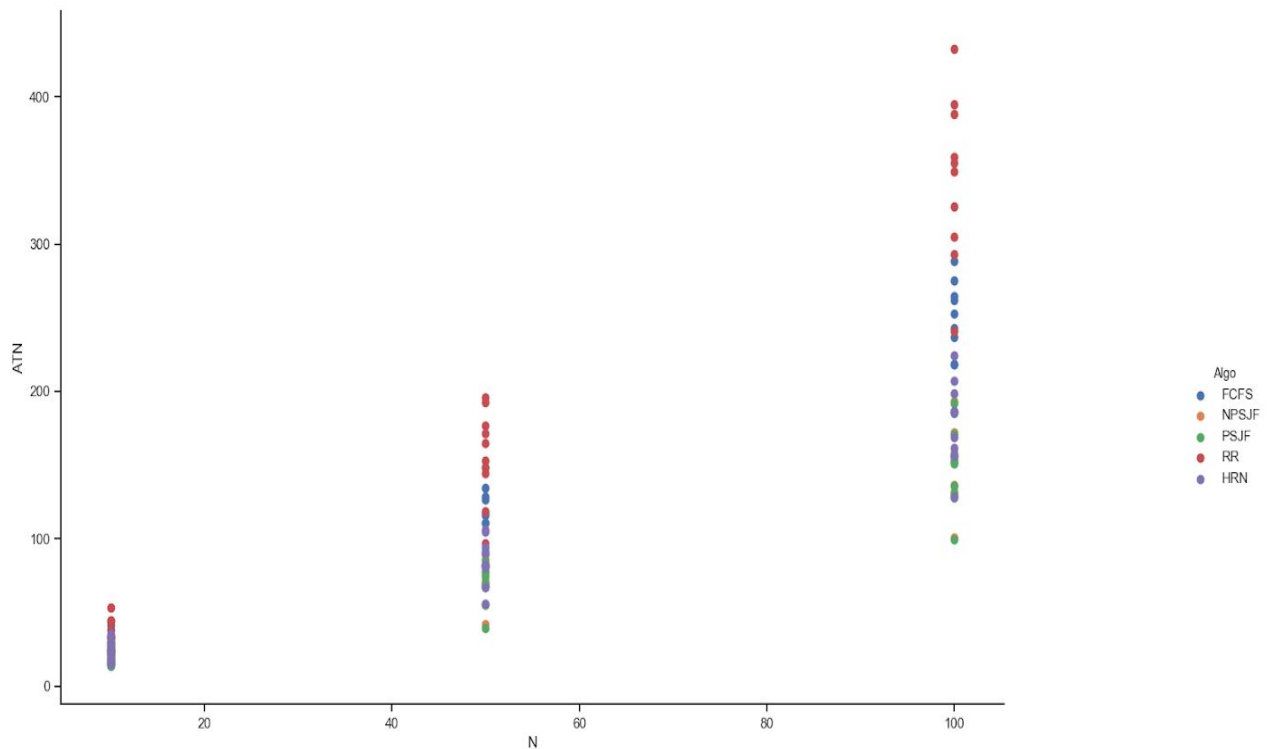
Fig-2 Scatter Plot for all the iterations

Contributions :
1. Vedic Partap (16CS10053) :
    a. Data generation
    b. FCFS
    c. NPSJF
    d. PSJF
    e. Build Plots
2. Rahul Kumar (16CS10042)
    a. Round Robin
    b. HRN
    c. Theoretical Lower Bound
    d. Report