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Assumptions:

The requests and responses are sorted by action sequence. E.g. without response **4.0**, Actions **4.1，4.2** and **4.3** verify password request won’t be processed.

**E1,E2** means **Error 1, Error2**… And automatic teller machine has different actions to different Error.

|  |  |
| --- | --- |
| Teller Request | Centralized Computer Response |
| **1** Teller-Bank Connection Request | **2.0** Teller-Bank Connection Reply  **E1** Connection Failed, please check Internet |
|  |  |
| **2.1** Verify Account | **3.0** Verified Account Successfully  **E2** Verified Account Failed |
| **3.1** Verify Password | **4.0** Verify Password Successfully  **E3** Verify Password Failed |
|  |  |
| **4.1** QueryAccount Balance | **4.1.1** Reply Account Balance |
| **4.2** Withdrawal | **4.2.0** Account Have enough Balance  **E4** Account Don’t Have enough Balance |
| **4.2.1** Teller Have Enough Money | **4.2.2** Withdrawal Money Successfully |
| **4.2.3** Teller Don’t Have Enough Money | **E5** Withdrawal Money Failed |
|  |  |
| **4.3** Top-Up | **4.3.0** Teller Can Top-up Now  **E6** Teller Can’t Top-up Now |
| **4.3.1** The number of Top-up Money | **4.3.2** Top-Up Successfully  **E7** Top-Up Failed and Return the Money |
| **5** Account Exit | **6** Connection End |

P5:

1. 150/100=1.5 hrs

3\*12\*10=360 secs

Total: 1.5 hrs +360 sec=96 mins

1. 150/100=1.5 hrs

3\*12\*8=288 sec

Total: 1.5 hrs +288 sec=94.8 mins

P6:

1. dprop=m/s
2. dtrans=L/R
3. delay=m/s+L/R
4. The last bit is just leaving Host A, and **m** metersfrom host B.
5. The first bit is (L/R)\*s meters from Host A.
6. The first bit has arrived Host B
7. m=120\*2.5\*10^8/(56\*10^3) meters

P9:

1. Because simultaneously, so

N=1Gbps/100Kbps=10^5

1. If M<=N, probability = 0

If M>n, probability = 1 –

P13:

1. First package: delay =0

Second package: delay=L/R

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N’th package: delay=(N-1)\*L/R

Total delay: (N-1)\*N\*L\*R/2

Average delay: (N-1)\*L\*R/2

1. Packets arrive one second: N\*1/(LN/R)=R/L

Link can accept packets one second: 1/(L/R)=R/L

So we will find that link can accept N packets in LN/R seconds, which is just the question a shows.

So we can get Average delay: (N-1)\*L\*R/2