Daniel Detore

I pledge my honor that I have abided by the Stevens Honor System.

1. 1. P1:   
      P2:   
      P3:   
      P3 is the slowest, P2 is in the middle, and P1 is the fastest.
   2. P1:   
        
      P2:   
        
      P3:
2. 1. P1:   
      P2:
   2. P1:   
      P2:
   3. P1:   
      P2:   
      P2 is faster.
3. 1. j and i exhibit temporal locality. A[j][i+1] and A[j][i-1] do so, as well as A[j+1][i] and A[j-1][i].
   2. A[j][i+1] and A[j][i-1] exhibit spatial locality. Assuming C places new variables in memory near each other, j and i also exhibit spatial locality.
   3. It would be slower. We are assigning Anew, which is stored in row-major order, so swapping i and j would put the loops in column-major order and result in many more guaranteed cache misses than the current layout.
4. 1. We need bits for the offset, bits for the index, and bits for the tag.
   2. We need bits for the offset, bits for the index, and bits for the tag.
   3. First cache:   
      Second cache:
5. Table on next page.

5.

| **Set Index** | **Line** | **Tag** | **Block 00** | **Block 01** | **Block 10** | **Block 11** |
| --- | --- | --- | --- | --- | --- | --- |
| 00 | 0 | 0x14 | 0x140\* | 0x141\* | 0x142\* | 0x143\* |
| 1 | 0x49 | 0x490\* | 0x491\* | 0x492\* | 0x493\* |
| 2 | 0x2a | 0x2a0\* | 0x2a\*1 | 0x2a2\* | 0x2a3\* |
| 3 |  |  |  |  |  |
| 01 | 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 10 | 0 | 0xc4 | 0xc48\* | 0xc49\* | 0xc4a\* | 0xc4b\* |
| 1 | 0x22 | 0x228\* | 0x229\* | 0x22a\* | 0x22b\* |
| 2 | 0x3b | 0x388\* | 0x3b9\* | 0x3ba\* | 0x3bb\* |
| 3 |  |  |  |  |  |
| 11 | 0 | 0x42 | 0x42c\* | 0x42d\* | 0x42e\* | 0x42f\* |
| 1 | 0xb2 | 0xb2c\* | 0xb2d\* | 0xb2e\* | 0xb2f\* |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |