

15-213 Recitation Exercise – October 26

Fix the following two code samples to use the cache more effectively.
The cache is 256 byte, direct-mapped, with 4 byte cache lines.

```
/* Run this in a 256B cache, and it is incredibly slow: */

int a[32][32]; /* 32*32*4 = 4k */
int r,c;
int sum = 0;

for(c = 0; c < 32; c++) {
    for(r = 0; r < 32; r++) {
        sum += a[r][c];
    }
}
```

```
/* Run this in a 256B cache, and it is incredibly slow: */

int a[32][32]; /* 32*32*4 = 4k */
int r,c;
int row_sum[32];
int avg;

for(r = 0; r < 32; r++) {
    row_sum[r] = 0;
    for(c = 0; c < 32; c++) {
        row_sum[r] += a[r][c];
    }
}

for(r = 0; r < 32; r++) {
    for(c = 0; c < 32; c++) {
        a[r][c] += row_sum[r];
    }
}
```