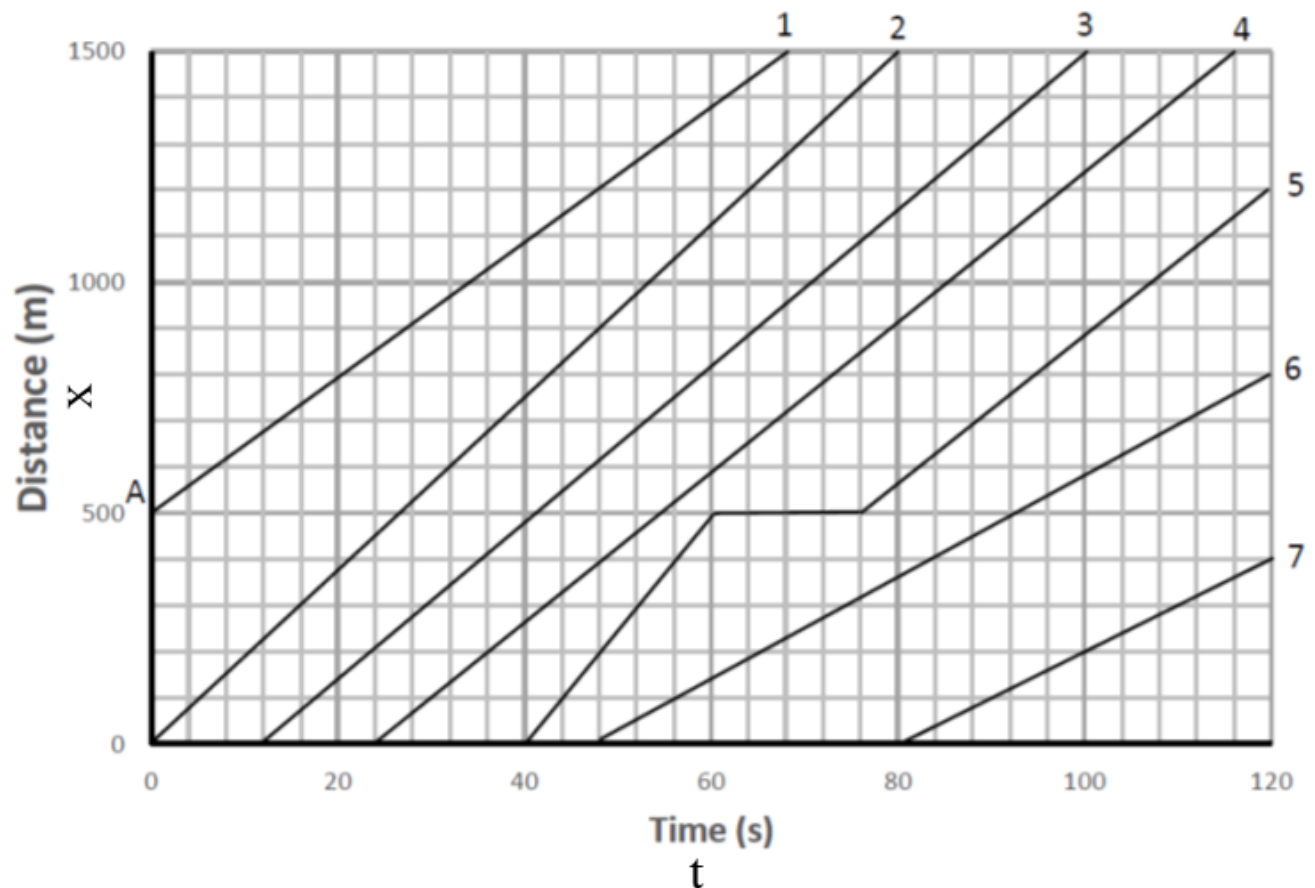# Space – Time Diagram:

Consider the trajectory data of vehicular traffic on an arterial shown in the x-t diagram below:

1) What does the horizontal bar beginning at x =500 and t = 60 mean?

2) For vehicle number 5:

i. What is its spot speed (in km/hr) at a location of distance = 300 m?

ii. What is its average speed (in km/hr) to cross the 1.5 km arterial section?

3) From the stationary observation point between 700 and 1000 m, find the space mean speed.

4) At location A of distance = 500 m, determine the flow rate (in veh/hr) and corresponding headway (in s).

5)If the arterial street section has a signalized intersection:

i. At what distance could it is most probably located?

ii. What would be the possible maximum and minimum red phase duration in the flow direction?

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CE 430: Transportation Systems. Tutorial Notes CH#2

1)

The trajectory data shows a queue at a red traffic signal. The horizontal bar marks the position of the traffic light and the duration of the red-light phase.

(= 16 seconds).

2.i)

=500/60-40   or 300/12   = 25 m/s   = 90 km/h

2.ii)

=1200/ (120-40)   = 15m/s   = 54 km/hr

3)

$u_s = 300 \times 6 / (20+16+16+16+20+9)$ =18.56m/s   = 68.8 km/h

4)

$q = n/T = 6/120$ = 0.05 veh/s   = 180 veh/hr

$h= 1/q=1/0.05$ =20s

5.i)

At location A of distance = 500 m

5.ii)

- Min. red phase duration is the time stopped by vehicle 5 at the signal=16 sec

- Max. red phase duration is the time between the passage of vehicles 4 and 6 who could have passed at end of G+Y phase of previous cycle and beginning of G phase of the next cycle, respectively; it equals: 88-55= 33 seconds.

■■■■