Service Engineering

# Homework 9: GazolCo's Call Center
## Partial Solution

No. of Agents : 14
Average handling time : 240 sec. (04:00 min.)

**1.** Results of the M/M/N model are recorded in the following table:

| Calls Per Hour | Average Speed of Answer (secs) | Agent's Occupancy (%) | P(Wait>0) |
|---|---|---|---|
| 180 | 57.8 | 85.7% | 1-0.518=0.482 |
| 185 | 79.6 | 88.1% | 1-0.447=0.553 |
| 190 | 113.5 | 90.5% | 1-0.37=0.63 |
| 195 | 171.3 | 92.9% | 1-0.286=0.714 |
| 200 | 289.2 | 95.2% | 1-0.197=0.803 |
| 205 | 647.0 | 97.6% | 1-0.101=0.899 |
| 210 | n/a | n/a | |

The ASA, agent's occupancy and P(Wait>0) increase with the call volume. At a certain level between 205 and 210 calls per hour, 4CallCenter claims that the system is "overloaded". This corresponds to an unstable Markov process- the system had reached the point where $\rho \geq 1$ ($\rho = arrival\ rate * handling\ time / agents$). Specifically, this occurs when the call volume $\geq 14 * 3600 / 240 = 210$ calls per hour.