**MEG 831 – Power Plant - Setup Step #1**

1. Write a c++ program, using the Microsoft Visual Studio environment, to calculate the required grid geometry for a 2D planar uniformly-spaced Cartesian grid.

Nx = Number of internal nodes in the x-direction

Ny = Number of internal nodes in the y-direction

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* Fictitious node, i.e., all cells at (i=0, j=0) and (i=ie+1, j=je+1)

- Control Volume (CV) node, e.g first cell at ( i=1,j=1)

XL = sum of the length of all finite volumes in the x-direction

YL = sum of the height of all finite volumes in the y-direction

1. Open a console application using the Microsoft Visual Studio with c++, named “meg826”, the main c++ source file should perform the following:
   * 1. Define all the indices ib, jb, ie, je and declare all the arrays and variables
     2. Set ib, jb and other variables as needed
     3. Call the necessary header programs to perform the required grid geometry processing, including:

* **input()**
* **echo()**
* **gridgen()**
* **gridecho()**

1. Run several test cases and check all the grid-related variables by printing the arrays. Don’t forget to:
   * 1. Check all the interior points
     2. Check the boundaries and corner points
     3. Set (and check) the distances to the fictitious control volume nodal points

**Test Case Suggestion (ie<10, je<10 )**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case | XL | YL | Nx | Ny |
| 1 | 1.0 | 1.0 | 5 | 5 |
| 2 | 1.0 | 2.0 | 5 | 8 |
| 3 | 2.0 | 1.0 | 8 | 5 |

1. The following header files are supplied as examples and templates to get started:

* **input.h**
* **echo.h**
* **gridgen.h**
* **main.h**
* **main.cpp**