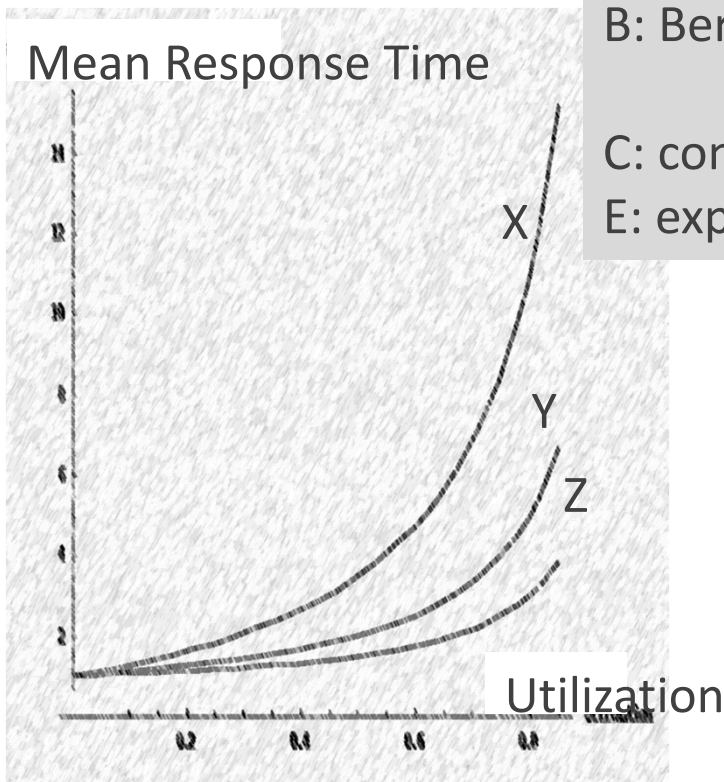
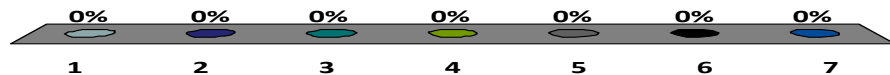


The 3 curves are for an M/GI/1 queue with different distributions of service times. Say which curve is for which distribution.



B: Bernoulli with mean $p = 0.2$
 C: constant
 E: exponential

1. X=B, Y=C; Z=E
2. X=B, Y=E; Z=C
3. X=E, Y=C; Z=B
4. X=C, Y=B; Z=E
5. X=E, Y=B; Z=C
6. X=C, Y=E; Z=B
7. I don't know



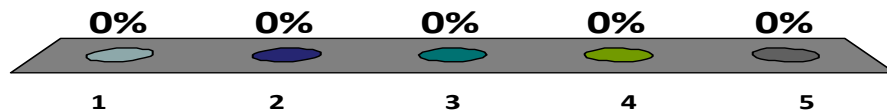
Which sentences are true ?

λ = arrival rate

S = mean service time

- A. For a single server queue, if $\lambda < \frac{1}{S}$ the queue has a stationary regime
- B. For an M/GI/1 queue, if $\lambda < \frac{1}{S}$ the queue has a stationary regime

1. Both
2. A
3. B
4. None
5. I don't know



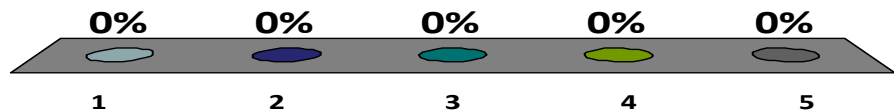
Which sentences are true ?

λ = arrival rate

S = mean service time

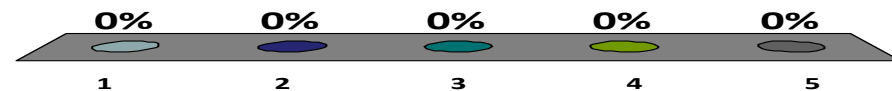
- A. For a single server queue, if $\lambda = \frac{1}{S}$ the queue does not have a stationary regime
- B. For an M/GI/1 queue, if $\lambda = \frac{1}{S}$ the queue does not have a stationary regime

1. Both
2. A
3. B
4. None
5. I don't know



A train with 200 tourists arrive at the skilift. A queue builds up. Doubling the capacity of the skilift would...

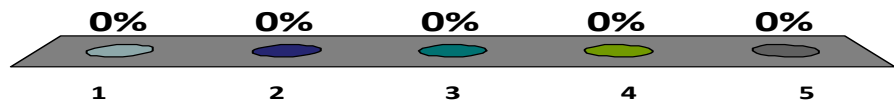
1. Reduce the queuing time by a factor of approximately 2
2. Reduce the queuing time by a factor much larger than 2
3. Reduce the queuing time by a factor much smaller than 2
4. It depends on the utilization factor
5. I do not know.



The average number of customers present in an $M/GI/\infty$ queue is ...

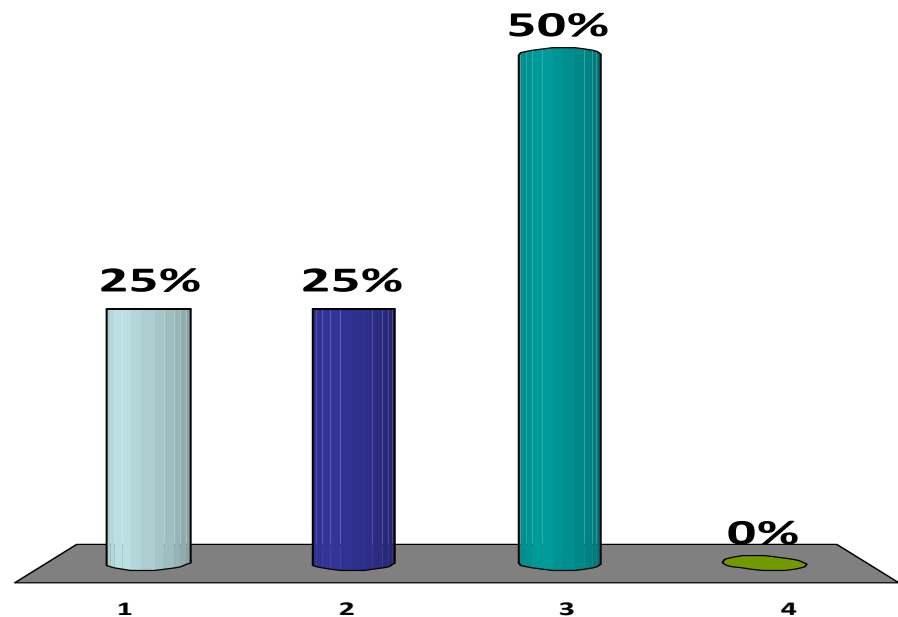
(S is the mean service time)

1. $N = \lambda S$
2. $N = \frac{\rho}{1-\rho}$ with $\rho = \lambda S$
3. None of the above, the formula involves the coefficient of variation
4. There is no closed form formula
5. I don't know



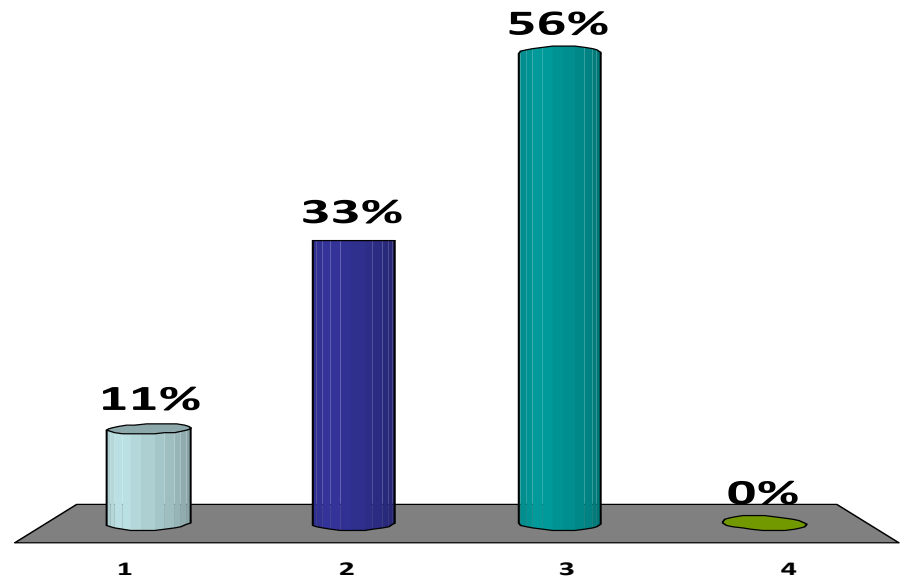
At a FIFO queue,
the expected
waiting time for a
job, given that its
service time is s
is...

1. Independent of s
2. Proportional to s
3. Dependent on s but not proportional (in general)
4. I don't know.



At a PS queue, the expected waiting time for a job, given that its service time is s is...

1. Independent of s
2. Proportional to s
3. Dependent on s but not proportional (in general)
4. I don't know.



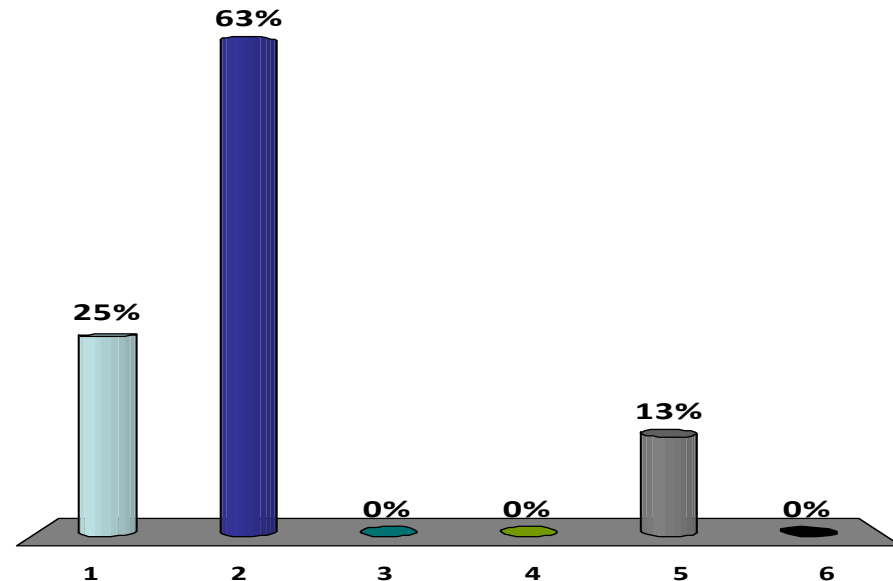
For a M/GI/1 queue,
which are equal ?

**A = distribution of
number of jobs seen by
an arriving job**

**B = distribution of
number of jobs left by a
departing job**

**C = distribution of
number of jobs seen by
an inspector**

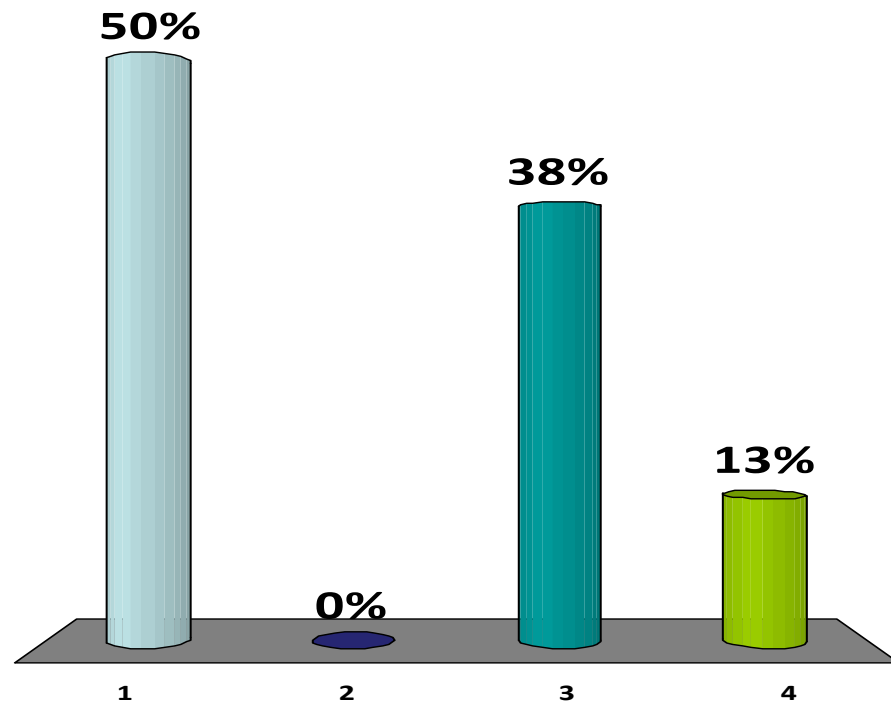
1. None
2. $A=B$
3. $A=C$
4. $B=C$
5. $A=B=C$
6. I don't know



We have a single class queuing network with FIFO queues, markov routing Poisson arrivals and iid service times.

Is it a product form queuing network ?

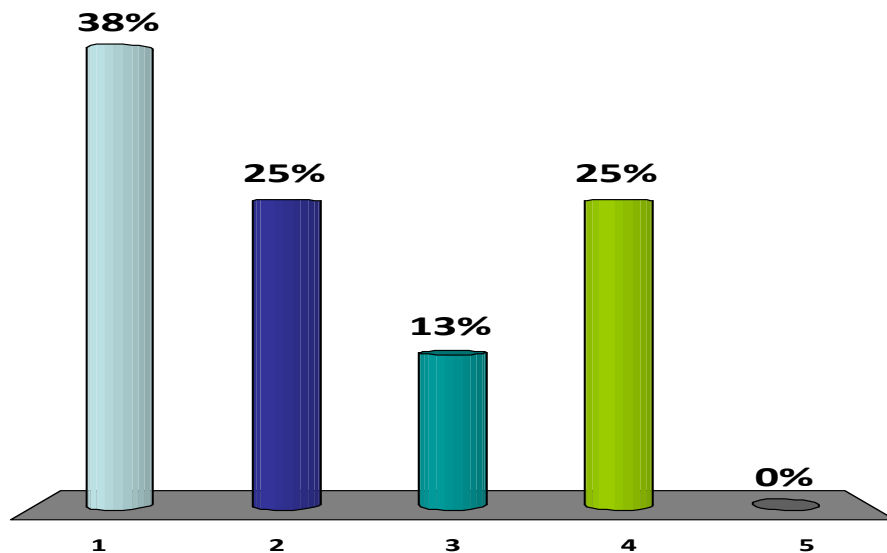
1. Yes.
2. No.
3. It depends on the distribution of the service times.
4. I don't know.



We have a
multiclass
queuing network
with PS queues,
markov routing
Poisson arrivals
and iid service
times.

Is it a product
form queuing
network ?

1. Yes.
2. No.
3. It depends on the distribution of the service times.
4. Yes if the distribution of service times is independent of the class
5. I don't know.



Arrivals are Poisson,
Discipline is FIFO, Services
are iid exponential.

Assume

$$m_1 + m_3 + m_5 = 0.99$$

and

$$m_2 + m_4 = 0.99$$

1. I can conclude that the network is stable
2. It depends on the values of m_i
3. The network is certainly not stable
4. I don't know

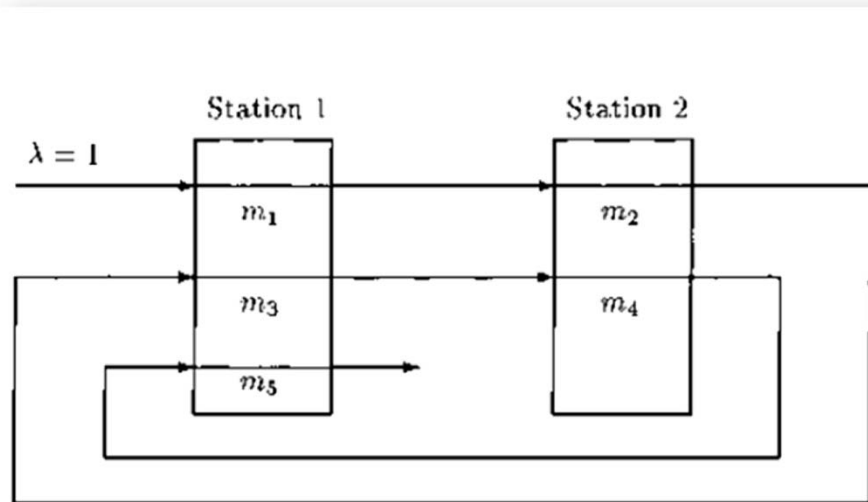
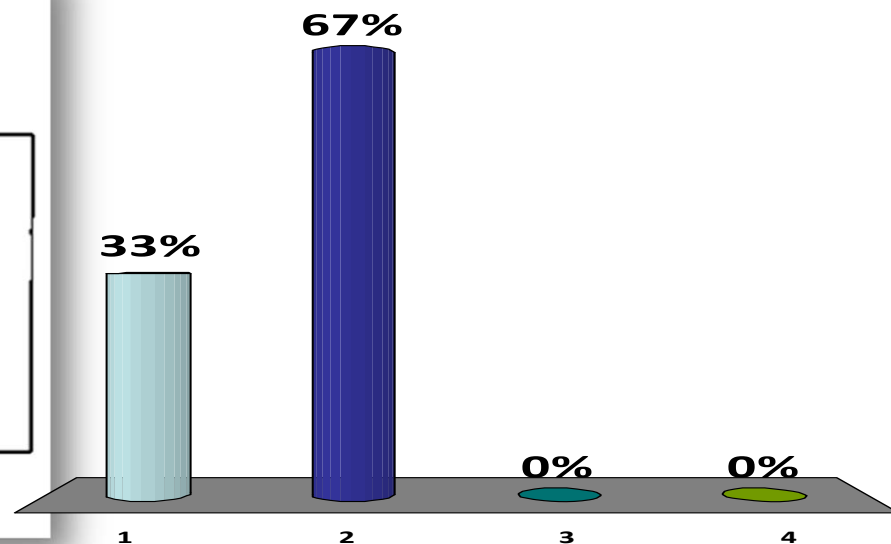
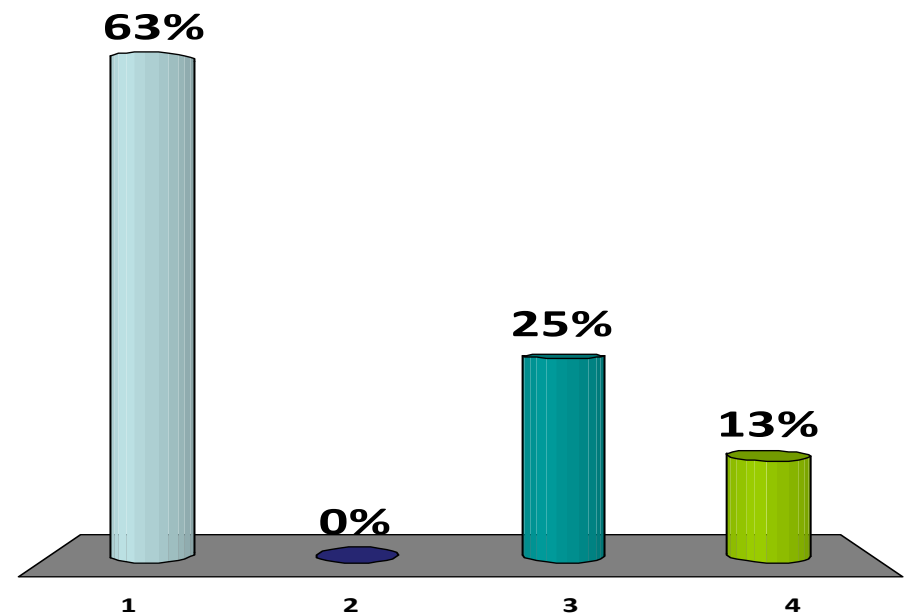
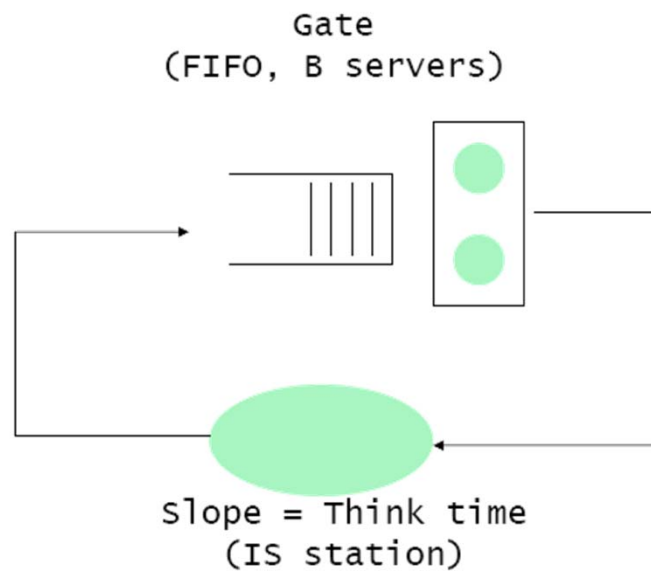


Fig. 1. An example of reentrant lines.



Service at the gate
is iid. and exponentially distributed.
Is this network
stable ?

1. Yes
2. No
3. It depends on the distribution of the service time at the gate
4. I don't know



N is the number of skiers present (in average).

Doubling N would...

1. more than double the waiting time
2. would not significantly impact the waiting time
3. less than double the waiting time
4. none of the above
5. I don't know

