

**University of Sydney**  
**School of Information Technologies**

**Simulation of Networks**

**Simulation Task Set 1 – Theoretical Validation of Results**

*Some Suggested Numerical Values*

**Task 1**

*Some numbers to try:*

Mean Interarrival time: 1500 (i.e. arrival rate of 1/1500)  
Mean packet holding time: 1000

*Results:*

Theoretical Mean Queue length: 2.0 (negative exponential packets)  
Theoretical Mean Queue length: 1.33 (constant length packets)

**Tasks 2.1 and 2.2**

*Some numbers to try:*

Mean Interarrival time: 100 (i.e. arrival rate of 1/100)  
Mean call holding time: 1000  
Number of circuits: 15

*Results:*

Theoretical blocking probability: 3.65%

**Task 3**

*Some numbers to try:*

Mean Interarrival time: 1500 ms (i.e. arrival rate of 1/1500 per ms)  
Mean packet holding time: 1000 ms

*Results:*

Theoretical Mean system time: 3000 ms (negative exponential packets)  
Theoretical Mean system time: 2000 ms (constant length packets)

#### **Task 4**

*Some numbers to try:*

|                               |                                |
|-------------------------------|--------------------------------|
| Number of queues:             | 3                              |
| Interarrival time (per node)  | 4500 ms                        |
| Mean packet time:             | 1000 ms (negative exponential) |
| Mean polling delay (per node) | 50 ms (constant)               |

*Results:*

|   |         |
|---|---------|
| Theoretical mean system time            | 3528 ms |
| Theoretical mean queue length per node: | 0.7840  |
| Theoretical mean queue length overall:  | 2.35    |