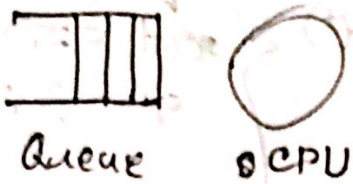
18004120

Ans to Q no. 1(a)



State Variables: Server Status, $x(t)$
queue length, $q(t)$

Output Variables: Average queue day, $\bar{d}$
Maximum queue delay, d_{max}
Jobs Proportion with more than 5 mins delay, d_{5+}

Ans. to Q no. 1(b)

Set of events
(i) Job arrival (a)
(ii) Job completion (c)
(iii) Termination (t)

Job forced to leave ??

Ans. to Q. no. 1(c)

For server status, $x(t) = \begin{cases} x(t)==0\ ?\ 1 : x(t) & [\text{arrival}] \\ q(t)==0\ ?\ 0 : x(t) & [\text{completion}] \end{cases}$

we can also write as $q(t)>0\ ?\ x(t) : 0$

For, queue length

$$q(t) \begin{cases} \text{[illegible]} \\ \text{[illegible]} \\ q(t) > 0, \; q(t)+1 & \text{arrival} \\ \max(0, q(t)-1) & \text{completion} \end{cases}$$

Output equation, let queing delay is d_i

job-average: [illegible]

of days, $\bar{d} = \frac{\sum_{i=0}^{n} d_i}{n}$

Now, Initialize, $d_{max} = 0$

Then, max delay $d_{max} = \max(d_{max}, d_i)$

---

delayed more then 5 min, $d_{5+} = \frac{\sum_{i=0}^{n_5} d_i}{n_5}$ [where $d_i > 5$]

(n_5 = no. of jobs with more than 5 mins)

Ans. to Q.no. 1(d)

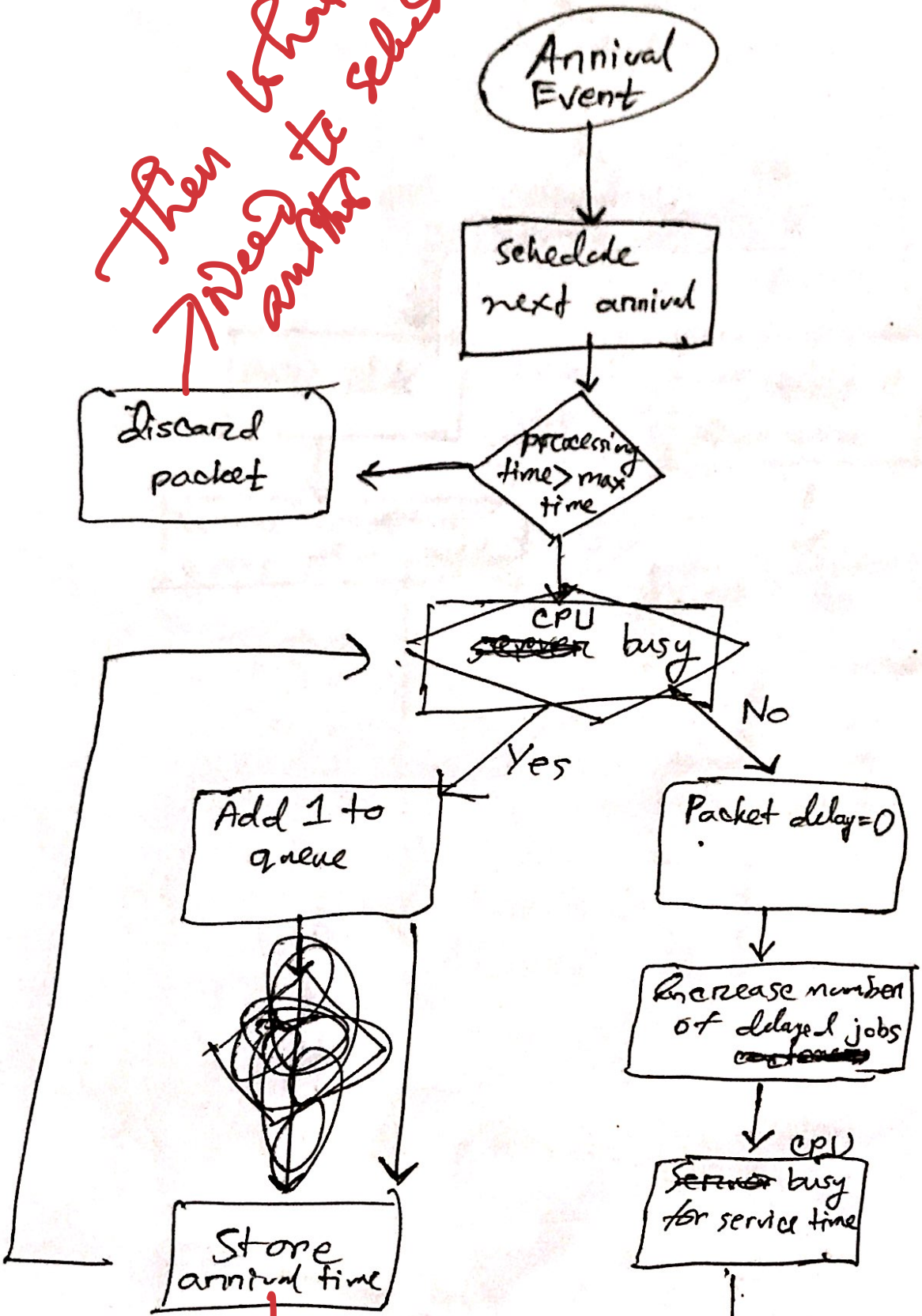
For the CPU status $X_{x(t)} = \{0, 1\}$

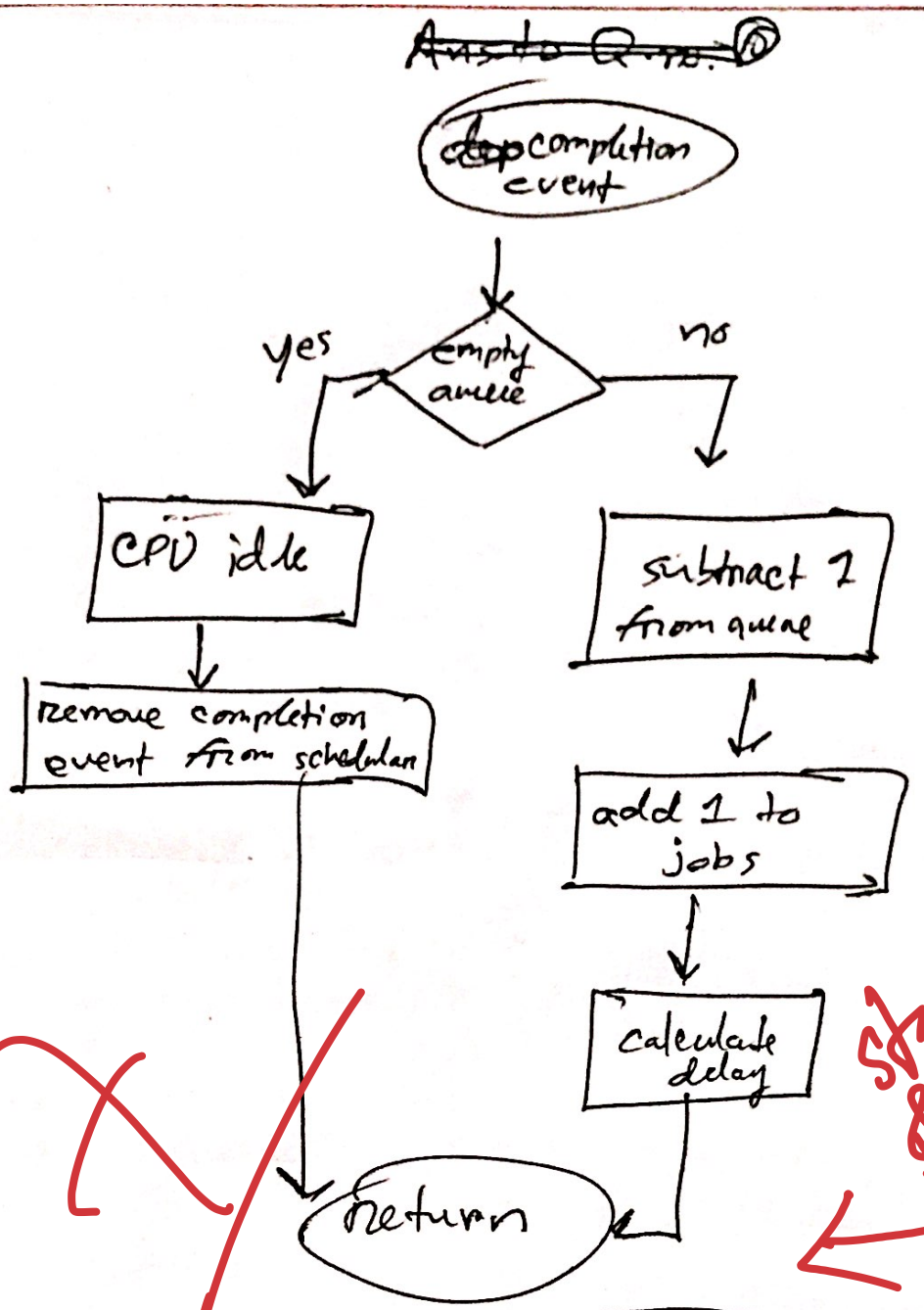
For queue length $X_{q(t)} = \{0, 1, 2, 3 \ldots\}$

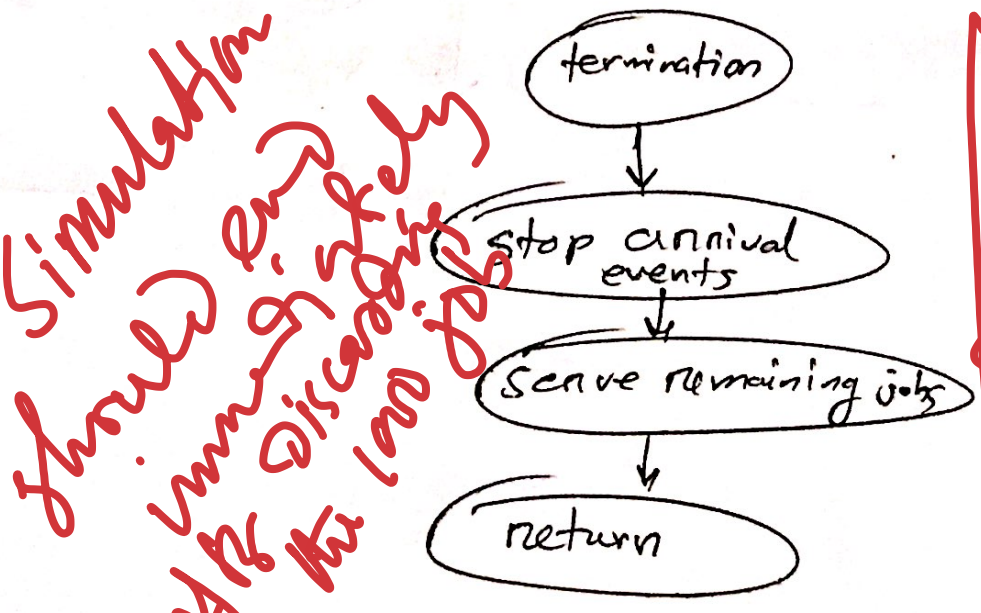
So, $X = \{(0,0), (1,0), (1,1), (1,2) \ldots$ [illegible] $\ldots\}$

$(0,1), (0,2)$ are not possible.

Ans to Q.no 2(b)


Annival Event
schedule next annival
Discard packet
Processing time > max time
CPU busy
No
Yes
Add 1 to queue
Packet delay=0
Increase number of delayed jobs
CPU busy for service time
Store arrival time
Add completion of packet to event schedule





Simulation should end immediately after discarding the incoming jobs

What is the termination condition?