Yumbo. Scheduling, Planning and Resource Allocation

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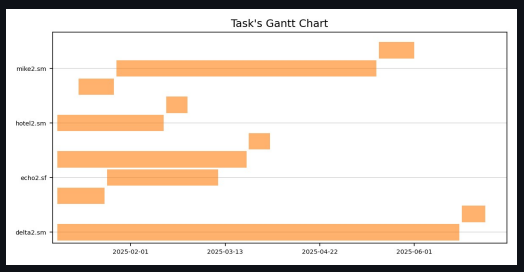
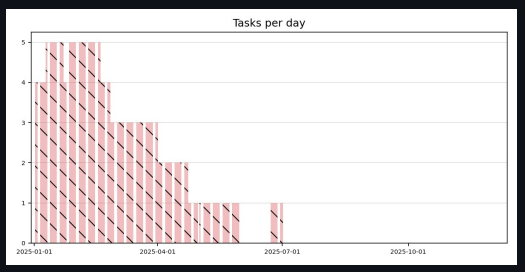
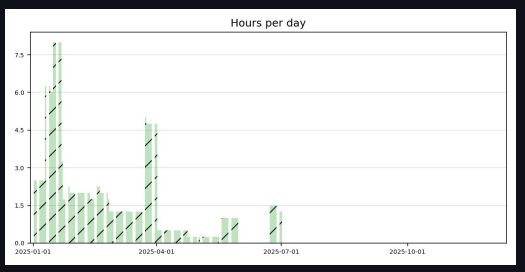
Source code, documentation and sample Excel input files can be found on Yumbo's GitHub repository.

28 January 2025, 14:07:30 PM

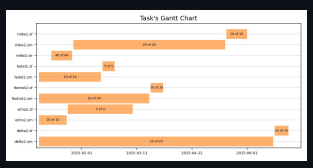
Experts overview

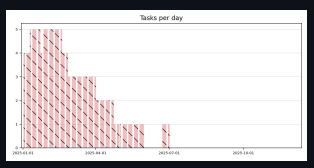


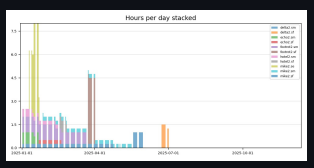


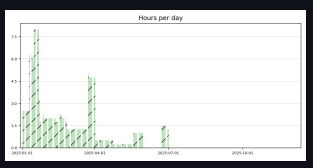


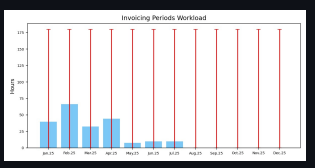
SA.Melanie the 2nd unit











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2025-01-01	Wednesday											
2025-01-02	Thursday	0.25		0.75		1.00		0.50				
2025-01-03	Friday	0.25		0.75		1.00		0.50				
2025-01-04	Saturday											
2025-01-05	Sunday											
2025-01-06	Monday	0.25		0.75		1.00		0.50				
2025-01-07	Tuesday	0.25		0.75		1.00		0.50				
2025-01-08	Wednesday	0.25		0.75		1.00		0.50				
2025-01-09	Thursday	0.25		0.75		1.00		0.50				
2025-01-10	Friday	0.25		0.75		1.00		0.50		3.75		
2025-01-11	Saturday											
2025-01-12	Sunday											
2025-01-13	Monday	0.25		0.75		1.00		0.50		3.75		
2025-01-14	Tuesday	0.25		0.75		1.00		0.25		3.75		
2025-01-15	Wednesday	0.25		0.75		1.00		0.25		3.75		
2025-01-16	Thursday	0.25		0.50		1.00		0.25		6.00		
2025-01-17	Friday	0.25		0.50		1.00		0.25		6.00		
2025-01-18	Saturday											
2025-01-19	Sunday											
2025-01-20	Monday	0.25		0.75		1.00		0.25		5.75		
2025-01-21	Tuesday	0.25		0.75		1.00		0.25		5.75		
2025-01-22	Wednesday	0.25			0.25	1.00		0.25		1.50		
2025-01-23	Thursday	0.25			0.25	1.00		0.25				
2025-01-24	Friday	0.25			0.25	1.00		0.25				
2025-01-25	Saturday											
2025-01-26	Sunday											
2025-01-27	Monday	0.25			0.25	1.00		0.25			0.50	
2025-01-28	Tuesday	0.25			0.25	1.00		0.25			0.25	
2025-01-29	Wednesday	0.25			0.25	1.00		0.25			0.25	
2025-01-30	Thursday	0.25			0.25	1.00		0.25			0.25	
2025-01-31	Friday	0.25			0.25	1.00		0.25			0.25	
2025-02-01	Saturday											
2025-02-02	Sunday											
2025-02-03	Monday	0.25			0.25	1.00		0.25			0.25	
2025-02-04	Tuesday	0.25			0.25	1.00		0.25			0.25	
2025-02-05	Wednesday	0.25			0.25	1.00		0.25			0.25	
2025-02-06	Thursday	0.25			0.25	1.00		0.25			0.25	
2025-02-07	Friday	0.25			0.25	1.00		0.25			0.25	
2025-02-08	Saturday											
2025-02-09	Sunday											
2025-02-10	Monday	0.25			0.25	1.00		0.25			0.25	
2025-02-11	Tuesday	0.25			0.25	1.00		0.25			0.25	

	Weekdays	delta2.sm	delta2.sf	echo2.sm	echo2.sf	foxtrot2.sm	foxtrot2.sf	hotel2.sm	hotel2.sf	mike2.se	mike2.sm	mike2.sf
2025-02-12	Wednesday	0.25			0.25	0.75		0.25			0.25	
2025-02-13	Thursday	0.25			0.25	0.75		0.25			0.25	
2025-02-14	Friday	0.25			0.25	0.75		0.25			0.25	
2025-02-15	Saturday											
2025-02-16	Sunday											
2025-02-17	Monday	0.25			0.25	0.75			0.75		0.25	
2025-02-18	Tuesday	0.25			0.25	0.75			0.75		0.25	
2025-02-19	Wednesday	0.25				0.75			0.75		0.25	
2025-02-20	Thursday	0.25				0.75			0.75		0.25	
2025-02-21	Friday	0.25				0.75			0.75		0.25	
2025-02-22	Saturday											
2025-02-23	Sunday											
2025-02-24	Monday	0.25				0.75			0.75		0.25	
2025-02-25	Tuesday	0.25				0.75			0.50		0.25	
2025-02-26	Wednesday	0.25				0.75					0.25	
2025-02-27	Thursday	0.25				0.75					0.25	
2025-02-28	Friday	0.25				0.75					0.25	
2025-03-01	Saturday											
2025-03-02	Sunday											
2025-03-03	Monday	0.25				0.75					0.25	
2025-03-04	Tuesday	0.25				0.75					0.25	
2025-03-05	Wednesday	0.25				0.75					0.25	
2025-03-06	Thursday	0.25				0.75					0.25	
2025-03-07	Friday	0.25				0.75					0.25	
2025-03-08	Saturday											
2025-03-09	Sunday											
2025-03-10	Monday	0.25				0.75					0.25	
2025-03-11	Tuesday	0.25				0.75					0.25	
2025-03-12	Wednesday	0.25				0.75					0.25	
2025-03-13	Thursday	0.25				0.75					0.25	
2025-03-14	Friday	0.25				0.75					0.25	
2025-03-15	Saturday											
2025-03-16	Sunday											
2025-03-17	Monday	0.25				0.75					0.25	
2025-03-18	Tuesday	0.25				0.75					0.25	
2025-03-19	Wednesday	0.25				0.75					0.25	
2025-03-20	Thursday	0.25				0.75					0.25	
2025-03-21	Friday	0.25				0.75					0.25	
2025-03-22	Saturday											
2025-03-23	Sunday											
2025-03-24	Monday	0.25					4.50				0.25	
2025-03-25	Tuesday	0.25					4.25				0.25	
2025-03-26	Wednesday	0.25					4.25				0.25	
2025-03-27	Thursday	0.25					4.25				0.25	
2025-03-28	Friday	0.25					4.25				0.25	
2025-03-29	Saturday											
2025-03-30	Sunday											
2025-03-31	Monday	0.25					4.25				0.25	
2025-04-01	Tuesday	0.25					4.25				0.25	
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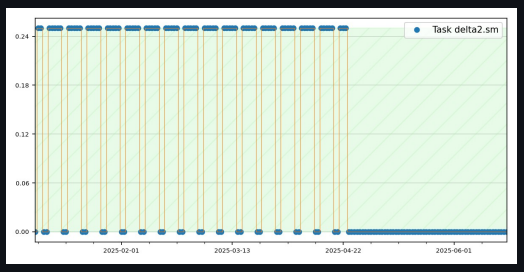
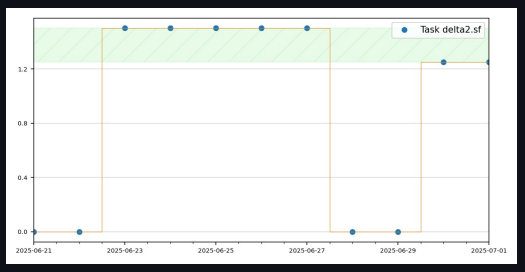
2025-04-03	Thursday	0.25									0.25	
2025-04-04	Friday	0.25									0.25	
2025-04-05	Saturday											
2025-04-06	Sunday											
2025-04-07	Monday	0.25									0.25	
2025-04-08	Tuesday	0.25									0.25	
2025-04-09	Wednesday	0.25									0.25	
2025-04-10	Thursday	0.25									0.25	
2025-04-11	Friday	0.25									0.25	
2025-04-12	Saturday											
2025-04-13	Sunday											
2025-04-14	Monday	0.25									0.25	
2025-04-15	Tuesday	0.25									0.25	
2025-04-16	Wednesday	0.25									0.25	
2025-04-17	Thursday	0.25									0.25	

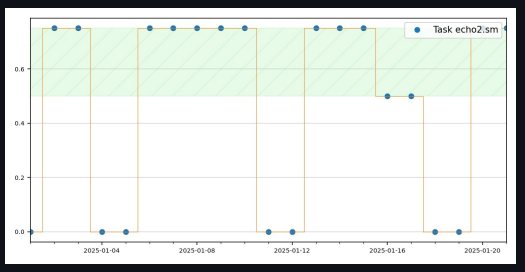
	Weekdays	delta2.sm	delta2.sf	echo2.sm	echo2.sf	foxtrot2.sm	foxtrot2.sf	hotel2.sm	hotel2.sf	mike2.se	mike2.sm	mike2.sf
2025-04-18	Friday	0.25									0.25	
2025-04-19	Saturday											
2025-04-20	Sunday											
2025-04-21	Monday	0.25									0.25	
2025-04-22	Tuesday	0.25									0.25	
2025-04-23	Wednesday	0.25									0.25	
2025-04-24	Thursday										0.25	
2025-04-25	Friday										0.25	
2025-04-26	Saturday											
2025-04-27	Sunday											
2025-04-28	Monday										0.25	
2025-04-29	Tuesday										0.25	
2025-04-30	Wednesday										0.25	
2025-05-01	Thursday											
2025-05-02	Friday										0.25	
2025-05-03	Saturday											
2025-05-04	Sunday											
2025-05-05	Monday										0.25	
2025-05-06	Tuesday										0.25	
2025-05-07	Wednesday										0.25	
2025-05-08	Thursday										0.25	
2025-05-09	Friday										0.25	
2025-05-10	Saturday											
2025-05-11	Sunday											
2025-05-12	Monday										0.25	
2025-05-13	Tuesday										0.25	
2025-05-14	Wednesday										0.25	
2025-05-15	Thursday										0.25	
2025-05-16	Friday										0.25	
2025-05-17	Saturday											
2025-05-18	Sunday											
2025-05-19	Monday											1.00
2025-05-20	Tuesday											1.00
2025-05-21	Wednesday											1.00
2025-05-22	Thursday											1.00
2025-05-23	Friday											1.00
2025-05-24	Saturday											
2025-05-25	Sunday											
2025-05-26	Monday											1.00
2025-05-27	Tuesday											1.00
2025-05-28	Wednesday											1.00
2025-05-29	Thursday											1.00
2025-05-30	Friday											1.00
2025-05-31	Saturday											
2025-06-01	Sunday											
2025-06-02	Monday											
2025-06-03	Tuesday											
2025-06-04	Wednesday											
2025-06-05	Thursday											
2025-06-06	Friday											
2025-06-07	Saturday											
2025-06-08	Sunday											
2025-06-09	Monday											
2025-06-10	Tuesday											
2025-06-11	Wednesday											
2025-06-12	Thursday											
2025-06-13	Friday											
2025-06-14	Saturday											
2025-06-15	Sunday											
2025-06-16	Monday											
2025-06-17	Tuesday											
2025-06-18	Wednesday											
2025-06-19	Thursday											
2025-06-20	Friday											
2025-06-21	Saturday											

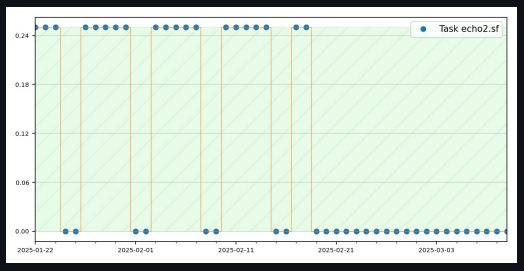
	Weekdays	delta2.sm	delta2.sf	echo2.sm	echo2.sf	foxtrot2.sm	foxtrot2.sf	hotel2.sm	hotel2.sf	mike2.se	mike2.sm	mike2.sf
2025-06-22	Sunday											
2025-06-23	Monday		1.50									
2025-06-24	Tuesday		1.50									
2025-06-25	Wednesday		1.50									
2025-06-26	Thursday		1.50									
2025-06-27	Friday		1.50									
2025-06-28	Saturday											
2025-06-29	Sunday											
2025-06-30	Monday		1.25									
2025-07-01	Tuesday		1.25									

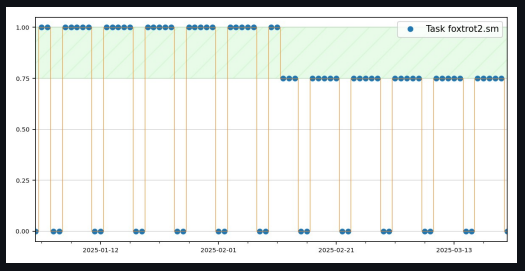
Show schedule as Streamlit table

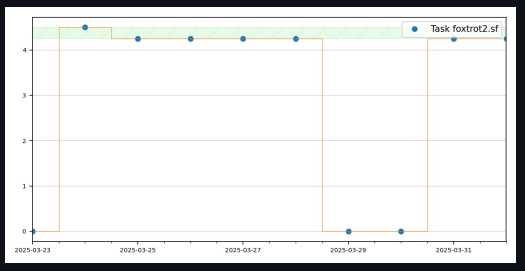


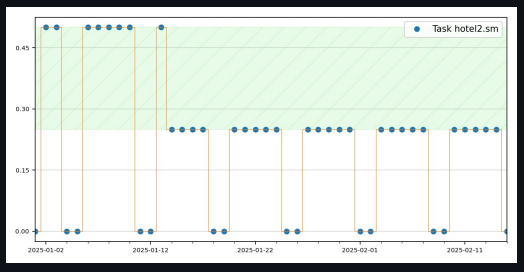


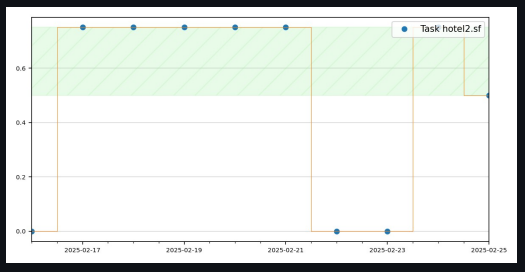


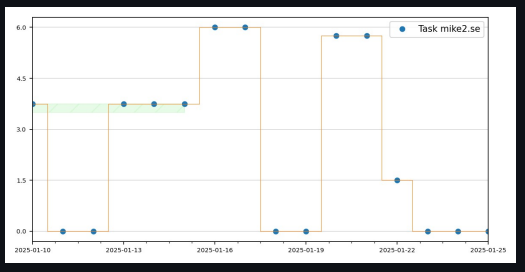


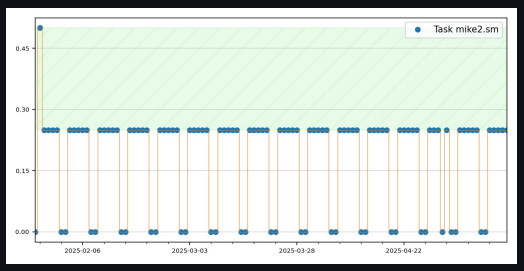


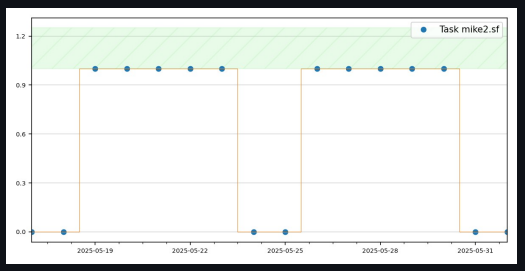












Solver output at 28 January 2025, 14:07:31 PM

```
HiGHS 1.8.1:   tech:outlev = 1
Running HiGHS 1.8.1 (git hash: 4a7f24a): Copyright (c) 2024 HiGHS under MIT licence terms
Coefficient ranges:
  Matrix [1e+00, 3e+01]
  Cost   [1e+00, 1e+00]
  Bound  [1e+00, 8e+01]
  RHS    [2e+01, 2e+02]
Presolving model
341 rows, 531 cols, 1052 nonzeros  0s
31 rows, 376 cols, 432 nonzeros  0s
29 rows, 287 cols, 343 nonzeros  0s
28 rows, 283 cols, 339 nonzeros  0s

Solving MIP model with:
   28 rows
   283 cols (180 binary, 103 integer, 0 implied int., 0 continuous)
   339 nonzeros
MIP-Timing:       0.004 - starting analytic centre calculation

Src: B => Branching; C => Central rounding; F => Feasibility pump; H => Heuristic; L => Sub-MIP;
     P => Empty MIP; R => Randomized rounding; S => Solve LP; T => Evaluate node; U => Unbounded;
     z => Trivial zero; l => Trivial lower; u => Trivial upper; p => Trivial point

        Nodes      |    B&B Tree     |            Objective Bounds              |  Dynamic Constraints |       Work
Src  Proc. InQueue |  Leaves   Expl. | BestBound       BestSol             Gap |   Cuts   InLp Confl. | LpIters     Time

         0       0         0   0.00%   1409.314383     inf                 inf        0      0      0         0     0.0s
 R       0       0         0   0.00%   2074.836287     2074.836287        0.00%       0      0      0        16     0.0s
         1       0         1 100.00%   2074.836287     2074.836287        0.00%       0      0      0        21     0.0s

Solving report
  Status            Optimal
  Primal bound      2074.83628687
```

```
  Dual bound        2074.83628687
  Gap               0% (tolerance: 0.01%)
  P-D integral      0
  Solution status   feasible
                    2074.83628687 (objective)
                    0 (bound viol.)
                    0 (int. viol.)
                    0 (row viol.)
  Timing            0.01 (total)
                    0.00 (presolve)
                    0.00 (solve)
                    0.00 (postsolve)
  Max sub-MIP depth 0
  Nodes             1
  Repair LPs        0 (0 feasible; 0 iterations)
  LP iterations     21 (total)
                    0 (strong br.)
                    0 (separation)
                    0 (heuristics)
HiGHS 1.8.1: optimal solution; objective 2074.836287
21 simplex iterations
1 branching nodes
absmipgap=4.54747e-13, relmipgap=0
```

Elapsed time for chart creation

Chart title	Chart short name	Number of calls	Elapsed time [s]	Average time per chart [s]
Hours per day stacked	simg	1	1.973	1.973
Plot task with its constrains	bimg	11	1.111	0.101
Tasks per day	timg	1	0.300	0.300
Hours per day	himg	1	0.286	0.286
Task's Gantt Chart	gimg	1	0.126	0.126
Invoicing Periods Workload	wimg	1	0.105	0.105