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Write-up:

How to compile the code:

```
python3 dvr.py
```

After doing this, there will be a GUI window that will appear, as shown below.



The file has already been loaded as per our class discussion. The data file should be named as **input.txt** and should be in the same working directory as the code. For ease of use, I have already added the file in the directory. This file contains the data as displayed on the instruction page.

There will be two options as displayed on the figure copied above. The Step-by-step function will display step by step output for all the nodes and stops once it reaches stable state. The other button displays the text “Without Intervention”.

This button will run the code without any intervention and display the output on the terminal window screen. After the run is completed, it should pop-up a dialog box which states the time it took to run the BellmanFord algorithm.

Please note that all the outputs will be displayed on the terminal screen.

Both the buttons are iterative. So if you want to re-run either of those, you can select the desired button *after* the first run is completed.

Display Result format:

The result will be displayed as :

```
Vertex Distance from node (Final result) 4
1          3
2          3
3          2
4          0
5          2
Vertex Distance from node (Final result) 5
1          1
2          5
3          4
4          2
5          0
```

Here, main node is shown in the line where we have the string- "Vertex Distance from node (Final result) "and then the node number.

After that, the shortest distance between that node and all the other nodes will be shown with the left-hand side numbers being the nodes and the right-hand side being the distances.

For the step-by-step methods, same rules apply except the print screen will be displayed as

Step-by-Step values till it reaches stable state are :

2 [7, 0, 16, 16, 16]

2 [7, 0, 1, 16, 16]

2 [7, 0, 1, 16, 8]

2 [7, 0, 1, 10, 8]

2 [7, 0, 1, 3, 8]

2 [7, 0, 1, 3, 5]

2 [6, 0, 1, 3, 5]

Here the node in calculation is the one on the left-hand side and the right hand side is the list of sorted nodes and their corresponding distances.