The thesis titled *Splitting Features in Queue with Application* is based on advanced theory of Queuing. First we addressed the joint distribution of queue length with two different types of models. First model with two buffers with all finite in size, while the second model is also with two buffers but one buffer we kept finite and other infinite. Also the stationary mean waiting time is considered. Further the approximation under Light Traffic and interpolation approximation is done. Matching moment correlation and Splitting feature are addressed. The case of Merging and reduction of variability in split merge system is also discussed.

In the next section the practical application of the theory is considered, where few numerical examples were discussed and case of Fork-Joint System is discussed. The split queue and flexible distributed simulation system is also discussed. TW strategy and SQTW strategy is applied for the simulation.

At last all the results are discussed in final part of the thesis.