assignment

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```
tab= matrix(c("Total Profit","Employment Level","Earnings NextYear",
                20,6,8,
                15,4,7,
                25,5,5,
                "Maximize","=50",">=75"),ncol=5, byrow = FALSE)

colnames(tab)= c('Factor', 'P1','P2','P3','Goal')
tab
```

```
##      Factor              P1   P2   P3   Goal
## [1,] "Total Profit"      "20" "15" "25" "Maximize"
## [2,] "Employment Level"  "6"  "4"  "5"  "=50"
## [3,] "Earnings NextYear" "8"  "7"  "5"  ">=75"
```

#1. Defining y1d,y1u,y2d,y2u

#Let x1,x2 and x3 be the number of products produced for P1,p2 and p3

#y1u = Positive deviation in employment level

#y1d = negative deviation in employment level

#y2u= Positive deviation in goal regarding earnings next year

#y2d = negative deviation in goal regarding earnings next year

P = 20x1 + 15x2 +25x3

#while maintaining employment level as 50 employees and increase in company earnings next year above 75 million dollars

#Formulating constraints

#Employment level constraint : y1u - y1d = 6x1 + 4x2 + 5x3 - 50
#Earnings next year constraint : y2u - y2d = 8x1 + 7x2 + 5x3 - 75

#Objective function

#Maximize: 20x1 + 15x2 + 25x3 - 6y1m - 6y1u - 3y2d

#Constraints:

#6x1 + 4x2 + 5x3 + y1d - y1u = 50 #8x1 + 7x2 + 5x3 + y2d - y2u = 75

#3.Formulating and solving the linear programming model

```
library(lpSolveAPI)
index<- read.lp("C:/Users/kurra/Downloads/corporation.lp")
index
```

```
## Model name:
##             x1    x2    x3   y1d   y1u   y2d   y2u
## Maximize    20    15    25    -6    -6    -3     0
## R1           6     4     5     1    -1     0     0  =  50
## R2           8     7     5     0     0     1    -1  =  75
## Kind       Std   Std   Std   Std   Std   Std   Std
## Type      Real  Real  Real  Real  Real  Real  Real
## Upper      Inf   Inf   Inf   Inf   Inf   Inf   Inf
## Lower        0     0     0     0     0     0     0
```

Solving

```
solve(index)
```

```
## [1] 0
```

```
get.objective(index)
```

```
## [1] 225
```

```
get.variables(index)
```

```
## [1]  0  0 15  0 25  0  0
```

#Interpretation

#The profit obtained is 225 million dollars.

#The constraint values are:

#x1=0,x2=0,x3=15,y1d=0,y1u=25,y2d=0,y2u=0

y1u=25 indicating increase in employment level by 25 hundred employees due to this increase the company have to pay a penality which decreases the profit,

#From above, we can interpret that x1=0 and x2=0 which means increase in the number of units produced for p1 and p2 will not have any impact in profit maximization, whereas increase in the number of units produced in p3 by 15 can help to maximize the profit.

#earnings of next year can be calculating by estimating values of y2d and y2u. Here, both the values are 0 so, which means there is no increase or decrease in the next year earnings.