

PROBLEM 9.10

Problem Statement

A manufacturer receives an order from a large city for six doubledecker buses, to be delivered two at a time over the next three months. Production data for the manufacturer are shown in the table.

	Months		
	1	2	3
Regular Production Capacity, units	1	2	3
Overtime Production Capacity, units	2	2	2
Regular Production Cost, \$1000/unit	35	43	40
Overtime Production Cost, \$1000/unit	39	47	45

Solution Template

	Month 1	Month 2	Month 3	Dummy	Supply	u_i
1 Reg	35	38	41	0	1	
1 Over	39	42	45	0	2	
2 Reg	1000	43	46	0	2	
2 Over	1000	47	50	0	2	
3 Reg	1000	1000	40	0	3	
3 Over	1000	1000	45	0	2	
Demand	2	2	2	6		
v_j						

SOLUTION
Tableau 1

	Month 1	Month 2	Month 3	Dummy	Supply	u_i
1 Reg	<div>35</div> <div>1</div>	<div>38</div> <div>$\langle 0 \rangle$</div>	<div>41</div> <div>$\langle 0 \rangle$</div>	<div>0</div> <div>$\langle 9 \rangle$</div>	1	-9
1 Over	<div>39</div> <div>1</div>	<div>42</div> <div>1</div>	<div>45</div> <div>$\langle 0 \rangle$</div>	<div>0</div> <div>$\langle 5 \rangle$</div>	2	-5
2 Reg	<div>1000</div> <div>$\langle 960 \rangle$</div>	<div>43</div> <div>1</div>	<div>46</div> <div>1</div>	<div>0</div> <div>$\langle 4 \rangle$</div>	2	-4
2 Over	<div>1000</div> <div>$\langle 956 \rangle$</div>	<div>47</div> <div>$\langle 0 \rangle$</div>	<div>50 (*)</div> <div>1</div>	<div>0 (*)</div> <div>1</div>	2	0
3 Reg	<div>1000</div> <div>$\langle 956 \rangle$</div>	<div>1000</div> <div>$\langle 953 \rangle$</div>	<div>40 (*)</div> <div>$\langle -10 \rangle$</div>	<div>0 (*)</div> <div>3</div>	3	0
3 Over	<div>1000</div> <div>$\langle 956 \rangle$</div>	<div>1000</div> <div>$\langle 953 \rangle$</div>	<div>45</div> <div>$\langle -5 \rangle$</div>	<div>0</div> <div>2</div>	2	0
Demand	2	2	2	6		
v_j	44	47	50	0		

Tableau 2

	Month 1	Month 2	Month 3	Dummy	Supply	u_i
1 Reg	$\begin{array}{ c } \hline 35 \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 38 \\ \hline \langle 0 \rangle \end{array}$	$\begin{array}{ c } \hline 41 \\ \hline \langle 0 \rangle \end{array}$	$\begin{array}{ c } \hline 0 \\ \hline \langle -1 \rangle \end{array}$	1	1
1 Over	$\begin{array}{ c } \hline 39 \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 42 \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 45 \\ \hline \langle 0 \rangle \end{array}$	$\begin{array}{ c } \hline 0 \\ \hline \langle -5 \rangle \end{array}$	2	5
2 Reg	$\begin{array}{ c } \hline 1000 \\ \hline \langle 960 \rangle \end{array}$	$\begin{array}{ c } \hline 43 \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 46 \quad (*) \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 0 \quad (*) \\ \hline \langle -6 \rangle \end{array}$	2	6
2 Over	$\begin{array}{ c } \hline 1000 \\ \hline \langle 966 \rangle \end{array}$	$\begin{array}{ c } \hline 47 \\ \hline \langle 10 \rangle \end{array}$	$\begin{array}{ c } \hline 50 \\ \hline \langle 10 \rangle \end{array}$	$\begin{array}{ c } \hline 0 \\ \hline 2 \end{array}$	2	0
3 Reg	$\begin{array}{ c } \hline 1000 \\ \hline \langle 966 \rangle \end{array}$	$\begin{array}{ c } \hline 1000 \\ \hline \langle 963 \rangle \end{array}$	$\begin{array}{ c } \hline 40 \quad (*) \\ \hline 1 \end{array}$	$\begin{array}{ c } \hline 0 \quad (*) \\ \hline 2 \end{array}$	3	0
3 Over	$\begin{array}{ c } \hline 1000 \\ \hline \langle 1000 \rangle \end{array}$	$\begin{array}{ c } \hline 1000 \\ \hline \langle 963 \rangle \end{array}$	$\begin{array}{ c } \hline 45 \\ \hline \langle 5 \rangle \end{array}$	$\begin{array}{ c } \hline 0 \\ \hline 2 \end{array}$	2	0
Demand	2	2	2	6		
v_j	34	37	40	0		

Tableau 3

	Month 1	Month 2	Month 3	Dummy	Supply	u_i
1 Reg	<div>35</div> <div>1</div>	<div>38</div> <div>$\langle 0 \rangle$</div>	<div>41</div> <div>$\langle 6 \rangle$</div>	<div>0</div> <div>$\langle 5 \rangle$</div>	1	-5
1 Over	<div>39</div> <div>1</div>	<div>42</div> <div>1</div>	<div>45</div> <div>$\langle 6 \rangle$</div>	<div>0</div> <div>$\langle 1 \rangle$</div>	2	-1
2 Reg	<div>1000</div> <div>$\langle 960 \rangle$</div>	<div>43</div> <div>1</div>	<div>46</div> <div>$\langle 6 \rangle$</div>	<div>0</div> <div>1</div>	2	0
2 Over	<div>1000</div> <div>$\langle 960 \rangle$</div>	<div>47</div> <div>$\langle 4 \rangle$</div>	<div>50</div> <div>$\langle 10 \rangle$</div>	<div>0</div> <div>2</div>	2	0
3 Reg	<div>1000</div> <div>$\langle 960 \rangle$</div>	<div>1000</div> <div>$\langle 957 \rangle$</div>	<div>40</div> <div>2</div>	<div>0</div> <div>1</div>	3	0
3 Over	<div>1000</div> <div>$\langle 960 \rangle$</div>	<div>1000</div> <div>$\langle 957 \rangle$</div>	<div>45</div> <div>$\langle 5 \rangle$</div>	<div>0</div> <div>2</div>	2	0
Demand	2	2	2	6		
v_j	40	43	40	0		