Cache Mapping Visualization

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Topics Covered

Threads

One for each mapping

Concurrency

Binary semaphores for thread ordering

Cache Mapping

- direct mapping
- fully associative
  - LFU & random
- set associative
  - LFU & random
  - 2- & 4-way

```
pthread_create(&dm_t, NULL, (void *) dm_simulation,
NULL )
pthread_create(&fa_t, NULL, (void *) fa_simulation,
NULL )
pthread_create(&sa_t, NULL, (void *) sa_simulation,
TWO_WAY )
```

Threads

```c
void dm_simulation(){
  ...
  for(...){
     sem_wait(&dm_sem);
     ...
     sem_post(&fa_sem);
     }
}
```

```c
void fa_simulation(){
  ...
  for(...){
     sem_wait(&fa_sem);
     ...
     sem_post(&sa_sem);
     }
}
```

```c
void sa_simulation(...){
  ...
  for(...){
     sem_wait(&sa_sem);
     ...
     sem_post(&dm_sem);
     }
}
```

Concurrency

Input & Output

Input

Text file of memory addresses to be read

Output

The cache contents and the number of hits, misses, and replacements of each cache

Project Demonstration & Questions