**Linear 1st scenario balancing at 8: iteration1**

--- Average Times per Task (Seconds) ---

Task01: 0.59 sec

Task02: 3.77 sec

Task03: 2.35 sec

Task04: 4.13 sec

Task05: 4.78 sec

Task06: 7.58 sec

Task07: 3.46 sec

Task08: 4.29 sec

Task09: 3.65 sec

Task10: 7.34 sec

Task11: 6.55 sec

Task12: 7.36 sec

Task13: 9.73 sec

Task14: 5.94 sec

Task15: 3.77 sec

Task16: 3.48 sec

Task17: 16.87 sec

Task18: 13.47 sec

Task19: 12.16 sec

Task20: 9.89 sec

Task21: 9.27 sec

Task22: 6.35 sec

Task23: 4.56 sec

Task24: 3.49 sec

Task25: 7.34 sec

Task26: 13.91 sec

Task27: 21.30 sec

Task28: 6.69 sec

Task29: 5.09 sec

Task30: 4.49 sec

Calculating learning rates (exponent b) for each TaskXX...

C:\Users\tternghaa's\AppData\Roaming\Python\Python310\site-packages\openpyxl\styles\stylesheet.py:237: UserWarning: Workbook contains no default style, apply openpyxl's default

warn("Workbook contains no default style, apply openpyxl's default")

Loading previous state (if any)...

Performing ILP-based balancing (all times in seconds)...

Comparing current balancing scenarios...

--- Comparison Results ---

Old Cycle Times (by workstation) [seconds]: [65.57, 74.84, 73.23]

New Cycle Times (by workstation) [seconds]: [71.51, 68.9, 73.23]

Old Total Time (Bottleneck) [seconds]: 74.84

New Total Time (Bottleneck) [seconds]: 73.23

--- Task Changes ---

Workstation 1:

Added tasks: [14]

Workstation 2:

Removed tasks: [14]

--- Metrics ---

Time Saved per Hour [seconds/hour]: 79.35

Setup Time Cost [seconds]: 60.00

Learning Penalty [seconds]: 56.21

Time to Net Benefit [hours]: 1.46

--- New Scenario Workstation Allocation ---

Workstation 1: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]

Workstation 2: [15, 16, 17, 18, 19, 20, 21]

Workstation 3: [22, 23, 24, 25, 26, 27, 28, 29, 30]

Saving the new scenario as the current baseline...

**Linear 1st scenario balancing at 8: iteration2**

--- Average Times per Task (Seconds) ---

Task01: 0.64 sec

Task02: 3.81 sec

Task03: 2.43 sec

Task04: 4.62 sec

Task05: 4.47 sec

Task06: 9.84 sec

Task07: 4.35 sec

Task08: 3.62 sec

Task09: 3.68 sec

Task10: 7.05 sec

Task11: 6.46 sec

Task12: 8.31 sec

Task13: 7.76 sec

Task14: 7.38 sec

Task15: 4.02 sec

Task16: 3.98 sec

Task17: 13.87 sec

Task18: 12.05 sec

Task19: 12.35 sec

Task20: 11.86 sec

Task21: 10.99 sec

Task22: 7.08 sec

Task23: 4.67 sec

Task24: 3.44 sec

Task25: 6.96 sec

Task26: 14.23 sec

Task27: 17.27 sec

Task28: 5.95 sec

Task29: 5.05 sec

Task30: 4.65 sec

Calculating learning rates (exponent b) for each TaskXX...

C:\Users\tternghaa's\AppData\Roaming\Python\Python310\site-packages\openpyxl\styles\stylesheet.py:237: UserWarning: Workbook contains no default style, apply openpyxl's default

warn("Workbook contains no default style, apply openpyxl's default")

Loading previous state (if any)...

Performing ILP-based balancing (all times in seconds)...

Comparing current balancing scenarios...

--- Comparison Results ---

Old Cycle Times (by workstation) [seconds]: [67.04, 76.51, 69.29]

New Cycle Times (by workstation) [seconds]: [74.43, 69.13, 69.29]

Old Total Time (Bottleneck) [seconds]: 76.51

New Total Time (Bottleneck) [seconds]: 74.43

--- Task Changes ---

Workstation 1:

Added tasks: [14]

Workstation 2:

Removed tasks: [14]

--- Metrics ---

Time Saved per Hour [seconds/hour]: 100.91

Setup Time Cost [seconds]: 60.00

Learning Penalty [seconds]: 56.30

Time to Net Benefit [hours]: 1.15

--- New Scenario Workstation Allocation ---

Workstation 1: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]

Workstation 2: [15, 16, 17, 18, 19, 20, 21]

Workstation 3: [22, 23, 24, 25, 26, 27, 28, 29, 30]

Saving the new scenario as the current baseline...

**Linear 1st scenario balancing at 8: iteration3**

--- Average Times per Task (Seconds) ---

Task01: 0.61 sec

Task02: 4.14 sec

Task03: 2.45 sec

Task04: 4.47 sec

Task05: 4.60 sec

Task06: 7.27 sec

Task07: 3.65 sec

Task08: 3.92 sec

Task09: 3.72 sec

Task10: 7.09 sec

Task11: 7.47 sec

Task12: 8.12 sec

Task13: 8.71 sec

Task14: 6.22 sec

Task15: 3.82 sec

Task16: 4.00 sec

Task17: 15.37 sec

Task18: 12.72 sec

Task19: 12.45 sec

Task20: 10.21 sec

Task21: 9.80 sec

Task22: 6.27 sec

Task23: 4.68 sec

Task24: 3.66 sec

Task25: 6.70 sec

Task26: 14.25 sec

Task27: 17.39 sec

Task28: 6.92 sec

Task29: 5.05 sec

Task30: 4.42 sec

Calculating learning rates (exponent b) for each TaskXX...

C:\Users\tternghaa's\AppData\Roaming\Python\Python310\site-packages\openpyxl\styles\stylesheet.py:237: UserWarning: Workbook contains no default style, apply openpyxl's default

warn("Workbook contains no default style, apply openpyxl's default")

Loading previous state (if any)...

Performing ILP-based balancing (all times in seconds)...

Comparing current balancing scenarios...

--- Comparison Results ---

Old Cycle Times (by workstation) [seconds]: [66.22, 74.59, 69.34]

New Cycle Times (by workstation) [seconds]: [72.43, 68.37, 69.34]

Old Total Time (Bottleneck) [seconds]: 74.59

New Total Time (Bottleneck) [seconds]: 72.43

--- Task Changes ---

Workstation 1:

Added tasks: [14]

Workstation 2:

Removed tasks: [14]

--- Metrics ---

Time Saved per Hour [seconds/hour]: 107.04

Setup Time Cost [seconds]: 60.00

Learning Penalty [seconds]: 50.11

Time to Net Benefit [hours]: 1.03

--- New Scenario Workstation Allocation ---

Workstation 1: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]

Workstation 2: [15, 16, 17, 18, 19, 20, 21]

Workstation 3: [22, 23, 24, 25, 26, 27, 28, 29, 30]

Saving the new scenario as the current baseline...

**Linear 1st scenario balancing at 8: iteration4**

--- Average Times per Task (Seconds) ---

Task01: 0.76 sec

Task02: 3.50 sec

Task03: 2.29 sec

Task04: 4.12 sec

Task05: 4.54 sec

Task06: 8.40 sec

Task07: 3.93 sec

Task08: 3.88 sec

Task09: 3.17 sec

Task10: 6.50 sec

Task11: 7.01 sec

Task12: 7.45 sec

Task13: 9.20 sec

Task14: 7.13 sec

Task15: 4.42 sec

Task16: 3.60 sec

Task17: 15.99 sec

Task18: 13.65 sec

Task19: 12.95 sec

Task20: 10.46 sec

Task21: 11.99 sec

Task22: 6.93 sec

Task23: 4.63 sec

Task24: 3.55 sec

Task25: 6.43 sec

Task26: 13.03 sec

Task27: 17.25 sec

Task28: 8.15 sec

Task29: 4.86 sec

Task30: 3.99 sec

Calculating learning rates (exponent b) for each TaskXX...

C:\Users\tternghaa's\AppData\Roaming\Python\Python310\site-packages\openpyxl\styles\stylesheet.py:237: UserWarning: Workbook contains no default style, apply openpyxl's default

warn("Workbook contains no default style, apply openpyxl's default")

Loading previous state (if any)...

Performing ILP-based balancing (all times in seconds)...

Comparing current balancing scenarios...

--- Comparison Results ---

Old Cycle Times (by workstation) [seconds]: [64.74, 80.19, 68.82]

New Cycle Times (by workstation) [seconds]: [71.87, 73.06, 68.82]

Old Total Time (Bottleneck) [seconds]: 80.19

New Total Time (Bottleneck) [seconds]: 73.06

--- Task Changes ---

Workstation 1:

Added tasks: [14]

Workstation 2:

Removed tasks: [14]

--- Metrics ---

Time Saved per Hour [seconds/hour]: 351.25

Setup Time Cost [seconds]: 60.00

Learning Penalty [seconds]: 55.37

Time to Net Benefit [hours]: 0.33

--- New Scenario Workstation Allocation ---

Workstation 1: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]

Workstation 2: [15, 16, 17, 18, 19, 20, 21]

Workstation 3: [22, 23, 24, 25, 26, 27, 28, 29, 30]

Saving the new scenario as the current baseline...

**Linear 1st scenario balancing at 8: iteration5**

--- Average Times per Task (Seconds) ---

Task01: 0.57 sec

Task02: 3.56 sec

Task03: 2.15 sec

Task04: 4.56 sec

Task05: 4.27 sec

Task06: 7.71 sec

Task07: 3.75 sec

Task08: 3.66 sec

Task09: 3.11 sec

Task10: 7.18 sec

Task11: 7.73 sec

Task12: 8.24 sec

Task13: 8.27 sec

Task14: 6.16 sec

Task15: 4.47 sec

Task16: 3.52 sec

Task17: 15.36 sec

Task18: 13.41 sec

Task19: 11.23 sec

Task20: 10.76 sec

Task21: 10.71 sec

Task22: 7.13 sec

Task23: 4.56 sec

Task24: 3.48 sec

Task25: 6.87 sec

Task26: 13.72 sec

Task27: 16.69 sec

Task28: 7.40 sec

Task29: 5.05 sec

Task30: 4.49 sec

Calculating learning rates (exponent b) for each TaskXX...

C:\Users\tternghaa's\AppData\Roaming\Python\Python310\site-packages\openpyxl\styles\stylesheet.py:237: UserWarning: Workbook contains no default style, apply openpyxl's default

warn("Workbook contains no default style, apply openpyxl's default")

Loading previous state (if any)...

Performing ILP-based balancing (all times in seconds)...

Comparing current balancing scenarios...

--- Comparison Results ---

Old Cycle Times (by workstation) [seconds]: [64.77, 75.63, 69.38]

New Cycle Times (by workstation) [seconds]: [70.93, 69.46, 69.38]

Old Total Time (Bottleneck) [seconds]: 75.63

New Total Time (Bottleneck) [seconds]: 70.93

--- Task Changes ---

Workstation 1:

Added tasks: [14]

Workstation 2:

Removed tasks: [14]

--- Metrics ---

Time Saved per Hour [seconds/hour]: 238.37

Setup Time Cost [seconds]: 60.00

Learning Penalty [seconds]: 55.73

Time to Net Benefit [hours]: 0.49

--- New Scenario Workstation Allocation ---

Workstation 1: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]

Workstation 2: [15, 16, 17, 18, 19, 20, 21]

Workstation 3: [22, 23, 24, 25, 26, 27, 28, 29, 30]

Saving the new scenario as the current baseline...