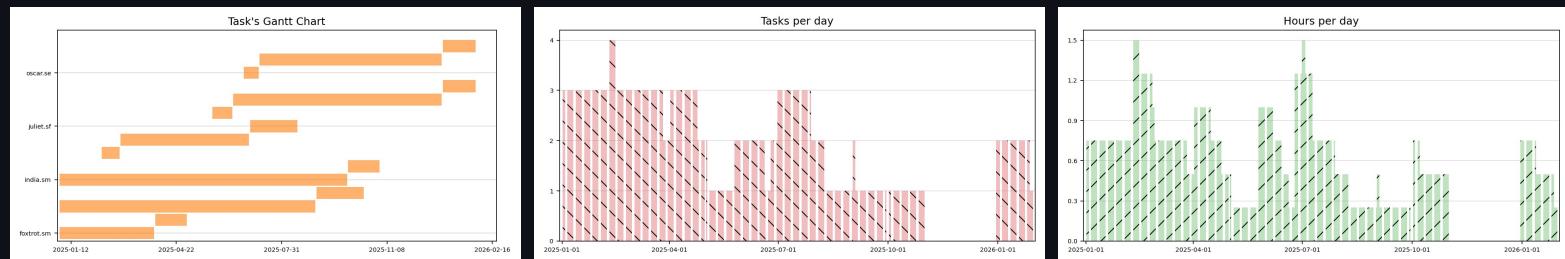


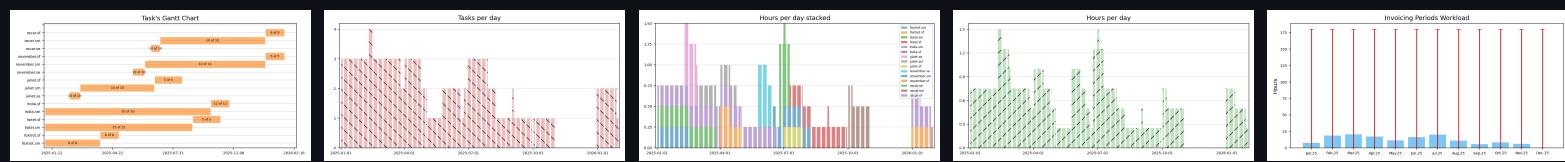
# **Yumbo. Scheduling, Planning and Resource Allocation**

Zbigniew Romanowski, Paweł Koczyk

## Experts overview



SA.Robert the 1st unit



	Weekdays	foxtrot.sm	foxtrot.sf	hotel.sm	hotel.sf	india.sm	india.sf	juliet.se	juliet.sm	juliet.sf	november.se	november.sm	november.sf	oscar.se	oscar.sm	oscar.sf
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2025-02-13	Thursday	0.25		0.25		0.25		0.75								
2025-02-14	Friday	0.25		0.25		0.25		0.75								
2025-02-15	Saturday															
2025-02-16	Sunday															
2025-02-17	Monday			0.25		0.25		0.75								
2025-02-18	Tuesday			0.25		0.25		0.75								
2025-02-19	Wednesday			0.25		0.25		0.75								
2025-02-20	Thursday			0.25		0.25		0.75								
2025-02-21	Friday			0.25		0.25		0.75								
2025-02-22	Saturday															
2025-02-23	Sunday															
2025-02-24	Monday			0.25		0.25		0.75								
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2025-02-27	Thursday			0.25		0.25		0.50								
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2025-03-01	Saturday															
2025-03-02	Sunday															
2025-03-03	Monday			0.25		0.25			0.25							
2025-03-04	Tuesday			0.25		0.25			0.25							
2025-03-05	Wednesday			0.25		0.25			0.25							
2025-03-06	Thursday			0.25		0.25			0.25							
2025-03-07	Friday			0.25		0.25			0.25							
2025-03-08	Saturday															
2025-03-09	Sunday															
2025-03-10	Monday			0.25		0.25			0.25							
2025-03-11	Tuesday			0.25		0.25			0.25							
2025-03-12	Wednesday			0.25		0.25			0.25							
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2025-03-15	Saturday															
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2025-03-23	Sunday															
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2025-03-25	Tuesday			0.25		0.25			0.25							
2025-03-26	Wednesday			0.25		0.25			0.25							
2025-03-27	Thursday					0.25			0.25							
2025-03-28	Friday					0.25			0.25							
2025-03-29	Saturday															
2025-03-30	Sunday															
2025-03-31	Monday					0.25			0.25							
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2025-04-02	Wednesday			0.50		0.25			0.25							
2025-04-03	Thursday			0.50		0.25			0.25							
2025-04-04	Friday			0.50		0.25			0.25							
2025-04-05	Saturday															
2025-04-06	Sunday															
2025-04-07	Monday			0.50		0.25			0.25							
2025-04-08	Tuesday			0.50		0.25			0.25							
2025-04-09	Wednesday			0.50		0.25			0.25							
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2025-04-11	Friday			0.50		0.25			0.25							
2025-04-12	Saturday															
2025-04-13	Sunday															
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2025-04-15	Tuesday			0.50		0.25			0.25							
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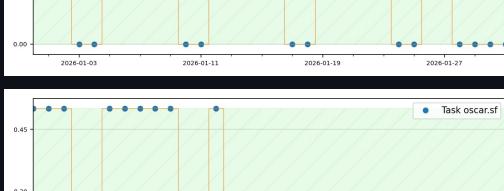
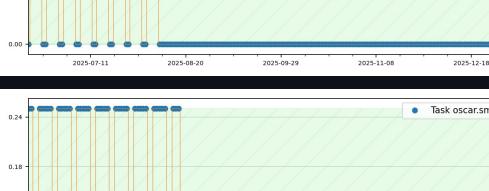
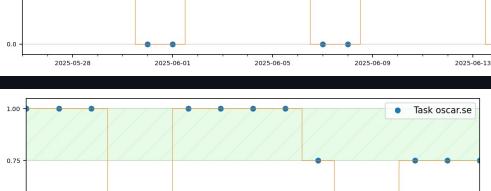
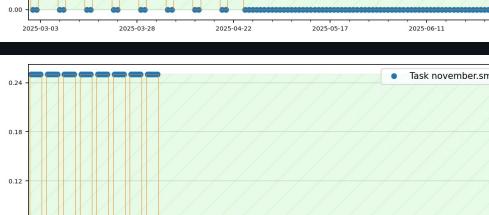
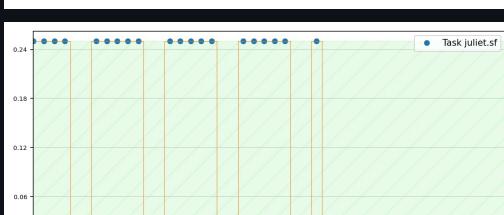
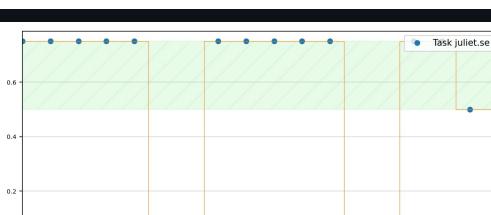
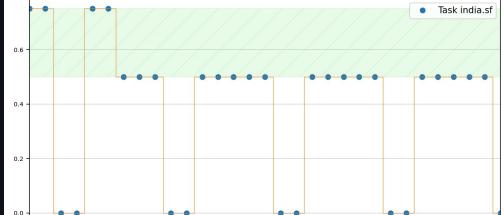
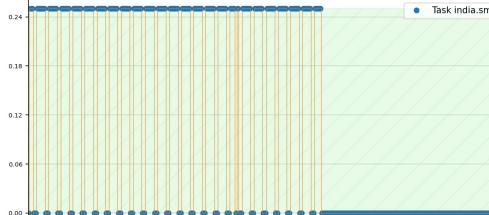
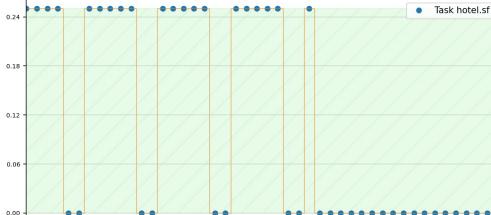
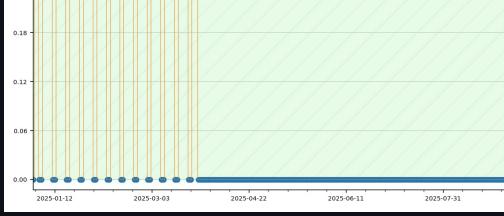
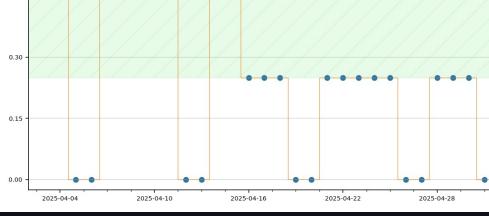




	Weekdays	foxtrot.sm	foxtrot.sf	hotel.sm	hotel.sf	india.sm	india.sf	juliet.se	juliet.sm	juliet.sf	november.se	november.sm	november.sf	oscar.se	oscar.sm	oscar.sf
2025-10-30	Thursday						0.50									
2025-10-31	Friday						0.50									
2025-11-01	Saturday															
2025-11-02	Sunday															
2025-11-03	Monday															
2025-11-04	Tuesday															
2025-11-05	Wednesday															
2025-11-06	Thursday															
2025-11-07	Friday															
2025-11-08	Saturday															
2025-11-09	Sunday															
2025-11-10	Monday															
2025-11-11	Tuesday															
2025-11-12	Wednesday															
2025-11-13	Thursday															
2025-11-14	Friday															
2025-11-15	Saturday															
2025-11-16	Sunday															
2025-11-17	Monday															
2025-11-18	Tuesday															
2025-11-19	Wednesday															
2025-11-20	Thursday															
2025-11-21	Friday															
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2025-11-23	Sunday															
2025-11-24	Monday															
2025-11-25	Tuesday															
2025-11-26	Wednesday															
2025-11-27	Thursday															
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2025-11-29	Saturday															
2025-11-30	Sunday															
2025-12-01	Monday															
2025-12-02	Tuesday															
2025-12-03	Wednesday															
2025-12-04	Thursday															
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2025-12-10	Wednesday															
2025-12-11	Thursday															
2025-12-12	Friday															
2025-12-13	Saturday															
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2025-12-16	Tuesday															
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2025-12-18	Thursday															
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2025-12-21	Sunday															
2025-12-22	Monday															
2025-12-23	Tuesday															
2025-12-24	Wednesday															
2025-12-25	Thursday															
2025-12-26	Friday															
2025-12-27	Saturday															
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2025-12-29	Monday															
2025-12-30	Tuesday															
2025-12-31	Wednesday												0.25			0.50
2026-01-01	Thursday												0.25			0.50
2026-01-02	Friday												0.25			0.50

	Weekdays	foxtrot.sm	foxtrot.sf	hotel.sm	hotel.sf	india.sm	india.sf	juliet.se	juliet.sm	juliet.sf	november.se	november.sm	november.sf	oscar.se	oscar.sm	oscar.sf
2026-01-03	Saturday															
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2026-01-28	Wednesday														0.25	
2026-01-29	Thursday															0.25
2026-01-30	Friday															0.25
2026-01-31	Saturday															

Show schedule as Streamlit table





## Solver output at 28 January 2025, 14:00:29 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, 4e+00]  
RHS [2e+01, 1e+02]

Presolving model

1761 rows, 1853 cols, 4472 nonzeros 0s  
15 rows, 980 cols, 980 nonzeros 0s  
15 rows, 980 cols, 980 nonzeros 0s

Solving MIP model with:

15 rows  
980 cols (873 binary, 107 integer, 0 implied int., 0 continuous)  
980 nonzeros

MIP-Timing: 0.01 - 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

Src	Proc.	Nodes		B&B Tree		Objective Bounds		Dynamic Constraints		Work		
		InQueue	Leaves	Expl.	BestBound	BestSol	Gap	Cuts	InLp	Confl.	LpIters	Time
T	0	0	0	0.00%	367.399391	inf	inf	0	0	0	0	0.0s
	1	0	0	1 100.00%	367.399391	1703.941528	78.44%	0	0	0	15	0.0s
		1	100	0.00%	1703.941528	1703.941528	0.00%	0	0	0	15	0.0s

Solving report

Status Optimal  
Primal bound 1703.94152829  
Dual bound 1703.94152829  
Gap 0% (tolerance: 0.01%)  
P-D integral 5.66644518113e-05  
Solution status feasible  
1703.94152829 (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 15 (total)  
0 (strong br.)  
0 (separation)  
0 (heuristics)

HiGHS 1.8.1: optimal solution; objective 1703.941528

15 simplex iterations

1 branching nodes

## 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	3.157	3.157
Plot task with its constraints	bimg	15	1.599	0.107
Tasks per day	timg	1	0.354	0.354
Hours per day	himg	1	0.329	0.329
Task's Gantt Chart	gimg	1	0.155	0.155
Invoicing Periods Workload	wimg	1	0.109	0.109