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HW 2

ECEN 449-503

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Problem #1:

C code:

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

```
#include <string.h>
```

```
#include <stdlib.h>
```

```
int main() {
```

```
    FILE* inA = fopen("inA.txt","r"); //open to read files inA, inB
```

```
    FILE* inB = fopen("inB.txt", "r");
```

```
    FILE* outC= fopen("outC.txt", "w");//open to write file outC
```

```
    int ar, ac, br, bc;
```

```
    fscanf (inA, "%d", &ar); // input r,c of A & B
```

```
    fscanf (inA, "%d", &ac);
```

```
    fscanf (inB, "%d", &br);
```

```
    fscanf (inB, "%d", &bc);
```

```
    if (ac != br) printf("A columns != B rows"); //must be == to do matrix multiplication
```

```
    else { //keep going
```

```
        int *A = (int *)malloc(ar * ac * sizeof(int));
```

```
int *B = (int *)malloc(br * bc * sizeof(int));
```

```
//populate Matrix A
```

```
float temp;
```

```
int i = 0;
```

```
for (i; i < ar; i++) {
```

```
int j=0;
```

```
for(j; j < ac; j++) {
```

```
    fscanf(inA, "%f", &temp); //read next file val
```

```
    *(A + i*ac + j) = temp; //store val in matrix
```

```
}
```

```
}
```

```
//populate Matrix B
```

```
temp = 0;
```

```
i = 0;
```

```
for (i; i < br; i++) {
```

```
int j=0;
```

```
for(j; j < bc; j++) {
```

```
    fscanf(inB, "%f", &temp); //read next file val
```

```
    *(B + i*bc + j) = temp; //store val in matrix
```

```
}
```

```
}
```

```
//Multiplication and insertion into a new matrix C
```

```
int *C = (int *)malloc(ar * bc * sizeof(int));
```

```
int cr = ar;
```

```
int cc = bc;
```

```
temp = 0;
```

```
i=0;
```

```
for(i; i < cr; i++) {
```

```
    int j=0;
```

```
    for (j; j < cc; j++) {
```

```
        int k=0;
```

```
        for (k; k < br; k++) temp = temp + *(A + i*ac + k) * *(B + k*bc + j); //summation  
operation of matrix multiplication
```

```
        *(C + i*cc + j) = temp;
```

```
        temp = 0; //reset sum to 0 for next summation;
```

```
    }
```

```
}
```

```
fprintf(outC, "%d %d\n", cr, cc); //On first line we write C's r,c
```

```
i=0;
```

```
for (i; i < cr; i++) {  
    int j=0;  
    for (j; j < cc; j++) fprintf(outC, "%d ", *(C + i*cc + j)); //write C vals into file  
}
```

```
free(A);  
free(B);  
free(C);  
}
```

```
fclose(inA);  
fclose(inB);  
fclose(outC);  
  
}
```

Output a)

2 2

20.160000 27.779999 44.309998 56.039997

Output b)

Error: "A Columns != B Columns"

Problem #2

A) 3 files: block1.o block2.o main.o

B) Block1.o is regenerated. Block2.o is linked to main so it doesn't need to be regenerated

C) No new files

Problem #3

