

Automatic Shift Scheduling Software Schedule Nurse III Users Manual



Nov.30.2020 Sugawara Systems



Classification of the work schedule

Shift-based work schedule	Task-based work schedule					
Two-Shifts(Ward /Nursing Care)	Child Care					
Three-Shifts(Regular Rotation)	Part Time					
Scheduling Benchmarks	Hall/Call Center					
	Factory's fixed shifts					
INRC-2						

■ Work schedules can be categorized into two types: shift work schedules, which are mainly sequences that span more than two days, and task work schedules, which assign multiple tasks (tasks) to a single day.

■ There is also a mixed type of work schedule that consists of a sequence shift of 2 days or more and 2 or more tasks.

* Scheduling Benchmarks and INRC-2 are academic benchmarking sites, respectively.



Document Structure

■ Video Tutorial

<u>Dr. Planning</u> is an example of using the software, solving a problem from scratch.

■ <u>Shift Tutorial</u>

We'll use actual examples to give you an overview of how to use it. Please follow along with your hands as you go through the process.

■ User manual

This manual explains the usage method for each item. Please refer to the necessary sections.

Advanced user manual Under Construction.

<u>Python3_Constraint Programming Tutorial/Manual</u> This is a programming manual for more advanced users.



File Menu

■ Open Project loads a project in a folder.

■ Save is an overwrite save of the current project.

■ Save as is a copy of the file in a different folder or make a copy with a different name.

 \blacksquare Exit terminates the software, schedule nurse III.

■ Open Project from Github loads a project from Github.

📰 Se	chedule Nurs	ie III					
File	Settings	Constraints	Schedule	Solve	Solutions	Windows Settings	Help
	Open Projec	ct					
	Save						
	Save as						
	Exit						
	Open Projec	ct File from Gitl	hub				



Save as

- Enter the filename to save.
- .nurse3 is an extension for the project.
- test/test.nurse3 Either can be used in the example below.

Save As							×
← → · ↑ 📙 «	Engli	sh > Project_Samples > Task_Projects	es > Task_Projects			ch Task_Projects	
Organize 🔻 New fo	older						?
E. Desktop	^	Name	Date modified	Туре		Size	
Documents		task_import_with_skills.nurse3	2020/11/19 19:48	NURSE3	File	549 KB	
👆 Downloads		📧 task_import_with_skills_process_req_only	2020/11/19 10:44	NURSE3	File	780 KB	
👌 Music		task_import1.nurse3	2020/11/18 16:51	NURSE3	File	257 KB	
Pictures		📧 test.nurse3	2020/11/22 1:40	NURSE3	File	270 KB	
📲 Videos							
🏪 Local Disk (C:)	¥						
File name: tes	st.nurs	se3					~
Save as type: nu	irse fil	e(*.nurse3)					\sim
 Hide Folders 					Save	e Cance	I



Load from Github

Double-clicking the project loads the project.
 Open Selected Project loads the project selected.





Three Elements of Constraints

■ For any constraint, the following three elements need to be specified. Below, we'll look at how to specify the set elements.





$\blacksquare Click Settings \rightarrow Staff Definitions.$



File	Settings	Constraints	Schedule	Solve	Solutions	Windows Settings	Help	
	Day	Definitions						
	Shift Definitions							
	Phase							
	Task							
	Staff	Definitions						
	Mac	ro Definitions						
			_					



Editing staff names

■ Click a staff member's name. Then you will see a color indicating that you have selected. You can't edit cells by keyboard at this stage because they are still in the cell selection stage.

By right-clicking, a menu like the one below will appear, allowing you to perform each operation.

For example, you can copy and paste a list of staff members from Excel.

🗾 Staff D	efinition	s						
Staff Def	initions	Shifts per Staff Group	Definitions	Group Age	regate Def	initions	Tasks per Person	
		Set						
No.	Enable	staffName		comn	nent	All_Members		
1		Staff1					A_Member_in_All	-
2		Staff2			_		A_Member_in_All	-
3		Staff3	Сору	,			A_Member_in_All	•
4		Staff4	Dacte				A_Member_in_All	-
5		Staff5		Clear			A_Member_in_All	-
6		Staff6	Clear				A_Member_in_All	-
7		Staff7	Insert	a Row			A_Member_in_All	-
8		Staff8	Delet	Delete Rows			A_Member_in_All	-
9		Staff9	Incart	Davia			A_Member_in_All	-
10		Staff10	Insen	NOWS			A_Member_in_All	-
11		Staff11					A_Member_in_All	-
12		Staff12					A_Member_in_All	-
13		Staff13					A_Member_in_All	-
14		Staff14					A_Member_in_All	-
15		Staff15					A_Member_in_All	-
16		Staff16					A_Member_in_All	-
17		Staff17					A_Member_in_All	•
18		Staff18					A_Member_in_All	-
10		Ctoff10					A Mombor in All	9



Editing in Cells

■ Click again or double-click to enter edit mode in a cell。

If you cannot enter cell edit mode, click on another cell and then click again.

		\				
	Staff D	efinitions				
S	Staff Def	initions s	Shifts per Staff Group Definitions	Group Aggregate Definitions	Tasks per Person	
		-	·			
		s	et			
		. \				
	No	Enable	StaffName	commont	All Mombors	
	NO.	Ellable	Starmane	comment	AII_PleIIDelS	
li	1		Staff1		A_Member_in_All	-
Ī	2		Staff2		A_Member_in_All	-
l	3		Staff3		A_Member_in_All	•
	4		Staff4		A_Member_in_All	-
	5		Staff5		A_Member_in_All	-
	6		Staff6		A_Member_in_All	-
H	7		Staff7		A_Member_in_All	-
H	8		Staff8		A_Member_in_All	-
H	9	_	Staff9		A_Member_in_All	-
H	10	✓	Staff10		A_Member_in_All	
H	11		Staff11		A_Member_in_All	-
H	12		Staff12		A_Member_in_All	-
H	13		Staff13		A_Member_in_All	
H	14		Staff14		A_Member_in_All	
H	15		Staff15		A_Member_In_All	
	10		Staff17		A_Member_in_All	
	1/		Staff18		A_Member_in_All	
	10		Ctoff10		A Mombor in All	



Moving the Staff Cell

Click here to select a row.

•	Staff	Defin	itions	

Staff Definitions Shifts per Staff Group Definitions Group Aggregate Definitions Tasks per Person

Set

No.	Enable	StaffName	comment	All_Members	
1		June BYRNE		A_Member_in_All	-
2		Amick, Sarah Jane		A_Member_in_All	-
3		Ismael Miranda		A_Member_in_All	-
4		Scott Lambert		A_Member_in_All	-
5		Alexander Teodorovich		A_Member_in_All	-
6		Michael Pelland		A_Member_in_All	-
7		Tim Davis		A_Member_in_All	.
8		Thomas Braum		A_Member_in_All	-
9		nguyen thu		A_Member_in_All	.
10		Ravi Zupa		A_Member_in_All	-
11		sitanshu kumar		A_Member_in_All	-
12		Vineel Vallapureddy		A_Member_in_All	-
13		Paul Eato		A_Member_in_All	-
14		Kenton Veeder		A_Member_in_All	-
15		菅原 Spaderna		A_Member_in_All	-
16		Wayne Marking		A_Member_in_All	-
17		KRISHNAKUMAR MANI		A_Member_in_All	-
18		Brad Parker		A_Member_in_All	-



Drag & Drop Staff Cells

Click again, and a bar will appear. Click and drag the bar to the destination.

🗾 Staff D	efinition	s					
Staff Def	initions	Shifts per Staff	Group Definitions	Group Aggregate Definit	ions Tasks per Person		
		Set					
No.	Enable	e Staff	Name	comment	All_Members		
1		June E	YRNE		A_Member_in_All	Γ	
2		Amick, Sa	rah Jane		A_Member_in_All	[
3		Ismael	Miranda		A_Member_in_All		
4 4		Scott La	ambert		A_Member_in_All		
5		Alexander T	eodorovich		A_Member_in_All		
6		Michael	Pelland		A_Member_in_All		
7		Tim [)avis		A_Member_in_All		
8		Thomas	Braum		A_Member_in_All		
9		nguye	n thu		A_Member_in_All		
10		Ravi 2	Zupa		A_Member_in_All		
11		sitanshu	ı kumar		A_Member_in_All		
12		Vineel Val	apureddy		A_Member_in_All		
13		Paul	Eato		A_Member_in_All		
14		Kenton	Veeder		A_Member_in_All		
15		菅原 Sp	aderna		A_Member_in_All		
16		Wayne I	Marking		A_Member_in_All		
17		KRISHNAKU	MAR MANI		A_Member_in_Al2		
18		Brad P	arker		A_Member_in_All	[



Applying the staff name

■ If you uncheck the checkbox, the staff member becomes not effective.

After editing, you can click on the Set button to apply the staff name table changes.

Please note that the changes will not be **valid** unless you click on the Set button.

Staff [Definition	15				
Staff Def	finitions	Shifts per Staff	Group Definitions	Group Aggregate Definitio	ns Tasks per Person	
		C-4				
		Jet				
No.	Enable	e Staffi	Name	comment	All_Members	
1		Amick, Sa	rah Jane		A_Member_in_All	-
2		Ismael	Miranda		A_Member_in_All	Ē
3		Scott La	ambert		A_Member_in_All	
4		June E	YRNE		A_Member_in_All	
5		Alexander T	eodorovich		A_Member_in_All	
6		Michael	Pelland		A_Member_in_All	
7		Tim [Davis		A_Member_in_All	
8		Thomas	Braum		A_Member_in_All	
9		nguye	n thu		A_Member_in_All	
10		Ravi 2	Zupa		A_Member_in_All	-
11		sitanshu	ı kumar		A_Member_in_All	
12		Vineel Val	apureddy		A_Member_in_All	
13		Paul	Eato		A_Member_in_All	
14		Kenton Veeder			A_Member_in_All	
15		菅原 Sp	aderna		A_Member_in_All	
16		Wayne I	Marking		A_Member_in_All	
17	v	KRISHNAKU	MAR MANI		A_Member_in_All13	3
18		Brad P	arker		A_Member_in_All	



Group Definition

■ The first line "A member in All" is included from the beginning. Please do not delete it.

■ The second line onwards is what you have added.

■ It contains the name of the attribute and the names of the members who belong to that attribute (Ward Manager, Ward Sister..)

You can set up the member names as you like, but you cannot duplicate them. If you click the Set button, the name will be valid in the staff definition.

🗾 Staff [Definition	5						
Staff De	finitions	Shifts per Staff Group	Definitions Group Aggregate Defi	initions Tasks per Person				
Set								
No.	No. Enable Staff Property		Member of the	Staff Property	-	E	G	
			1	2	3	4	5	
1		All_Members	A_Member_in_All					
2	Image: A state of the state	Function	RN	LPN	HeadNurse	Chief	Manager	
3		Late_Attribute	Late_Possible					
4		Early_Attribute	Eary_Possible					
5								
6								
7								
8								
9							14	
10							•	



Describe the attributes of each staff member

■ The items you set up in the group definition will appear in the order of definition, and you can set the relevant attributes for each staff member.

Staff Definitions

Staff Definitions Shifts per Staff Group Definitions Group Aggregate Definitions Tasks per Person

Set

No.	Enable	StaffName	comment	All Members		Function	Function		Early_Attribute		
	LINGDIC	otarritanic	connene	/III_ITCINUCIO		- unceron		Luce_nambate			
1		June BYRNE		A_Member_in_All	-	Manager	-	•			•
2		Amick, Sarah Jane		A_Member_in_All	-	HeadNurse	-	•			-
3		Ismael Miranda		A_Member_in_All	-	Chief	-	-]		•
4	✓	Scott Lambert		A_Member_in_All	-	RN	-	Late_Possible 💽		Eary_Possible	-
5	Z	Alexander Teodorovich		A_Member_in_All	•	RN	-	Late_Possible 💽]	Eary_Possible	-
6		Michael Pelland		A_Member_in_All	-	RN	-	Late_Possible 🕞		Eary_Possible	-
7		Tim Davis		A_Member_in_All	•	RN	-	Late_Possible 🕞]	Eary_Possible	-
8		Thomas Braum		A_Member_in_All	-	RN	-	Late_Possible 💽		Eary_Possible	-
9		nguyen thu		A_Member_in_All	-	RN	-	-]	Eary_Possible	-
10		Ravi Zupa		A_Member_in_All	-	RN	-	•		Eary_Possible	-
11	V	sitanshu kumar		A_Member_in_All	-	RN	-	Late_Possible 💽]	Eary_Possible	-
12		Vineel Vallapureddy		A_Member_in_All	-	RN	-	Late_Possible 💽		Eary_Possible	-
13		Paul Eato		A_Member_in_All	•	LPN	-	Late_Possible 🕞			-
14	✓	Kenton Veeder		A_Member_in_All	-	LPN	-	Late_Possible 💽			-
15		菅原 Spaderna		A_Member_in_All	-	LPN	-	Late_Possible 💽]		-
16		Wayne Marking		A_Member_in_All	-	LPN	-	•]		-
17		KRISHNAKUMAR MANI		A_Member_in_All	-	LPN	-	-]		•
18		Brad Parker		A_Member_in_All	-	LPN	-	-			-



Group Set

■ We describe here the staff set required by the constraints.

■ When you click on the name of a group set name, the corresponding staff member is displayed below. You can ensure your operation is correct.

📃 Staff [Definitions						/			
Staff Def	finitions S	Shifts per Staff Grou <mark>p</mark>	Definitions	Gro	oup Aggregate Definitions	Tas	sks per Person			
	Set									
No.	Enable	Group Aggregate	Opera	ito			Member of the St	aff Property		
		Name	r		1		2	3		
1		Night_Possible	OR	•	RN	-	LPN 👻	Chief	•	
2		Night_Impossible	NOT	-	RN	-	LPN 👻	Chief	•	
3		Late_Impossible	NOT	•	Late_Possible	•	-		-	
4		Early_Impossible	NOT	•	Eary_Possible	•			•	
5			OR	1		•	-		-	
6			OB	•		•			•	
7			OR	•		•			-	
8			OR	-		•			•	
9			OR	-		-	-		-	
10			OR	-		-	-		•	
June B' Amick, 3	YRNE Sarah Jane									16



Shifts for each staff member

On the Shifts per Staff page, uncheck the box for impossible shifts per staff member.
When a new staff member is defined, they will all start On state. Only uncheck and use it if the team and shifts are relatively fixed.

■ We do not recommend using this in workplaces where shifts change from month to

month.

💼 Staff D	efinitions				
Staff Defi	nitions Shifts per Staff G	roup Definitions Group A	Aggregate Definitions	Tasks per Person	
	6-4				
	Set				
	or ((n)	Day Shift	Night Shift	After Night Shift	Paid Holiday
	Starrname				
1	June BYRNE		v	v	v
2	Amick, Sarah Jane	v	✓	V	V
3	Ismael Miranda			V	
4	Scott Lambert				
5	Alexander Teodorovich	\checkmark	✓	\mathbf{V}	V
6	Michael Pelland		.	.	✓
7	Tim Davis			✓	✓
8	Thomas Braum				✓
9	nguyen thu	✓	✓	✓	✓
10	Ravi Zupa	✓	2	<u>₹</u>	✓
11	sitanshu kumar				
12	Vineel Vallapureddy			×	V
13	Paul Eato				✓
14	Kenton Veeder				
15	官原 Spaderna				✓
16	wayne Marking				
1/	RESHNAKUMAK MANI				
18	Brad Parker				\checkmark



You will see the following by clicking on Settings \rightarrow Day Definitions \rightarrow Scheduling Period.





Scheduling Period

The StartDate and FinishDate are mandatory.
StartDisplayDate does not need to be specified if not required.

	Day Definitions							(- • •
	Scheduling Period	Predefined Day	s Month Char	racteristic Days	Day Aggregate	s			
								Set	
Selecting the date in									
the calendar and			<u>/</u>			StartDate			
clicking the Set	StartDate		Sun	Mon	Tue	Wed	Thu	Eri	Sat
			29	30	1	2	3	4	5
button will make it			6	7	8	9	10	11	12
valid	-		13	14	15	16	17	18	19
vand.			20	21	22	23	24	25	26
			27	28	29	30	31		2
Set	+								9
StartDate,FinishDate(
,StartDisplayDate),in	FinishDate	•							
the order.									
	StartDsiplay[)ate							19



We usually constraint only after StartDate.



StartDate is base

 StartDate is the base for most Day definitions. (Exceptions are Month Characteristic Dates which consists of absolute dates.)
 When we move to next month, this method is useful because we need only to change the Scheduling Period.



Predefined Days

■ This page is read-only.

Setting the Scheduling Priod determines PredefinedDays automatically.

■ For example, ThisMonth will be within the StartDate between FinishDate, as shown below. You can check it by clicking ThisMonth.

hisMonth	Inisimonth						
uri on	<			November 2020			
ue	Sun	Mon	Tue	Wed	Thu	Fri	Sat
/ed	25	26	27	28	29	30	31
~	1	2	3	4	5	6	7
:	8	9	10	11	12	13	21
	22	23	24	25	26	27	28
t	29	30					
Days							
tionalHolidays							
ostituteHolidays							
condMonth I							
condMonth							
condMonth							
condMonth							
ondMonth .							
condMonth							
cond Month							
cond Month							
ond Month							
ondMonth							
ondMonth							
ondMonth							
ondMonth							
ondMonth							
cond Month							



Sunday Definition

Clicking the Sun will show you the calendar below.

Day Definitions							
Scheduling Period Prede	fined Days Month Charac	teristic Days Day Aggreg	ates				
ThisMonth	Sun						
Sun				11 1 2020			
Mon	<u> </u>			November 2020			>
		Mon	7 Tue	Wed	Thu 29	Fri	Sat 21
Wed	- 1	2	3	4	5	6	7
Thu Tri	8	9	10 17	11 18	12	13 20	14
	- 22	23	24	25	26	27	28
AllDavs	29	30					5
NationalHolidays							
SubstituteHolidays	—						
SecondMonth							
							23



National Holidays

Clicking the NationalHolidays will show countries as below.
 Select your country, and Click on NatinalHolidays or
 SubstituteHolidays again to show the dates.
 Save the project for memory.

hisMonth	NationalHoli	United States of America:California	\sim		
un		United States of America:California	<u>^</u>		
lon	<.	United States of America:California:Los Angeles United States of America:Colorado			:
ue	Sun	United States of America:Connecticut United States of America:Delaware	Thu	Fri	Sat
/ed	25	United States of America:District of Columbia	29	30	31
hu	1	United States of America:Florida United States of America:Georgia	5	6 13	7
·i	15	United States of America:Hawaii	19	20	21
at		United States of America:Idano United States of America:Illinois	26	27	28
n IDave	29	United States of America:Indiana	3		
ildays		United States of America.jowa			
ationalmonidays		United States of America:Kentucky United States of America:Louisiana			
ubstituteHolidays		United States of America:Louisiana:New Orleans			
econdMonth	_	United States of America:Maine United States of America:Maryland			
		United States of America:Massachusetts			
		United States of America:Michigan United States of America:Minnesota			
		United States of America:Mississippi			
		United States of America:Missouri United States of America:Montana			
		United States of America:Nebraska			
		United States of America:New Hampshire			
		United States of America New Jersey	U		
		Officed States of America New Mexico			



Month Characteristic Days

■ On this page, you can set the days in the year after the StartDate, which are **absolute** dates, so unaffected by changes in the Scheduling Period.

- 1.Entry the User Defined Name
- 2.Select the dates, pressing Ctrl-key
- 3.Click on Set

🔲 Day	Definition	5		_																			
Schedu	ling Period	l Predefined Days Month (Characteri	istic Da	ays D	ay Agg	regates																
	Enable	User Defined Dates						Clear							•			Se	t				
1	✓	MyHoliday																					
2								MyHol	idav														
3										1													
5					Oc	tober 2	2020					Nov	ember	2020					Dece	ember	2020		
6			Sun	Mon	Tue	Wed	Thu	Fri	Sat	See	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
7			27				1	2	3	25	26						29		1	2	3	4	5
8			4	5	6	7	8	9	10	1	2	3	4	5	6	7	6	7	8	9	10	11	12
9			11	12	13	14	15	16	17	8	9	10	11	12	13	14	13	14	15	16	17	18	19
10			18	19	20	21	22	23	24	15	16	17	18	19	20	21	20	21	22	23	24	25	26
			25	26	27	28	29	30	31	22	23	24	25	26	27	28	27	28	29	30	31		
			1							29	30						3						
					Ja	nuary 2	2021					Feb	ruary	2021					Ma	irch 20	21		
			Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
			27					1	2	- 31	1	2	3	4	5	6	28	1	2	3	4	5	6
			3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13
			10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20
			17	18	19	20	21	22	23	21	22	23	24	25	26	27	21	22	23	24	25	26	27
			24	25	26	27	28	29	30	28							28	29	30	31			
			31							7							- 4						
					٨	oril 20	21					M	lay 202	21					Ju	ine 202	1	21	5
			Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat



Day Aggregates

■ This page allows you to set up different sets of days of the week using the previously defined day names.

■ Various sets are already defined by default.

■ For example, if you click on a WeekDay, you will get the result displayed on the calendar.

🗾 Day De	finitions																×
Schedulin	g Period	Predefined Days Month C	Characte	eristi	ic Days Day Aggregates					1	Ν						
Set									<			Day					
No.	Enable	Day Aggregate Name	Opera	ato									Oct	ober 2	020		>
	Lindbird	bay nggregate name	r		1		2		3		Sun	Mon	Tue	Wed	Thu	Fri	Sat
1		WeekDay	OR	-	Mon	-	Tue	•	Wed 💽		27	28	29	30	1	2	3
2	✓	WeekEnds	OR	-	Sat	-	Sun	-	•		4	5	6	7	8	9	10
3	V	Day_on_Closed	OR	-	WeekEnds	-	NationalHolidays	-		-	10	12	13	14	15	16	24
4	✓	ConsultationDay	NOT	-	Day_on_Closed	-		-			25	26	27	28	29	30	31
5		StartDateMinus1	-1	-	StartDate	-		-			1	2	3	4	5	6	7
6	✓	StartDateMinus2	-2	-	StartDate	-		-									
7		StartDateMinus3	-3	-	StartDate	-		-		-							
8	✓	StartDateMinus4	-4	-	StartDate	-		-			<		Nove	mber	2020		>
9		StartDateMinus5	-5	-	StartDate	-		-			Sup	Mon	Tue	Mod	Thu	Eri	Sat
10	✓	StartDateMinus6	-6	-	StartDate	-		-			25	26	27	28	29	30	31
11		StartDateMinus7	-7	-	StartDate	-		-		•	1	2	3	4	5	6	7
12	✓	StartDatePlus1	+1	-	StartDate	-		-			8	9	10	11	12	13	14
13		StartDatePlus2	+2	-	StartDate	-		-			15	16	17	18	19	20	21
14	✓	StartDatePlus3	+3	-	StartDate	-		-			22	23	24	25	26	27	28
15		StartDatePlus4	+4	-	StartDate	-		-			29	30					5
16	✓	StartDatePlus5	+5	-	StartDate	-		-	•								
17		StartDatePlus6	+6	-	StartDate	Ţ		-			L						



WeekEnds

Likewise, you can see that WeekEnds are the set of Saturday or Sunday.
You can edit any definition here as you like.

🗌 Day D	efinitions																×
Schedulir	g Period	Predefined Days Month (Characte	eristi	c Days Day Aggregates												
Set											WeekE	inds					
No	Enable	Day Aggregate Name	Opera	ato						^	<		Oct	ober 2	020		>
NO.	cilable	Day Aygregate Name	r		1		2		3		Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	 Image: A start of the start of	WeekDay	OR	-	Mon	-	Tue	-	Wed 🚽		27	28	29	30	1	2	3
2		WeekEnds	OR	-	Sat	-	Sun	-	-		4	5	6	7	8	9	10
3		Day_on_Closed	OR	-	WeekEnds	-	NationalHolidays	-	-		11	12	13	14 21	15	16	24
4	✓	ConsultationDay	NOT	-	Day_on_Closed	-		-	-		25	26	27	28	29	30	31
5		StartDateMinus1	-1	-	StartDate	-		-	-		1					6	7
6		StartDateMinus2	-2	-	StartDate	-		-	-								
7		StartDateMinus3	-3	-	StartDate	-		-	-						_		
8		StartDateMinus4	-4	-	StartDate	-		-	-		<		Nove	mberi	2020		>
9		StartDateMinus5	-5	-	StartDate	-		-	-		Sun	Mon	Tue	Wed	Thu	Eri	Sat
10		StartDateMinus6	-6	-	StartDate	-		-	-		25	26	27	28	29	30	31
11		StartDateMinus7	-7	-	StartDate	-		-	-		1	2	3	4	5	6	7
12		StartDatePlus1	+1	-	StartDate	-		-	-		8	9	10	11	12	13	14
13		StartDatePlus2	+2	-	StartDate	-		-			15	16	17	18	19	20	21
14		StartDatePlus3	+3	-	StartDate	-		-	-		22	23	24	25	26	27	28
15		StartDatePlus4	+4	-	StartDate	-		-	-		29	30					5
16		StartDatePlus5	+5	-	StartDate	-		-	-								
17	~	StartDatePlus6	+6	-	StartDate	-		-	-								



ConsultationDay

The ConsultationDay equals to Boolean NOT of Day_on_Closed, which is OR of WeekEnds or NationalHolidays, defined in Month Characteristic Dates or Predefined Days.

■ You can edit them as you like.

🗾 Day De	efinitions															×
Schedulin	ng Period	Predefined Days Month C	haracte	erist	ic Days Day Aggregates											
Set										Cor	sultati	on				
No.	Enable	Day Aggregate Name	Opera	ato						^		Oc	tober 2	020		>
	Lindbird	bay nggregate name	r		1		2		3	Su	n Mo	n Tue	Wed	Thu	Fri	Sat
1		WeekDay	OR	-	Mon	-	Tue	-	Wed 💽	2	28	29	30	1	2	3
2		WeekEnds	OR	-	Sat	-	Sun	-	-	4	5	6	7	8	9	10
3		Day_on_Closed	OR	-	WeekEnds	-	NationalHolidays	-	-	1	1 12 2 19	20	21	22	23	24
4		ConsultationDay	NOT	-	Day_on_Closed	-		-	-	2	5 26	27	28	29	30	31
5		StartDateMinus1	-1	-	StartDate	-		-	-	1						7
6		StartDateMinus2	-2	-	StartDate	-		-	-							
7		StartDateMinus3	-3	-	StartDate	-		-	-		_					
8		StartDateMinus4	-4	-	StartDate	-		-	-			Nov	ember	2020		>
9		StartDateMinus5	-5	-	StartDate	-		-	-	S.	n Mo	, Tue	\//ed	Thu	Eri	Sat
10	✓	StartDateMinus6	-6	-	StartDate	-		-	-	2	1 10	27	28	29	30	31
11		StartDateMinus7	-7	-	StartDate	-		-	-	1	2	3	4	5	6	7
12		StartDatePlus1	+1	-	StartDate	-		-	-	8	9	10	11	12	13	14
13		StartDatePlus2	+2	-	StartDate	-		-	-	1	5 16	17	18	19	20	21
14	✓	StartDatePlus3	+3	-	StartDate	-		-	-	2	2 23	24	25	26	27	28
15		StartDatePlus4	+4	-	StartDate	-		-	-	2	30					5
16		StartDatePlus5	+5	-	StartDate	-		-								
17		StartDatePlus6	+6	-	StartDate	-		F	_							

Any Set of Day can be created by set operation

■ When you click on a Operator, you can select from a variety of operators. The most commonly used are OR, NOT, and AND.

You can confirm
 how each operator
 works by the
 calendar right.
 Clicking on Day
 Aggregate Name
 shows yellow mark
 on the calendar.

														_	_	_	_	
rm	🗾 Day De	efinitions															- 6	×
	Schedulin	ng Period	Predefined Days Month	Characte	risti	o Days Day Aggregates	8											
or	Set										١	Week D	ау					
	No	Enable	Day Aggregate Name	Opera	to						^	۲.		Nov	ember	2020		>
	110.	LIIADIC		r		1		2		3		Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	V	WeekDay	OR	-	Mon	-	Tue	-	Wed		25	26	27	28	29	30	31
	2		WeekEnds		\mathbf{A}	Sat	-	Sun	-			1	2	3	4	5	6	7
	3		Closed_Day	OR		WeekEnds	-	NationalHolidays	-			8 15	9	10	12	12	13	21
	4		WorkingDay	NOT		Closed_Day	-		-			22	23	24	25	26	27	28
av	5		StartDateMinus1	-7		StartDate	-		-			29	30					5
J	6		StartDateMinus2	-6	¥	StartDate	-		-									
	7	v	StartDateMinus3	-3	•	StartDate	-		-			_						
	8	•	StartDateMinus4	-4	•	StartDate	-		-			<		Dec	ember	2020		>
	9		StartDateMinus5	-5	•	StartDate	-		-			Sun	Mon	Tue	Wed	Thu	Eri	Sat
rl	10	✓	StartDateMinus6	-6	•	StartDate	•		-			29	30	1	2	3	4	5
11 N	11		StartDateMinus7	-7	•	StartDate	-		-			6	7	8	9	10	11	12
	12	✓	StartDatePlus1	+1	•	StartDate	•		-			13	14	15	16	17	18	19
	13		StartDatePlus2	+2	-	StartDate	-		-			20	21	22	23	24	25	26
	14	Image: A state of the state	StartDatePlus3	+3	•	StartDate	•		-			27	28	29	30	31		2
	15		StartDatePlus4	+4	-	StartDate	-		-									9
	16	V	StartDatePlus5	+5	-	StartDate	-		-									
					_													

■ You can synthesize any dates by using the dates previously described.

■ In this way, you can create your own arbitrary set of days.



Shift Definition

■ Please reduce the number of shifts as much as possible, usually to a few or less. (This will affect the solution time and memory requirement.)

■ We will use Alias to make it easier to see when entering the schedule, although there is no distinction regarding constraints.

■ If you do not want to assign the shift automatically, uncheck Automatic Shift. In this case, you need to assign the shift manually.

🗾 Shift	Definitions											
Shift De	finitions S	hift Aggregates										
		Set						\nearrow				
No.	Enable	Shift Name	Color	Label	Counts	Work Hours	Automatic Shift	A	ias1	A	ias2	^
								Label	Color	Label	Color	
1	Image: A state of the state	Day_Shift	LightGray	@ D	•	-	Image: A start and a start	d1	255, 192, 12 @	d2	255, 128, 0 @	
2		Night_Shift	Violet	@ N	-	-	Image: A state of the state		Gray @		Gray 🔘	
3		After_Night_Shift	LightSkyBlue	@ A	-	-	Image: A state of the state	•	Gray 🔘		Gray 🔘	
4		Early_Shift	PaleGreen	@ E	-	-	Image: A state of the state		Gray 🔘		Gray 🔘	
5		Late Shift	BurlyWood	a I		-		0	Grav @		Grav @	



Alias

■ To add an alias, right-click to bring up the menu and add a column in the following fig.

■ There is no limit to the number of alias names, and there is no impact on performance.

■ Don't forget to select a checkbox and click the Set button when you've done editing.

								/							
III S	chedule						23	/							
							_								
			NA	PH	H B										
)
		Filter	Fevious	Month		ThelWeek	^							8	
	StaffNa	me				_		/							
Shift [)efinitions							/							
Shift Dof	initiona o						_ /								
Shint Der	initions 5	ohift Aggregates				-	\rightarrow	_							
		Set 🖌													
		001													
									At	lias1		1	Alias2		^
No.	Enable	Shift Name	Color	Label	Counts	Work	Hours	Automatic Shift	Al	tias1		Label	Alias2 Color		^
No.	Enable	Shift Name Day_Shift	Color LightGray	Label	Counts	Work	Hours	Automatic Shift	Labet d1	Color 255, 192, 1	2 @	Label	Alias2 Color 255, 128,		^
No.	Enable	Shift Name Day_Shift Night_Shift	Color LightGray Violet	Cabel	Counts	Work	Hours	Automatic Shift	Label d1	Color 255, 192, 1 Gray	2 @	Label d2	Alias2 Color 255, 128, Gray		^
No.	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift	Color LightGray Violet LightSkyBlue	Cabel	Counts	Work	Hours • •	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray	20	Label d2	Alias2 Color 255, 128, Gray Gray	0 @ @	^
No.	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift	Color LightGray Violet LightSkyBlue PaleGreen	Label D N A E	Counts	Work	Hours • • •	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray	2 @ 0	Label d2	Alias2 Color 255, 128, Gray Gray Gray	0 0 0	^
No. 1 2 3 4 5	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood	Label @ D @ N @ A @ E @ L	Counts	Work	Hours • • • •	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray Gray	20	Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray		^
No. 1 2 3 4 5 6	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue	Label @ D @ N @ A @ E @ L @ J	Counts Counts Copy Paste Clear	Work	Hours • • • • •	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray Gray Gray	200000000000000000000000000000000000000	Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray	00000	^
No. 1 2 3 4 5 6 7	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift Late_Night_Shift	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue red	Label @ D @ N @ A @ E @ Label @ N @ A @ J @ S	I Counts Copy Paste Clear Add a Row	Work	Hours - - - - - - - - - - - - -	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray Gray Gray Gray Gray		Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray Gray Gray	000000000000000000000000000000000000000	^
No. 1 2 3 4 5 6 7 8	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift Late_Night_Shift Long_Day_Shift	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue red Tan	Label @ D @ N @ A @ A @ A @ J @ S @ LD	I Counts Copy Paste Clear Add a Row Insert a Roy	Work	Hours * * * * * * * * * *	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray Gray Gray Gray Gray Gray		Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray Gray Gray Gray	00000	^
No. 1 2 3 4 5 6 7 8 9	Enable V V V C C C C C C C C C C C C C	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift Late_Night_Shift Long_Day_Shift Beginning_of_Night_Shift	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue red Tan Cyan	Label @ D @ N @ A @ A @ A @ A @ A @ A @ A @ A @ A @ A @ A @ A @ A @ B	Counts	Work	Hours - - - - - - - - - - - - -	Automatic Shift	Labet d1	Color 255, 192, 1 Gray Gray Gray Gray Gray Gray Gray Gray		Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray Gray Gray Gray		^
No. 1 2 3 4 5 6 7 8 9 10	Enable ✓ / ✓ / / / / / / / / / / / / / /	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift Late_Night_Shift Long_Day_Shift Beginning_of_Night_Shift Waiting	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue red Tan Cyan Yellow	Label @ D @ N @ A @ E @ I @ I @ S @ B @ W	I Counts Copy Paste Clear Add a Row Insert a Row Add a Colu	Work	Hours v v v v v v v v v v v v v	Automatic Shift	Adi Labet di	Gray Gray Gray Gray Gray Gray Gray Gray		Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray Gray Gray Gray		^
No. 1 2 3 4 5 6 7 8 9 10 11 12	Enable	Shift Name Day_Shift Night_Shift After_Night_Shift Early_Shift Late_Shift Semi_Night_Shift Late_Night_Shift Long_Day_Shift Beginning_of_Night_Shift Waiting Training	Color LightGray Violet LightSkyBlue PaleGreen BurlyWood Blue red Tan Cyan Yellow DarkKhaki	Label @ D @ N @ A @ E @ I @ I @ S @ B @ W @ N	I Counts Copy Copy Paste Clear Add a Row Insert a Row Add a Colu Delete Row	Work	Hours v v v v v v v v v v v v v	Automatic Shift	Ad Labet di	Color 255, 192, 1 Gray Gray Gray Gray Gray Gray Gray Gray		Label d2	Alias2 Color 255, 128, Gray Gray Gray Gray Gray Gray Gray Gray		^



Time, Counts in Shift Definition

■ Define Work Hours if you want to use time constraints. If you're not using time constraints, you don't need to define them.

■ The Counts need to be defined if you are counting integers for row constraints. For more information, see Row Constraints.

Shift D	efinitions											
Shift Defi	initions S	ihift Aggregates		\mathbf{n}								
	Se	ət										
No.	Enable	Shift Name	Color		Label	Counts		Work Hours	Automatic Shift	Al Label	ias1	0
1		Day_Shift	LightGray	0	D		-	•		Laber		Gra
2		Night_Shift	Violet	0	N		-	-				Gra
3		After_Night_Shift	LightSkyBlue	@	Α		•	-	V			Gra
4		Early_Shift	PaleGreen	@	E		•	-	v			Gra
5		Late_Shift	BurlyWood	@	L		•	-	Image: A state of the state			Gra
6		Semi_Night_Shift	Blue	@	J		-	-	✓			Gra
7		Late_Night_Shift	red	0	S		•	-	V			Gra
8		Long_Day_Shift	Tan	0	LD	[-	-	✓			Gra
9		Beginning_of_Night_Shift	Cyan	@	В	[•	-	V			Gra
10		Waiting	Yellow	@	W	[•	-	✓			Gra
11		Training	DarkKhaki	0	Т	[•	-	V			Gra
12		Paid_Holiday	MediumAquamar	@	PH		•	7:45 💌	✓			Gra
13		Legal_Holiday	GreenYellow	@	LH		•	-	~			Gra
14		Paid_Vacation	Gold	@	PV		•	•	✓			Gra
15		Maternity_Leave	DarkSeaGreen	0	ML		•	-	V			Gra
16		Holiday_Shift	Tomato	@	HS		•	-				Gra
17		Leader_Shift	Orange	@	LS		•	-				Gra
18		Meeting	CadetBlue	0	М	[-	-	✓		ეი	Gra
19		Student_Advising	MediumSpringGr	0	SA	[-	-	V		SZ	Gra
20		Long_Night_Shift	SlateBlue	0	LN	[-	-	✓			Gra
21		HalfDay Shift	Grav	0	Н		-	3:45				Gra





Not Operator sometimes makes it simpler

■ For example, the shift aggregate of "Working" requires OR for many elements, such as Day Shift, Early Shift, Late Shift, Night Shift, and so on. However, "Working" can be written as Not Off using the NOT operator, which is much simpler than many OR elements. In that case, we recommend using Not Off.

				\mathbf{X}										
🗾 Shift D	efinitions													
Shift Defi	initions S	Shift Ae	gregates	\backslash										
	5	Get .												
No.	Enable	Sh	nift Aggregate	Color		Label	Opera	ito/			5	Shift Na	me	
			Name						1		2		3	
1		-	Working	Gray	0	W	OR	-	Night_Shift	-	Early_Shift	-	Late_Sh	ift 🖃
2			Working	Gray	@	W	NOT	-	Paid_Holiday	/ 🖵		-		-



Shifts per Staff member

■ Settings → Staff definitions → Shifts per Staff

When you set up a new shift, all staff will have a checked state on it.
Don't forget to click the set button when you've done setting it up.

🗾 Staff D	efinitions	/							
Staff Def	initions Shifts per Staff	Group Definitions	Group Aggregate Definitio	ons Tasks per Person					
Set									
	StaffName	Day_Sh	nift Night_Shif	ft After_Night_Shi	ft Paid_Holiday				
1	Staff1								
2	Staff2								
3	Staff3								
4	Staff4								
5	Staff5				 ✓				
6	Staff6								
7	Staff7								
8	Staff8	V			V				
9	Staff9				V				
10	Staff10	V	V		✓				
11	Staff11	V			V				
12	Staff12	V	V	V	✓				
13	Staff13	Image: A state of the state	V		V				
14	Staff14		V	✓	✓				
15	Staff15			v	V				
16	Staff16		V	✓	✓				
17	Staff17		V	V	V				
18	Staff18	V	V	✓	✓				



Using Shift Aggregates

■ By making full use of shift aggregates, you can enter various shifts that he/she wants to take for that day while keeping the solution space as large as possible.



📰 Schedule Nurse III 🖸 C:\Users\sugaw\Documents\Git1\Schedule_nurse3 Gallery\Schedule_Nurse3 Gallery\English\Project_Samples\Doctor_Planning\doctor_planning.nurse3

File Settings Constraints Schedule Solve Solutions Windows Settings Help


Summary of three elements in constraints

■ We have looked at how to specify them.





Task Type Work Schedule

The task-based work schedule further requires an understanding of the concepts of tasks and phases.



What is task?

■ Shift: Shifts were called for Day Shift, Night Shift, Late Shift, Early Shift, so they are mainly a term for the horizontal direction.



Task: On the other hand, a task is a vertical concept, such as surgery or $_{39}$ internal medicine, performed within a shift.



■ Think about one support nurse. We have multiple tasks within a shift.



■ Note we have a time-term for each task.



We will call each task period a phase in the tutorial.The number of phases is the sum of them per day.



Basic relations shift task phase

Active shift definition: A Nurse can only work one shift per day.

Active shift is at **most one** AND at **least one** per day.

(Note: we must always define Off Shift to address the rule above.)

■ Only Active shift can have active tasks. Inactive shift makes any tasks inactive state.

Active task is at most one per phase.



Binding a Shift to phases

■ Phase requires at least one shift to be defined.

■ For example, the ph0 phase satisfies this condition since the Work and PH1 shifts are defined.

■ In principle, you must define a shift (Off in this example), which does not include a phase at all.

												\						
🖳 Phase																		
Phase Phas	se Vars	Phase Va	rs Se	t														
				- -							Shift D	efinitions						
				10	ετ					S	hift Defi	initions 🔓	hift Aggi	regates				
	P	hase Cla	SS			Primar	y Phase						Set					
No.					0			1			_							i.
	5	Shift Nan	ne	Time	Phase	Color	Time	Phase	Color		No.	Enable		Shift Name	Color		Label	
Day Phas	ses			0:0 -	pru	wni @	1:0 -	pni	Gai @									
1		Work	-		V			V			1	V		Work	Orange	0	W	
2		PH1	-		V						2			PH1	GreenYellow	0	1	
3		PH2	-					V			3			PH2	PaleGreen	0	2	
4											4			Off	White	0	Y	Ī

Binding a Shift to inconsecutive phases

■ The phases do not have to be consecutive, as in the PH1 shift below.

🚽 Phas	se																
Phase	Phase Var:	s Phase Vars S	iet														
											📃 Shift	Definition	5				
			:	Set							Shift De	efinitions	Shift Aggregates				
		Phase Class			Pri	iprary Ph	lase					Set					
No.	-			0		1			2			1	1				
		Shift Name	Time	Phase Colo	Time	Phase	Color	Time	Phase	Color	No.	Enable	Shift	Name	Color		Label
Day	Phases		0:0 🗸	ph0 Whi 🙆	1:0 🗸	ph1	Gai 🔘	2:0 🗸	ph2	Lig @		Lindbird		- Canal	00101		Luber
	1	Work 💽		×		V			~		1		We	ork	Orange	0	W
	2	PH12 🗣		V		V					2	Image: A state of the state	PH	12	Cyan	@	12
	3	PH23 💽				V			V		3		PH	23	LightBlue	@	23
	4	PH1 🔺 🗸		V					V		4		PI	41	GreenYellow	@	1
	5	PH2 🗣				V					5		PI	H2	PaleGreen	@	2
	6	PH3 🗣							V		6		PI	H3	LightGreen	0	3
	7	-]								7		0	ff	White	0	Y

■ 1shift -1 phase is also no problem.

🛃 Phase																							
Phase Phase Va	rs Phase Vars S	Set													cuto p								
		5	Get											S	hift Defi	initions S	hift Aggregate	e e					
		_																,0					
	Phase Class				1		Primar	y Phase								Set							
NO.	Chift Name	Time	0 Dhace	Color	Time	1 Dhace	Color	Time	2 Dhace	Color	Time	3 Dhace	Color										
Day Phases	Shirt Name	0:0 -	ph0	Gra @	1:0 -	ph1	Gra @	2:0 -	ph2	Gra @	3:0 -	ph3	Gra @		No.	Enable	SI	nift Name	1	Color		Label	
1	Early 💽	•	✓							·					1			Early	Ye	llow	@	Е	
2	Day 💽	•				V									2	V		Day	G	ray	0	D	
3	Late 💽	•							✓						3			Late	P	ink	0	L	
4	Night 🗖	•										V			4			Night	Ora	ange	@	N	
5	•	•													5			Y	B	lue	0	0	



Task

■ Settings→Task Definitions →Task Definition

■ In the example below;

■ We have at most 4 tasks per each phase.

■ It depends on the person in the table, Tasks per person.

■ Do not check the optional checkboxes.

🔳 Task	Definitior	1															ון				
Task D	efinition	Task Aggreg	ates														_				
	Set																				
				🗌 Use a	another la	bes as pha	ased task lab	pel													
				Allow	use of n	otaskvar in	n active shift	t		Allow	use of no	taskvar ir	n only schedu	ed task							
No.	Enable	Task Na	ame	Cold	Dr	Label	Automat	ic Task		Al	ias1			Alia	52						
									La	ibel	C	olor	Labe		Colo	r					
1		HeadN	urse	LightBlu	e @	не	X				Gra	y @			Gray	0					
2		Nurs	e kor	PINK	9	NU	Y				Gra	y @			Gray	0					
3		Train	Ker Do	Prown	U Ø		×				Gra	y 🚇			Gray						
4		ITalin	86	BIOWII	<u>w</u>	I			1		Gia	y w	1		Gray	<u>w</u>					
🖳 Phas	e													(🔳 Staff	Definitions					
Phase	Phase Va	ars Phase V	ars Set												Staff De	finitions Shi	ifts per Staff Gro	oup Definitions Group A	Aggregate Definitions	Tasks per Person	
				C -1												-					
				361												Set					
		Phase Cla	ass					Primary	/ Phase							Ch	offliame	HeadNurse	Nurse	Caretaker	Trainee
No.				0			1			2			3			36	anname				
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Task Aggregates

■ Settings→Task Definitions →Task Aggregates

■ In the example below;

- We have Task1_2 and Task1_2_3 as task aggregates.
- You can use those labels as shown in the fig. below.





Staff Definitions

Tasks per Staff

■ Settings→Staff Definitions \rightarrow Tasks per Person ■ This table is essential as a skill reference. ■ Don't forget to click Set when you've done editing.

Staff	Definitions	Shifts per Staff	Group Definitions	Group A	ggregate Definitions	Tasks per Person				
	Set									
		StaffName	Task	1	Task2	Task3	Task4	Task5	Task6	Task7

	Starmaine									
1	June BYRNE									
2	Amick, Sarah Jane			✓					✓	✓
3	Ismael Miranda									
4	Scott Lambert	✓	•		✓					
5	Alexander Teodorovich									
6	Michael Pelland			✓	✓	✓			✓	✓
7	Tim Davis									
8	Thomas Braum	✓	Image: A start and a start				✓			
9	nguyen thu	>								
10	Ravi Zupa			✓	✓					
11	sitanshu kumar									V
12	Vineel Vallapureddy									
13	Paul Eato									
14	Kenton Veeder			✓					✓	✓
15	菅原 Spaderna									V
16	Wayne Marking	✓		✓					✓	✓
17	KRISHNAKUMAR MANI									
18	Brad Parker						✓			
19	George Smith									
20	mohamed mohmand									
21	Vladimir Golev					✓				
22	asela.zuniega	✓	X		✓					
23	Terry Lalonde									✓
24	Heechan Shin			✓	✓				✓	✓
25	A de Bruin									
26	Arnaud Amadjikpe			✓	✓	✓		✓	✓	✓
27	Douglas Patterson	x								
28	david smithson	2		2					2	✓
29	ALAN WATSON	x								
30	Dear Vladimir									
31	Dagon Ryan									

- • ×

Task

Task8



■ NoTaskVar is special task variable, used in special condition.



- Phase object ties a specific Phase to a particular task.
- Phase objects are optional, most users can ignore this function.
- A phase object consists of a phase variable and a set of phase variables.
- A phase object can be treated in the same way as a shift in most cases.



■ A phase variable is a reference to set of a task or task aggregate in a day. It can be used like a shift.



A Phase Vars Set set is an OR of phase variables. It is like the relationship between a shift and a shift aggregate, but a Phase Vars Set can also have a shift as an element.
 The Phase Vars Set has limitations in integer counting and time constraints.

- (1) Inverting counting is not supported.
- (2) The elements must be in an exclusive set.



Constraints

Constraints are classified as below.

■ You won't need to use the advanced features of the Python language constraints for most situations.





Relationship to set definitions

■ No matter which constraint you choose, you will need to specify the Day set, the Shift set, and the Staff set.

■ In addition to this, the task set and (phase object) must be described in the taskbased work schedule.

■ Only if the GUI cannot describe a description will we use Python language constraints.





Direction on Constraints

■ Row constraints are on the horizontal directional rule per each staff.

- Column constraints are on the vertical directional rule per each day.
- In Task-based constraints, column constraints are on the vertical directional rule per each phase.

■ Pair constraints are on a staff pair, which is a vertical directional rule per each day or phase.





Row Constraints Summary

There are four types of constraints on row constraints, as shown below.
Prohibit_Pattern Describe one or more patterns.
Max_Min_Pattern Specifies the maximum and a minimum number of patterns.
Either maximum or minimum, or both, must be listed. Describe one or more patterns.
Integer_Count Count shift or phase_object.
Max_Min_Time Count time value. Specifies the max/min of it.

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								5	hift Pat	tern					Soft	First pattern	^
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2	V	TwoDaysOffafterAfter_Night_Shift_ifpo ssible.	Automatic_This_ Month	A_Member_in_All 👻	Prohibitt_Pattern 👻								-	-	3 🗸	Ţ	
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Descriptions required for row constraints

Checkmark If not selected, the constraint will be ignored.

Set You need to click on the Set button to reflect the changes.

■ You must enter Row Constraint Name, Day Type, Group Type, Constraint Type. If you enter any of 1 to 7 in the soft level, it becomes a soft constraint, and if not, it is a hardware constraint.

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First/Last pattern daytype

If the first/last day pattern is not empty, the following condition will add to the constraint.

The constraint will be active only if the first pattern of the day matches the day type.
The constraint will be active only if the last pattern of the day matches the day type.

RowC	onstraint																	
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🗹 Enab	e Se	RowConstraintGroup1																
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4	•	Prohibit_one_day_work_on_weekends2	FromStartDateMi nus1	A_Member_in_All 👻	Prohibitt_Pattern 👻								-	-	-	•	Sun 👻	



Row Time Constraint

Select Max-Min_hours .

■ Only one pattern is allowed. Multiple patterns are not allowed.

Either maximum or minimum, or both, must be listed.

- No invert checkmark is permitted.
- No soft level is supported.

RowC	onstraint																
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1 2

Row Integer Count Constraint

- Specifies the max/min of the counts.
- Either maximum or minimum, or both, must be listed.
- Only one pattern is allowed. Multiple patterns are not allowed.
- No invert checkmark is permitted.
- Soft Level is supported, unlike Time constraint.
- The counting objects are count field of shifts or phase_object.
- If the counting objects are aggregate type, the set must be exclusive.

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■ When you want to change the Max/Min value for each staff member, you can use the following method.

■ We can apply vectorized max/min values only for the group's attribute items described by only positive integers. Blank spaces are allowed. In that case, the staff will have no constraint.

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New page for phase constraint group

■ This is the page for describing the constraints for the tasks in each phase in row constraints.

■ Right Click on the blue part→Insert Phase Page





Row phase constraint

The phase pattern is in the order of the phase name as defined in the phase definition.
The Pallet is tasks or task sets.

■ The sample below prohibits Late-Early sequence of Task1.

Task Definition			Phase Class	Primar	y Phase						
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Group Management

■ We can color the tabs of the constraints or change the order.





Usage of Macro

If you want to define the same constant in multiple places, it is useful to define macros. This makes it easy to perform monthly maintenance, as long as you only need to set up the period and change the value of the macro.





Column Constraints

There are five types of column constraints, as shown in the figure below. ■ Prohibit Shift Prohibit the Shift.

■ Max_Min_Staffs Specifies the maximum and minimum number of staff to be assigned.

- Force_Shift Force the shift, inverse of Prohibit_Shift.
- Max-Min_Hours Time Constraint

■ Soft_Staffs_Max_Min Extended function of Max_Min_Staffs.

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ColumnC	onstraint	Group1 ColumnConstraintGroup2										
🗹 Enabl	le Se	t ColumnConstraintGroup1										
No.	Enable	Column Constraint Name	Day Туре		Group Type	Shift Type	Constraint Type	Max	Min	1	Soft Constraint Level Max for different weight	Soft Level
1		TwoNightShift	ThisMonth	- 1	A_Member_in_All 👻	Night_Shift 💌	Max-Min_Staffs	2 🖵	2	-	-	-
2		TwoAfterNightShift	ThisMonth	• 1	A_Member_in_All 👻	After_Night_Shift 💌	Prohibit_Shift	2 🔹	2	-	-	•
3		At_least_1_nurse_per_Night_S	ThisMonth	•	Nurse 💌	Night_Shift 💽	Max-Min_Staffs	•	1	-	_	-
4		At_least_1_nurse_per_After_Ni	ThisMonth	•	Nurse 👻	After_Night_Shift 👻	Force_Shift Max Min Hours	-	1	-	-	•
5		At_least_10_persons_on_Days	ConsultationDay	- /	A_Member_in_All 👻	Day_Shift 💽	Soft Staffs Max-Min	-	10	-	-	-
6	v	At_least_5_persons_on_Days_	Day_on_Closed	• /	A_Member_in_All 👻	Day_Shift 💽	Max-Min_Staffs 💽	-	5	-	—	-
7				•	-		Prohibit_Shift 💽	-		-	-	•
8				•	-	•	Prohibit_Shift 💽	-		-	-	•
9				•			Prohibit_Shift 💽	-		-	-	•

- CheckBox Selecting the checkbox will make the constraint enabled.
- Set You need to click on the Set button to reflect the changes.
- You must enter Column Constraint Name, Day Type, Group Type, Shift Type, and Constraint Type.
- If you enter any of 1 to 7 in the soft level, it becomes a soft constraint, and if not, it is a hardware constraint.



Column Time Constraint

- Select Max-Min Hours.
- Either maximum or minimum, or both, must be listed.
- No soft level is supported.

🗾 Colun	nnConstrai	int								
ColumnC	onstraintG	roup1 ColumnConstraintGroup2								
🗹 Enabl	e Set	ColumnConstraintGroup1]							
No.	Enable	Column Constraint Name	Day Туре	Group Type	Shift Type	Constraint Type	Max	Min	Soft Constraint Level Max for different weight	Soft Level
7	•	MaxOffsTimes	ConsultationDay 💽	A_Member_in_All 🗸	Day_Offs 🖃	Max-Min_Hours 🗨	36 星	•		-



Column Soft Staffs Max-Min

- It is a extended function of Max-Min Staffs.
- You can set the soft level for the Max and the Min individually.
- You should check both levels on the solution page; otherwise, the behavior is undefined.

📧 Colui	nnConstra	iint				$\langle \rangle$		\		
Column	Constraint	aroup1 ColumnConstraintGroup2					· · · · · ·			
🗹 Enab	le Se	t ColumnConstraintGroup1					_			
No.	Enable	Column Constraint Name	Day Туре	Group Type	Shift Type	Constraint Type	Max	Soft Constraint Level Min Max for different weight	Soft Level	
1		TwoNightShift	ThisMonth 🚽	A_Member_in_All 🗸	Night_Shift 💽	Soft_Staffs_Max-Min 💌	3 🗸	2 - 1 -	2 🔹	
2			-		-	Prohibit Shift 🛛 🗸	-	▼	T	



Column Task Constraint

This page is for describing constraints on tasks per phase in the column constraints.





Column Vectorized max-min

■ Refer to <u>Specifying Max/Min Tasks in Column Constraint</u>.





Undo

Click on Undo.

Schedule 3 5 8 2 4 9 Undo Redo ^ Filter ThelWeek I J StaffName 1 2 з 4 Ŧ 5 6 7 8 9 -Tue Wed. Thu Fri Sat Sun Mon Tue Ned 1 1 1 1 1 Staff1 1 1 1 Staff2 1 1 1 1 Staff3 1 I 1 1 1 1 Staff4 1 Staff5 ¥ < >



■ The current input is cancelled. If you want to undo the undo, click Redo button.

Schedule									-	• •	۲.
Undo Redo	1 2	3	4	5	6	7	8	9			
	Filter				ThelWee)	c .			I	J	^
StaffName		• 1 Tre	2	3	4	5	6	7	8	9	
		• IU8	Hed	104	111	SAL	San	non	108	Hed	-
Staff1											
Staff2		8	•	0	¢	¢		0	0		
Staff3			7			1					
Staff4		4									
Staff5											. 🗸
<		Ĩ	i	I	i	i	i	1	I	>	


Multiple Entering

■ You can enter multiple cells at once.





Locked state

■ Yellow marking reflects the cell is locked.

Schedule											2
Undo	1 2	3	4	5	6	7	8	9			
	Filter				ThelWeek				I	J	
StaffName		▼ 1 ▼ Tue	2 Wed	3 Thu	4 Fri	5 Sat	6 Sun	7 Mon	8 Tue	9 Wed	
Staff1											
Staff2		8									
Staff3			7			1					
Staff4		4									
Staff5											
Staff6				¢	¢						
Staff7				÷							
Staff8											
Staff9											





■ Please make the scroll bar appear and move the staff after you complete the window smaller.





Entering Task Schedule

■ The window of Task Schedule will appear as well Shift Schedule after clicking here when you define more than one phase.

Click Window Settings \rightarrow Cascade in the window to make it visible when you can not see it.

■ The palette is lined with labels for tasks and task aggregate.

🖳 Task Schedule																							(٢
Undo Redo		12	3	4	56	5 7	8	9	10	11	1:	2														
a. (1)		Filter		29 Wed	30 Thu		31 Fri	s	1 at	S	2 2011	ж	3 Ion	T	4 19	: We	5 ad	т	5 hu	F	7 r1	s	8 at	9 51	9 20	^
StaffName		•																								
June BYRNE												1	2	3												
Amick, Sarah Jan	e																									
Ismael Miranda												¢	¢		ç	ç				ç		¢				
Scott Lambert												¢										¢				
Alexander <																									>	*
Task Name		Attribute	v	29 Ved	30 Thu		31 Fri	s	1 at	S	2 un	м	3 on	T	4 ue	w	5 ed	Т	5 1U	F	7 ri	s	8 at	SI) JN	^
Task1	•	A_Member_in_All 👻						0	0	0	0	4 4	1 1	4 4	2	4 4	2	4 4	2 2	4 4	0	0	0	0	0	
Task1	-	RegisteredNurse 👻								0		2	1	2	1	2	1	2	1	2						
Task2	-	A_Member_in_All 👻						0	0	0	0	2	1	3	3	2	2	3	2	2	0	0	0	0	0	
Task2	•	RegisteredNurse 👻	E 									-			_	-	_		-	-	0					
Taak2		A Mombor in All -	<u>F</u>					0	0	0	0	0	1 2	2	0	0	0	0	1	0	0	0	0	0	0	
I dSK3		A_merriber_in_All	E									0	2	0	0	0	0	0	0	0	0					
Tack3	-	RegisteredNurse -	E			į			<u>;</u>			. V	<u>.</u>	. v	. U	. U	U	U	U	. U	U					

Specifying Max/Min Tasks in Column Constraint

■ Below is a TaskProjects/task_import_with_skills.nurse3.

■ This table that defines the maximum and minimum.

■ The upper row corresponds to max and the lower row to min.

Colur	nnConstrai	int																									X
excel_ge	n																										
🗹 Enab	le Set		excel_gen																								
No.	Enable	Column C	onstraint Name	Day Type	Grou	р Туре	Phas	e Type		Task	Туре		Constra	aint Typ	De		Ма	ax				Min			Soft Constraint Leve Max for different weight	So	oft Le ^
1	2	Task1A_Me	ember_in_All_ph0	ThisMonth	► A_Memb	er_in_All 🚽	ph	0	•	Task	1	•	Max-Min	_Staffs	💽 Ta	ask1A_	Jember	r_in_All_	max 🗖	Tas	k1A_Me	ember_i	n_All_n	nin 🖵		2	3
2		Task1A_Me	ember_in_All_ph1	ThisMonth	 A_Member 	er_in_All 👻	ph	1	•	Task	1	-	Max-Min	_Staffs	• •	askIA_M	1ember	r_in_All_	_max 🗔	 Tas 	LA_Me	ember_i	n_All_n	nin 💽		-	3
3		Task1Regi	steredNurse_ph0	ThisMonth	 Registered 	dNurse 👻	ph	0	-	Task	1	-	Max-Min	_Staffs	• T	ask1Reg	gistered	dNurse_	max	Tas	k1Regi	steredN	urse_m	nin 🖵		-	3
4	V	Task1Regi	steredNurse_ph1	ThisMonth	- Register	edNurse 👻	ph	1	-	Task	1	-	Max-Min	_Staffs	- T	ask1Reg	jistereo	Nurse_	max 🖣	Tas	k1Regi	steredN	urse_m	nin 🖃		-	3
5		Task2A_Me	ember_in_All_ph0	ThisMonth	- A_Memb	er_in_All -	ph	0	-	Task	2		Max-Min	_Staffs	• Ta	ask2A_A	lember	_in_All_	_max _	Tas	k2A_Me	ember_i	n_All_n	nin 👻		-	3
0		Task2A_M	ember_in_All_ph1	ThisMonth	A_Member	er_in_Ali -	pr	1	-	Task	2		Max-Min	_Starrs		ask2A_M	iember	_IN_AII	max	Tas	KZA_ME	ember_i		in 👻			3
9		Task2Regi	steredNurse_ph0	ThisMonth	- Register		pi nh	1		Task	2		Max-Min	Staffe	T	ask2Reg	listered	INUISE_	may .	Tas	k2Regi	steredN	urse_m				3
-		ruskenegi	stereditarse_pri1	monun	register					Tusk			riux riiii	_otuno		usitzitteg	Joteree	interse_			itzi tegi	Sterear	urse_m				, v
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	Task	Name	Attribute	29 Wed	Thu	31		1 Gat	S	2 un	Me	3 on	т	4 ue	w	5 /ed	т	6 hu	F	7 ri	s	8 Jat	S	9 un	^		
	Tac	- L1	A Mombor in All				0	0	0	0	4	1	4	2	4	2	4	2	4	0	0	0	0	0			
	Ids		A_Member_III_AII			1			0	°	4	1	4	2	4	2	4	2	4		0	1	0	0			
	Tae	k1 -	RegisteredNurse																								
	100		Registereunuise								2	1	2	1	2	1	2	1	2								
	Tas	k2 -	A Member in All	•			0	0	0	0	2	1	3	3	2	2	3	2	2	0	0	0	0	0			
											2	1	3	3	2	2	3	2	2					<u> </u>			
	Tas	k2 -	RegisteredNurse	-							4	-	-	-	-	-	-	-		U		-					
							0	0	0	0	1	1	2	1	1	1	2	1	1	0	0	0	0	0			
	Tas	k3 🔻	A_Member_in_All	▼			· · · ·	v	v	v	v	2	v	v	v	v	v		v	v	v	v	v	v			
											0	-	0	0	0	0	0	0	0	0							
	Tas	ik3 🔻	RegisteredNurse	▼	·			-				2										-					
	-					1	0	0	0	0	4	2	4	4	4	4	3	4	4	0	0	0	0	0	~		



Task Max/Min in Schedule

If you change only the maximum and minimum values without changing the task names and attributes, you do not need to maintain the column constraints.
 However, if you change the task name or attribute name, you need to maintain the corresponding column constraints (delete or change the constraints).

🔲 Colu	nnConstra	raint																								x
excel_ge	n																									
🗹 Enat	le Se	et	excel_gen]																						
No.	Enable	Column C	Constraint Name	Day Type	Gro	oup Type	Phase	Туре		Task Ty	e	Constra	int Type	e		Max	x				Min			Soft Constraint Leve Max for different weight	Soft L	e^
1		Task1A_Me	ember_in_All_ph0	ThisMonth	A_Mem	nber_in_All 👻	phO	[-	Task1	-	Max-Min	_Staffs [🔹 Ta	sk1A_M	ember_	_in_All	_max 🕞	Tasl	k1A_Me	mber_i	n_All_m	nin 🖵	-	3	
2	•	Task1A_Me	ember_in_All_ph1	ThisMonth	 A_Mem 	nber_in_All 👻	ph1		-	Task1	-	Max-Min	_Staffs	🔹 Ta	sk1A_M	ember_	_in_All	_max 🕞	Tasl	k1A_Me	mber_i	n_All_m	nin 🖵		3	
3		Task1Regi	isteredNurse_ph0	ThisMonth	 Register 	eredNurse 💌	phO		•	Task1	-	Max-Min	_Staffs	🔹 Ta	isk1Regi	istered	Nurse_	max 🗣	Tas	k1Regis	teredN	urse_m	in 🗸		3	
4		Task1Regi	isteredNurse_ph1	ThisMonth	- Registe	eredNurse 👻	ph1		-	Task1	•	Max-Min	_Staffs	• Та	sk1Regi	istered	Nurse_	max 🖣	Tas	k1Regis	teredN	urse_m	in 🖵		3	
5		Task2A_Me	ember_in_All_ph0	ThisMonth	- A_Mem	nber_in_All -	phO		•	Task2	-	Max-Min	_Staffs	→ Ta	sk2A_M	ember_	_in_All	_max 🗣	Tas	k2A_Me	mber_i	n_All_m	nin 👻		3	
6		Task2A_M	ember_in_All_ph1	ThisMonth	 A_Mem Begiete 	nber_in_All -	pn1		-	Task2	-	Max-Min	_Staffs		SKZA_M	emper_	_in_All	_max -	Tasi	k2A_Mei	mper_II	n_All_m	nin 👻		3	-
	2	Task2Regi	steredNurse_ph0	ThisMonth	- Registe	eredNurse -	phu nh1		-	Task2		Max-Min	Staffe	• Ta	sk2Regi	istered	Nurse_	may -	Tac	k2Regis	teredN	urse_m	in 🖃		3	
		Tuskzitegi	sterearrange_prir	mononar	Regist		pina		•	TUSKE		PIGA PIIII	_otano [ISKZINCY	beereui	autoc_	intex [*		NZINC 915		unoc_m			_	- ×
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	-																						>	_	>	
	Tasl	sk Name	Attribute	29 Word	30 Thu	31	1		2		3 Mon		4	5	j od	6 Th		7	7 Pi	8	3 at	0	, ,	<u>^</u>	>	
	Tasl	:k Name	Attribute	29 Wed	30 Thu	31 Fri	1 5;	at 0	2 Su	n	3 Mon	T	4 ue	5 We	i ed	6 Th	u 2	F	ri 0	8 53	3 at	Si O))))	^	>	
	Tasl Ta	sk Name ask1 ▼	Attribute	29 Wed	30 Thu	31 Fri	1 53	at 0	2 Su 0	n O	3 Mon 1	T 4 4	4 ue 2 2	5 We 4	ed 2	6 Th 4	u 2 2	7 F 4	7 ri 0	8 53	B at O	0 0) JN 0	^	>	
	Tasl Ta Ta	s <mark>k Name</mark> ask1 ▼	Attribute A_Member_in_All RegisteredNurse	29 Wed	30 Thu	31 Fri	t S: 0	at O	2 Su 0	n 0 4	3 Mon 1 1	T 4 4	4 ue 2 2	4 4 2	ed 2 2 1	6 Th 4 4	u 2 2	F 4 4 2	ri 0	8 S; 0	B at O	0) 1n 0		>	
	Tasl Ta Ta	s <mark>k Name</mark> ask1 •	Attribute A_Member_in_All RegisteredNurse	29 Wed	30 Thu	31 Fri	1 5; 0	at 0	2 Su 0	n	3 Mon 1 1 1 1	T 4 4 2 3	4 ue 2 2 2 1 3	4 4 2 2	ed 2 2 1 2	6 Th 4 4 2 3	u 2 2 1 2	2 2 2	r i 0	8 53 0 0	3 at 0	0 0	> 311 0		>	
	Tasl Ta Ta Ta Ta	sk Name ask1 • ask1 •	Attribute A_Member_in_All RegisteredNurse A_Member_in_All	29 Wed	30 Thu	31 Fri	1 S: 0	at O	2 Su 0	n 0 0	3 Mon 1 1 1 1 1 1	1 4 4 2 3 3 3	4 ue 2 2 1 3 3	4 4 2 2 2	2 2 1 2 2	6 Th 4 4 2 3 3	u 2 2 1 2 2	2 2 2 2	ri 0	8 Si 0	at O	0	> 30 0 0	Î	>	
	Tasl Ta Ta Ta Ta Ta	sk Name ask1 • ask1 • ask2 • ask2 •	Attribute A_Member_in_All RegisteredNurse A_Member_in_All RegisteredNurse	29 Wed	30 Thu	31 Fri		at O	2 Su 0		3 Mon 1 1 1 1 1 1	7 4 4 2 3 3 3	4 ue 2 2 1 3 3 3	4 4 2 2 2 1	ed 2 2 1 2 2 2 2 1	6 Th 4 2 3 3 3	u 2 2 1 2 2 1	2 2 2 1	ri 0 0	8 Si 0 0	at O		> JN 0		>	
	Tasl Ta Ta Ta Ta Ta	sk Name ask1 • ask1 • ask2 • ask2 •	Attribute A_Member_in_All RegisteredNurse A_Member_in_All RegisteredNurse A_Member_in_All A_Member_in_All	29 Wed •	30 Thu	31 Fri		at 0	2 Su 0 0		3 Mon 1 1 1 1 1 1 1 1 1 1 2	1 4 4 2 3 3 3 2 0	4 2 2 1 3 3 3 1 0	4 4 2 2 2 1 0	2 2 2 1 2 2 2 1 2 1 0	6 Th 4 4 2 3 3 3 2 0	u 2 2 1 2 2 1 2 0	2 2 2 1 0	ri 0 0 0 0	0 0 0	B at 0		> 3 1 0 0 0		>	
	Tasl Ta Ta Ta Ta Ta Ta	sk Name ask1 • ask2 • ask2 • ask2 •	Attribute A_Member_in_All RegisteredNurse A_Member_in_All RegisteredNurse A_Member_in_All A_Member_in_All	29 Wed •	30 Thu	31 Fri		5t 0 0	2 Su 0 0		3 Mon 1 1 1 1 1 1 1 1 1 1 1 1 2 2	T 4 4 2 3 3 3 2 0	4 ue 2 2 1 3 3 3 1 0	4 4 2 2 2 1 0	i 2 2 1 2 1 2 1 0	6 Th 4 4 2 3 3 3 2 0	u 2 2 1 2 2 1 0	2 2 2 1 0	7 ri 0 0 0 0 0				>)))))))))))))))))))		>	
	Tasl Ta Ta Ta Ta Ta Ta Ta	sk Name ask1 • ask2 • ask2 • ask2 • ask3 •	Attribute A_Member_in_All RegisteredNurse A_Member_in_All RegisteredNurse A_Member_in_All RegisteredNurse RegisteredNurse	29 Wed • •	30 Thu	31 Fri		at 0	2 Su 0 0		3 Mon 1 1 1 1 1 1 1 1 2 2 2 2	T 4 4 2 3 3 3 2 0 0	4 ue 2 2 1 3 3 3 1 0 0	4 4 2 2 2 1 0	2 2 2 1 2 2 1 2 1 0 0	6 Th 4 2 3 3 3 2 0 0	u 2 2 1 2 2 1 0 0	2 2 2 1 0	ri 0 0 0		3 at 0		> 31 0 0		>	



Pair Prohibition Constraint

■ There are two types of constraint types: pair prohibition and if A, then B.(Implication)

Pair prohibition logic would look like as follows ,if we use C-language style. assert(! (function(A) & function(B)));//where the function is OR/AND

This constraints Staff A and Staff B must not work together on NightShift.

Pair Co	nstraint																		
PairConstr	aintGroup	PairConstraintGroup2																	
🗹 Enable	Set	PairConstraintGroup1																	
No	Enable	Pair Constraint Name	Constraint Type					Α							В				Soft Level
110.	LINUDIC		constraint type	Staff Definition	on	Opera	tor	Shift Type		Day Type		Staff Definition	0	perato	r	Shift Type		Day Offset	Sont Ecver
1	✓	Prohibit_Staff1-2_Nishift_Shift_	Pair_Inhibited 🕞	Staff1	-	OR	-	Night_Shift	-	ThisMonth	-	Staff2		OR	•	Night_Shift	-	-	-
2	✓	Prohibit_Staff1-3_Nishift_Shift_	Pair_Inhibited 🕞	Staff1	-	OR	-	Night_Shift	-	ThisMonth	-	Staff3		OR	-	Night_Shift	-	-	-
3	V	Prohibit_Staff1-4_Nishift_Shift_	Pair_Inhibited 🕞	Staff1	-	OR	-	Night_Shift	-	ThisMonth	-	Staff4		OR	-	Night_Shift	-	-	-
4	✓	Prohibit_Staff1-5_Nishift_Shift_	Pair_Inhibited 🕞	Staff1	-	OR	-	Night_Shift	-	ThisMonth	-	Staff5	•	OR	-	Night_Shift	-	-	-
5			Pair_Inhibited 🖃	·	•	OR	-		.		•			OR	•		F	-	-
6			Pair_Inhibited 💌		-	OR	-		-		-		•	OR	•		-	-	-
7			Pair_Inhibited 💽	·	•	OR	-		•		-			OR	•		-	-	-
8			Pair_Inhibited 🕞		-	OR	-		-		-			OR	-		-	-	-
9			Pair_Inhibited 🖃	•	•	OR	•		•		-			OR	•		-	-	-
10			Pair_Inhibited 🖵		-	OR	-		-		-			OR	-		-	-	-
11			Pair_Inhibited 🖵	•	-	OR	•		•		-		•	OR	-		-	-	-
12			Pair_Inhibited 🕞		-	OR	-		-		-			OR	-		-	-	-



Pair Implication Constraint

The implication is the constraint that If A, then B.

- The logic would look like as follows ,if we use C-language style. assert(! function(A) | function(B));
- If we would like to A == B, we need to use it in both directions.
- We strongly recommend using a soft constraint for preceptor-preceptee because it narrows the solution space significantly.

Pair Co PairConstr	nstraint raintGroup1	PairConstraintGroup2																	
🗹 Enable	Set	PairConstraintGroup1	/																
No.	Enable	Pair Constraint Name	Constraint Type	Staff Defir	nition	Operat	or	A Shift Type	_	Day Type		Staff Definition	on	Operat	E or	3 Shift Type	_	Day Offset	Soft L
1		Staff1_preceptor	If(A)_Then_B	Staff1	-	OR	-	Night_Shift	•	ThisMonth	-	Staff2	-	OR	-	Night_Shift	-	-	6
2		Staff2_preceptee	If(A)_Then_B 👻	Staff2	-	OR	-	Night_Shift	-	ThisMonth	-	Staff1	-	OR	-	Night_Shift	-	-	6
3			Pair_Inhibited 💌		-	OR	-		-		-		-	OR	-		-	-]
4			Pair_Inhibited 💌		-	OR	-		-		-		-	OR	-		-	-]



Excel Operation

There are two features: importing an Excel sheet into this software and exporting this software to an Excel sheet.



Excel Import

There are mandatory sheets and optional sheets in the following table. Keep also the order of the sheets.

Example Name	Page Type	Mandatory/Option
SchedulingPeriod	SchedulingPeriod	mandatory
StaffProperty	StaffProperty	mandatory
StaffSchedule	StaffSchedule	Option
ProcessRequirement	ProcessRequirement	Option
TaskSkills	StaffTaskProperty	Option



Set Excel imported file name

- Windows Setting → Excel Import Export Setting
- $\blacksquare Excel Import \rightarrow File Path$
- Set file name to open.

Excel I	ngs Con Import E po port Excel	straints Schedule S ort Setting	Solve Solutions Win	dows Settings Help				
Se	et	F Path	Import					
No	Taabla	Chart Name	Daga Tura	Iter	n	Item		
NO.	Enable	Sneet Name	Page Type	Value	Туре	Value	Туре	Value
1		SchedulingPeriod	SchedulingPeriod -		-		-	
2		StaffProperty	StaffProperty -		-		-	
4		Macro	Macro -					
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<	• •	Open → · ↑ • • Ei rganize ▼ New folc ③ 3D Objects ↑	nglish > Project_Sample der Name	es > Excel_Samples	Date modified	マ ご Type	∽ Search Exce B Size	el_Samples
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SchedulingPeriod

■ Scheduling Period and Month Characteristic Dates can be imported as follows.

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StaffProperty

■ Staff definitions also can be imported.

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StaffSchedule

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ProcessRequirement

■ Load the project TaskProjects/task_import_with_skills as a sample.

- Importing ProcessRequirement generates a number of internal tables.
- Phase definitions, shift definitions, task definitions, column groups , and the task schedules are newly generated.
- The next page is the screen importing task_phase2_with_many_skills.xlsx.

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Excel Export Sample

Load excel_sample/Excel_import_export.nurse3



Set Exported Excel file name





Export to Excel

Click on Set to set the **file path** to the project in memory.

■ Be sure to output the solution form (example below) before pressing the output button.

Click on Output to save it as excel file. (In this example, sheet name "output" is the exported sheet.

To remember the settings above, please save the project file.

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Notes on Excel Export

■ The Excel export file is as it is on the solution screen.

■ Excel Auto Filter on the sheet is as it is on the solution screen selected.

■ It is necessary to close the Excel file when outputting to Excel.

■ You can also export from the solution screen by right-clicking on the menu.

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Excel User Formatted Export

■ See excel sheet named "output" on "Excel_import_sample.xlsx.

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- Note the sheet has a user-defined format.
- According to the format, GUI performs Excel write operation.
- In other words, you must specify those formats.
- A straightforward approach is to copy the Scheduling format as output format.
- You can add the name of the row constraint if you like in the yellow line.



- In phase mode, only Shift names are output. Options are;Staff
- Specify Item Name.
- Monochrome
- Use when you do not want a color background label.
- BlankedLabel
- Use when you do not want a specific label. (In this example, GUI omitted D.)
- MarkScheduledInputs
- Use when you want to indicate the hard-schedule in red font.

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Move to Next Month

■ Refer to <u>Shift Tutorial</u>.

When you can't see the columns of the window?

Do Reset Windows Settings.

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When the window is hidden?

Click on any of them in the Window Settings.

schedule Nurse III C:\Users\sugaw\Documents\Git1\Schedule_nurse3_Gallery\Schedule_Nurse3_Gallery\English\Project_Samples\tutorial2.nurse3

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Random Schedule Generation

Right Click → Click on Generate Random Schedule

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Days Selection on Random Schedule Generation

The choice comes out. The choices are from the top to the fourth of the <u>Day Aggregates</u>.

📰 Schedule Nurse III 🛛 C:\Users\sugaw\Documents\Git1\Schedule_nurse3_Gallery\Schedule_Nurse3_Gallery\English\Project_Samples\tutorial2.nurse3

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	Staff8									WeekDay			StartDatePlus3	+3	-	StartDate	-		-		29	- 30				5	
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	Staff1(WorkingDa	ys		2ndWeek	UK ⊥7	-	1 stWeek		StanDatePlus1	-	50							
	Junit									20			3rdWeek	+7	Ţ	2ndWeek	Ţ										Ĺ
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