CEE 235A Programming Project **DATE:** 12/18/2023

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Instructions to Students: *Include this sheet, along with the accompanying data sheets, with your project submission. Students should fill in the self-assessment parts of the form based on an objective review of your own teams work.*

Project Requirements:

(a) Functionality of the standard 1st-order elastic analysis routines in MASTAN2
(b) A short written description of your program summarizing its features and the overall structure of the program, including a simple flow-chart of how the program works.
(c) A printed listing of your program. We expect that the main program file ***ud_3d1el.m*** will include comment statements that define and describe all the main variables and functions in your program. Each sub-function should also include appropriate comment statements.
(d) An electronic copy of your source code (we may run your program to check that it really works).
(e) A summary of results from the example/verification problems.

Grading:

[50 %] Required Features & Run Correctly – Does the program possess all of the required features and has been demonstrated to run correctly? If not, briefly explain what the problems are and what steps were taken to try and resolve the problems.

STUDENT ASSESSMENT:

Yes, the program possesses all of the required features and has been demonstrated to run correctly using the various verification problems provided. We have also coded the extra credit part for flexure release of one or both ends.

We believe our main code provides the correct solutions for 3D space frame analysis. However, it might prove to be difficult in some planar cases if I or J values are set at zero without restricting out of plane deformation. To resolve this, we have set default values of Izz=Iyy in case either 1 of the two is zero and J = (Izz+Iyy)/2 to avoid blowing up of deflection values.

We have created a detailed computational base for the extra credit which works in most situations. We have seen some numerical anomalies while running this code such as value blow-ups, but it hasn't seemed to affect any of our final answers.

TA/PROFESSOR ASSESSMENT **(Score _____/50%)**

[30 %] Code Organization and Documentation: Is the source code well organized and well documented? Are all of the variables defined in the main program and the functions? Are the functions and their purpose defined in the source code comments? Is the code efficient in terms of run time and storage operations?

STUDENT ASSESSMENT:

The code is well organized and modular. ud_3d1el is the main function that calls all other functions as need be. Almost every block of the code is preceded by a comment statement explaining what the following block does. Every matlab file starts with a header, defining the purpose of that code/function, all child functions called in that file, and all variables defined in the same. We have also followed proper hierarchy in naming the functions for better code modularity. and user-friendliness

We believe our code is efficient, we no repetitive or irrelevant computations. It is fast and efficient in terms of run time for the most complex structures tested via the same.

Finally, our code provides excellent replicability in terms of output results for complex 3D structural analysis.

TA/PROFESSOR ASSESSMENT **(_____/30%)**

[20%] Project Write-up: Is the project report well organized and complete? Is the program flow chart accurate and informative in understanding the code? Is the program overview and critique informative? Are all the verification problems complete?

STUDENT ASSESSMENT:

We have separated each deliverable of the project report into a separate file for efficient perusal by the grader. We have a separate folder for the MATLAB code files which can be run by simply running the main ud_3d1el function. We have also provided a separate folder with the pdf versions of the code files for read-through. We have created an extensive flowchart with ashort description explaining the code flow. We believe that this along with our in-line documentation is an accurate description of the code and should provide complete understanding of the same.

Herein, we have tried our best to explain the shortcomings of our code with a critical perspective and also, explained the things we tried to mitigate these. All our verification problems are complete, with results from both inbuilt MASTAN analysis and those from our code

TA/PROFESSOR ASSESSMENT **(Score _____/20%)**

Final Grade (by Professor): _____/100%