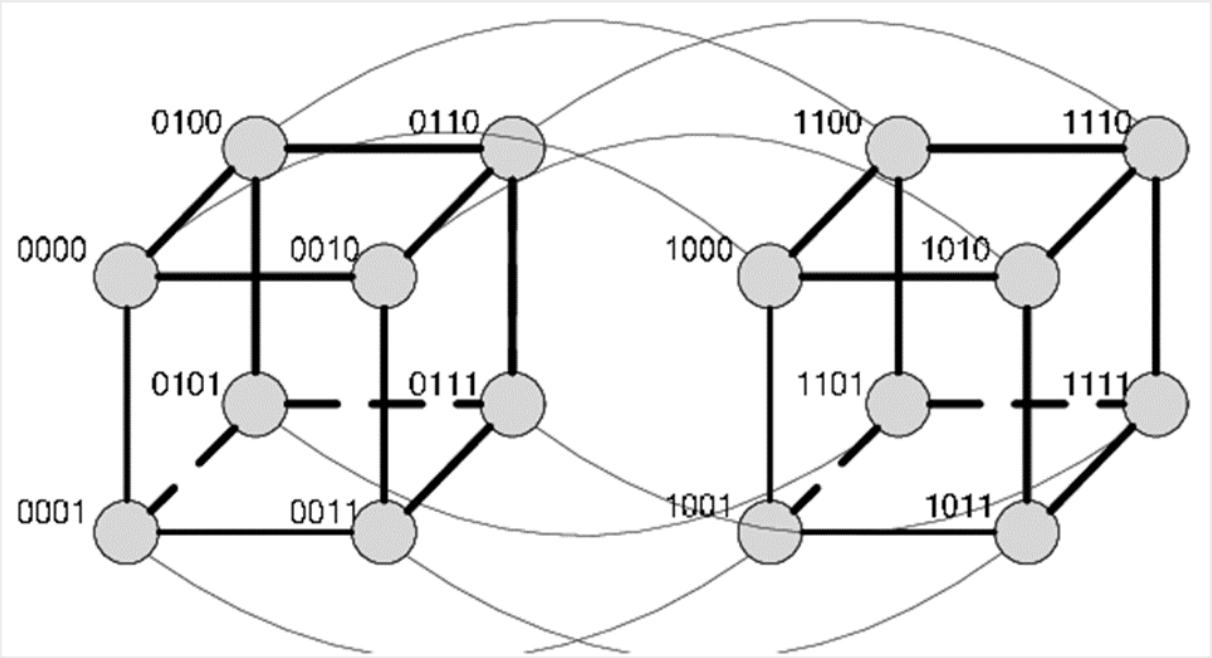
Chp 4 - Exercise 2 - Individual



•What is the longest path in this Hypercube?
•Assuming each connection can be processed independently how many messages can a node simultaneously receive?
•We have a large message that must go from 1000 to 0100.
    •What simultaneous routes could be used to speed up sending it?

Grading Rubric:
_____ (1 Point) States longest path
_____ (2 Points) # of messages and explanation
_____ (2 Points) States a set of routes that could be used at the same time

Answer:

The longest path in this 4-dimensional hypercube (represented in binary from 0000 to 1111) is 4 hops.

I was thinking that each node has only 3 connections to it. However, since we have two hypercubes communicating the nodes can receive up to 4 simultaneous messages.
For example:
Node 0000 has connection:

- Node 0001 (same hypercube)
- Node 0100 (same hypercube)

- Node 0010 (same hypercube)
- Node 1000 (the other hypercube - the on right)

The quickest way to communicate from 1000 to 0100 we have 3 options

Option 1: 1000 —> 1100 —> 0100
Option 2: 1000 —> 0000 —> 0100
Option 3: 1000 --> 1001 —> 0001 —> 0000 —> 0100

Therefore the quickest way to speed it up is to either communicate with the node that share the same location from the same cube that mimic location of the target or go through the path that jumps first directly to the other cube then use that node to send the message to the target. These two options both takes two jumps in this scenario , which is 1000 wanting to communicate with 0100