### Set Associative Caches

<table>
<thead>
<tr>
<th>Index (implicit)</th>
<th>Tag</th>
<th>Valid</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Indices represent sets of associative cache blocks, which use a replacement strategy when the bucket is full.

#### Problems

1. How big should the T, I, and O fields of a memory address be on a system with...?
   
   **Answers given as T/I/O**
   
   a. 32-bit addressed memory, 64 KB fully associative cache, 4-byte blocks
      
      30/0/2
   
   b. 32-bit addressed memory, 64 KB fully associative cache, 16-byte blocks
      
      28/0/4
   
   c. 8-bit addressed memory, 32 B 2-way set associative cache, 4-byte blocks
      
      4/2/2
   
   d. 8-bit addressed memory, 32 B 4-way set associative cache, 4-byte blocks
      
      5/1/2

#### Practice Question (From Su 98, Question 4)

See HKN website for solutions