5/5 very Good!

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PROBLEM 1

```
> result2;
$variables
[1] "x1" "x2" "x3" "x4" "x5" "x6" "x7"

$augcoeffMatrix
     x1   x2        x3       x4       x5        x6        x7      RHS
1 10000    0  3100.000    0.000 2600.000 1300.0000  350.0000 78300000
2     0 8700  3217.000 5100.000 1582.000 -209.0000 -225.5000 79351000
3     0    0 -5012.368 1537.931 1806.943  469.5632  414.5287 11861287
4     0    0     0.000 5263.438 2571.960 1414.1581  349.6817 71900509
5     0    0     0.000    0.000 1957.996 1776.8988  909.5977 47055771
6     0    0     0.000    0.000    0.000  972.4694  517.1846 17451514
7     0    0     0.000    0.000    0.000    0.0000 -481.2421 -6737389

$solution
[1]  2500  3100  4500  6000  8000 10500 14000

>
> result3 <- GaussJordanMethod(result1);
> result3;
$variables
[1] "x1" "x2" "x3" "x4" "x5" "x6" "x7"

$augcoeffMatrix
  x1 x2 x3 x4 x5 x6 x7   RHS
1  1  0  0  0  0  0  0  2500
2  0  1  0  0  0  0  0  3100
3  0  0  1  0  0  0  0  4500
4  0  0  0  1  0  0  0  6000
5  0  0  0  0  1  0  0  8000
6  0  0  0  0  0  1  0 10500
7  0  0  0  0  0  0  1 14000

$solution
[1]  2500  3100  4500  6000  8000 10500 14000
```

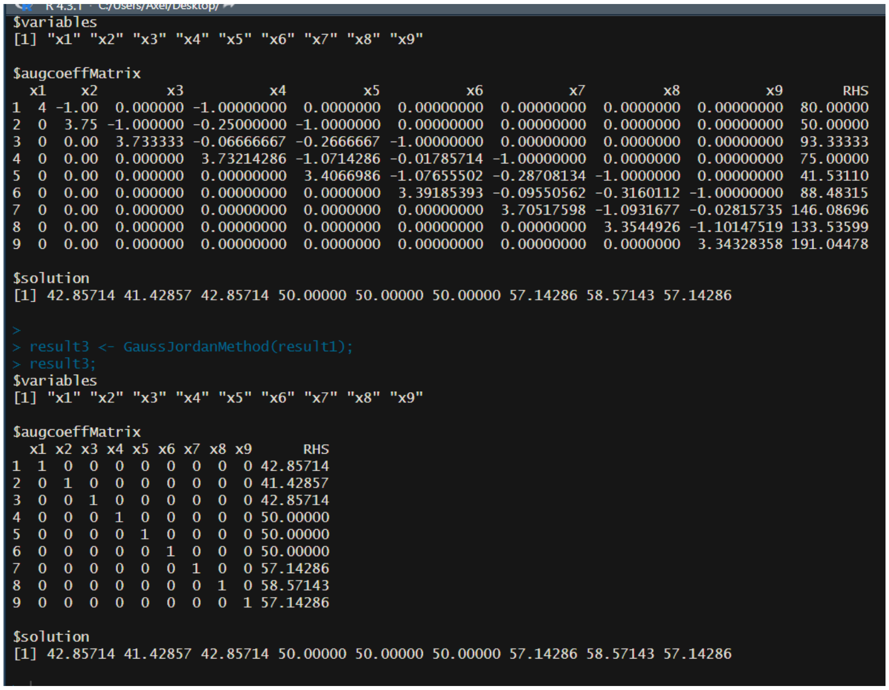
Picture 1. *Snapshot of Gaussian (top) and Gauss-Jordan (below) for ticket problem.*

Based on the Gaussian and Gauss-Jordan matrix solution, ABI Entertainment should price Homeless Children concert tickets as follows to obtain the profit given the constraints of the different venue capacities:

Gen. Ad.	2500
Upper Box B	3100
Upper Box A	4500
Lower Box B	6000
Lower Box A	8000
VIP	10500
Royalty	14000

Table 1. *Ticket prices of Homeless Children concert tickets.*

PROBLEM 2



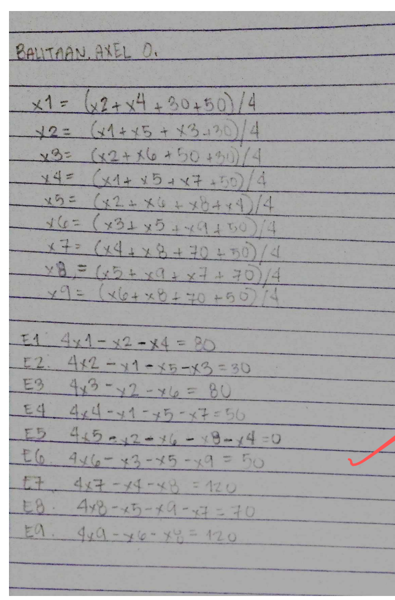
```
R 4.3.1 · C:/Users/Axel/Desktop/
$variables
[1] "x1" "x2" "x3" "x4" "x5" "x6" "x7" "x8" "x9"

$augcoeffMatrix
  x1    x2       x3          x4         x5          x6          x7         x8          x9       RHS
1  4 -1.00 0.000000 -1.00000000  0.0000000  0.00000000  0.00000000  0.0000000  0.00000000  80.00000
2  0  3.75 -1.000000 -0.25000000 -1.0000000  0.00000000  0.00000000  0.0000000  0.00000000  50.00000
3  0  0.00 3.733333 -0.06666667 -0.2666667 -1.00000000  0.00000000  0.0000000  0.00000000  93.33333
4  0  0.00 0.000000  3.73214286 -1.0714286 -0.01785714 -1.00000000  0.0000000  0.00000000  75.00000
5  0  0.00 0.000000  0.00000000  3.4066986 -1.07655502 -0.28708134 -1.0000000  0.00000000  41.53110
6  0  0.00 0.000000  0.00000000  0.0000000  3.39185393 -0.09550562 -0.3160112 -1.00000000  88.48315
7  0  0.00 0.000000  0.00000000  0.0000000  0.00000000  3.70517598 -1.0931677 -0.02815735 146.08696
8  0  0.00 0.000000  0.00000000  0.0000000  0.00000000  0.00000000  3.3544926 -1.10147519 133.53599
9  0  0.00 0.000000  0.00000000  0.0000000  0.00000000  0.00000000  0.0000000  3.34328358 191.04478

$solution
[1] 42.85714 41.42857 42.85714 50.00000 50.00000 50.00000 57.14286 58.57143 57.14286

>
> result3 <- GaussJordanMethod(result1);
> result3;
$variables
[1] "x1" "x2" "x3" "x4" "x5" "x6" "x7" "x8" "x9"

$augcoeffMatrix
  x1 x2 x3 x4 x5 x6 x7 x8 x9      RHS
1  1  0  0  0  0  0  0  0  0 42.85714
2  0  1  0  0  0  0  0  0  0 41.42857
3  0  0  1  0  0  0  0  0  0 42.85714
4  0  0  0  1  0  0  0  0  0 50.00000
5  0  0  0  0  1  0  0  0  0 50.00000
6  0  0  0  0  0  1  0  0  0 50.00000
7  0  0  0  0  0  0  1  0  0 57.14286
8  0  0  0  0  0  0  0  1  0 58.57143
9  0  0  0  0  0  0  0  0  1 57.14286

$solution
[1] 42.85714 41.42857 42.85714 50.00000 50.00000 50.00000 57.14286 58.57143 57.14286
```

***Picture 2**. Snapshot of Gaussian (top) and Gauss-Jordan (below) for temperature problem.*

Based on the Gaussian and Gauss-Jordan matrix solution, the equilibrium temperatures at the internal points of the plate are determined and as follows. The equations were obtained through the property of each point and shown in the photo below.

x1 **42.85714**	x2 **41.42587**	x3 **42.85714**
x4 **50.0000**	x5 **50.0000**	x6 **50.000**
x7 **57.14286**	x8 **58.57143**	x9 **57.14286**

***Table 2**. Temperature in each of the internal points.*



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x1 = (x2 + x4 + 30 + 50)/4
x2 = (x1 + x5 + x3 + 30)/4
x3 = (x2 + x6 + 50 + 30)/4
x4 = (x1 + x5 + x7 + 50)/4
x5 = (x2 + x6 + x8 + x4)/4
x6 = (x3 + x5 + x9 + 50)/4
x7 = (x4 + x8 + 70 + 50)/4
x8 = (x5 + x9 + x7 + 70)/4
x9 = (x6 + x8 + 70 + 50)/4

E1 4x1 - x2 - x4 = 80
E2. 4x2 - x1 - x5 - x3 = 30
E3 4x3 - x2 - x6 = 80
E4 4x4 - x1 - x5 - x7 = 50
E5 4x5 - x2 - x6 - x8 - x4 = 0
E6. 4x6 - x3 - x5 - x9 = 50
E7. 4x7 - x4 - x8 = 120
E8. 4x8 - x5 - x9 - x7 = 70
E9. 4x9 - x6 - x8 = 120

***Picture 3**. Derivation of equations.*