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1. Selesaikan linear program berikut ini dengan metode Simplex

   Maksimumkan $Z = 400X_1 + 300X_2$

   Fungsi kendala/ batasan:

   1) $4X_1 + 6X_2 \leq 1200$
   2) $4X_1 + 2X_2 \leq 800$
   3) $X_1 \leq 250$
   4) $X_2 \leq 300$

1) Fungsi Tujuan

   * $Z = 400x_1 + 300x_2 \Rightarrow Z - 400x_1 - 300x_2 = 0$

Fungsi Batasan

* $4x_1 + 6x_2 \leq 1200 \Rightarrow 4x_1 + 6x_2 + S_1 = 1200$
* $4x_1 + 2x_2 \leq 800 \Rightarrow 4x_1 + 2x_2 + S_2 = 800$
* $x_1 \leq 250 \Rightarrow x_1 + S_3 = 250$
* $x_2 \leq 300 \Rightarrow x_2 + S_4 = 300$

Var. Dsr	Z	x_1	x_2	S_1	S_2	S_3	S_4	NK	Index
Z	1	-400	-300	0	0	0	0	0	
S_1	0	4	6	1	0	0	0	1200	300
x_1	0	(4)	2	0	1	0	0	800	200
S_3	0	1	0	0	0	1	0	250	250
S_4	0	0	1	0	0	0	1	300	~

baris baru kunci = baris kunci : angka kunci

[1 ½ 0 ¼ 0 0 0 200]

* baris Z

baris lama	[-400	-300	0	0	0	0	0]
NBBK	-400 [1	1/2	0	1/4	0	0	200]
baris baru	0	-100	0	100	0	0	80.000

* baris S_1

baris lama	[4	6	1	0	0	0	1200]
NBBK	4 [1	1/2	0	1/4	0	0	200]
baris baru	0	4	1	-1	0	0	400

* baris S_3

baris lama	[1	0	0	0	1	0	250]
NBBK	1 [1	1/2	0	1/4	0	0	200]
baris baru	0	-1/2	0	-1/4	1	0	50

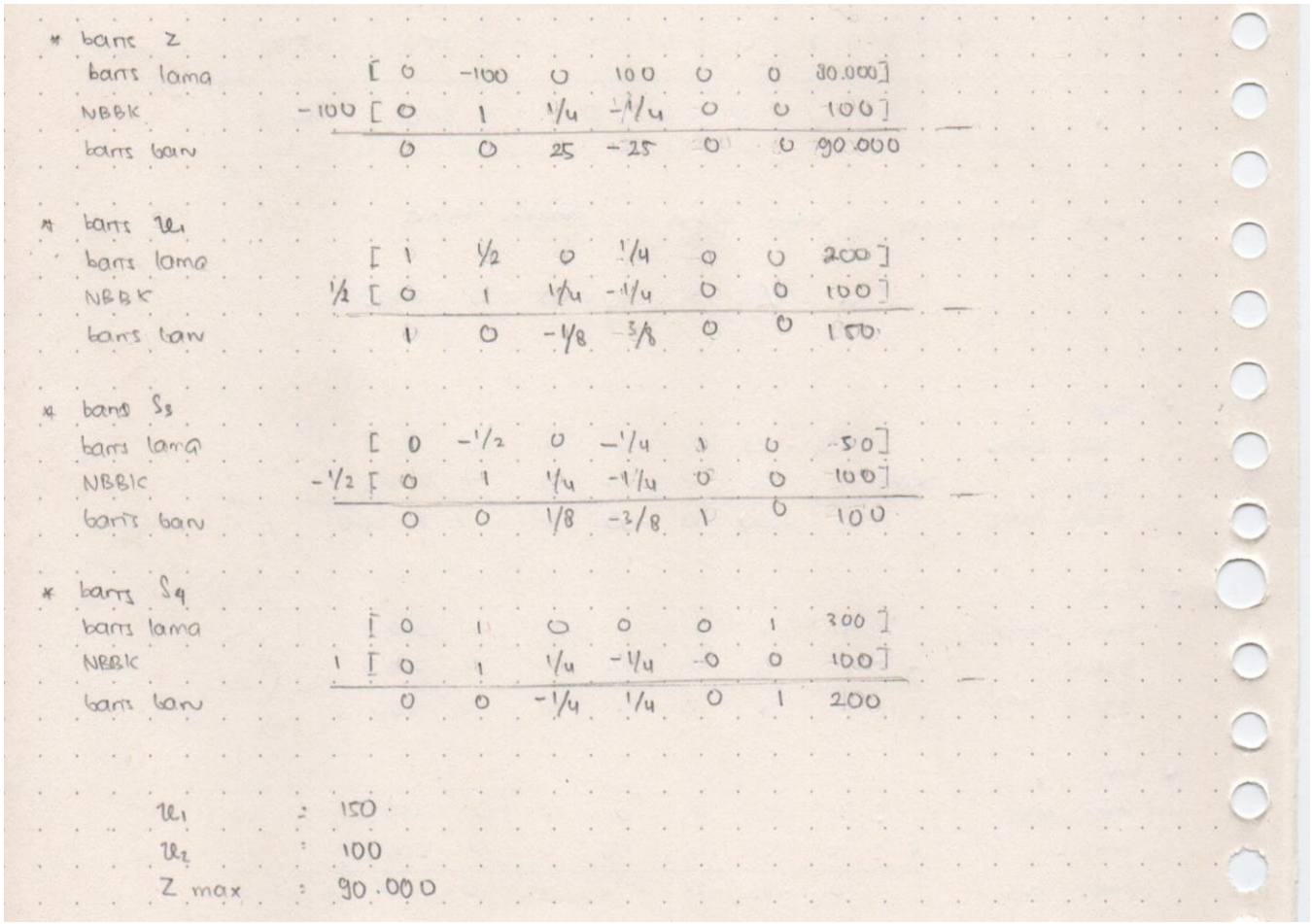
* baris S_4

baris lama	[0	1	0	0	0	1	300]
NBBK	0 [1	1/2	0	1/4	0	0	200]
baris baru	0	1	0	0	0	1	300

*karena baris Z masih terdapat minus, maka :

Var. Dsr	Z	R_1	R_2	S_1	S_2	S_3	S_4	NK	index
Z	1	0	-100	0	100	0	0	80.000	-800
R_2	0	0	(4)	1	-1	0	0	400	100
R_1	0	1	1/2	0	1/4	0	0	200	400
S_3	0	0	-1/2	0	-1/4	1	0	50	-100
S_4	0	0	1	0	0	0	1	300	300

baris kunci baru : [0 1 1/4 -1/4 0 0 100]



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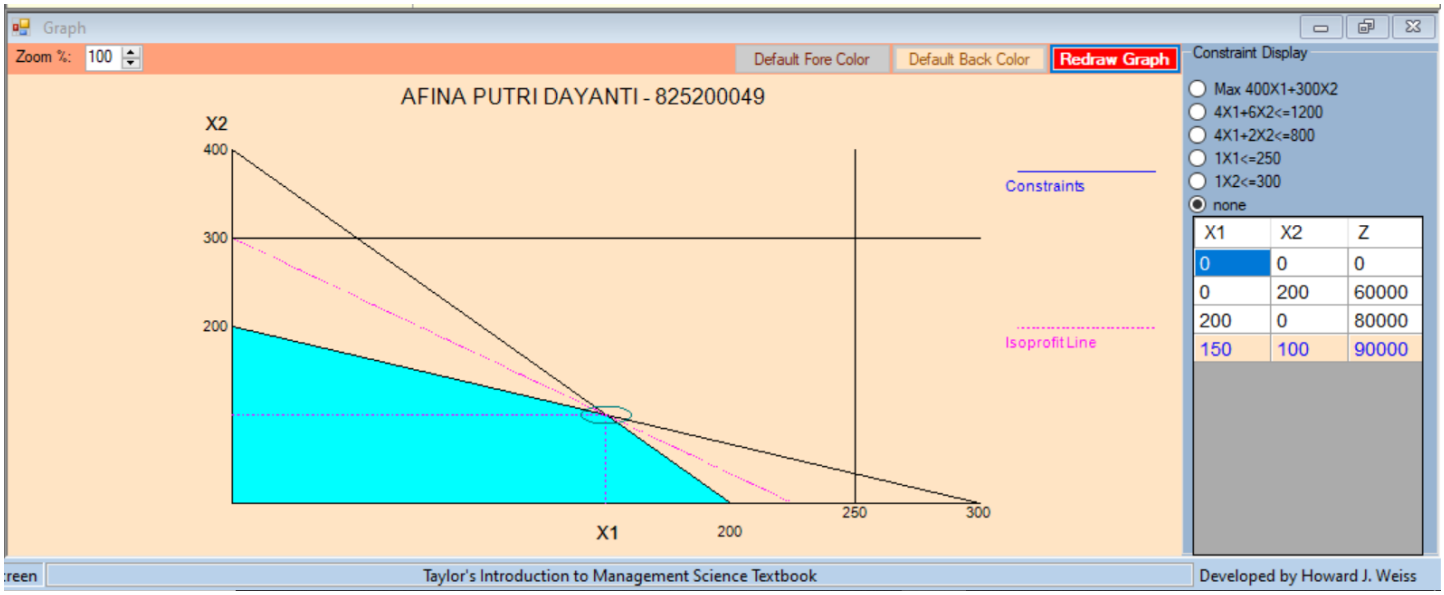
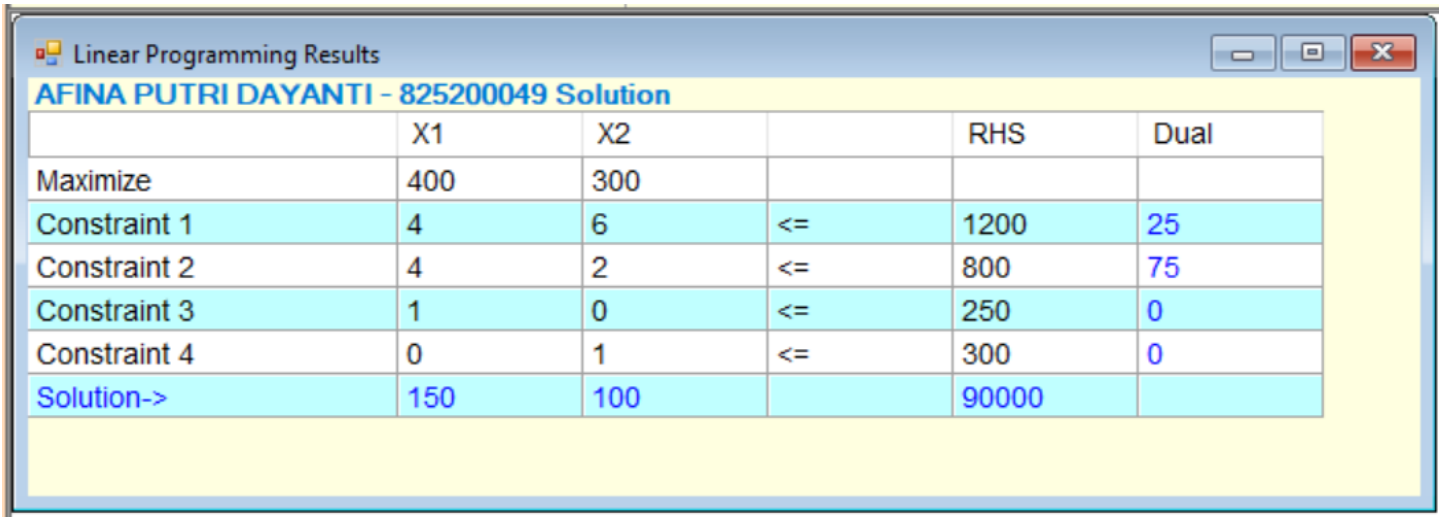
Cj	Basic Variables	Quantity	400 X1	300 X2	0 slack 1	0 slack 2	0 slack 3	0 slack 4
Iteration 1								
0	slack 1	1,200	4	6	1	0	0	0
0	slack 2	800	4	2	0	1	0	0
0	slack 3	250	1	0	0	0	1	0
0	slack 4	300	0	1	0	0	0	1
	zj	0	0	0	0	0	0	0
	cj-zj		400	300	0	0	0	0
Iteration 2								
0	slack 1	400	0	4	1	-1	0	0
400	X1	200	1	0.5	0	0.25	0	0
0	slack 3	50	0	-0.5	0	-0.25	1	0
0	slack 4	300	0	1	0	0	0	1
	zj	80,000	400	200	0	100	0	0
	cj-zj		0	100	0	-100	0	0
Iteration 3								
300	X2	100	0	1	0.25	-0.25	0	0
400	X1	150	1	0	-0.125	0.375	0	0
0	slack 3	100	0	0	0.125	-0.375	1	0
0	slack 4	200	0	0	-0.25	0.25	0	1
	zj	90,000	400	300	25	75	0	0
	cj-zj		0	0	-25	-75	0	0





Linear Programming Results

AFINA PUTRI DAYANTI - 825200049 Solution

	X1	X2		RHS	Dual
Maximize	400	300			
Constraint 1	4	6	<=	1200	25
Constraint 2	4	2	<=	800	75
Constraint 3	1	0	<=	250	0
Constraint 4	0	1	<=	300	0
Solution->	150	100		90000	

2. Selesaikan linear program berikut ini dengan metode Simplex

   Maksimumkan $Z = 2X_1 + 3X_2 + X_3$

   Dengan fungsi kendala:

   1) $X_1 + X_2 + X_3 \leq 9$
   2) $2X_1 + 3X_2 \leq 25$
   3) $X_2 + 2X_3 \leq 10$
   4) $X_1, X_2, X_3 \geq 0$

2) Fungsi Tujuan

* $Z = 2x_1 + 3x_2 + x_3 \Rightarrow Z - 2x_1 - 3x_2 - x_3 = 0$

Fungsi Batasan

* $x_1 + x_2 + x_3 \leq 9 \Rightarrow x_1 + x_2 + x_3 + S_1 = 9$
* $2x_1 + 3x_2 \leq 25 \Rightarrow 2x_1 + 3x_2 + S_2 = 25$
* $x_2 + 2x_3 \leq 10 \Rightarrow x_2 + 2x_3 + S_3 = 10$
* $x_1, x_2, x_3 \geq 0$

Var. dsr	Z	x_1	x_2	x_3	S_1	S_2	S_3	NK	index
Z	1	-2	-3	-1	0	0	0	0	
S_1	0	1	1	1	1	0	0	9	9
x_2	0	2	3	0	0	1	0	25	$25/3$
S_3	0	0	1	2	0	0	1	10	10

baris kunci baru = $[\ 2/3 \quad 1 \quad 0 \quad 0 \quad 1/3 \quad 0 \quad 25/3\ ]$

* baris Z

baris lama	[-2	-3	-1	0	0	0	0]
NBBK	-3 [2/3	1	0	0	1/3	0	25/3]
baris baru	0	0	-1	0	1	0	25

* baris S_1

baris lama	[1	1	1	1	0	0	9]
NBBK	1 [2/3	1	0	0	1/3	0	25/3]
baris baru	1/3	0	1	1	-1/3	0	2/3

* baris S_3

baris lama	[0	1	2	0	0	1	10]
NBBK	1 [2/3	1	0	0	1/3	0	25/3]
baris baru	-2/3	0	2	0	-1/3	1	5/3

Karena masih terdapat minus, maka

Var dsr	Z	x_1	x_2	x_3	S_1	S_2	S_3	NK	Index
Z	1	0	0	-1	0	1	0	25	
x_3	0	1/3	0	1	1	-1/3	0	2/3	2/3
x_2	0	2/3	1	0	0	1/3	0	25/3	~
S_3	0	-2/3	0	2	0	-1/2	1	5/3	5/6

TRG

baris kunci baru : [1/3 0 1 1 -1/3 0 2/3]

* baris Z

baris lama	[0	0	-1	0	1	0	25]
NBBK	-1 [1/3	0	1	1	-1/3	0	2/3]
baris baru	1/3	0	0	1	2/3	0	77/3

* baris x_2

baris lama	[2/3	1	0	0	1/3	0	25/3]
NBBK	0 [1/3	0	1	1	-1/3	0	2/3]
baris baru	2/3	1	0	0	1/3	0	25/3

* baris S_3

baris lama	[-2/3	0	2	0	-1/3	1	5/3]
NBBK	2 [1/3	0	1	1	-1/3	0	2/3]
baris baru	-9/3	0	0	-2	1/3	1	1/3

$x_1 = 0$

$x_2 = 25/3$

$x_3 = 2/3$

$Z = 77/3$

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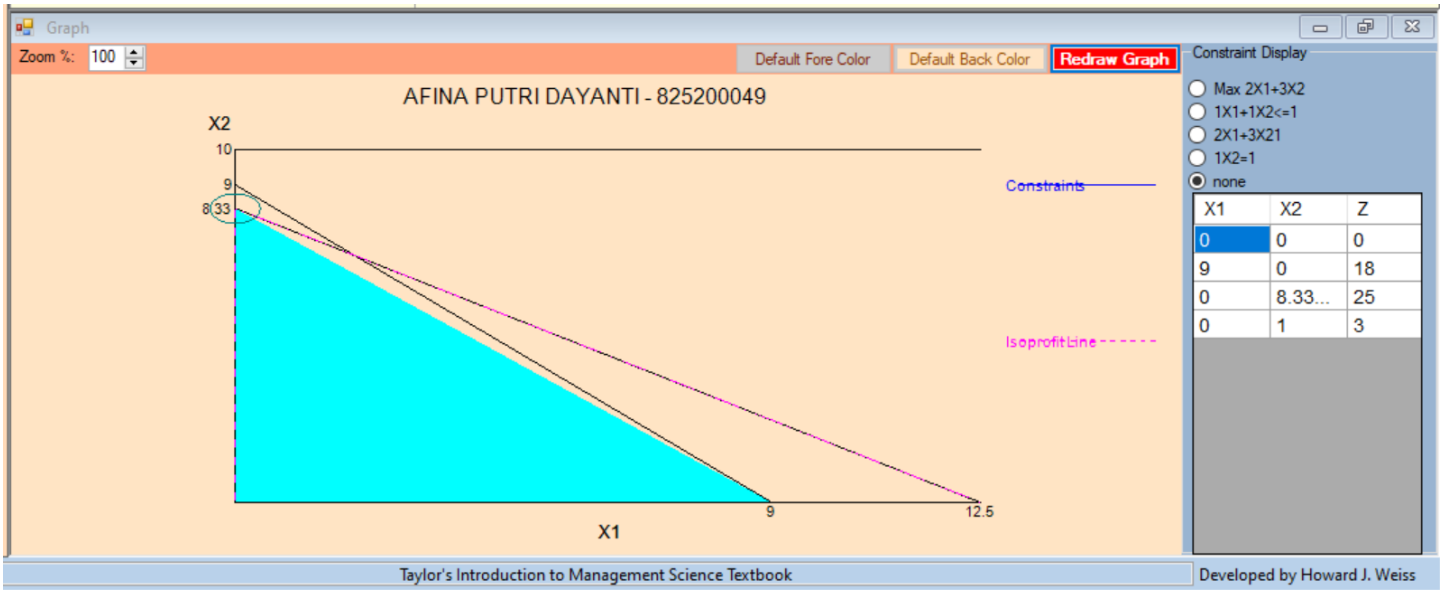
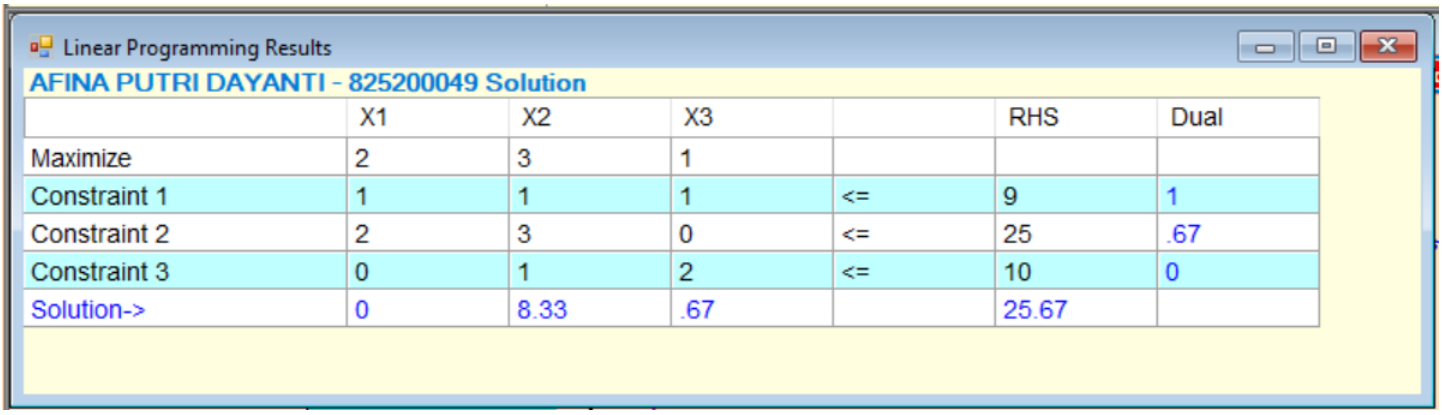
Cj	Basic Variables	Quantity	2 X1	3 X2	1 X3	0 slack 1	0 slack 2	0 slack 3
Iteration 1								
0	slack 1	9	1	1	1	1	0	0
0	slack 2	25	2	3	0	0	1	0
0	slack 3	10	0	1	2	0	0	1
	zj	0	0	0	0	0	0	0
	cj-zj		2	3	1	0	0	0
Iteration 2								
0	slack 1	0.6667	0.3333	0	1	1	-0.3333	0
3	X2	8.3333	0.6667	1	0	0	0.3333	0
0	slack 3	1.6667	-0.6667	0	2	0	-0.3333	1
	zj	25	2	3	0	0	1	0
	cj-zj		0	0	1	0	-1	0
Iteration 3								
1	X3	0.6667	0.3333	0	1	1	-0.3333	0
3	X2	8.3333	0.6667	1	0	0	0.3333	0
0	slack 3	0.3333	-1.3333	0	0	-2	0.3333	1
	zj	25.6667	2.33	3	1	1	.67	0
	cj-zj		-0.3333	0	0	-1	-0.6667	0





	X1	X2	X3		RHS	Dual
Maximize	2	3	1			
Constraint 1	1	1	1	<=	9	1
Constraint 2	2	3	0	<=	25	.67
Constraint 3	0	1	2	<=	10	0
Solution->	0	8.33	.67		25.67	