Theory Assignment 1

SWARNARUP
B21140

(1)

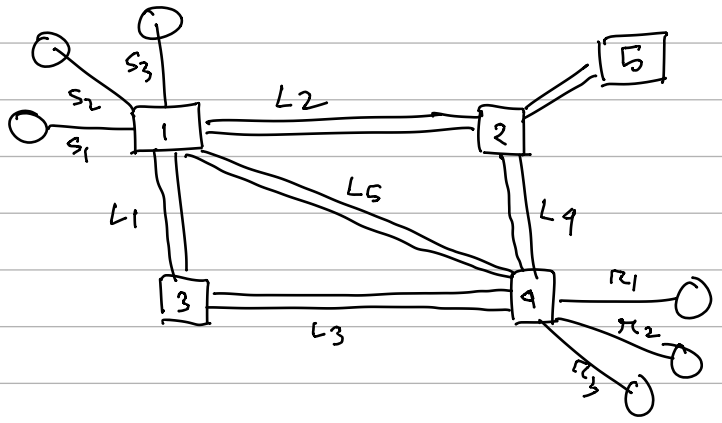
N-bit data every K unit time

Example of a system can be a device sending its location to a place continuously. In every K sec the location data is sent. K is small and fixed.

(a) Ideally a circuit switched network should be used for reliability and speed of transmission purpose.

But since a device is transmitting its location, it's not inappropriate to assume it's going to be sending data across a wide range. In that case packet switched network system would be a better option.

(b)



s_i : Rate of users connected to Router 1

r_i : Rate of users connected to Router 2

Case 1 : if $\Sigma s_i + \Sigma r_i < L_i$ then there would be no requirement for congestion control but Routing the Data through shortest path would make a difference in end-to end experience.

Case 2 : if $\Sigma s_i < L_i$ and $\Sigma r_i < L_i$ but $\Sigma s_i + \Sigma r_i > L_i$ then there is need for congestion control. Because at

an intermediate Router incoming rate can be $\Sigma s_i + \Sigma r_i$ and it can only send to it's capacity L_i. there it has to drop packets and require congestion control.

(2) For a protocol to be universally acceptable standards are important, because depending on the scenario and prerequisits a system may be unable to produce the protocol or without using the standard measures of the protocol diffirent systems are producing diffirent values.

example of lack of standared protocols:

Lack of standard protocols for Registrations of Courses. Sometimes it's OAS, LMS sometimes Samarth or Google form. And since things are First come First Serve, students need to be alert about the mode of registration in the beginning of every semester.

(3) Analogy of network protocol stack and Airline functionality

Physical layer: Aircraft, runways and airport infrastructure
Link layer: Air traffic control and ground handling.
Network layer: Route planning, Fligent Connection.
Transport layer: Seating of Passenger, baggage handling
Application layer: Passenger experience and customer services.

End to end argument in Airline system:

The passenger has two jobs
① selecting source & destination Airports
② Selecting seat and leaving the baggage.

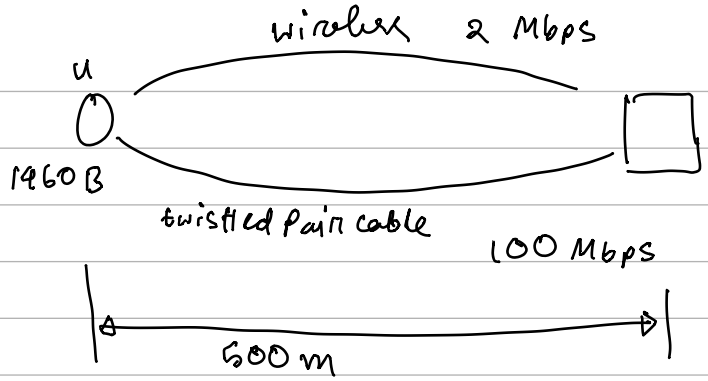
The Transport layer in the system takes care of Assigning a Plane then seat the passanger, installing the baggage.

Physical, Link and Network layer takes care of assigning a route to the Destination airport securely and efficiently.

When Plane reaches the destination airport. The transport layer extracts the baggages and with the help of tag returns the baggage to respective passanger.

(9) 3 tools to measure distance between 2 end points of new road
→ ① Sattalite image ② Gps
③ Speedometer.

(5)



Propagation speed
air 3×10^8 m/s
cable 2×10^8 m/s

what's the delay?

(i) Wireless Technology:

$$\text{transmission delay} = \frac{1460 \times 8}{2 \times 2^{20}} = 5840 \times 2^{-20}$$

$$\simeq 5840 \times 10^{-6} \text{ sec}$$

$$\text{Propagation delay} = \frac{500}{3 \times 10^8} = 1.67 \times 10^{-6} \text{ sec.}$$

total delay = transmission delay + Propagation delay

$$\simeq (5840 + 1.67) \times 10^{-6} \text{ sec}$$

$$= 5841.67 \times 10^{-6} \text{ sec.}$$

$$\simeq 5.841 \times 10^{-3} \text{ sec}$$

(ii) Twisted Cable Technology.

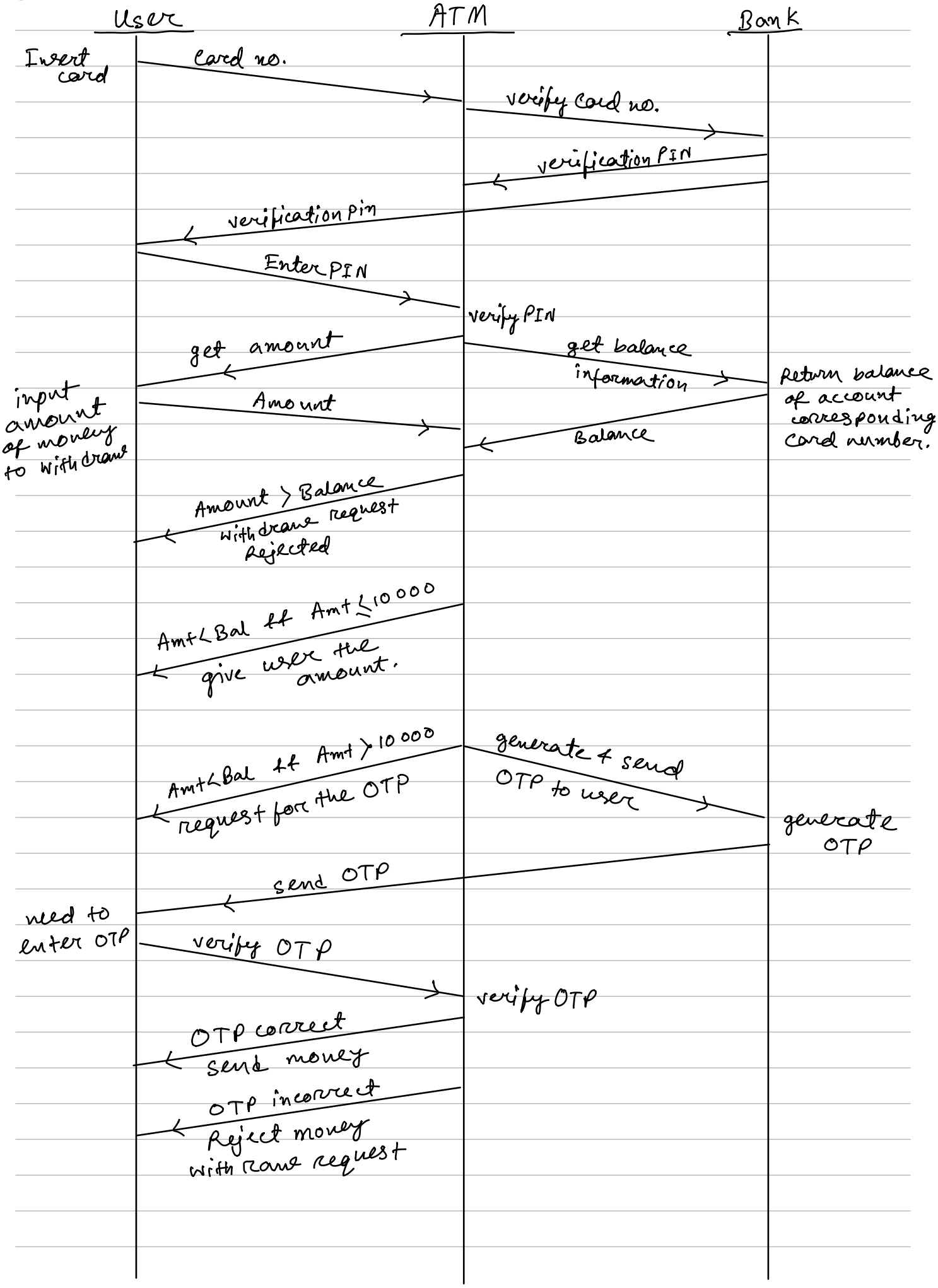
$$\text{transmission delay} = \frac{1460 \times 8}{100 \times 2^{20}} = 0.11 \times 10^{-3} \text{ sec}$$

$$\text{Propagation delay} = \frac{500}{2 \times 10^8} = 250 \times 10^{-8} \text{ sec}$$

total delay = transmission delay + Propagation delay

$$\simeq 0.11 \times 10^{-3} \text{ sec.}$$

(6)


User
ATM
Bank
Insert card
card no.
verify card no.
verification PIN
verification pin
Enter PIN
verify PIN
get amount
get balance information
Return balance of account corresponding card number.
input amount of money to withdraw
Amount
Balance
Amount > Balance
withdraw request rejected
Amt<Bal && Amt≤10000
give user the amount.
Amt<Bal && Amt>10000
request for the OTP
generate & send OTP to user
generate OTP
send OTP
need to enter OTP
verify OTP
verify OTP
OTP correct
send money
OTP incorrect
Reject money withdraw request