Surname : Pendyala
Firstname : Praveen Kumar
Matrikel # : 2919474

Some of the answers were arrived at while working in group with:
Lokesh Kumar Jamjoor Ramachandran - 2596208

Problem 9.1

A. Answers
   i. False
   ii. False (= 2 works too)
   iii. True
   iv. False
   v. True

B. **Slice:** A set of allocated resources **distributed across PlanetLab**.
   Sliver: A set of allocated resources on a **single PlanetLab node**.

Problem 9.2

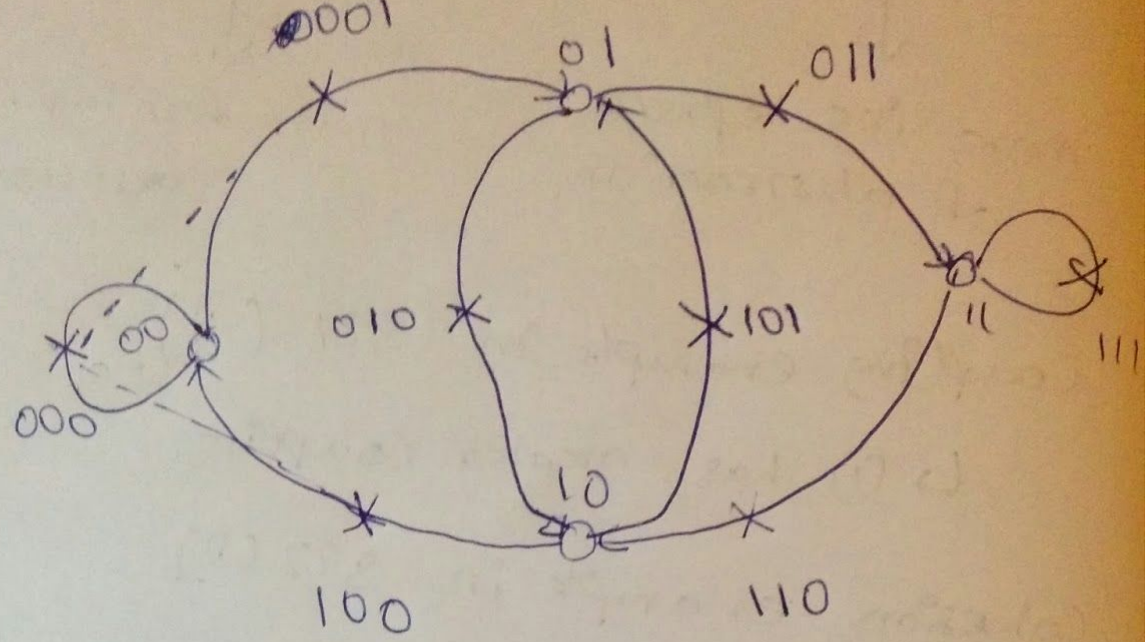
A. Steps:
   i. In the original N-graph, corresponding to each directed edge, say an edge given by Edge(Node (ABC) → Node (BCD)), mark a new node in the new N+1-grah as Node(ABCD)

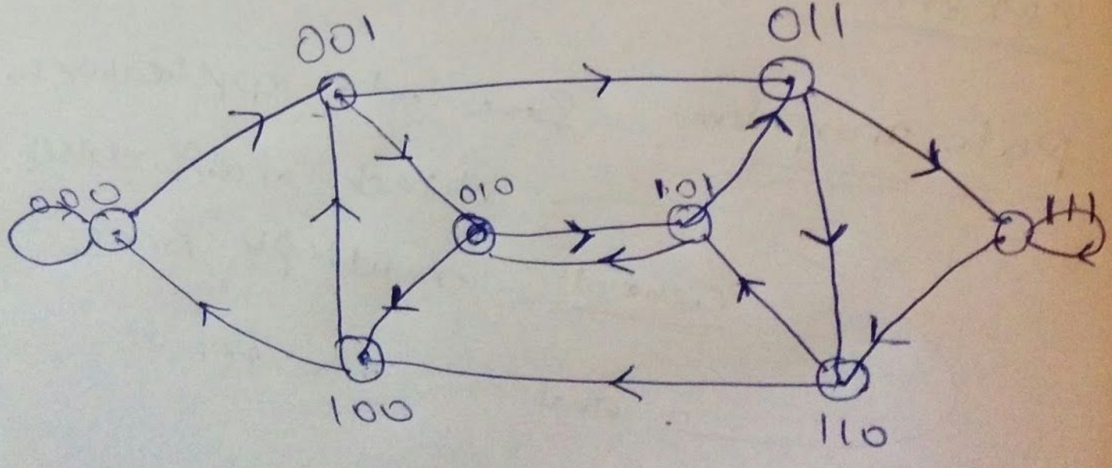
      Example: 00 → 01 gives 001

   ii. Once all the nodes in the N+1-graph are obtained as described in i, we will mark a directed edges for each node, say Node(ABCD), such that they start in Node(ABCD) and end in Node(BCD0), Node(BCD1). This gives two outward edges for each node in the graph and thus completes the N+1-graph.

      Example: 000 gives:
         i. 101 → 010
         ii. 101 → 011

   The resulting graph and construction process:


001
01
011
00
000
010
101
11
111
10
100
110


001
011
000
010
101
111
100
110

B. de Brujin graph for a network of size m (not a power of 2) such that $2^{n-1} < m < 2^n$

a. Method 1: Using a de Brujin of size 2^{n-1}

i. Select 2^{n-1} nodes out of m and form a de Brujin graph
ii. Now each of the remaining ($m - 2^{n-1}$) nodes can be distributed among the 2^{n-1} vertices of the existing de Brujin graph
iii. For vertices with more than one node, depending on the application, the nodes can behave as clones of each other or maintain a small internal address space to identify among themselves.

Pros:
1. Network of any random size be represented as a de Brujin graph
2. Nodes with relatively lower resources can be combined together and serve in the network with combined resources

Cons:
1. Additional overhead to keep nodes at a vertex in sync with each other
2. Increased delay when using internal address space schema or in general routing and forwarding
3. Schemes have to adopted for management among nodes at a vertex

b. Method 2: Using a de Brujin graph of size 2^n

i. Select m nodes and place them at m different vertices of 2^n de Brujin graph.
ii. Allocate the remaining vertices to the nodes closest to them.
iii. Some of the physical nodes will be assuming more than one vertex in the graph and all the existing methods on a normal de Brujin network applies.

Pros:
1. Network of any random size be represented as a de Brujin graph
2. Nodes with higher resources may assume two vertices and contribute more work to the network
3. Delay can be cut down on some requests

Cons:
1. Some nodes have more load than others and this is a drawback when all nodes in the network have almost same amount of resources.