**NAMA : DECSON JOSEPHO MIRNAT NJOTO SUSANTO**

**NIM : A11.2017.10071**

**KELOMPOK : A11.4806 – RISET OPERASI**

**Max Z = 2x1 + x2 + 3x3**

Batasan:

**x1 + x2 + x3 < 59**

**2x1 + 3x3 < 75**

**x2 +  6x3 < 54**

**x1 ≥ 0, x2 ≥ 0, x3 ≥ 0**

Jawaban :

**x1 + x2 + x3 < 59** => **x1 + x2 + x3 + S1= 59**

**2x1 + 3x3 < 75** => **2x1 + 3x3 + S2 = 75**

**x2 +  6x3 < 54** => **x2 +  6x3 + S3 = 54**

**Max Z = 2x1 + x2 + 3x3 + 0 S1 + 0 S2 + 0 S3**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |
| **0** | **S1** | **59** | **1** | **1** | **1** | **1** | **0** | **0** |
| **0** | **S2** | **75** | **2** | **0** | **3** | **0** | **1** | **0** |
| **0** | **S3** | **54** | **0** | **1** | **6** | **0** | **0** | **1** |
|  | **zj** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
|  | **cj - zj** |  | **2** | **1** | **3** | **0** | **0** | **0** |

**Menentukan Kolom Pivot :**

cj – zj = 3 (terbesar)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** | **Kuantitas** |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** | **/ Kol pivot** |
| **0** | **S1** | **59** | **1** | **1** | **1** | **1** | **0** | **0** | **59/1 = 59** |
| **0** | **S2** | **75** | **2** | **0** | **3** | **0** | **1** | **0** | **75/3 = 25** |
| **0** | **S3** | **54** | **0** | **1** | **6** | **0** | **0** | **1** | **54/6 = 9** |
|  | **Zj** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |  |
|  | **cj - zj** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |

**Menentukan Baris Pivot = 9**

**Menentukan Nilai Pivot = 6**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **3** | **X3** | **54 /6** | **0/6** | **1/6** | **6/6** | **0/6** | **0/6** | **1/6** |  |
| **0** | **S1** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

**Memperbaiki Tabel Simpleks**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **3** | **X3** | **9** | **0** | **1/6** | **1** | **0** | **0** | **1/6** |  |
| **0** | **S1** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris S1 baru = Baris S1 lama – (nilai S1 sekolom pivot) \* Baris pivot

(59 1 1 1 1 0 0)

X1 (9 0 1/6 1 0 0 1/6)

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(50 1 5/6 0 1 0 -1/6)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **3** | **X3** | **9** | **0** | **1/6** | **1** | **0** | **0** | **1/6** | **= 9/0 = ?** |
| **0** | **S1** | **50** | **1** | **5/6** | **0** | **1** | **0** | **-1/6** | **=50/1 = 50** |
| **0** | **S2** |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris S2 baru = Baris S2 lama – (nilai S2 sekolom pivot) \* Baris pivot

(75 2 0 3 0 1 0)

X3 (9 0 1/6 1 0 0 1/6)

-------------------------------------------------------------------------------------- -

(48 2 -3/6 0 0 1 -3/6)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **3** | **X3** | **9** | **0** | **1/6** | **1** | **0** | **0** | **1/6** | **= 9/0 = ?** |
| **0** | **S1** | **50** | **1** | **5/6** | **0** | **1** | **0** | **-1/6** | **=50/1 = 50** |
| **0** | **S2** | **48** | **2** | **-3/6** | **0** | **0** | **1** | **-3/6** | **=48/2=24** |
|  | **zj** | **27** | **0** | **½** | **3** | **0** | **0** | **1/2** |  |
|  | **cj - zj** |  | **2** | **1/2** | **0** | **0** | **0** | **-1/2** |  |

**Menentukan Kolom Pivot :**

cj – zj = 2 (terbesar)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **3** | **X3** | **9** | **0** | **1/6** | **1** | **0** | **0** | **1/6** | **= 9/0 = ?** |
| **0** | **S1** | **50** | **1** | **5/6** | **0** | **1** | **0** | **-1/6** | **=50/1 = 50** |
| **0** | **S2** | **48** | **2** | **-3/6** | **0** | **0** | **1** | **-3/6** | **=48/2=24** |
|  | **zj** | **27** | **0** | **1/2** | **3** | **0** | **0** | **1/2** |  |
|  | **cj - zj** |  | **2** | **1/2** | **0** | **0** | **0** | **-1/2** |  |

**Menentukan Baris Pivot = 24**

**Menentukan Nilai Pivot = 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **48/2** | **2/2** | **(-3/6)/2** | **0/2** | **0/2** | **1/2** | **(-3/6)/2** |  |
| **0** | **S1** | **26** | **0** | **13/12** | **0** | **1** | **-1/2** | **1/12** |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **24** | **1** | **-1/4** | **0** | **0** | **1/2** | **-1/4** |  |
| **0** | **S1** | **26** | **0** | **13/12** | **0** | **1** | **-1/2** | **1/12** |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris S1 baru = Baris S1 lama – (nilai S1 sekolom pivot) \* Baris pivot

(50 1 5/6 0 1 0 -1/6)

X1 (24 1 -1/4 0 1 -1/2 1/12)

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(26 0 13/12 0 1 -1/2 1/12)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **24** | **1** | **-1/4** | **0** | **0** | **1/2** | **-1/4** |  |
| **0** | **S1** | **26** | **0** | **13/12** | **0** | **1** | **-1/2** | **1/12** |  |
| **3** | **X3** |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris X3 baru = Baris X3 lama – (nilai X3 sekolom pivot) \* Baris pivot

(9 0 1/6 1 0 0 1/6)

X0 (24 1 -1/4 0 0 1/2 -1/4)

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(9 0 1/6 1 0 0 1/6)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **24** | **1** | **-1/4** | **0** | **0** | **1/2** | **-1/4** | **-96** |
| **0** | **S1** | **26** | **0** | **13/12** | **0** | **1** | **-1/2** | **1/12** | **24** |
| **3** | **X3** | **9** | **0** | **1/6** | **1** | **0** | **0** | **1/6** | **54** |
|  | **zj** | **75** | **2** | **0** | **3** | **0** | **0** | **0** |  |
|  | **cj - zj** |  | **0** | **1** | **0** | **0** | **-1** | **0** |  |

**Menentukan Baris Pivot = 24 (nilai minus tidak dianggap)**

**Menentukan Nilai Pivot = 13/12**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** |  |  |  |  |  |  |  |  |
| **1** | **X2** | **24** | **0** | **1** | **0** | **12/13** | **-6/13** | **1/13** |  |
|  |  |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris X1 baru = Baris X1 lama – (nilai X1 sekolom pivot) \* Baris pivot

(24 1 -1/4 0 0 1/2 -1/4)

X(-1/4) (24 0 1 0 12/13 -6/13 1/13)

-------------------------------------------------------------------------------------- -

(30 1 0 0 3/13 5/13 -3/13)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **30** | **1** | **0** | **0** | **3/13** | **5/13** | **-3/13** |  |
| **1** | **X2** | **24** | **0** | **1** | **0** | **12/13** | **-6/13** | **1/13** |  |
| **3** | **X3** |  |  |  |  |  |  |  |  |
|  | **zj** |  |  |  |  |  |  |  |  |
|  | **cj - zj** |  |  |  |  |  |  |  |  |

Baris X3 baru = Baris X3 lama – (nilai X3 sekolom pivot) \* Baris pivot

(9 0 1/6 1 0 0 1/6)

X(-1/4) (24 0 1 0 12/13 -6/13 1/13)

-------------------------------------------------------------------------------------- -

(5 0 0 1 -2/13 1/13 2/13)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cj** | **Variabel** |  | **2** | **1** | **3** | **0** | **0** | **0** |  |
|  | **Basis** | **Kuantitas** | **X1** | **X2** | **X3** | **S1** | **S2** | **S3** |  |
| **2** | **X1** | **30** | **1** | **0** | **0** | **3/13** | **5/13** | **-3/13** |  |
| **1** | **X2** | **24** | **0** | **1** | **0** | **12/13** | **-6/13** | **1/13** |  |
| **3** | **X3** | **5** | **0** | **0** | **1** | **-2/13** | **1/13** | **2/13** |  |
|  | **zj** | **99** | **2** | **1** | **3** | **12/13** | **7/13** | **1/13** |  |
|  | **cj - zj** |  | **0** | **0** | **0** | **-12/13** | **-7/13** | **-1/13** |  |

Karena semua hasil pada baris cj – zj hasil nya 0 dan negative, maka bisa dikatakan sudah optimal

**Solusi :**

X1 = 2

X2 = 1

X3 = 3

Z = 99