

# Tölvutækni og Forritun Verkefni 2

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# I Skrifu hermi fyrir skyndiminni

```
void initCache()
{
    cache = (cache_set_t*) malloc(S*sizeof(cache_set_t));
    for (int i = 0; i < S; i++) {
        cache[i] = (cache_line_t*) malloc(E*sizeof(cache_line_t));
    }
}

void freeCache()
{
    free(cache);
}

void accessData(mem_addr_t addr)
{
    long set = (addr >> b) & ((1ULL << s) - 1);
    long tag = addr >> (s+b);

    int has_hit = 0;
    int insert_place = -1;
    int lowest_value = policy_code == 1 ? cache[set][0].lru : cache[set][0].fifo;
    int lowest_index = 0;

    for (int i = 0; i < E; i++) {

        cache_line_t line = cache[set][i];

        if (policy_code == 1) {
            if (lowest_value > line.lru) {
                lowest_value = line.lru;
                lowest_index = i;
            }
        } else if (policy_code == 2) {
            if (lowest_value > line.fifo) {
                lowest_value = line.fifo;
                lowest_index = i;
            }
        }

        if (line.valid && line.tag == tag) {
            line.lru = ++lru_counter;
            hit_count++;
            has_hit = 1;
            cache[set][i] = line;
        }
    }
}
```

```

        break;
    }
    if (!line.valid) {
        insert_place = i;
    }
}
if (!has_hit) {
    miss_count++;
    if (insert_place == -1) {
        insert_place = policy_code == 3 ? rand() % E : lowest_index;
        eviction_count++;
    }
    cache_line_t line_to_be_added;
    line_to_be_added.tag = tag;
    line_to_be_added.fifo = fifo_counter++;
    line_to_be_added.lru = lru_counter++;
    line_to_be_added.valid = 1;
    cache[set][insert_place] = line_to_be_added;
}
}

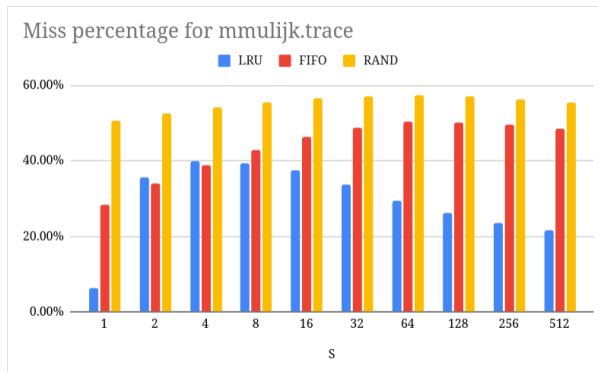
```

```

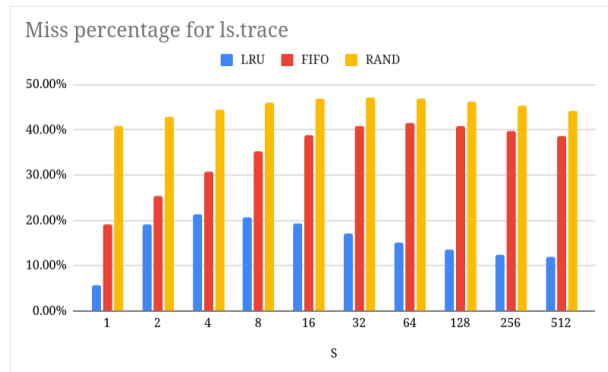
ragnar@gamer ~/school/tolfor/v2/verk2 ◆ ./csim -S 16 -B 64 -E 4 -p LRU -t traces/transpose.trace
hits: 233 misses: 5 evictions: 0
miss ratio: 2.10%
ragnar@gamer ~/school/tolfor/v2/verk2 ◆ ./csim -S 16 -B 64 -E 4 -p LRU -t traces/yi.trace
hits: 6 misses: 3 evictions: 0
miss ratio: 33.33%
ragnar@gamer ~/school/tolfor/v2/verk2 ◆ ./csim -S 16 -B 64 -E 4 -p LRU -t traces/yi2.trace
hits: 16 misses: 1 evictions: 0
miss ratio: 5.88%
ragnar@gamer ~/school/tolfor/v2/verk2 ◆ █

```

## II Besta uppsetning á skyndiminni



Mynd 1: mmulijk.trace



Mynd 2: ls.trace

II.i Hver er munurinn á bestu uppsetningu á milli rakningaskráanna?

II.ii Hvernig kemur uppsetning Intel Core i7 út í hermunum?