Computer networks

Assignment unit - 4

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1. what is Service rate?

A. In an M/M/4 questioning system

- λ (arrival rate) = 50 requests/band
- μ (Service rate per second) = 20 requests/second
- There are 4 Servers

1. Total service rate :

Total Service rate is caluculated as :

Total Service rate = $c \times \mu$.

where :

- c = no. of sever = 4.
- μ = Service rate per second = 20/s

Total service rate = 4×20

= 80 requests/second

Clients
Internet
Load balancer
Servers

2. What is system utilization P?

A. To find the system utilization(P) in an M/M/4 queue we use the formula.

$$P = \frac{\lambda}{C \cdot \mu}$$

where

- $\lambda = 50$ requests / second
- $\mu = 20$ requests / second per servers
- $C = 4$ servers

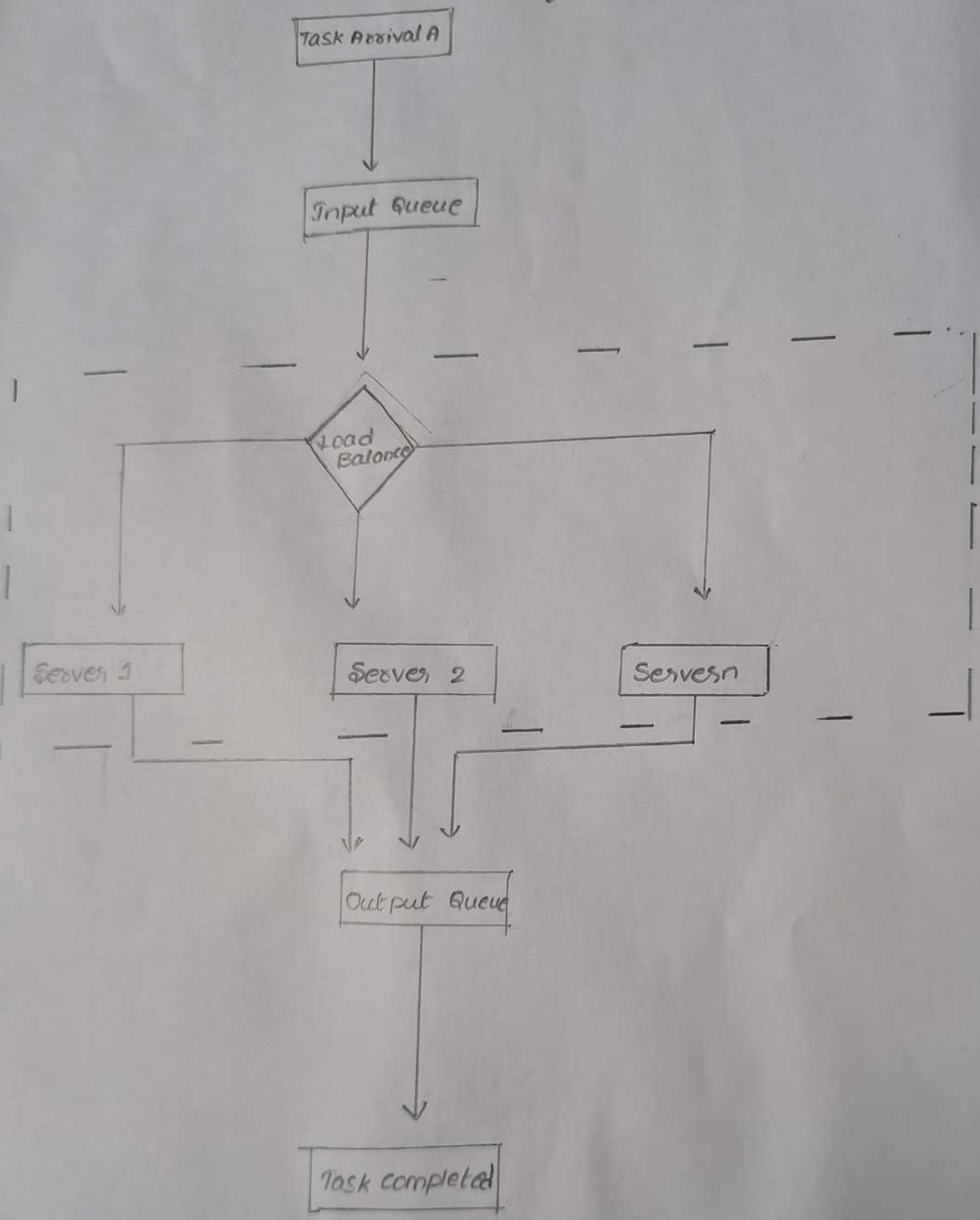
Calculation:

$$P = \frac{50}{4 \times 20}$$

$$= \frac{50}{80}$$

$$= 0.625$$

Question frame work.



39. If one server fails, what is new service rate?

A. Updated parameters :

- Number of servers $C = 3$
- Arrival rate. $\lambda = 50$ request/band
- Service rate $\mu = 20$ requests/sec.

1. New Total Service Rate :

New total service rate = 3×20

$= 60$ request/sec

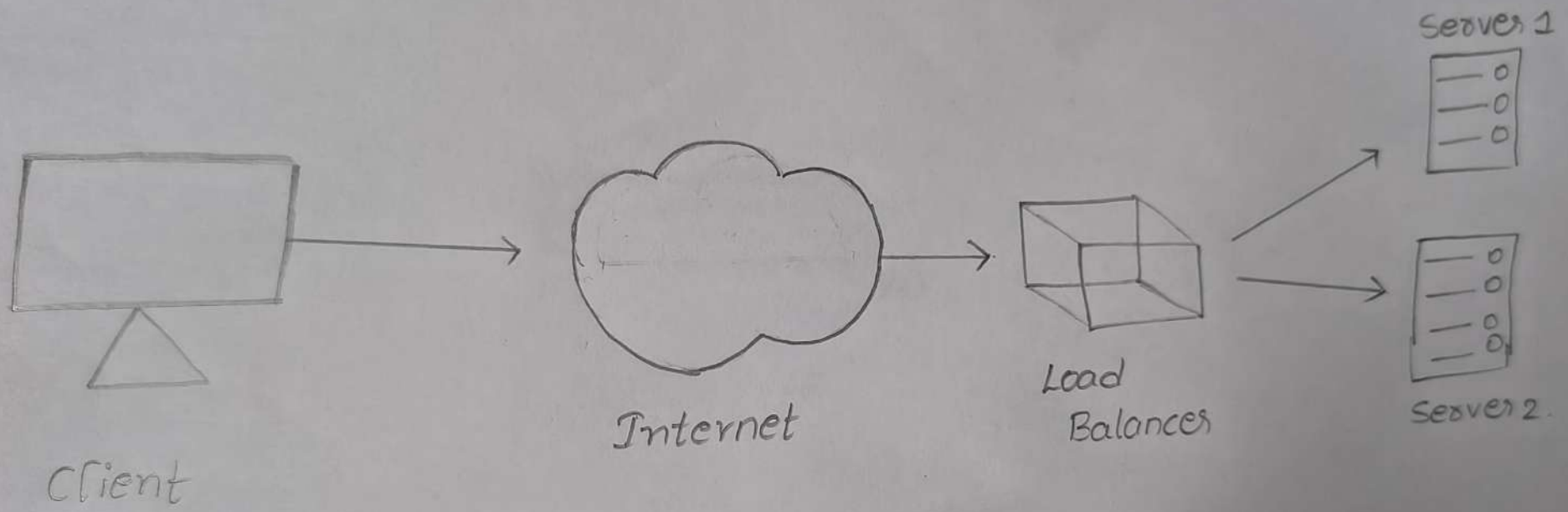
2. New Utilization (P) :

$$P = \frac{\lambda}{C \cdot \mu}$$

$$= \frac{50}{3 \times 20}$$

$$= \frac{50}{60}$$

$$= 0.8333$$


Server 1
Server 2
Load
Balancer
Internet
Client