EE103 Introduction to Programming
Homework Assignment #5
Due Date: Jan 05, 2015 (11:55pm)

Write a program that multiplies two matrices and writes the resulting matrix in an output file. The program should read the two matrices from a single file (matrices.txt) which is formatted like:

matrices.txt:

5 8	.....	Row and Column size of the first matrix
8 10	.....	Row and Column size of the second matrix
2 4 6 4 2 4 1 9	.....	First row of the first matrix
.		
.	.....	4 more lines for the first matrix (not shown here)
11 3 6 4 2 3 1 5 7 2	.....	First row of the second matrix
.		
.	.....	7 more lines for the second matrix (not shown here)

Your program should be based on the following code segment:

```
int main(int argc, char **argv)
{
/*Variable declarations here */
FILE *fp;
int  NR1,NC1,NR2,NC2,i,j;
double *mat1,*mat2,*mat_result;

fp=fopen(argv[1],"r")
fscanf(fp,"%d %d \n",&NR1,&NC1);
fscanf(fp,"%d %d \n",&NR2,&NC2);
mat1=malloc(NR1*NC1*sizeof(double));
mat2=malloc(NR2*NC2*sizeof(double));

for(i=0;i<NR1;i++) for(j=0;j<NC1;j++) fscanf(fp,"%lf",&mat1[i*NC1+j]);
for(i=0;i<NR2;i++) for(j=0;j<NC2;j++) fscanf(fp,"%lf",&mat2[i*NC2+j]);
...
mat_result=multiply_matrices(mat1,mat2);
...
...
}

double *multiply_matrices(double *mat1, double *mat2,
                          int NR1,int NC1,int NR2,int NC2)
                    /* implement the multiplication here */
{ ...
  double *out_matrix;
  for (...) ...
  out_matrix[i*NC2+j]= ...
  return (out_matrix);
}
```

Example:

After your program is compiled and linked to produce an executable named **matrix_multiply** it should be executed by:

> **matrix_multiply input_file.txt**

The result should be the output file named **matrix_output.txt** which contains the result of the matrix multiplication. E.g:

```
 89    91   109    41    47
 67   107    93    35    40
 26   103    58    27    27
 92   167   136    43    79
 73    51    79    23    39
```