WebOpt PCB Panel Optimization

Version 2.37

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1 One Layout Optimization

This optimization mode is useful for high machine set-up costs and low material costs, e.g. silk screen printin or PCB manufacturing. The algorithm calculates a solution with only one layout. All parts fit in this layout.

1.1 Definitions

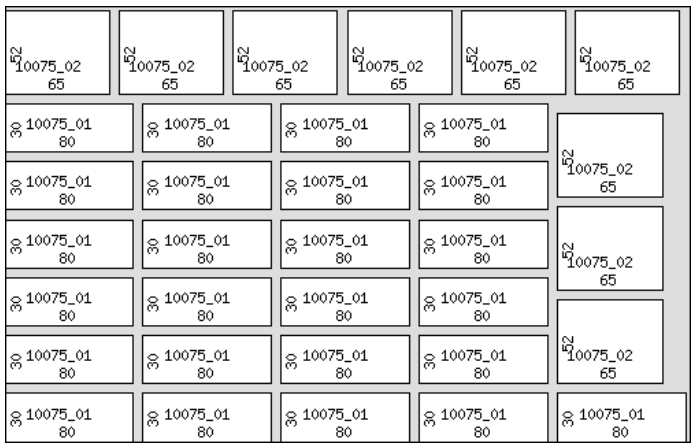
Panels	Base material (the input). The panel is cut into pieces to get the parts.
Parts	The output, e.g. boards, in PCB optimization.

1.1.1 Example

	Quantity	Length	Width	Information
Panel1	no limit	426	271	Unlimited panels
Part1	423	80	30	10075_01
Part2	145	65	52	10075_02

1.1.2 Solution

The solution is only one layout (17x) with 78.32 % utilization (distance between the parts was 6mm). Overproduced parts are 8 (Part2) and 2 (Part1).



One layout solution

1.2 Option AutoMode

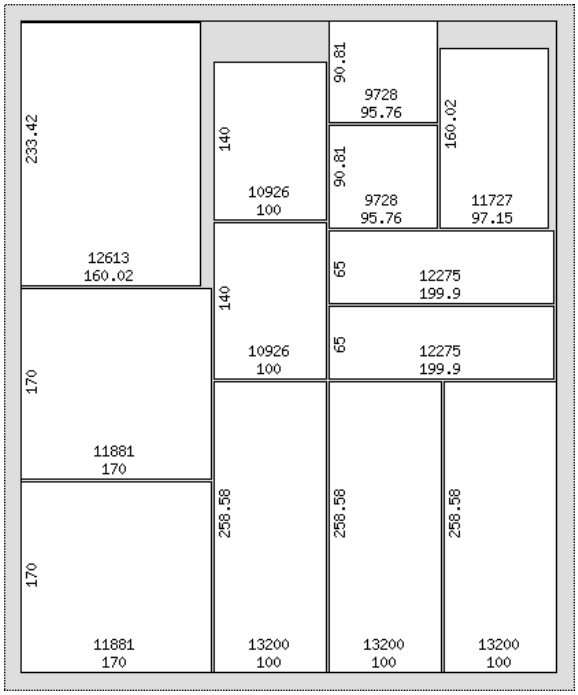
In some cases the parts do not fit into one panel. There are too much parts given. By default WebOpt returns with an error, if one layout is not possible. Running WebOpt in AutoMode allows the algorithm to decrease the number of input parts types and to calculate the best solution.

1.2.1 Example AutoMode

Distance between parts: 2.4 **time limit:** 240 **Max cut depth:** 10
Optimize for min layouts: yes **Auto decrease mode:** yes **Use fillparts:** no

1.2.2 Input Panels/Parts

No	Quantity	Length	MarginX	Width	MarginY	Material	Turn	Information	Comment	Fillpart
1	no limit	508	15	610	15		-	Panel		-
1	25	90.81	0	95.76	0		yes	9728		no
2	2	92.99	0	111.58	0		yes	13356		no
3	30	65	0	199.9	0		yes	12275		no
4	18	100	0	140	0		yes	10926		no
5	32	100	0	258.58	0		yes	13200		no
6	11	160.02	0	233.42	0		yes	12613		no
7	16	170	0	170	0		yes	11881		no
8	11	100	0	258.6	0		yes	11818		no
9	10	160.02	0	97.15	0		yes	11727		no
10	2	208.48	0	260.25	0		yes	12325		no
11	20	215.5	0	95.24	0		yes	9001		no



Solution AutoMode

Layout 1: 11 x 508 x 610 Usage 93.66 % Offcut 6.34 %
Solution Panel Usage: 93.66 % Offcut: 6.34 % Time [sec]: 114

Missing parts Length Width Material Information Comment

3	90.81	95.76	9728
2	92.99	111.58	13356
8	65	199.9	12275
11	100	258.6	11818
2	208.48	260.25	12325
20	215.5	95.24	9001

The solution is one layout (11x), but the algorithm did not use 6 part types (see table above).

1.3 Option FillMode

To increase the utilization, fillparts can be added to the input part list. The algorithmus tries to use these fillparts, if there is enough space. If the fillparts do not fit, no error is returned. This option is useful for manufacturing not time critical orders or parts for the stock.

1.3.1 Example FillMode

Distance between parts: 2.4 **time limit:** 15

Optimize for min layouts: yes **Use fillparts:** yes

1.3.2 Input Panels/Parts

No	Quantity	Length	MarginX	Width	MarginY	Material	Turnable	Information	Comment	Fillpart
1	no limit	406	15	535	15		-	Panel		-
1	140	52	0	18	0		yes	5208		no
2	36	60	0	66	0		yes	Fill		yes
3	23	50	0	96	0		yes	4849		no
4	27	71.98	0	154.99	0		yes	5548		no
5	40	83	0	91	0		yes	4841		no
6	53	90.17	0	148.59	0		yes	5471		no
7	54	92.99	0	95.99	0		yes	4669		no
8	50	37.5	0	175	0		yes	4554		no
9	25	91.5	0	68	0		yes	3938		no
10	397	57.8	0	102.8	0		yes	3894		no
11	36	100	0	205.8	0		yes	5626		no
12	80	148	0	23	0		yes	5101		no
13	60	95.99	0	97	0		yes	4984		no

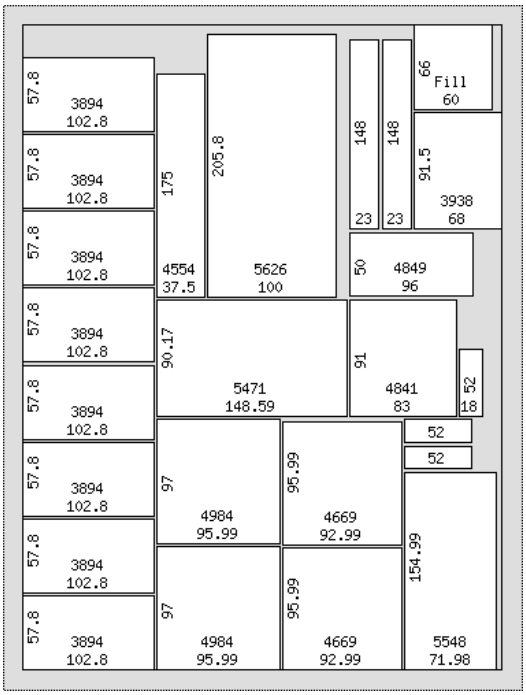
1.3.3 Solution Panels

Usage: 88.40 % Offcut: 11.60 % Time [sec]: 14

Quantity Length Width Material Information Comment

53 406 535 Panel

Layout 1 [1]: 53 x 406 x 535 Usage 88.40 % Offcut 11.60 %



Solution with fillpart

No	Quantity	Length	Margin X	Width	Margin Y	Information Comment
1	3	52	0	18	0	5208
2	1	60	0	66	0	Fill
3	1	96	0	50	0	4849
4	1	71.98	0	154.99	0	5548
5	1	83	0	91	0	4841
6	1	148.59	0	90.17	0	5471
7	2	92.99	0	95.99	0	4669
8	1	37.5	0	175	0	4554
9	1	68	0	91.5	0	3938
10	8	102.8	0	57.8	0	3894
11	1	100	0	205.8	0	5626
12	2	23	0	148	0	5101
13	2	95.99	0	97	0	4984

The solution is one layout (53x), utilization is increased by 1.72 % (88.4% | 86.32%) .