Input: Arrival rate λ, Service rate μ, Simulation time T
Output: Average number of customers in the system L, Average waiting time W

```
initialize t = 0, n = 0, A = 0, D = ∞, L = 0, W = 0; while t < T do
    if A < D then
        t = A; n ← n + 1; A ← t − ln(U)/λ; if D = ∞ then
            D ← t − ln(U)/μ;
        end
        L ← L + (n − 1)(t − T_last); T_last ← t;
    end
    else
        t = D; n ← n − 1; if n > 0 then
            D ← t − ln(U)/μ; W ← W + (t − A);
        end
        else
            D ← ∞;
        end
    end
end
L ← L/T; W ← W/n;
```

Algorithm 1: MM1 Queueing System Simulation

Input: $\lambda\ \mu\ k\ T$
Output: $L\ W$

$t \leftarrow 0$, $n \leftarrow 0$, $A \leftarrow 0$, $D_i \leftarrow \infty$ for $i = 1, 2, \ldots, k$, $L \leftarrow 0$, $W \leftarrow 0$;

while $t < T$ **do**
- **if** $A < \min(D_1, D_2, \ldots, D_k)$ **then**
  - $t \leftarrow A$; $n \leftarrow n + 1$; $A \leftarrow t - \ln(U)/\lambda$; **if** $n \leq k$ **then**
    - $i \leftarrow theidleserver$; $D_i \leftarrow t - \ln(U)/\mu$;
  - **end**
  - $L \leftarrow L + (n-1)(t - T_{last})$; $T_{last} \leftarrow t$;
- **end**
- **else**
  - $t \leftarrow \min(D_1, D_2, \ldots, D_k)$;
  - $n \leftarrow n - thenumberofserversthatfinishserviceatt$; **for** $i = 1, 2, \ldots, k$ **do**
    - **if** $D_i = t$ **then**
      - **if** $n \geq k$ **then**
        - $D_i \leftarrow \infty$;
      - **end**
      - **else**
        - $D_i \leftarrow t - \ln(U)/\mu$; $W \leftarrow W + (t - A)$;
      - **end**
    - **end**
  - **end**
- **end**

end

$L \leftarrow L/T$; $W \leftarrow W/n$;

Algorithm 2: MMk Queueing System Simulation