Computer Programming Project for First Year Electrical Engineering 2009 - 2010

Subject

Create a windows application that performs simple Matrix initialization and calculations.

Primary Requirements

Requirement 1:

Ability to initialize the matrix by supplying matrix values with any dimension, for example:

```
1x1 Matrix: [6]
1x1 Matrix: [6.1*5+(5+2)/2]
3x2 Matrix: [6+5+2.3   6+8;3    4]
2x5 Matrix: [1.2 8.9 3.2 7.8 9.4; 7.3 8.7 5 8 9.3]
```

Note: The sign ";" is used to separate the rows and the (Space/s, Tab/s) is used to separate the items inside each row.

Note: It is required only to use scalar values between the two brackets "[]".

Requirement 2:

Ability to assign a name to the entered matrix value, which is equivalent to define a variable in any programming language, for example:

```
>A = [6]
>BBB = [6.1+5+2]
>C = [6+5+2.3   6+8;3    4]
>D = [1.2 8.9 3.2 7.8 9.4; 7.3 8.7 5 8 9.3]
```

Note: the ">" is placed at the beginning of each line to indicate the new command status.

Requirement 3:

Ability to print any supplied matrix value by only entering its name then presses enter, for example:

```
>C
13.3      14.0
3.0       4.0
```

Requirement 4:

Ability to perform simple mathematical operation including "+-*/" between two matrices, for example:

```
>D = A+B
>D = A/B
>D = A*B
>D = A-B
```

Optional Requirements

1. Ability to initialize a matrix by another matrix for example :
    - E = [A B;C D]
2. Support advanced matrix expressions for example:
    - S = A+B*C/(D+E)
3. Support the usage of scalar values inside matrix expressions for example:
    - S = 5 * A+B*C/(D+E/3)

Competition Phases

Phase 1: Simple Scalar Value Parsing and Calculations

In this phase you should be able to evaluate the numerical value inside any string; initially you should support "+-" signs. For example:

"90.3 + 28.9 – 87 + 9.8 – 3.2 + 47.5 + 89.9 + 72.3 – 8.9 + 458.4 – 237.5"

Phase 2: Advanced Scalar Value Parsing and Calculations

In this phase you should support more signs like "*/()". For example:

"90.3 * 28.9 – (87.1/ 9.8 – 3.2) / (47.5 * 89.9 – 8.9 * 458.4 * 237.5)"

Phase 3: Matrix Definition and Initialization

In this phase you should implement matrix initialization. For example:

>A = [6]

>BBB = [6.1+5+2]

>C = [6+5+2.3 6+8;3 4]

>D = [1.2 8.9 3.2 7.8 9.4; 7.3 8.7 5 8 9.3]

Phase 4: Matrix Calculation

In this phase you should implement the required matrix calculations. For example:

>D = A+B

>D = A/B

>D = A*B

>D = A-B

Competition Rules:

Programming Language	C/C++
Programming Environment	Microsoft Visual Studio 2005, 2008, 2010
Operating System	Windows
Group Size	5 to 10 from single or different sections
Delivery Email	asueng@simulaworks.net You must deliver the final program and the source to above email before the final delivery deadline.
Discussion	15/5/2010

Best Wishes

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