

# 计算机体系架构 第八周作业

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作业内容: 7.1, 7.3, 7.6, 7.11, 7.25, 7.32, 7.36。

## Problem 7.1

如果不考虑成本的话, 更大的 SRAM 会占据更大额度片上面积, 进而影响其他的模块, 并且缺少 RAM 接口, 难以兼容以 RAM 接口为主的 DMA 模块, 速度成为瓶颈。

## Problem 7.3

```
define N 10000
assign data to int[N][N]

assign index_x to int [N]
assign index_y to int [N]

load index_x from rand(int, N)
load index_y from rand(int, N)

for i in 1:N:
    for j in 1:N:
        print(data[index_x][index_y])
```

## Problem 7.6

## Problem 7.11

在不进行优化的情况下, 通过时钟函数进行计时, 代码如下, y 优化比例大概有 2.5 倍。

```
#include <stdio.h>
#include <time.h>

int main()
{
    static int array[10000][100000];
    clock_t start, end;
    start = clock();
    double t1, t2;
```

```
    for (int i = 0; i < 10000; ++i)
    {
        for (int j = 0; j < 100000; ++j)
        {
            array[i][j] = 2 * array[i][j];
        }
    }
    end = clock();
    t1 = end - start;
    printf("the cost of for-row is %d\n", end - start);

    start = clock();
    for (int i = 0; i < 100000; ++i)
    {
        for (int j = 0; j < 10000; ++j)
        {
            array[j][i] = 2 * array[j][i];
        }
    }
    end = clock();

    t2 = end - start;
    printf("the cost of for-col is %d\n", end - start);

    printf("the ratio is %f", t1 / t2);

    return 0;
}
```

```
>>> the cost of for-row is 7779271
>>> the cost of for-col is 19284270
>>> the ratio is 0.403400
```

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**Problem 7.25****Problem 7.32**

需要计算整体未命中的惩罚:  $Total = I_{penalty} + D_{penalty}$ 。

因此分别为:

$$t1 = (6 + 1) \times (4\% + 6\%/2) = 0.49$$

$$t2 = (6 + 4) \times (2\% + 4\%/2) = 0.4$$

$$t3 = (6 + 4) \times (2\% + 3\%/2) = 0.35$$