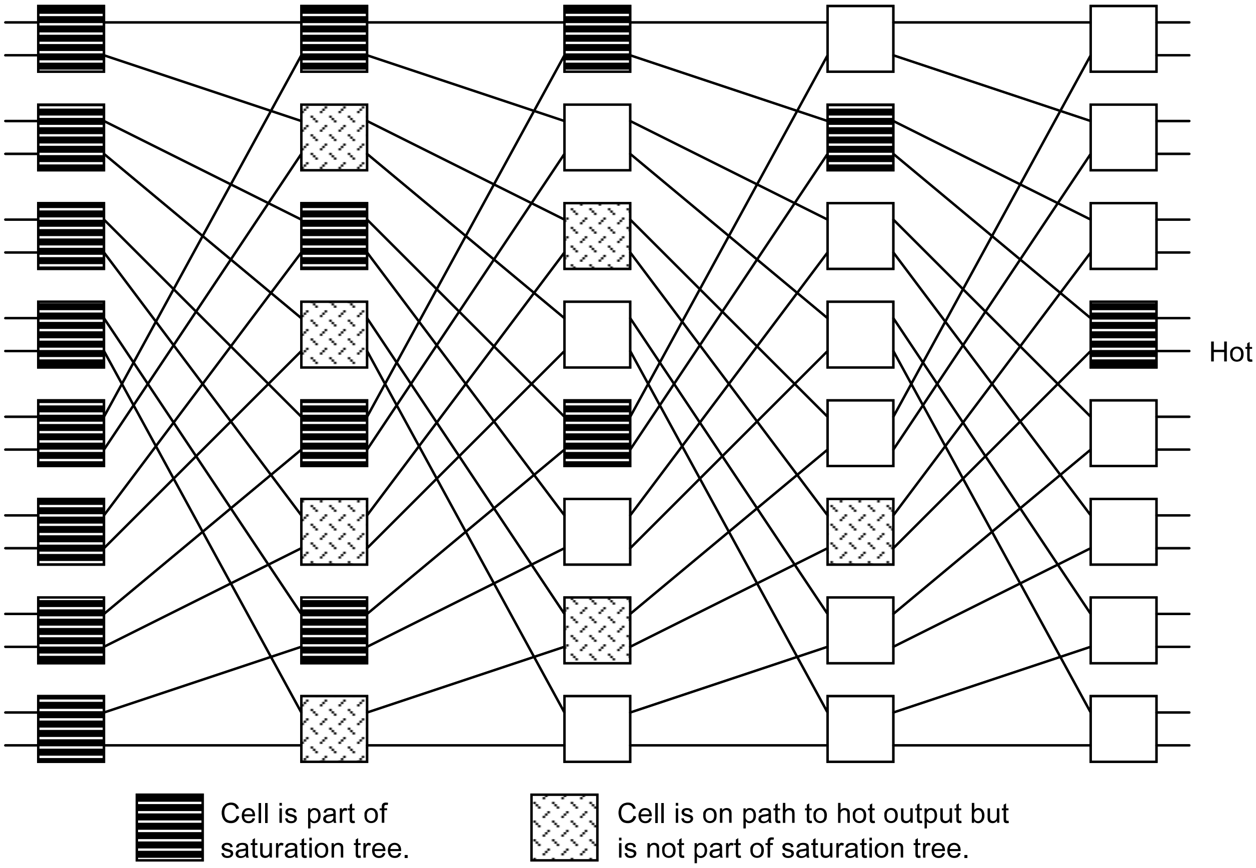
Homework 4 Solution

Problem 1

Use a fixed value of e for hot traffic, for example $e = 0$.

This will limit the saturation tree to a part of the network:



Consider request (a, α).

For normal traffic choose e randomly from $\{0, 1, \ldots m-1\}$ if

$$\alpha_{(n-1:n-x-1)} \neq H_{(n-1:n-x-1)}$$

Otherwise, choose e randomly from $\{1, 2, \ldots m-1\}$.

Problem 2

Each cell has a counter which is initialized to zero.

A single network output is called the barrier output, say output zero.

Cells perform the following actions:

- When a `check-in` message is received by a cell:
    - The message is removed from the queue.
    - The counter is incremented.
    - If the count is m then:
    - Stage $< n-1$ cells send a `check-in` message towards the barrier output.
    - Stage $n-1$ cells send m `check-out` messages back towards the inputs.
- When a `check-out` message is received by a cell:
    - m `check-out` messages are send back towards the inputs.
- When an input receives a `check-out` message it can resume execution.