

Homework 12

1. Suppose we have some code as below. Try to optimize the function **SUM** with a combination of at least **4 optimizations** you learned in the ICS class. Comment briefly on your optimizations.

```
typedef struct{
    int lwh[3];
}block_t;
typedef struct{
    int length;
    block_t *blocks;
} blocklist;
int get_length(blocklist *bl) { return bl->length;};
block_t* get_blocks(blocklist *bl) { return bl->blocks;};
void SUM(blocklist *bl, long *dest){
    for(int i = 0; i < get_length(bl); i++){
        int size = 1;
        for(int j = 0; j < 3; j++){
            size = size * get_blocks(bl)[i].lwh[j];
            *dest = *dest + size;
        }
    }
}
```

2. Suppose there's a program consisting of 3 parts A, B & C. Part A takes up 20% of the overall run time, while part B takes up 30%, part C 50%. You decide to optimize one of the three parts to improve the performance. For the same cost, you can speed up A by a factor of 3.0, or speed up B by a factor of 2.5, or C by a factor of 1.5. Which choice would maximize the performance? Why? And please give the speedup.