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# Python Script: "**Project1.py**" #

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**Python Version:** 2.7

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**Python Packages Used:** networkx (Version 1.10)

numpy

lpsolve55

pygraphviz

re

math

**Other Softwares:** graphviz-2.38

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**Input Files:** 1. Any valid **.dot** format file is supported

Examples:

* hal.dot
* fir1.dot
* cosine1.dot
* cosine2.dot

2. Resource definition file

* rdf.txt

**Output Files:** 1. Formatted Output **.dot** files

* MLRC\_ILP\_FinalOutput.dot
* MLRC\_ILP\_FinalOutput\_formatted.dot
* MRLC\_ILP\_FinalOutput.dot
* MRLC\_ILP\_FinalOutput\_formatted.dot

2. Constraint files

* MLRC\_ILP\_Start\_time\_constraints.txt
* MLRC\_ILP\_Precedence\_constraints.txt
* MLRC\_ILP\_Resource\_constraints.txt
* MRLC\_ILP\_Start\_time\_constraints.txt
* MRLC \_ILP\_Precedence\_constraints.txt
* MRLC \_ILP\_Resource\_constraints.txt

3. Objective Function files

* MLRC\_ILP\_Objective\_Function.txt
* MRLC\_ILP\_Objective\_Function.txt

4. Other files

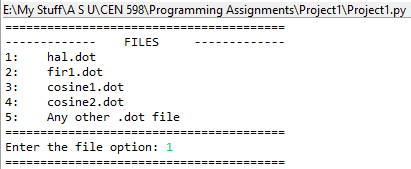
* ASAP.dot
* ALAP.dot
* Mobility.dot

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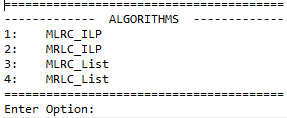
**Execution Steps:**

**1:** The Input .dot File and Resource definition file should be placed in the current directory

**2:** Choose options from Test Files or provide custom file in the User Interface



**3:** Choose from any algorithms



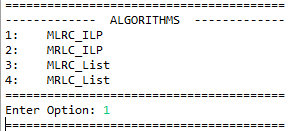
IF Option is 1 THEN algorithm is “**MLRC\_ILP**” GOTO Step-4.1

ELSE IF Option is 2 THEN algorithm is “**MRLC\_ILP**” GOTO Step-4.2

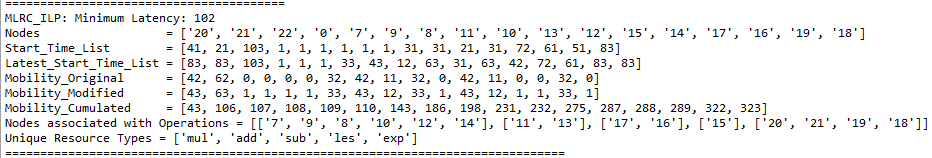
ELSE IF Option is 3 THEN algorithm is “**MLRC\_List**” GOTO Step-4.3

ELSE Option is 4 THEN algorithm is “**MRLC\_List**” GOTO Step-4.4

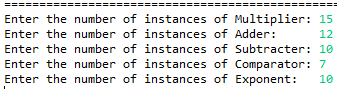
**4.1: MLRC\_ILP**



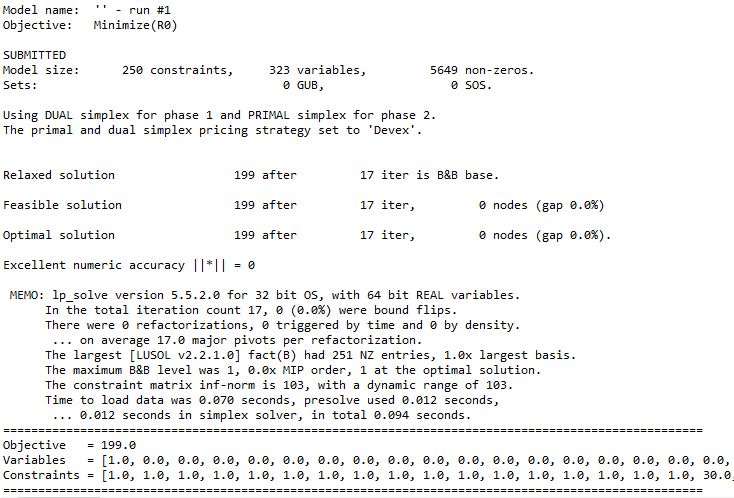
**a.** Displays a Summary of Information



**b.** Enter the number of instances of various Resources



**c.** Displays the results of LP Solver



**d.** The following files are created:

The coefficients of *Start Time Constraints* are written into “***MLRC\_ILP\_Start\_time\_constraints.txt***”

The coefficients of *Precedence Constraints* are written into “***MLRC\_ILP\_Precedence\_constraints.txt***”

The coefficients of *Resource Constraints* are written into “***MLRC\_ILP\_Resource\_constraints.txt***”

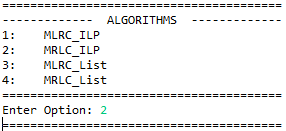
The coefficients of *Objective Function* are written into “***MLRC\_ILP\_Objective\_Function.txt***”

The final computed .dot file is written into “***MLRC\_ILP\_FinalOutput.dot***” and the formatted version is written into “***MLRC\_ILP\_FinalOutput\_formatted.dot***”

**e.** The Output of the algorithm is displayed in the console:



**4.2: MRLC\_ILP**

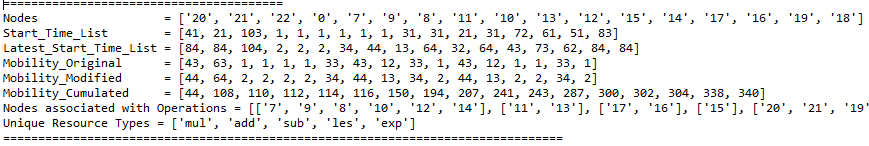


**a.** Displays a Summary of Information

**b.** Enter the Upper bound on the latency



**c.** Displays a Summary of Information



**d.** The following files are created:

The coefficients of *Start Time Constraints* are written into “***MRLC\_ILP\_Start\_time\_constraints.txt***”

The coefficients of *Precedence Constraints* are written into “***MRLC\_ILP\_Precedence\_constraints.txt***”

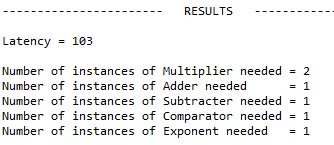
The coefficients of *Resource Constraints* are written into “***MRLC\_ILP\_Resource\_constraints.txt***”

The coefficients of *Objective Function* are written into “***MRLC\_ILP\_Objective\_Function.txt***”

The final computed .dot file is written into “***MRLC \_ILP\_FinalOutput.dot***” and the formatted version is written into “***MRLC\_ILP\_FinalOutput\_formatted.dot***”

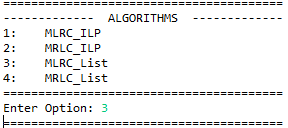
**e.** LP Solver in progress

**f.** The Output of the algorithm is displayed in the console:



MRLC\_ILP algorithm provides the minimum number of resources under a given latency.

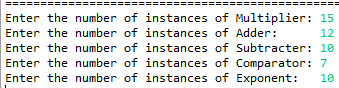
**4.3: MLRC\_List**



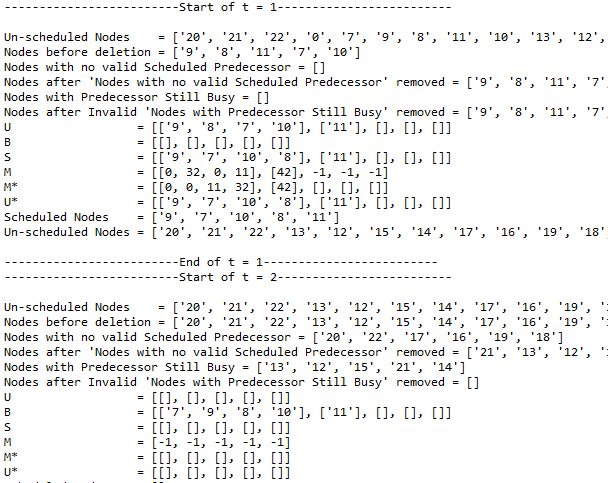
**a.** Displays a Summary of Information



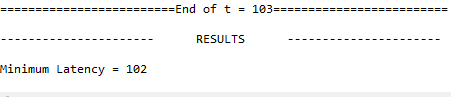
**b.** Enter the number of instances of various Resources



**c.** Displays the algorithmic computation with respect to each time step:



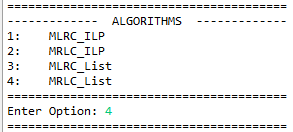
**d.** The Output of the algorithm is displayed in the console:



**e.** The following files are created:

The final computed .dot file is written into “***MLRC\_List\_FinalOutput.dot***” and the formatted version is written into “***MLRC\_List\_FinalOutput\_formatted.dot***”

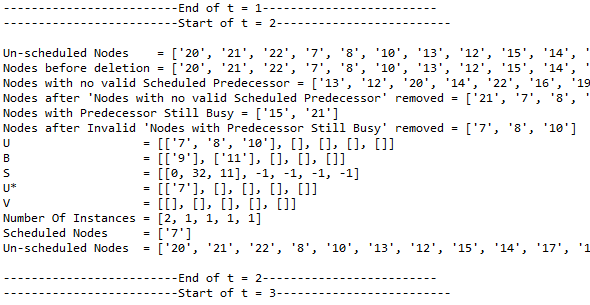
**4.4: MRLC\_List**



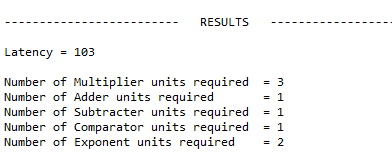
**a.** Enter the Upper bound on the latency



**b.** Displays the algorithmic computation with respect to each time step:



**c.** The Output of the algorithm is displayed in the console:



**d.** The following files are created:

The final computed .dot file is written into “***MRLC\_List\_FinalOutput.dot***” and the formatted version is written into “***MRLC\_List\_FinalOutput\_formatted.dot***”

Sample Graph: The 1st number indicates the node number. 2nd indicates the operation. 3rd is time step along with mobility range.

