

Homework Assignment 4

(Due 2:10pm, Dec. 6, scan (or take a photo) and upload it in Canvas)

You should use the following instructions only.

- Instructions
 - ADD, SUB, AND, ORR, EOR, MOV, **MUL**
 - CMP, BGE/BLT/BGT/BLE/BEQ/BNE
 - B, BL, BX
 - LDR, STR, PUSH, POP

1. (100 points) Write an assembly code for the “for loop” in the following C code.

```
int* x = new int[10];
int* y = new int[20];
...
for ( int k = 0 ; k < 5 ; k++ ) {
    x[2*k] = y[4*k];
}
```

R15 (PC)	...	0x0414	...
R14 (LR)	0x0410	0x0410	x
R13 (SP)	0x0404	0x040C	...
R12	...	0x0408	y
	RF	0x0404	0x0410
		0x0400	0x0408
		0x03FC	...
		0x03F8	...

Main memory

- R0-R12 are freely available.
- You can use any of R0-R12 for “int k” (i.e., you don’t need to use the stack for k).

2. (100 points) Write an assembly code for the “nested for loop” (in the rectangle) in the following C code.

```
int** x = new* int[10];
int* y = new int[100];
for ( int k = 0 ; k < 10 ; k++ ) {
    x[k] = new int[10];
}
...

```

```
for ( int k = 0 ; k < 10 ; k++ ) {
    for ( int m = 0 ; m < 10 ; m++ ) {
        x[k][m] = y[10*k+m];
    }
}
```

R15 (PC)	...	0x4014	...
R14 (LR)	0x4010	0x4010	0x4000
R13 (SP)	0x4000	0x400C	...
R12	...	0x4008	x
	RF	0x4004	...
		0x4000	y
		0x03FC	...
		0x03F8	...

Main memory

- R0-R12 are freely available.
- You can use any of R0-R12 for “int k” and “int m” (you don’t need to use the stack for them).