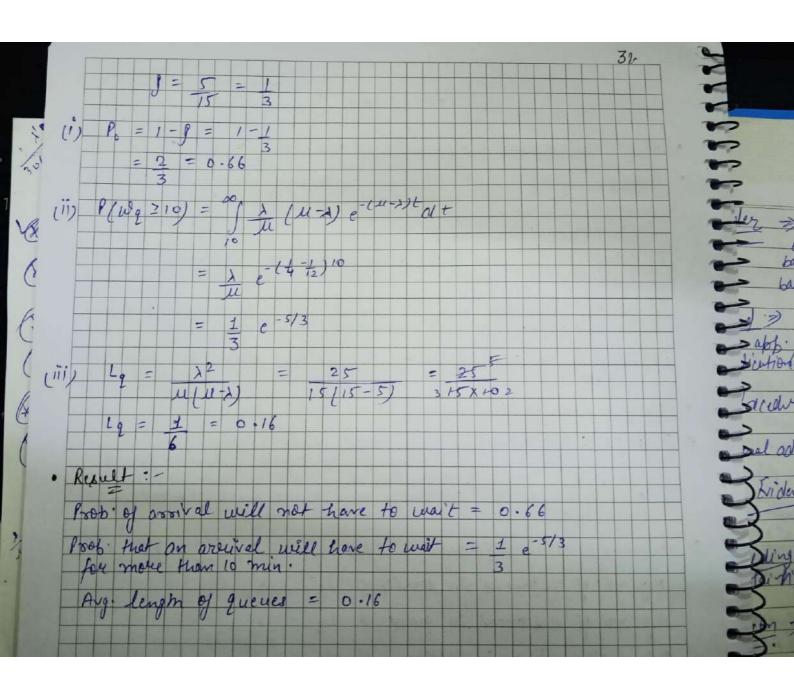


Aim: - To measure the performance of model [M/M/ 1) = (0/FIFO). Problem: - At a public telephone booth in a Post office areuvals arrival time of 12 min. The length of a phone call distributed exponentially with an avg. of 4 min. Li) What is the prob that a fresh arrival will not have to wait for the phone? (ii) What is the prob. that an arrival will have to wait more than 10 min before the phone is fore? (iii) What is the avg-length of queues that form from time to Hine ? Theory & foundly: # (m/m/1): (0) FI FO) =) This model deals with a quewing system input, Exp. service & there is no limit on the dystem Capacity while the customers are served on a ci first in, Performance = > (Mean arenival), U(Mean gervice) Avg. no of customers in service =) 4-12 Avg. no of customers in queue Avg. waiting time in system u-x Wa Ang waiting time in queue M(M-X) Prob of no customer 1-8=1-2 length of non-empty queue 7 (11-x) (-(11-x) Prob of weating time in queue In =) dt Poot that avoiral will have to wait for more than N men. Calculation: -& U = 1×60 = 15/98. 1 X 60 = 5/48



Aim: To measure the performance of model [14/14/1]: (0) (FIFO) Problem: At a certain petrol pump, Customers arrive in a Poisson
fracess with an average time of 5 min. 6/14 arrivals.
The time interval b/12 servers at the petrol pump follows
an exp. dist. & mean time taken to service a unit
is 2 min. Find: in Arg. no of customers in the system.

in Arg. time a customer has to wait in the queue. Av. time a Customer has to spend in the system how much time the flow of the customer be increased to justify the opening of pnother service point, where customer has to weart for min for the service? Theory & formula (M/M/1): (00/FIFO) =) This model deals with a quewing system having single service a there is no limit on the the customers are sorved on a " fixet system capacity while in first out " basis. # Performance > > (Mean Assival), U (Mean scrvice); Avg. no of customers in service 4-1 Avg no of customers in queue 12 19 414-2 Arg. waiting time in system 1 4-1 ula waiting time in queue A u(u-2) Po Probability of no customer 1-X M length of non empty queue 4) Ln = 11-1 ,- (4-2)t Prob of waiting time in queue In dt 41-21 u Calculation: = 12/48. 1 x 60 U = 1 x60 = 30/ hr 8 12 2 M 30

hor

tion of 7

ら上

4

0

Tu 9 23

30 (30 -12) 30 x 18 12 = 4 = 0.26 (30-12) (") = 0.66 = +22 $u_{2} = \lambda = 12 = +22$ $u(u-\lambda) = 30(30-12) = +230 \times 183$ (111) Wg = 1 = 0.0222 30-12 18 Ws = 0.0555 let time increase = 2' 60, 5 = 1 3 30-21=12 \$ 21=18 11-1= 18-12 = 16 Averege queue lengten = 0.26 Ang no of customers in system = 0.66 Arg. weiling time in the queue = 0.0222 Avg. waiting time in system = 0.0555 austomer arrival increase by 6/ hr. to justify the opening another service point.