**Given:**

Address Size: 16 bits

Word Size: 16 bits

Block Size: 4 words × 16 bits = 64 bits = 8 bytes per block

Associativity: 2-way (since each section has 2 blocks = 2-way set associative)

Cache Capacity: 4096 words = 4096 × 2 bytes = 8192 bytes = 8 KB

**Solution:**

1. Calculate Number of Cache Blocks

* Each block = 4 words = 8 bytes
* Cache size = 8192 bytes
* Number of blocks = 8192 / 8 = 1024 blocks

2. Determine Number of Sets

* It is 2-way set associative (2 blocks per set)
* Number of sets = 1024 / 2 = 512 sets

3. Breakdown of 16-bit Address

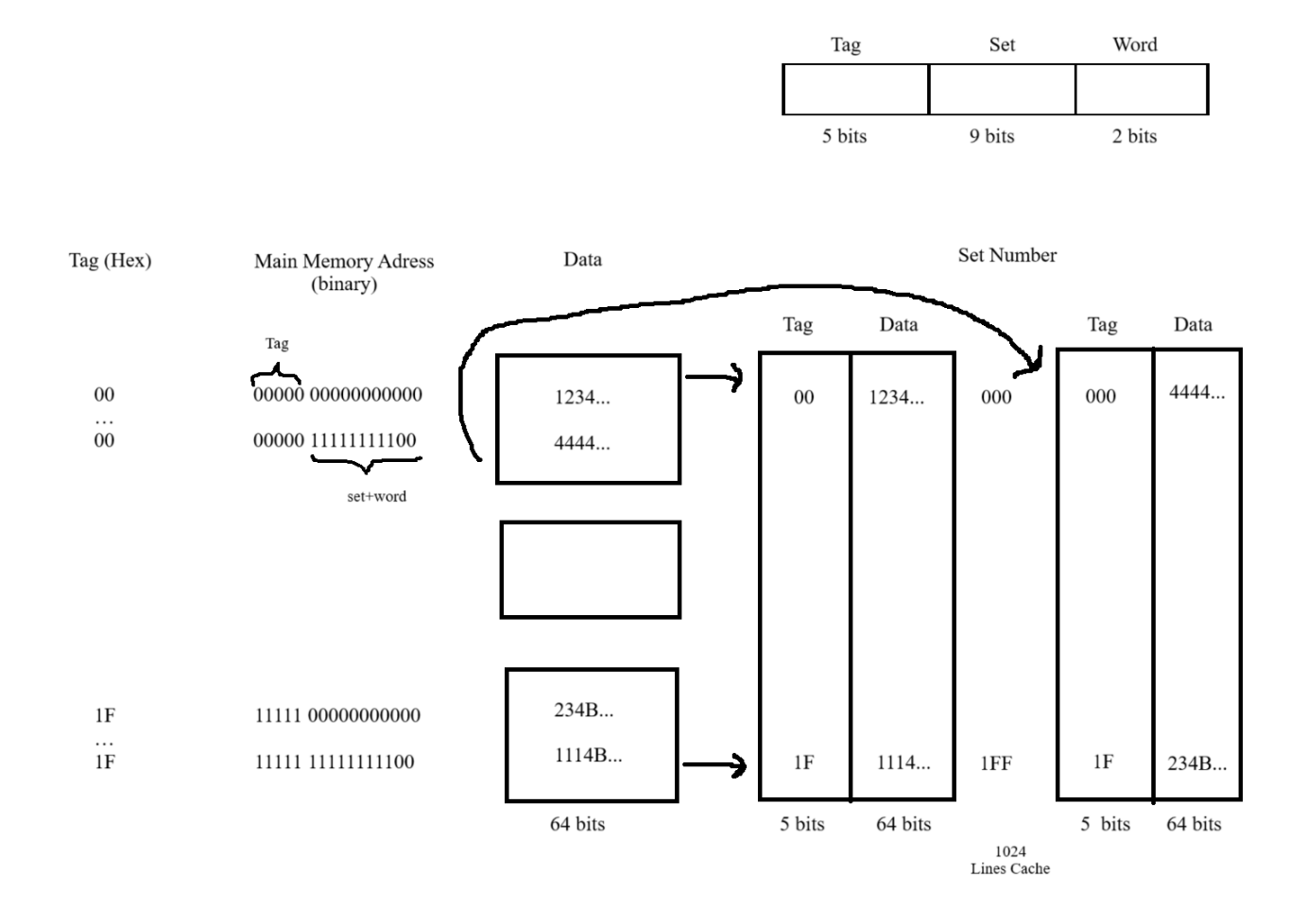
We divide the address into:

**Block Offset:**  
- Each block = 4 words = 2 bits to identify the word inside the block  
- So, 2 bits for offset

**Set Index:**  
- 512 sets = 2^9 → 9 bits for set index

**Tag:**  
- Total address = 16 bits  
- Tag = 16 - (9 + 2) = 5 bits for tag

**Diagram:**

****