

# Single Server Queuing Model

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### Problem Statment

Write a R program to simulate a single-server queue

### Function for SSQ

```
ssq <- function(ra, rs, numOfCustomers) {
  wait_time <- 0;
  total_arrival_time <- 0;
  total_wait_time<- 0;
  total_idle_time <- 0;
  previous_service_time <- 0;
  for (i in 1:numOfCustomers)
  {
    serTime <- rexp(1, rs);
    interArrTime <- rexp(1, ra);
    total_arrival_time <- total_arrival_time + interArrTime;
    wait_time <- wait_time - interArrTime + prvious_service_time;
    prvious_service_time <- serTime;
    if (wait_time >= 0)
    {
      total_wait_time <- total_wait_time + wait_time
    }
    else
    {
      total_idle_time <- total_idle_time - wait_time;
      wait_time <- 0;
    }
  }
  print(paste("Expected Utilization is",1 - total_idle_time/total_arrival_time,sep = " "))
  print(paste("Expected Average delay in the queue is",total_wait_time/numOfCustomers,"minutes.", sep = " "))
  print(paste("Expected Average Customers in the queue is",total_wait_time/total_arrival_time, sep = " "))
}
```

### call the function with params

```
# ssq(lamda, mu, number_of_cust)
ssq(1,0.5,20)

## [1] "Expected Utilization is 0.898297474155975"
## [1] "Expected Average delay in the queue is 8.5364814589151 minutes."
## [1] "Expected Average Customers in the queue is 8.36349057298809"
```