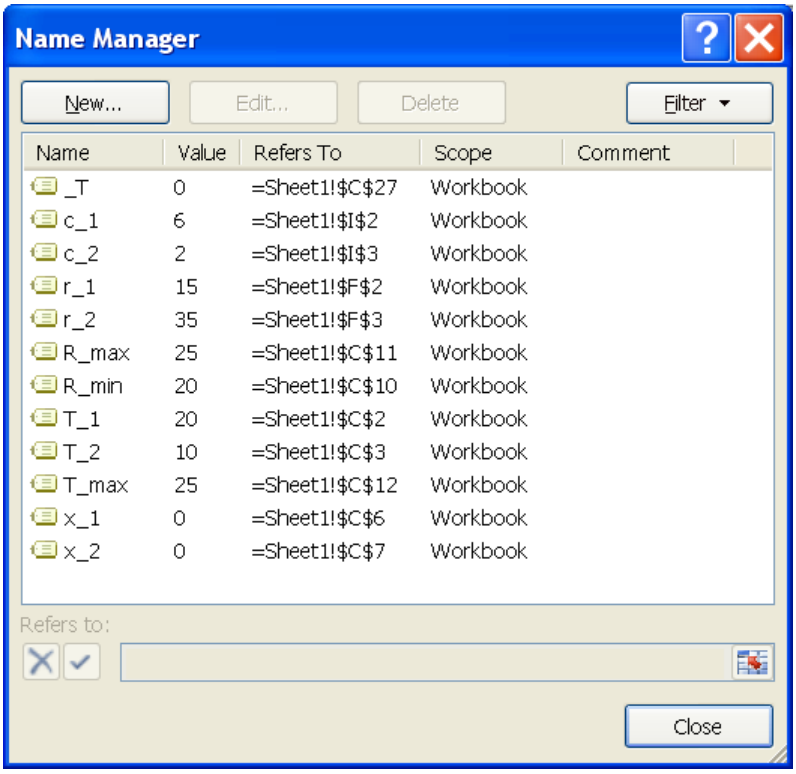
Optimization with Excel Solver

Variable Names

The Excel sheet is first set up. I have introduced names for easier referencing of the cells:



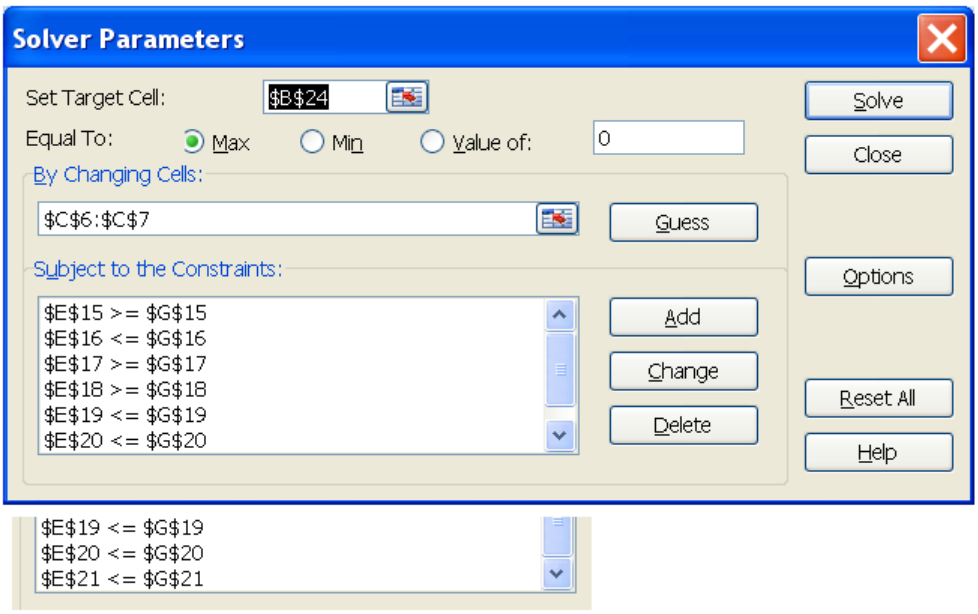
Excel Sheet with Formulas

The initial content of the sheet is:

	A	B	C	D	E	F	G	H	I
1	**Blocks**	**Tonnage T**			**Concentration R%**			**Profit c/ton**	
2	Block B1	T_1	20		r_1	15		c_1	6
3	Block B2	T_2	10		r_2	35		c_2	2
4									
5	**Variables**	**Taken x**							
6	Block B1	x_1	0						
7	Block B2	x_2	0						
8									
9	**Requirements on Mix**								
10	Concentration %	R_min	20						
11		R_max	25						
12	Transport capacity	T_max	25						
13									
14	**Constraints**	**Coeff of x_1**	**Coeff of x_2**		**LHS**	**Op**	**RHS**		
15	Mix R% min:	=r_1-R_min	=r_2-R_min		=B15*x_1 + C15*x_2	>=	0		
16	Mix R% max:	=r_1-R_max	=r_2-R_max		=B16*x_1 + C16*x_2	<=	0		
17	x_1 >= 0:	1	0		=B17*x_1 + C17*x_2	>=	0		
18	x_2 >= 0:	0	1		=B18*x_1 + C18*x_2	>=	0		
19	x_1 <= T_1:	1	0		=B19*x_1 + C19*x_2	<=	=T_1		
20	x_2 <= T_2:	0	1		=B20*x_1 + C20*x_2	<=	=T_2		
21	Transport limitation:	1	1		=B21*x_1 + C21*x_2	<=	=T_max		
22									
23	**Objective**	**Profit**							
24	Max:	=c_1*x_1+c_2*x_2							
25									
26	**Result**								
27	Taken	_T	=x_1+x_2						
28	R% mix	=(r_1*x_1+r_2*x_2) /_T							

Solver Parameters

The goal and the constraints are set up in the Solver dialog box:



Excel Solution Sheet and Answer Report

After pressing the Solve button the solution is computed and written into the sheet.

The Solver also writes an "Answer Report" into another sheet.

	A	B	C	D	E	F	G	H	I
1	**Blocks**		**Tonnage T**		**Concentration R%**			**Profit c/ton**	
2	Block B1	T_1	20		r_1	15		c_1	6
3	Block B2	T_2	10		r_2	35		c_2	2
4									
5	**Variables**	**Taken x**							
6	Block B1	x_1	18.75						
7	Block B2	x_2	6.25						
8									
9	**Requirements on Mix**								
10	Concentration %	R_min	20						
11		R_max	25						
12	Transport capacity	T_max	25						
13									
14	**Constraints**	**Coeff of x_1**	**Coeff of x_2**		**LHS**	**Op**	**RHS**		
15	Mix R% min:	-5	15		0	>=	0		
16	Mix R% max:	-10	10		-125	<=	0		
17	x_1 >= 0:	1	0		18.75	>=	0		
18	x_2 >= 0:	0	1		6.25	>=	0		
19	x_1 <= T_1:	1	0		18.75	<=	20		
20	x_2 <= T_2:	0	1		6.25	<=	10		
21	Transport limitation:	1	1		25	<=	25		
22									
23	**Objective**	**Profit**							
24	Max:	125							
25									
26	**Result**								
27	Taken	_T		25					
28	R% mix	20							

Microsoft Excel 12.0 Answer Report
Worksheet: [LinOptimization07.xlsx]Sheet1
Report Created: 13.11.09 18:10:50

Target Cell (Max)

Cell	Name	Original Value	Final Value
$B$24	Max: Profit	0	125

Adjustable Cells

Cell	Name	Original Value	Final Value
$C$6	x_1	0	18.75
$C$7	x_2	0	6.25

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$20	x_2 <= T_2: LHS	6.25	$E$20<=$G$20	Not Binding	3.75
$E$16	Mix R% max: LHS	-125	$E$16<=$G$16	Not Binding	125
$E$15	Mix R% min: LHS	0	$E$15>=$G$15	Binding	0
$E$17	x_1 >= 0: LHS	18.75	$E$17>=$G$17	Not Binding	18.75
$E$18	x_2 >= 0: LHS	6.25	$E$18>=$G$18	Not Binding	6.25
$E$19	x_1 <= T_1: LHS	18.75	$E$19<=$G$19	Not Binding	1.25
$E$21	Transport limitation: LHS	25	$E$21<=$G$21	Binding	0