**MRLC\_ILP (hal.dot)**

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------------- FILES -------------

1: hal.dot

2: fir1.dot

3: cosine1.dot

4: cosine2.dot

5: Any other .dot file

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Enter the file option: 1

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------------- ALGORITHMS -------------

1: MLRC\_ILP

2: MRLC\_ILP

3: MLRC\_List

4: MRLC\_List

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Enter Option: 2

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MRLC\_ILP: Minimum Latency: 102

Enter Maximum Latency: 103

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Nodes = ['20', '21', '22', '0', '7', '9', '8', '11', '10', '13', '12', '15', '14', '17', '16', '19', '18']

Start\_Time\_List = [41, 21, 103, 1, 1, 1, 1, 1, 1, 31, 31, 21, 31, 72, 61, 51, 83]

Latest\_Start\_Time\_List = [84, 84, 104, 2, 2, 2, 34, 44, 13, 64, 32, 64, 43, 73, 62, 84, 84]

Mobility\_Original = [43, 63, 1, 1, 1, 1, 33, 43, 12, 33, 1, 43, 12, 1, 1, 33, 1]

Mobility\_Modified = [44, 64, 2, 2, 2, 2, 34, 44, 13, 34, 2, 44, 13, 2, 2, 34, 2]

Mobility\_Cumulated = [44, 108, 110, 112, 114, 116, 150, 194, 207, 241, 243, 287, 300, 302, 304, 338, 340]

Nodes associated with Operations = [['7', '9', '8', '10', '12', '14'], ['11', '13'], ['17', '16'], ['15'], ['20', '21', '19', '18']]

Unique Resource Types = ['mul', 'add', 'sub', 'les', 'exp']

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OBJECTIVE FUNCTION = [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 17, 2, 2, 1, 2]

set\_int: Column 0 out of range

Model name: '' - run #1

Objective: Minimize(R0)

SUBMITTED

Model size: 261 constraints, 345 variables, 6995 non-zeros.

Sets: 0 GUB, 0 SOS.

Using DUAL simplex for phase 1 and PRIMAL simplex for phase 2.

The primal and dual simplex pricing strategy set to 'Devex'.

Relaxed solution 58.7333333333 after 151 iter is B&B base.

Feasible solution 75 after 182 iter, 5 nodes (gap 27.2%)

Improved solution 60 after 17485 iter, 10608 nodes (gap 2.1%)

Optimal solution 60 after 30232 iter, 15480 nodes (gap 2.1%).

Excellent numeric accuracy ||\*|| = 1.33582e-012

MEMO: lp\_solve version 5.5.2.0 for 32 bit OS, with 64 bit REAL variables.

In the total iteration count 30232, 409 (1.4%) were bound flips.

There were 7765 refactorizations, 0 triggered by time and 2 by density.

... on average 3.8 major pivots per refactorization.

The largest [LUSOL v2.2.1.0] fact(B) had 2039 NZ entries, 1.0x largest basis.

The maximum B&B level was 63, 0.1x MIP order, 47 at the optimal solution.

The constraint matrix inf-norm is 104, with a dynamic range of 104.

Time to load data was 0.094 seconds, presolve used 0.011 seconds,

... 16.098 seconds in simplex solver, in total 16.203 seconds.

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Objective = 60.0

Variables = [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 1.0, 0.0, 1.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 1.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 1.0, 3.0, 1.0, 1.0, 1.0, 2.0]

Constraints = [0.9999999999999999, 0.9999999999999999, 0.9999999999999871, 1.0, 1.0, 1.0, 1.0000000000000004, 1.0, 1.0000000000000004, 1.0, 1.0, 0.9999999999999999, 1.0, 1.0, 1.0, 1.0, 1.0, 29.99999999999998, 22.999999999999993, 19.999999999999996, 30.0, 30.0, 30.0, 29.999999999999996, 35.0, 11.0, 11.999999999999986, 19.999999999999996, 42.99999999999999, 19.999999999998664, 19.99999999999868, 39.99999999999867, 82.99999999999866, -1.0000000000000009, -1.0000000000000009, -1.0000000000000009, -1.0000000000000009, -1.0000000000000009, -1.0000000000000009, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -0.9999999999999999, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -2.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, 0.0]

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----------------------- RESULTS -----------------------

Latency = 103

Number of instances of Multiplier needed = 3

Number of instances of Adder needed = 1

Number of instances of Subtracter needed = 1

Number of instances of Comparator needed = 1

Number of instances of Exponent needed = 2