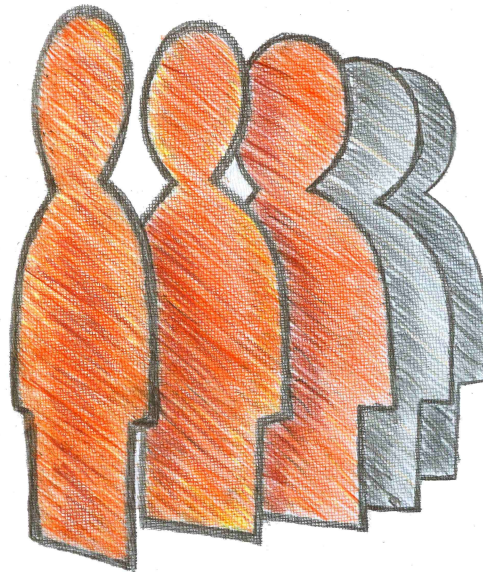


Senang

# SUMit's Artificial Planner



[www.sum-it.nl](http://www.sum-it.nl)

SUMit, January 2010, Henk Jan Nootenboom

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# 1. Artificial Intelligence in Planning

Senang is SUMit's Artificial Intelligence Software for solving complex planning puzzles.

SUMit's Senang makes complex planning easy

- The computer generates an excellent solution for complex planning puzzles.
- With minimum cost, efficient usage of resources
- Quickly, within minutes

## Who will benefit from Senang

- Organisations with complex shift rosters, open 7 days a week, 24 hours a day.
- Hospitals that need an optimum distribution of tasks among employees.
- Factories that need to produce at minimum costs.
- Companies that need a minimum staff level.
- Distribution centers who need route planning for many delivery trucks.

Senang is a word from the Malay language. In Indonesia it means 'at ease', 'well balanced'. In Malaysia it means 'easy'.

SUMit's Senang makes your planning easy.

Planning is tough, complex, sometimes too complex for a human mind.

- How to create an excellent planning, when things get too complex for the human mind?
- How to satisfy contradictory requirements?
- How to deal with shades of grey, e.g. 82% rested, 18% tired?

Is your planning complex enough?

Let Senang plan for you!

nacht				
Bert	438		**	
Eric	419			
Gerrie			418	
Hans				417
Marc	425			
Michael	****		****	416
Willy	**	415		

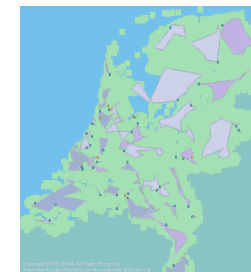
automatic distribution of tasks to staff

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The Pc now assigns tasks of Tue 9 Oct.

Dag	...	u126	...	...
Mon 1	17:30 - 20:30	7:00 - 11:00	8:4	
Tue 2	Off	17:30 - 20:45	8:0	
Wed 3	Off	17:30 - 20:45	8:0	
Thu 4	7:00 - 15:30	17:30 - 20:30	17:3	
Fri 5	12:00 - 20:45	17:30 - 20:30		
Sat 6	17:30 - 20:45	Off	7:0	
Sun 7	12:00 - 20:30	Off	17:3	
Mon 8	17:30 - 20:30	17:30 - 20:45		
011 Tue 9	Off	...		
011 Wed 10	...	Off		

shift roster generator



route planning for many trucks



## 2. Save Time

See the following example with a simple goal:

- Minimize travelling time
- for 2 salesmen
- both of them need to travel from home to a customer.

Which salesman will visit which city?

See the table at right hand side for travel times.

1. Will Andy travel 12 hours to Dublin and Ben travel 6 hours to Edam?  
Total travel time will be 18 hours.
2. Or, will Andy travel 1 hour to Edam and Ben travel 19 hours to Dublin?  
Total travel time will be 20 hours.

	travel time	
	to Dublin	to Edam
Andy from Apeldoorn	12 hours	1 hour
Ben from Berlin	19 hours	6 hours

optimum distribution			
staff	from	to	travel time
Andy	from Apeldoorn	to Dublin	12 hours
Ben	from Berlin	to Edam	6 hours
optimum total travel time			18 hours

The solution for this small distribution problem is easy:

The optimum, lowest total travel time is 18 hours.

This optimum saves you two hours compared to the alternative.

Imagine how much time you can save when you have many salesmen, many delivery trucks, many staff, etc.



### 3. Save Money

The bigger the size of the planning, the harder it is to find the optimum solution.

The following example shows a more complex assignment problem:

Distribute 7 tasks to 7 employees.

The table below shows the costs of each possibility, with the optimum task distribution highlighted, with a total cost of 1,223.

<i>Costs for Possible Tasks</i>								<i>Optimal Task Assignments</i>		
Employee	food	garage	hatch	inspection	jewelry	kanoo	laundry	Employee	Task	Cost
Andy	10,000	184	10,000	10,000	308	308	10,000	Andy	jewelry	308
Ben	43	75	43	43	252	252	273	Ben	garage	75
Carl	128	10,000	128	128	308	308	10,000	Carl	kanoo	308
Dave	169	10,000	169	169	10,000	10,000	336	Dave	laundry	336
Ellen	64	113	64	64	271	271	273	Ellen	food	64
Fuad	10,000	10,000	46	46	10,000	10,000	10,000	Fuad	hatch	46
Gerrie	86	10,000	86	86	271	271	10,000	Gerrie	inspection	86
<b>total 1,223</b>										

Senang, the SUMit planning generator will find the optimum solution quickly.

Try any other combination of task assignment in the table above and see how much money the optimum task assignment will save you.



## 4. Contradicting requirements

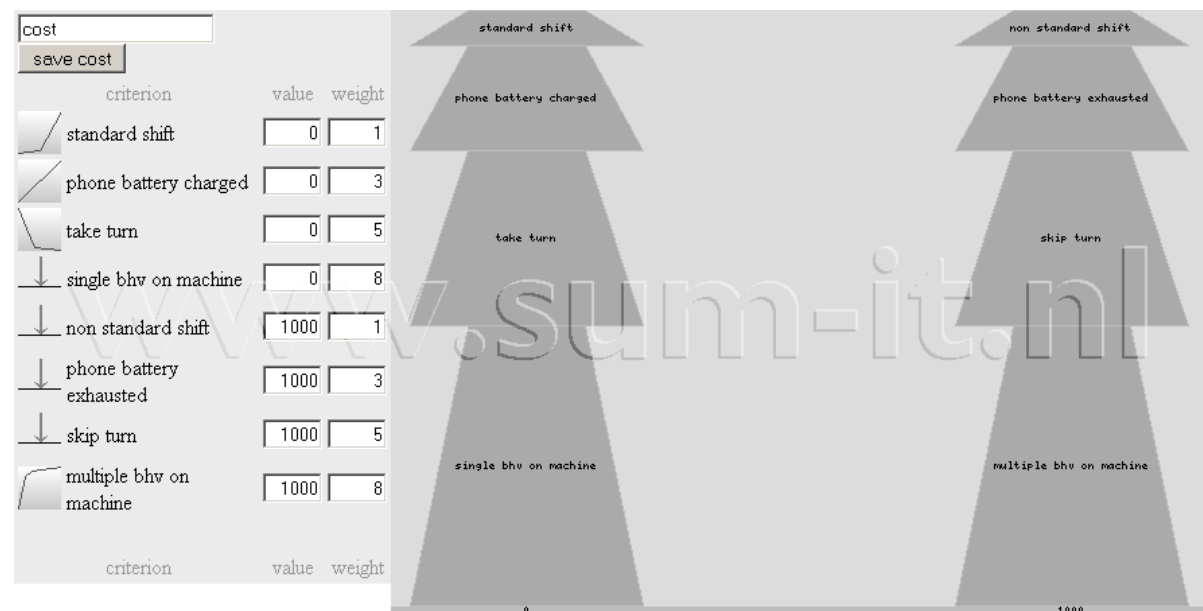
SUMit generator can cope with contradictory requirements.

It prioritises important criteria and satisfies other criteria where possible.

SUMit's Senang weighs various criteria to find an excellent solution.

An example of criteria, good and bad, important and less important:

- The left pile of criteria defines good, what the generator should strive for
- The right pile of criteria defines bad, what to avoid
- The size of each criterion pictures the weight.  
The bottom criteria are very important.  
The ones on top are light weight, less important.

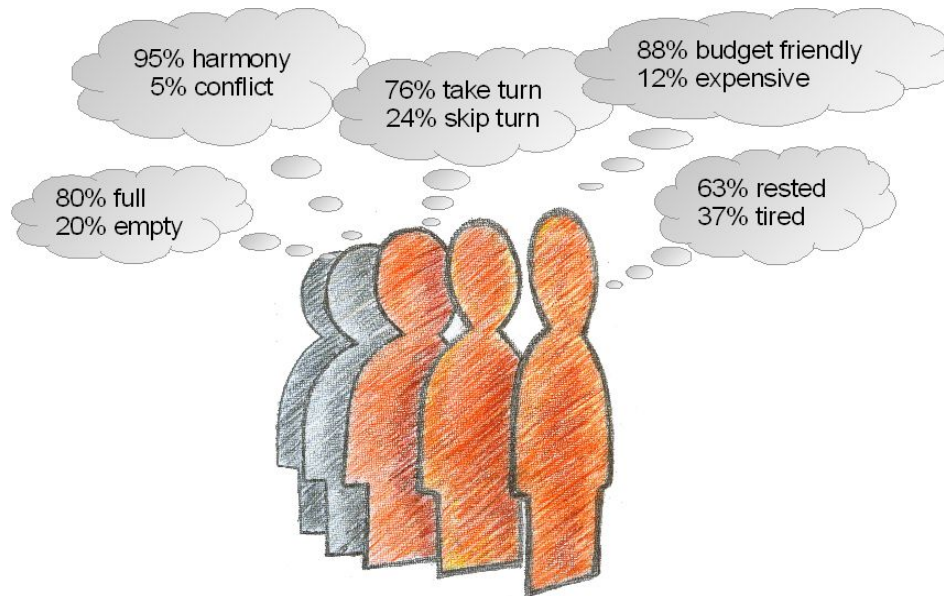


SUMit will create these diagrams for you using a tailored rule tool.



## 5. Shades of Grey

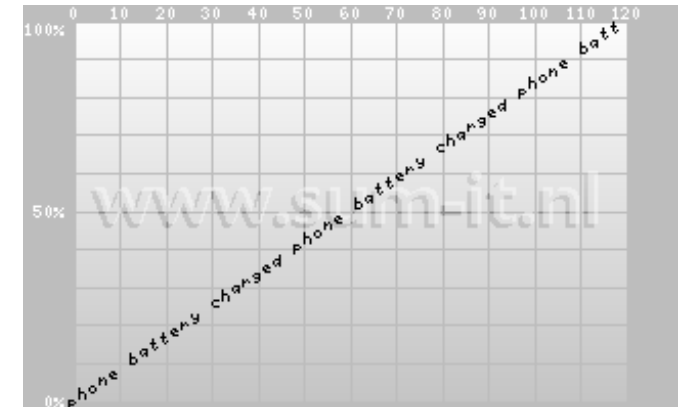
A human planner typically thinks in shades of grey:



Unlike the typical computer black-white logic. Senang thinks like a human planner would; in shades of grey.

So it will not search just a solution that is possible; according to black & white rules. Better: Senang will search the optimum solution using shades of grey; prefers 81% good over 80%.

The result is an excellent solution as if the brightest planner has solved your planning problem.



The graph above defines that it takes 120 minutes to fully charge a phone battery.

0 minutes: 0% charged  
40 minutes: 33% charged  
80 minutes: 67% charged  
120 minutes: 100% charged.

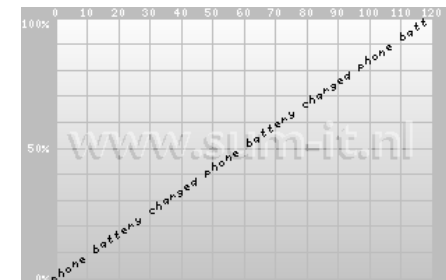
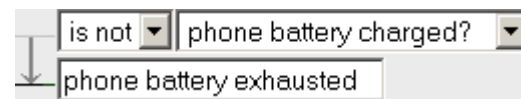
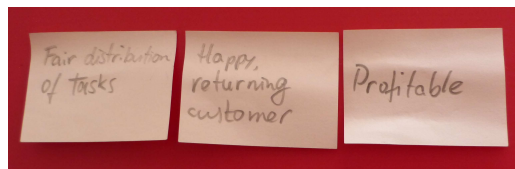
Percentages can also apply to other things.

- A customer can be 88% happy, 12% sad.
- A product can be 92% good, 8% bad.
- A staff can be 82% rested, 18% tired.



## 6. Project Approach

### 5.1 Rule analysis



The project starts with analysis. Which criteria define your optimum planning?

SUMit teams up with you to get a clear view of your planning criteria, using simple but effective tools: pencil and sticky pads.

Some criteria are derivable with logic.

Example:

An empty battery is the opposite of a charged battery.

Or, in shades of grey, 80% charged equals 20% empty.

SUMit will create a tailored rule tool to define this logic.

SUMit creates graphs for percentages.

Which values correspond to which percentages for

- fair distribution
- happy
- profitable
- fully charged
- well rested

and your other criteria that define a good planning.



## 5.2 Design

SUMit designs screens that suit your business situation.

## 5.3 Software Construction

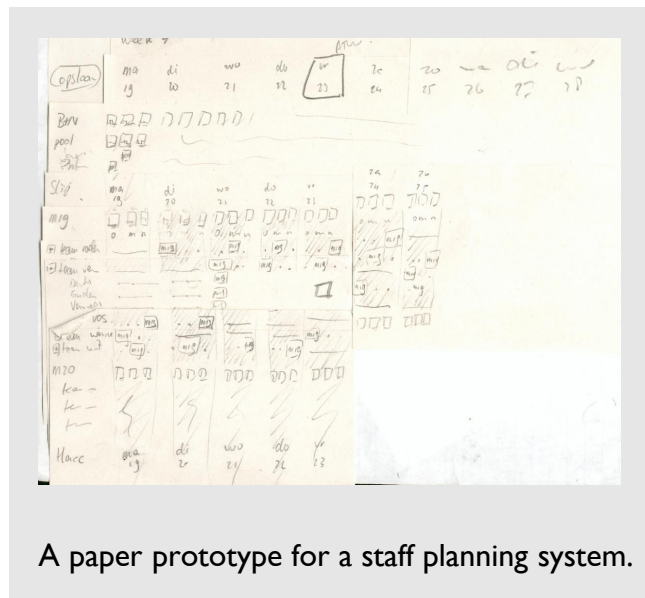
SUMit will program tailored software for you, including an interface between Senang and your current IT systems.

You will see the progress online, on [www.sum-it.nl](http://www.sum-it.nl)

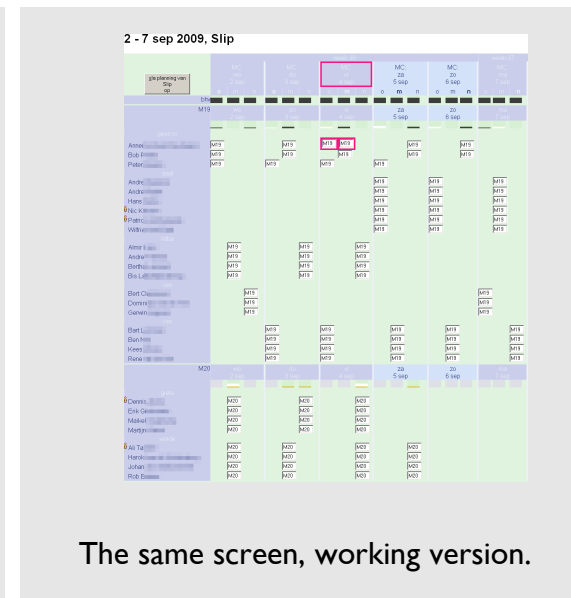
## 5.3 Implementation

SUMit implements the working system. Your staff gets training in how to use the system.

Your tailored version of Senang will generate your planning.



A paper prototype for a staff planning system.



The same screen, working version.



## 7. Price

SUMit will create a tailored version of Senang that suits your needs.

You will join forces with SUMit to analyse your situation.

- What makes your planning complex?
- Which criteria define your optimum planning?

SUMit will offer you a quotation for paper prototyping and software development.

A basic version of Senang can be as cheap as

- € 3867 up front, for ½ day analysis and 3 days design.
- € 268 per month for development of tailored software and web hosting.

Popular extensions are:

- allow employees to browse their shift roster using smart phone or internet connected PC.
- publish planning results to Outlook agenda of staff
- interface with other computer systems.

The investment for extensions will be based on SUMit's hourly rate: €138 ex VAT.

### A tailored quotation?

Use the contact form at  
[www.sum-it.nl](http://www.sum-it.nl).

Explain what makes  
your shift roster  
complex enough for Senang.



## 8. Questions

Is your planning complex enough for Senang?  
Would you like to explore possibilities, see a demo?

Please drop a line,  
using the contact SUMit page at [www.sum-it.nl](http://www.sum-it.nl)

Or call now:

Australia,  
Netherlands



Henk Jan  
+31 182 534 895

Malaysia



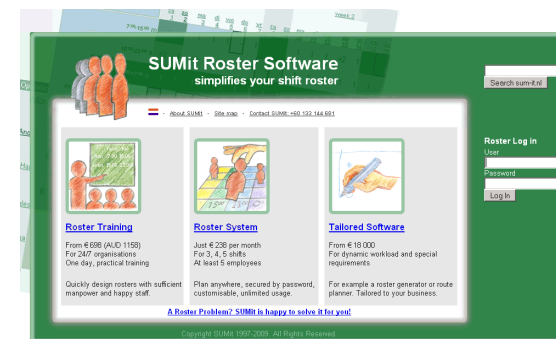
Kamariah  
+60 164 843 900

### About SUMit

SUMit is a quality focussed,  
multinational company,  
founded in 1997.

SUMit is based  
in the Netherlands  
and also operates  
in Australia and Malaysia.

Core business:  
**Simplify your planning.**



[www.sum-it.nl](http://www.sum-it.nl)