Assignment 1: Model driverless cars in promela

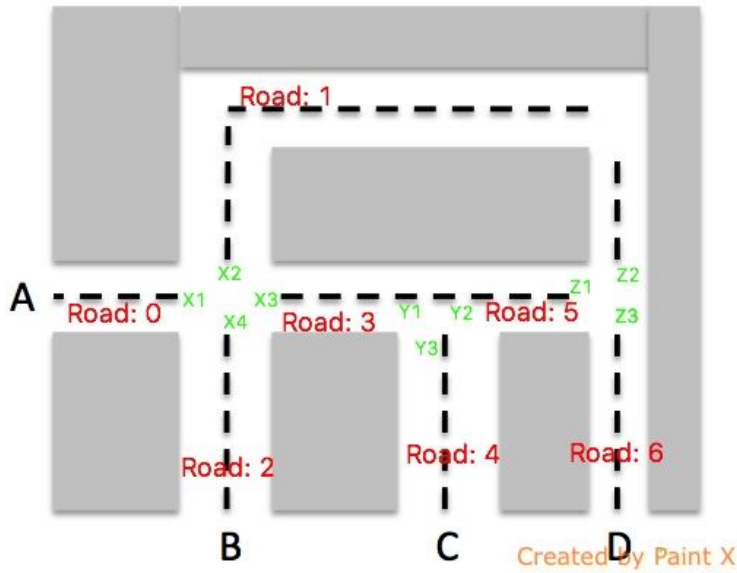
Assumptions:

- Car drive only at following discrete distribution of speeds: 5,10,15,20,25.
- Roads in map have only two lanes, one for each side.
- There is no traffic lights on the turns.
- Cars don't slow down at turns.
- Only two cars in map at single instance.
- Model doesn't work for other maps.
- Map has dimensions defined below.
- Cars can not move in backward direction.
- Roads and completely empty and there is no external intervention.

Insights:

- Promela being very much similar to c language it becomes very easy to do development on it.
- Number of process must be used in controlled manner, else it goes out of memory.
- Random value selection: the set of statement
  do
  ::takeTurnTo[3] ! 1;
  ::takeTurnTo[3] ! 3;
  od
  works very unpredictably, It randomly choose to stuck with one value and never changes the value in takeTurnTo. However it is part of promela.
- For lengthy function like "Map" defined in the promela model, it is not recommended to use inline function. However unavailability of normal functions in promela forces to use inline instead of it. And inline functions do not allow you to return values to cally functions, Hence we have to use channels or global variables to exchange data.

Map definition:



Where: X1-X4, Y1-Y3 and Z1-Z3 are names of turning points available in the map.
In promela model, turns are defined as:
Turn left = 1
Go straight = 2
Turn Right = 3