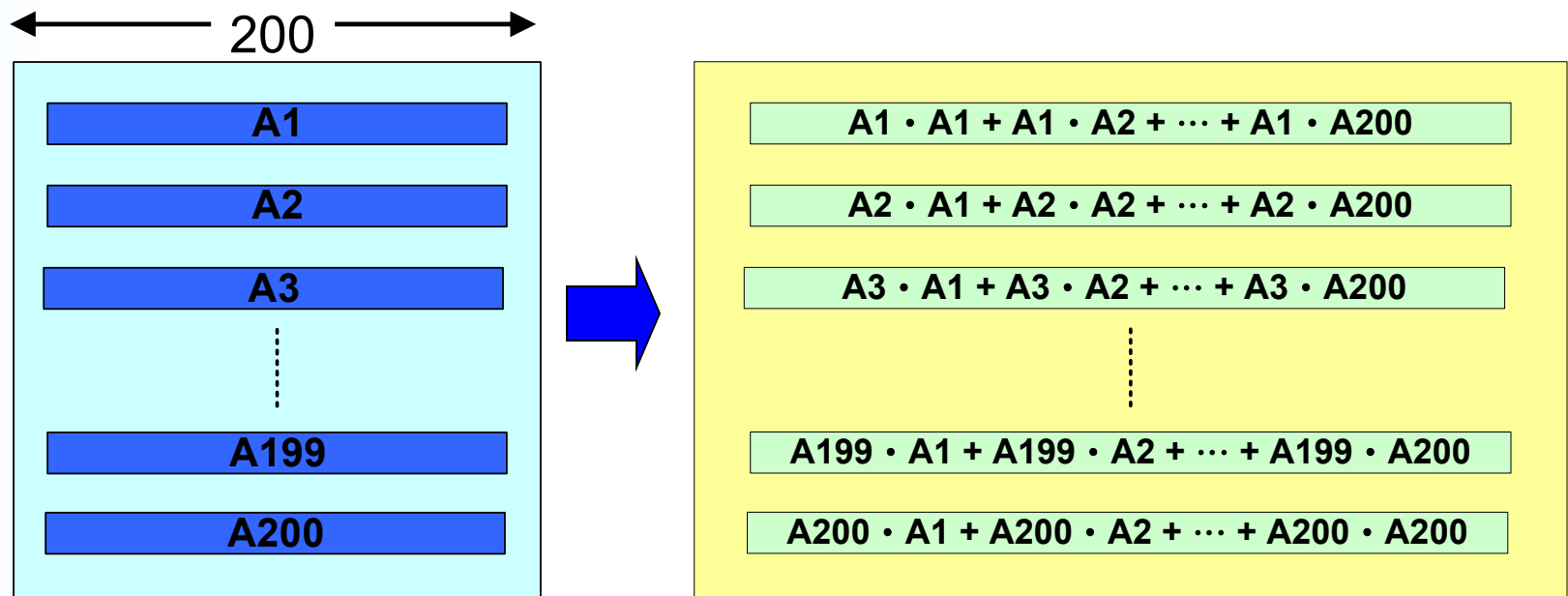


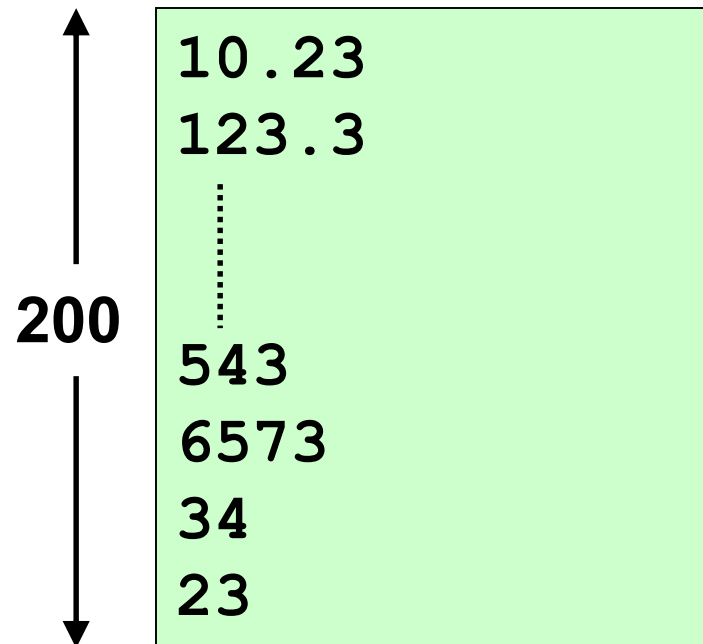
Homework #9 (1)

- Write a C program to perform:
 - Read a text file named “**data.txt**” (200x200 matrix, each element is a **float**)
 - Do following computation



Homework #9 (2)

- Output the result to a file named “output.txt”
- Output file needs to follow the form:



10.23
123.3
...
543
6573
34
23

Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

30

Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

30 + 19

Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

$$30 + 19 + 36$$

Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

$$30 + 19 + 36 + 70$$

Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

$$30 + 19 + 36 + 70$$

155
?
?
?

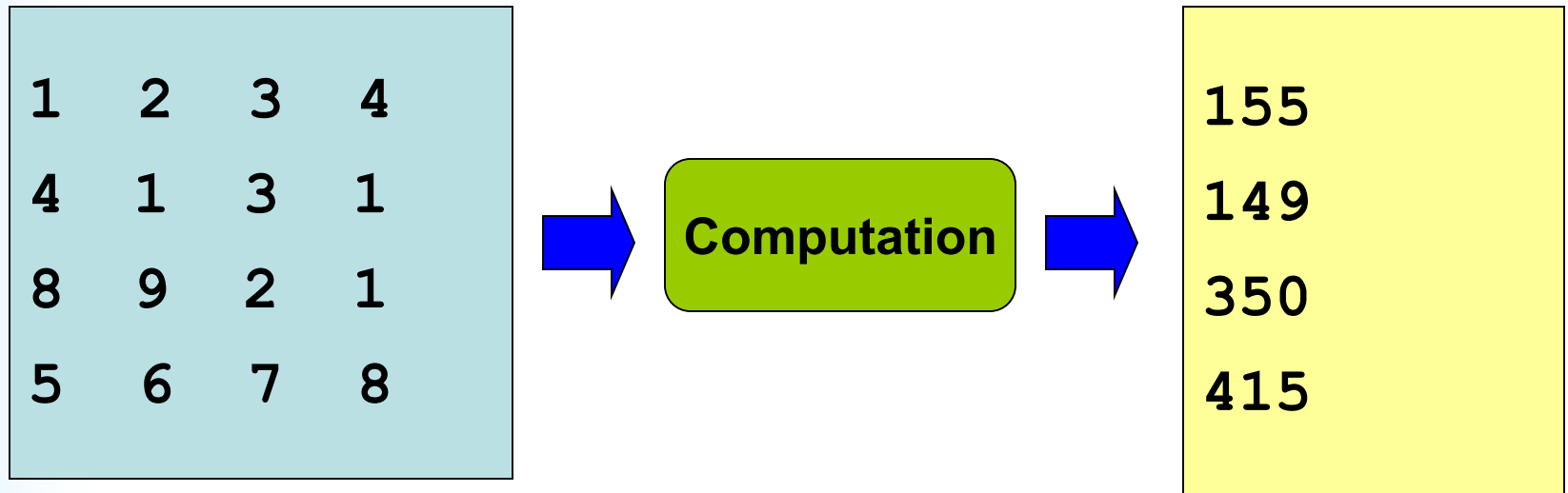
Homework #9 (3)

1	2	3	4
4	1	3	1
8	9	2	1
5	6	7	8

19

155
?
?
?

Homework #9 (3)



Homework #9 (4)

- 輸入檔檔名 **data.txt** (自行產生)
 - 包含200 row的資料
 - 每一row有200個floating point數字，數字與數字間用一個空白隔開
- 輸出檔檔名 **output.txt** (計算結果)
 - 包含200 row的資料

Example

```
#include <mmintrin.h>
#include <xmmintrin.h>
#include <stdio.h>
```

```
int main(void)
```

```
{
```

```
float A[4] __attribute__((aligned(16)));
float B[4] __attribute__((aligned(16)));
float C[4] __attribute__((aligned(16)));
__m128 *a, *b, *c;
```

```
a = (__m128*) A;
```

```
b = (__m128*) B;
```

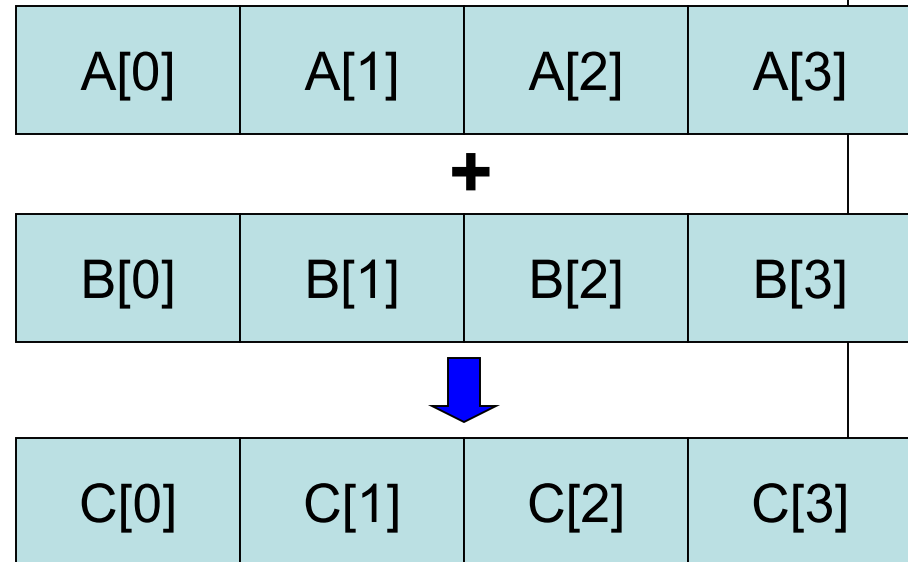
```
c = (__m128*) C;
```

```
*c = _mm_add_ps(*a, *b);
```

```
printf("%f %f %f %f\n", C[0], C[1], C[2], C[3]);
```

```
return 0;
```

```
}
```



GCC Options

- These **switches** enable or disable **the use of built-in functions** that allow direct access to the MMX, SSE, SSE2, SSE3, SSE4, AVX, and 3Dnow extensions of the instruction set
 - -mavx
 - -msse
 - -msse2
 - -msse3
 - -msse4
 - -m3dnow

```
gcc -msse4 test.c
```

Intrinsic Functions

- 你可以使用 SSE, SSE2, SSE3, SSE4 相關的 intrinsic functions (請參閱 [cref_cls.pdf](#) 文件裡 page 88, 124, 168 裡面的函式說明)
- 或請至下面的網站查詢有哪些 intrinsic functions
 - <https://software.intel.com/sites/landingpage/IntrinsicsGuide/#>

Homework #9 (5)

- 使用SIMD intrinsic function來做計算
 - 請使用**GCC 3.4**以上的版本編譯你的程式
 - 主要評分標準：
 - 是否使用大量的**SIMD intrinsic function**？
 - 程式執行速度？
- 在Linux上進行編譯與測試
 - 請多利用系上工作站
- 程式中應有適當的說明（註解）

Homework #9 (6)

- You should turn in to **ECOURSE**
 - “**README.txt**” file: 文字檔，描述你程式的內容、如何編譯程式、如何執行你的程式、**在哪個型號的CPU上執行成功**等等。
 - 一個可以執行成功的input檔案“**data.txt**”與相對應的結果檔案“**output.txt**”
 - A C program without SIMD intrinsic functions: **hw9.c**
 - A C program with SIMD intrinsic functions: **hw9simd.c**
 - Any file needed in your work (ex: Makefile)
- **Deadline: January 14 (Thursday), 24:00, 2016**

這時間之後，將無法補交這次作業