HW4

1. Ans
   For 8-ary 2-cube, 64 entries are needed for one node.
   If CAM is applied, at least 7 entries; for node 34(011 100), i.e.
   011 100 this node
   1XX XXX above
   010 XXX the line just below
   00X XXX all other below
   011 0XX on the west
   011 1X1 on the east
   011 11X on the east

2. Ans
   For a flit size of Lf and V virtual channels, a downstream buffer has a size of Lf/V;
   Thus, the total credit overhead is L*V/Lf

3. Ans
   For each two-abstract-cycle-combination of 8 turns, at least one turn must be eliminated;
   Thus, for k-ary n-mesh routing, at least k^n turns must be eliminated.

4. Ans
   For the first stage,

$$\mathrm{T} = \frac{\lambda}{\mu_c(\mu_c - \lambda)}, \qquad \lambda = \frac{\mu_c^2 T}{1 + \mu_c T}$$

   For the second stage,

$$\mathrm{T} = \frac{\lambda}{\mu(\mu - \lambda)}, \qquad \lambda = \frac{\mu^2 T}{1 + \mu T}$$

   Thus, the average is

$$\lambda_{avg} = \frac{\mu_c^2 T}{2(1 + \mu_c T)} + \frac{\mu^2 T}{2(1 + \mu T)}$$