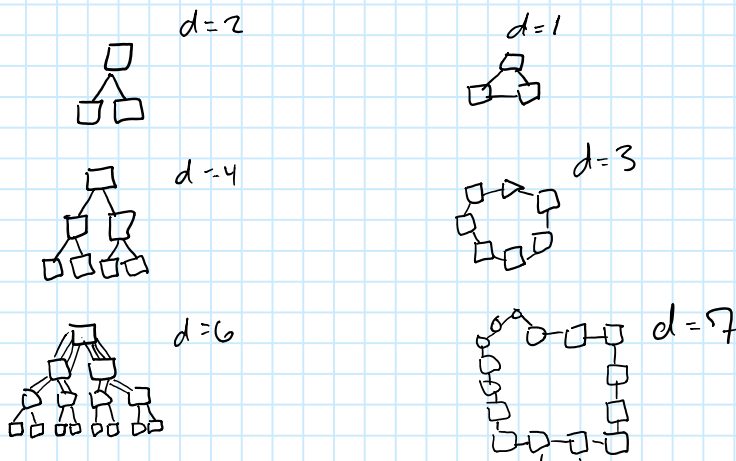


# Homework # 4

Sean Webster

Friday, August 12, 2016 1:19 AM

1. Find the number of processors for which the tree topology has a lower diameter than the ring topology. The diameter is the maximum distance between two processors in the computer system. This is the maximum number of processors a message must pass through to reach its final destination (including the destination processor).

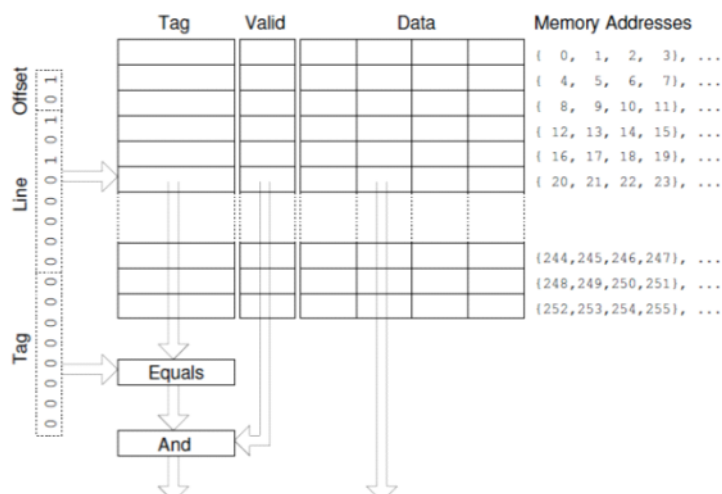


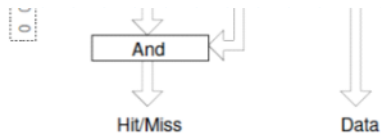
Diameter lower than ring @  $\geq 15$  processors

2. Draw a table that itemizes fundamental differences among direct mapped, fully associative and set-associative caches. Demonstrate these differences on an example.

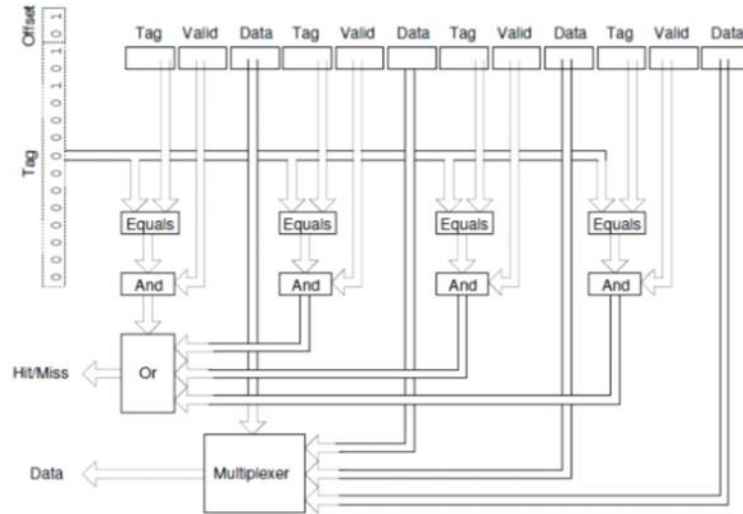
Associative	Direct-Mapped	Set-Associative
<ul style="list-style-type: none"> <li>allows any memory location to map into more than one cache line</li> <li>searching cache is complex</li> <li>hardware is larger</li> <li>lower miss ratio</li> <li>parallel search</li> <li>expensive</li> <li>complex</li> <li>high performance</li> </ul>	<ul style="list-style-type: none"> <li>one choice of line per address</li> <li>→ interference / line contention</li> <li>higher miss ratio</li> <li>linear search</li> <li>less complex</li> <li>slow performance</li> </ul>	<ul style="list-style-type: none"> <li>combines previous two caches</li> <li>address used to find single cache set</li> <li>→ each set has small # of lines</li> <li>→ each set is fully associative</li> <li>performance close to fully-associative</li> <li>complexity close to Direct-Mapped</li> <li>not too expensive</li> </ul>

Direct-Mapped





### Associative



### Set-Associative

