FLORIDA INSTITUTE OF TECHNOLOGY

MECHANICAL AND AEROSPACE ENGINEERING DEPARTMENT

# MAE 3150: Aerospace Computational Techniques

## Spring 2016

Homework 1 – Due January 28, 2016

This first assignment will serve as both review and warm-up for other assignments to come this semester. Through this assignment, you will also begin to build a library of functions that you can use in other codes, saving you work in the future. For this reason, you are encouraged to write your code as generally as possible to maximize its usefulness.

You are to write a computer program that will accept as input from the screen or read from a file two square matrices of arbitrary size less than or equal to 10, and conduct basic operations upon them. The matrices must be multiplied (full matrix multiplication, not element-by-element), added, subtracted, and transposed (both matrices). Each operation must be contained within its own subroutine or function, and the input matrices passed to the subroutine or function as appropriate. For each operation, the resulting matrix must be formatted and written to a file that you will turn in. Screenshots or files that have been “cleaned-up” using Word or other software are not acceptable. For this assignment, the definition of “formatted” means that each matrix row and column must be evenly spaced so as to be legible without excessive white space (i.e. don’t separate the rows and columns by ~15 blank spaces). Also, each value in the resulting matrix should have exactly two significant decimal figures, including any trailing zeros. In your file, it should be clear what each matrix is, so you will need to include additional print/write statements for that purpose.

The input matrices are on the next page. These matrices and their size must be entered from the keyboard or read from a file. They cannot be hard coded into your program.

You may choose any computer language you prefer provided you are not using a commercial or other pre-written application to do the work for you (MATLAB, Mathematica, Excel, and other available software are not acceptable).

While working in small groups to set up the problem and determine how to solve it is acceptable, all code must be original work. **Code that is copied or substantially similar to other students’ work will be rejected and no credit for the assignment received.**

To complete this project, you must turn in both a hard copy of the code listing and the solutions, and an electronic copy of the code. Refer to the “How to Submit Coding Assignments” document.

Use the following filename template for your code:

*firstname\_lastname.hmwk1.ext* where *“ext”* is the proper language extension.

|  |  |  |
| --- | --- | --- |
| 3.13 | 2.08 | 3.82 |
| 5.31 | 5.17 | 6.86 |
| 6.48 | 4.94 | 5.49 |

|  |  |  |
| --- | --- | --- |
| 5.71 | 8.58 | 5.85 |
| 9.30 | 9.74 | 4.34 |
| 0.72 | 9.81 | 8.01 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2.30 | 9.23 | 4.50 | 8.46 | 7.05 |
| 0.32 | 6.20 | 2.27 | 3.25 | 6.61 |
| 6.20 | 5.40 | 1.47 | 0.41 | 8.33 |
| 5.60 | 3.87 | 2.31 | 9.42 | 8.66 |
| 8.29 | 4.83 | 5.03 | 4.69 | 8.86 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2.02 | 9.70 | 7.58 | 0.82 | 3.10 |
| 0.12 | 6.23 | 7.66 | 6.51 | 1.90 |
| 4.53 | 3.73 | 2.21 | 6.12 | 2.41 |
| 1.03 | 5.14 | 6.30 | 1.58 | 1.79 |
| 7.56 | 3.57 | 1.61 | 5.17 | 0.49 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5.66 | 9.97 | 8.71 | 1.63 | 8.92 | 3.37 | 8.25 |
| 6.27 | 7.00 | 0.15 | 1.26 | 7.02 | 3.99 | 0.13 |
| 9.65 | 7.11 | 3.86 | 7.58 | 1.86 | 5.21 | 6.41 |
| 2.87 | 0.02 | 6.29 | 6.21 | 9.61 | 4.16 | 6.43 |
| 9.23 | 7.65 | 9.17 | 4.54 | 8.96 | 1.23 | 8.82 |
| 8.84 | 1.54 | 4.68 | 5.73 | 7.40 | 1.85 | 6.76 |
| 0.89 | 2.02 | 3.33 | 0.96 | 8.36 | 2.24 | 5.11 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4.79 | 0.64 | 8.17 | 9.42 | 8.64 | 9.20 | 1.98 |
| 9.70 | 2.60 | 5.88 | 4.87 | 6.98 | 1.96 | 1.23 |
| 6.24 | 3.08 | 3.76 | 5.69 | 1.27 | 9.06 | 8.31 |
| 6.00 | 0.89 | 8.29 | 0.77 | 6.45 | 3.37 | 8.49 |
| 3.23 | 3.05 | 4.63 | 8.89 | 6.14 | 0.13 | 3.25 |
| 4.58 | 5.19 | 5.11 | 8.14 | 1.95 | 0.56 | 7.13 |
| 6.86 | 5.43 | 9.97 | 9.02 | 5.26 | 3.03 | 2.47 |