CACHE SIZES CALCULATOR

SIZE	UNIT	FIELD	BITS
	BYTE		
	4	BYTE OFFSET	2
	WORD		
		BLOCK OFFSET	
	BLOCK (LINE)		
		ASSOCIATIVITY	
	SET		
		INDEX	
1	CACHE		
		TAG +	
	MEMORY BYTES		

CACHE ADDRESS CALCULATOR

Here's an example: 512-byte 2-way set-associative cache with blocksize 4
Main memory has 4096 bytes, so an address is 12 bits.
Doing the cache size calculation for this example gives us 2 bits for the block offset and 4 bits each for the index and the tag.

TAG	INDEX	BLOCK OFFSET	BYTE OFFSET
4	4	2	2

Now let's do the address calculation for address 2429. We do four long division problems working right to left. We get the divisors by taking 2 to the power of the number of bits in the byte offset, the block offset, the index, and the tag. (The long division is condensed to make all this fit on one page.)

```
   0          9        151        607
16|9      16|151     4|607     4|2429
  0         144        604       2428
  9           7          3          1
```

So the tag field is 9, the index is 7, the block offset is 3, and the byte offset is 1.

Here's another way to do it: 2429 is 100101111101 in binary. Breaking it up into fields of the correct sizes gives us 1001-0111-11-01, which is 9-7-3-1.

Either way, we can run the python cache program, set it to make a cache like this, and choose this address in main memory, it will verify that we have the right answer.