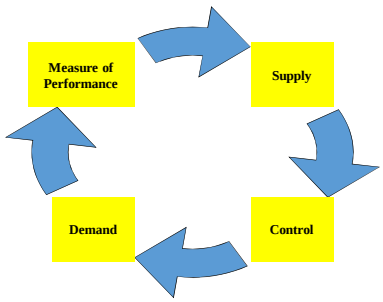


Characteristics of Transport Demand

- Not an end in itself – associated with activities
  - people use transportation to go to work, shop, etc…
  - goods are moved to be consumed

- Takes place over space – demand spatiality
  - people / goods move from Origin A to Destination B

- Varies with time - Dynamic
  - hourly (peak / off peak)
  - daily (working days / weekends)
  - seasonally (summer / winter)

- Stochastic in nature
  - we usually works with averages

- Hard to forecast
  - impacted by many socio-economic attributes
  - income – car ownership rate – family size – etc…

- Manageable
  - flexible working hours
  - dynamic pricing schemes

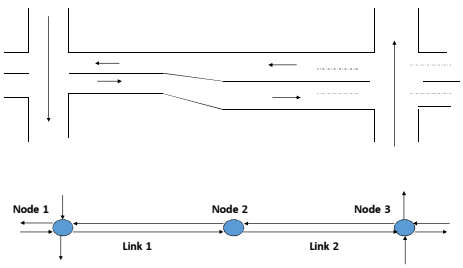
Transport Modeling

- **Transportation models** are used to model and forecast where and when the demand for travel will occur, so that the transportation system can be planned and designed to meet the projected travel demand and ensure a high quality of life for the residents and visitors of a geographical region (Study area).

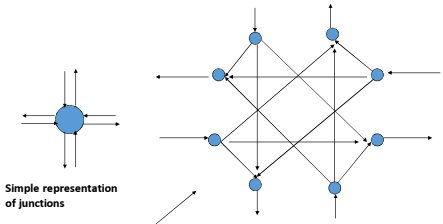
Network Representation

- In Normal Practice, the network is modeled in the form of **A DIRECT GRAPH**
- Nodes: Junctions (Intersections)
- Links: homogenous stretches of road segment between junctions

  speed – number of lanes – existence of special lanes - etc



- How to represent junctions?



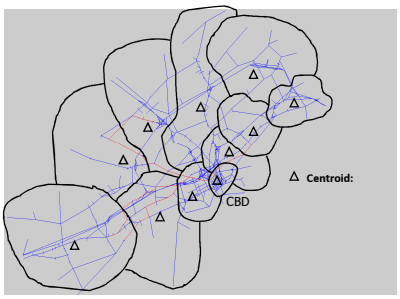
Simple representation of junctions

Advanced representation of junctions to include turning movements

12 more arcs
7 more nodes

Zoning of the Study Area

- Traffic Zone: it is an area with homogenous land use in terms of activity types, density and has no physical barrier (e.g., river)
- Zone Centroid: an imaginary point at the zone center of the activity, it represents origin/destination of trips from/to this zone.
- Centroid Connector: it is areal/imaginary connection between the zone centroid and the network.
- Zone Boundary: it represents the limit of the TAZ and could be natural barrier, road, etc…



Method of Presentation of Trip

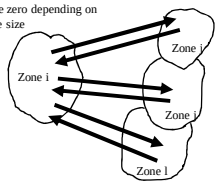
- Mathematical Presentation
  - Origin Destination (O/D Matrix, Trip Table)

Intra zonal trip

0 could be zero depending on the zone size

Inter zonal trip

300



	i	j	k	l	
i	0	700	700	500	2200
j	700	0	500	300	1900
k	300	700	0	400	2000
l	300	600	500	0	2100
	1600	2400	2300	1900	

- All Day Trip Matrix is a symmetric matrix
- Peak hour Trip Matrix is not a symmetric matrix

- The trips could be classified into
  - Internal- Internal Trips
  - Internal- External Trips
  - External- Internal Trips
  - External- External Trips

  Where the study includes zones "i" and "j"

	i	j	k	l
i	Internal – Internal Trips		Internal – External Trips	
j				
k	External – Internal Trips		External – External Trips	
l				

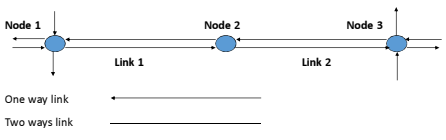
- Distance Matrix

  It represents the distance between each pair of zones In unit distance (km)
- Time Matrix

  It represents the time between each pair of zones In unit time (minute, Hour)

Note: Symmetric Matrices if two ways links and vice versa

	i	j	k	l
i	0	70	70	50
j	70	0	50	30
k	30	70	0	40
l	30	60	50	0



One way link

Two ways link