Example: Crew Scheduling

Set up the Crew Scheduling model in Excel:

13 Joe 6 =sum(E13:E15) 1 1 1 1 1 1 1 1 1	AO AT AU A
Sumproduct(E7:E24,B7:B24) Sumproduct(E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E24,B7:B24) Sum (E7:E9) Sum (E7:	AS AT AU AV
Worker Satisfaction	
Day shift Evening shift Night shift Night shift Night shift Sch Limit Targets Variables Sch Limit Targets Va	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 12 13 14 12 13 14 12 13 14 12 13 14 12 13 14 14 14 13 14 14 14	
Bob 1	
The state of the	11 12 13 14
8	
9	
Bill 3 sum(Ei0:Ei2) 1 1 1 1 1 1 1 1 1	
11	1 1
12	
13 Joe 6 =sum(E13:E15) 1	
14	1 1 1 1
15	1 1 1
16	
17	
18	1 1
19	
20	
21 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
22 Mary 3 =sum(E22:E24) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
23 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1
24 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
25	1 1
25	
Number working =sumproduct(\$E7:\$E24,G7:G24) →	
27	
28 Requirements	1 1 1 1

Max B3

By changing E7:E24 E7:E24=binary, C7:C24=D7:D24, G26:AV26>=G28:AV28 Constraints:

doesn't matter Nonnegativity: Method: SimplexLP

Example: Crew Scheduling

Solver Solution:

Α	В	С	D	E F	G	HI	J	K L	I M	N O	Р	Q	R	S	T	UV	/ W	X	/ Z	A/A	EAC	AD	AE	AF	AG	4H /	AΙΑ	JAI	AL/	NΑ	AC	AFA	(Al	R AS	AT	Al	J A
Crew Scheduling																																					
Worker Satisfaction	26				Г											I	Prop	os	ed 7	Γwο	-W	eek	Scl	hedi	ıles												
					Г				Da	ay sl	hift				Т				E	ven	ing	shi	ft			Т					N	ght	shi	ft			
					1	2 3	4	5 6	7	8 9	10	11	12	13	14	1 2	2 3	4 5						12	13	14	1 2	2 3	4	5 6	7	8 9	1) 11	12	2 13	1
	Weights	Sch Limit	Sch Limit Targets	Variables	Г										Т											Т				Т							Т
Bob	1	1	. 1	0	1	1 1	1	1		1 1	1	1	1																								
	4			1	1	1 1	1	1												1	1 1	1	1	1													Т
	5			0	П											1 1	1	1	l													1 1	l	1 1	1	L	
Bill	3	1	. 1	0	П	1	1	1 1	1													1	1	1	1	1											
	3			1							1	1	1	1	1		1	1	1	1																	
	4			0																								1	1	1 1	1			1 1	1	1 !	L
Joe	6	1	. 1	1	П																						1 1	l		1 1	1	1 1	l		1	1 !	ī
	3			0																1	1 1			1	1	1	1 1	l		1 1	1						
	1			0												1 1		1	1	1 1	1 1			1	1	1											
Sylvia	1	1	. 1	0												1 1	1	1		1												1 1	l	1 1	ı		
	5			0	1	1 1	1		1											1	1 1	1	1			1											
	4			1						1 1	1	1			1	1 1	1	1		1																	
Joann	2	1	1	0		1 1	1	1 1		1	1	1	1	1																							
	2			0												1	1	1	1		1	1	1	1	1												
	6			1																							1	1	1	1 1		1	1	1 1	. 1	L 1	Ĺ
Mary	3	1	1	1	1	1 1		1	1											1	1 1	1			1	1											
	6			0																							1 1	1		1	1	1 1	1	1		1	L :
	1			0											\perp	1 1	1		1	1 1	1 1	1			1	1											
																														\Box							
			Number working		2	2 2	1	1 1	1	1 1	2	2	1	1	2	1 1	2	2	1	2 2	2 2	2	1	1	1	1	1 2	2 1	1	2 2	1	1 2	2	1 1	2	2 1	1
					>=	>:>:	>=:	>=>=	>=>	>=>=	>=	>=	>=	>=	>= :	>:>	<>	>=>	×>:	>:>	×>:	>=	>=	>=	>= :	>= :	>:>	<>	>:	>>	:>:	>=>	×>:	= >=	: >=	= >=	: >:
			Requirements		1	1 1	1	1 1	1	1 1	1	1	1	1	1	1 1	1	1	1	1	1 1	1	1	1	1	1	1 1	1	1	1 1	1	1 1	l	1 1	1	1 !	(
	Crew Scheduling Worker Satisfaction Bob Bill Joe Sylvia Joann	Weights Satisfaction 26 Weights	Weights Sch Limit	Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Bob 1 1 1 4 5 1 1 1 Bill 3 1 1 1 Joe 6 1 1 1 1 Sylvia 1 <td>Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1 1 0 4 1 1 0 Bill 3 1 1 0 Joe 6 1 1 1 1 Sylvia 1 1 1 0 0 1 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 0 1 0 0 1 0 0 1 0 0 0 0 1 0 <</td> <td>Crew Scheduling 26 Worker Satisfaction 26 Weights Sch Limit Bob 1 4 1 5 0 Bill 3 3 1 4 0 Joe 6 1 1 2 0 3 0 1 1 3 0 1 0 2 0 4 1 1 0 5 0 1 0 2 0 4 1 1 0 2 0 6 1 1 0 1 0 1 0 2 0 4 1 1 1 1 0 2 0 3 1</td> <td>Crew Scheduling 26 Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1</td> <td>Crew Scheduling Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1 1 0 1<</td> <td> Worker Satisfaction 26 </td> <td>Crew Scheduling 26 Sch Limit Targets Variables Discription Discription</td> <td> Crew Scheduling</td> <td>Crew Scheduling 26 Sch Limit Targets Variables Day shift Weights Sch Limit Sch Limit Targets Variables 1 2 3 4 5 6 7 8 9 10 Bob 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td> Crew Scheduling</td> <td> Crew Scheduling Crew Sched</td> <td> Crew Scheduling Crew Sched</td> <td> Crew Scheduling Crew Sched</td> <td> Crew Scheduling Crew Sched</td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Morker Satisfaction 26 </td> <td> Worker Satisfaction Z6 </td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Crew Scheduling</td> <td> Crew Scheduling 26 </td> <td> Crew Scheduling 26 27 28 28 28 28 28 28 28</td> <td>Verker Satisfaction</td>	Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1 1 0 4 1 1 0 Bill 3 1 1 0 Joe 6 1 1 1 1 Sylvia 1 1 1 0 0 1 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 0 1 0 0 1 0 0 1 0 0 0 0 1 0 <	Crew Scheduling 26 Worker Satisfaction 26 Weights Sch Limit Bob 1 4 1 5 0 Bill 3 3 1 4 0 Joe 6 1 1 2 0 3 0 1 1 3 0 1 0 2 0 4 1 1 0 5 0 1 0 2 0 4 1 1 0 2 0 6 1 1 0 1 0 1 0 2 0 4 1 1 1 1 0 2 0 3 1	Crew Scheduling 26 Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1	Crew Scheduling Worker Satisfaction 26 Weights Sch Limit Sch Limit Targets Variables Bob 1 1 0 1<	Worker Satisfaction 26	Crew Scheduling 26 Sch Limit Targets Variables Discription Discription	Crew Scheduling	Crew Scheduling 26 Sch Limit Targets Variables Day shift Weights Sch Limit Sch Limit Targets Variables 1 2 3 4 5 6 7 8 9 10 Bob 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Crew Scheduling Crew Sched	Crew Scheduling Crew Sched	Crew Scheduling Crew Sched	Crew Scheduling Crew Sched	Crew Scheduling	Crew Scheduling	Crew Scheduling	Crew Scheduling	Morker Satisfaction 26	Worker Satisfaction Z6	Crew Scheduling 26	Crew Scheduling 26 27 28 28 28 28 28 28 28	Verker Satisfaction												