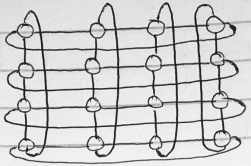
① 4x4 two-dimensional mesh with wraparound links



(a) Diameter

p = total nodes = 16

diameter = $2\lfloor \sqrt{p}/2 \rfloor$

$= 2\lfloor \sqrt{16}/2 \rfloor$

$= 4$

(b) Cost (No of links)

Cost = $2p$

$= 2(16)$

$= 32$

(c) Bisection Width

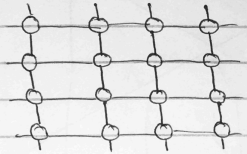
Bisection width = $2\sqrt{p}$

$= 2 \times \sqrt{16} = 8$

(d) Arc-Connectivity

Arc connectivity = 4

② 4×4 two-dimensional mesh with no wraparound links



ⓐ Diameter

$= 2(\sqrt{p} - 1)$

$= 2(\sqrt{16} - 1) = 6$

ⓑ Cost

$= 2(p - \sqrt{p})$

$= 2(16 - \sqrt{16})$

$= 2(16 - 4) = 24$

ⓒ Bisection Width

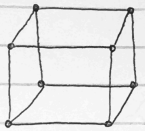
$= \sqrt{p}$

$= \sqrt{16} = 4$

ⓓ Arc-Connectivity

$= 2$

(3) Three-dimensional hypercube (8 nodes)



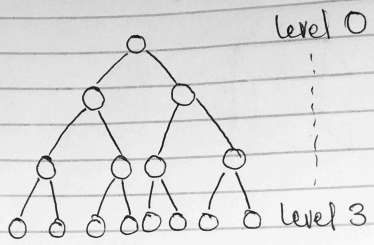
(a) Diameter
$= \log_2 p$
$= \log_2(8) = 3$

(b) Cost
$= (p \log_2 p)/2$
$= (8 \log_2(8))/2 = (8 \times 3)/2 = 12$

(c) Bisection Width
$= p/2$
$= 8/2 = 4$

(d) Arc-Connectivity
$= \log_2 p$
$= \log_2(8) = 3$

(4) A complete binary tree of 3-levels



(a) ~~Cost~~ Diameter

$= 2 \log_2\left(\frac{p+1}{2}\right)$

$= 2 \log_2\left(\frac{15+1}{2}\right) = 6$

(b) Cost

$= p - 1$

$= 15 - 1 = 14$

(c) Bisection width

$= 1$

(d) Arc - Connectivity

$= 1$