**National Technology of Mexico**
**Technological Institute of Tijuana**

ACADEMIC SUBDIRECTION
Systems and Computing Department

SEMESTER
February - June 2020

ACADEMIC CAREER
Information and Communication Technologies Engineer

SUBJECT AND KEY:
Data Mining BDD-1703TI9A

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NAME OF THE JOB:
Practice #2

UNIT TO BE EVALUATED
Unit I

TEACHER'S NAME:

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**Due date:** March 16, 2021

# Practice #3

Scenario: You are a data scientist working for a consulting company. One of his colleagues from the Audit Department has asked for his help in helping them assess the financial status of organization X.

He has been provided with two data vectors: Monthly Income and Expenses for the fiscal year in question. Your task is to calculate the following financial matrices:

- profit per month

- profit after tax for each month (the tax rate is 30%)

- profit margin for each month: equal to profit after tax divided by income (present in%)

- good months: where the profit after tax was higher than the average for the year

- bad months: where after-tax profit was less than average for years

- the best month: where the profit after tax was maximum for the year

- the worst month: where the profit after tax was minimum for the year

All results must be presented as vectors.

Results for dollar values must be calculated with a precision of $ 0.01, but must be presented in Units of $ 1,000 (i.e. 1k) with no decimal point.

The profit margin index results were to be presented in units of% with no decimal points.

Note: his colleague has warned him that it is okay for a given month's taxes to be negative (in accounting terms, negative tax translates into a deferred tax asset).

**Pasos**

1. Create the vectors with the information provided in the practice text file. In this case they are the income and expenses of a company.

```
Revenue <- c (14574.49, 7606.46, 8611.41, 9175.41, 8058.65, 8105.44,
11496.28, 9766.09, 10305.32, 14379.96, 10713.97, 15433.50)
Expenses <- c (12051.82, 5695.07, 12319.20, 12089.72, 8658.57,
840.20, 3285.73, 5821.12, 6976.93, 16618.61, 10054.37, 3803.96)
Revenue
Expenses
```

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2. To calculate profits properly, the difference between the company's income and expenses must be realized.

```
#Calculate Profit As The Differences Between Revenue And Expenses
Profit <- Revenue - Expenses
Profit
```

3. The tax calculation is made by multiplying the profits and the percentage of the taxes applied, in this case, 30%. As a next step, the difference between the profit and the taxes was made to obtain the real profit.

```
#Calculate Tax As 30% Of Profit And Round To 2 Decimal Points
tax <- round(0.30* Profit, 2)
tax

#Calculate Profit Remaining After Tax Is Deducted
Profit_After_tax <- Profit - tax
Profit_After_tax
```

4. To obtain the profit margin, it is necessary to divide between the real profit and the income multiplied by 100 to obtain it as a percentage. The "mean ()" function was applied to obtain the mean of the operation performed.

```
#Calculate The Profit Margin As Profit After Tax Over Revenue
#Round To 2 Decimal Points, Then Multiply By 100 To Get %
Profit_Margin <- round(Profit_After_tax/Revenue, 2)*100
Profit_Margin
```

5. The average of the real income of all the months is calculated.

```
#Calculate The Mean Profit After Tax For The 12 Months
mean_pat <- mean(Profit_After_tax)
mean_pat
```

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6. Calculation of good months can be done by comparing the vector of actual earnings and the mean of actual earnings. The function returns values of type binary.

```
#Find The Months With Above-Mean Profit After Tax
GoodMonths <- Profit_After_tax > mean_pat
#The good months were January, June, July, August, September and
December
GoodMonths
```

7. The bad months are carried out with the same operation, but using the symbol "<".

```
#Bad Months Are The Opposite Of Good Months !
BadMonths <- Profit_After_tax< mean_pat
#The bad months were February, March, April, May, October and
November
BadMonths
```

8. For the calculation of the best month is found by equating the maximum value of the real profit.

```
#The Best Month Is Where Profit After Tax Was Equal To The Maximum
BestMonth <- Profit_After_tax == max(Profit_After_tax)
#The best month is December
BestMonth
```

9. To calculate the worst month is found by equating the minimum value of the real profit.

```
# The Worst Month Is Where Profit After Tax Was Equal To The Minimum
WorstMonth <- Profit_After_tax == min(Profit_After_tax)
#The worst month was March
WorstMonth
```

10. The conversion of the calculations made previously to thousand units is carried out as follows: The "round ()" function is used and as parameters the vector to be converted,

the quantity to which it is to be reduced, is sent as parameters, and finally, a number to indicate the number of decimal numbers to display.

```
# Convert All Calculations To Units Of One Thousand Dollars
Revenue <- round(Revenue/1000, 2)
Revenue

Expenses <- round(Expenses/1000, 2)
Expenses

Profit <- round(Profit/1000, 2)
Profit

Profit_After_tax <- round(Profit_After_tax/1000, 2)
Profit_After_tax

M <- rbind(
  Revenue,
  Expenses,
  Profit,
  Profit_After_tax,
  Profit_Margin,
  GoodMonths,
  BadMonths,
  BestMonth,
  WorstMonth
)
M
```