

Practice 3 Unit 1

Scenario: You are a Data Scientist working for a consulting firm. One of your colleagues from the Auditing Department has asked you to help them assess the financial statement of organization X.

You have been supplied with two vector of data: monthly revenue and expenses for the financial year in question. Your task is to calculate the following financial matrices:

- profit for each month
- profit after tax for each month (the tax rate is 30%)
- profit margin for each month - equal to profit after tax divided by revenue
- good months - where the profit after tax was greater than the mean for the year
- bad months - where the profit after tax was less then the mean for years
- the best month - where the profit after tax was max for the year
- the worst month - where the profit after tax was min for the year

All results need to be presented as vectors.

Results for dollar values need to be calculate with \$0.01 precision, but need to be presented in Units of \$1,000(i.e. 1k) with no decimal point.

Results for the profit margin ratio needed to be presented in units of % with no decimal points.

Note: Your colleague has warned you that it is okay for tax for any given month to be negative (in accounting terms, negative tax translates into a deferred tax asset).

Hint 1 Use: round() mean() max() min()

Data

```
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)
```

Solution

Calculate Profit As The Differences Between Revenue And Expenses

```
profit <- revenue - expenses
print(profit)
```

```
> print(profit)
[1] 2522.67 1911.39 -3707.79 -2914.31 -599.92 7265.24 8210.55
```

```
3944.97 3328.39 -2238.65 659.60 11629.54
```

Calculate Tax As 30% Of Profit And Round To 2 Decimal Points

```
tax <- round(0.30 * profit, 2)
print(tax)
```

```
> print(tax)
[1] 756.80 573.42 -1112.34 -874.29 -179.98 2179.57 2463.17
1183.49 998.52 -671.60 197.88 3488.86
```

Calculate Profit Remaining After Tax Is Deducted

```
profit.after.tax <- profit - tax
print(profit.after.tax)
```

```
> print(profit.after.tax)
[1] 1765.87 1337.97 -2595.45 -2040.02 -419.94 5085.67 5747.38
2761.48 2329.87 -1567.05 461.72 8140.68
```

Calculate The Profit Margin As Profit After Tax Over Revenue

Round To 2 Decimal Points, Then Multiply By 100 To Get %

```
profit.margin <- round(tax / revenue, 2) * 100
print(profit.margin)
```

```
> print(profit.margin)
[1] 5 8 -13 -10 -2 27 21 12 10 -5 2 23
```

Calculate The Mean Profit After Tax For The 12 Months

```
mean_pat <- mean(profit.after.tax)
print(mean_pat)
```

```
> print(mean_pat)
[1] 1750.682
```

Find The Months With Above-Mean Profit After Tax

```
good.months <- profit.after.tax > mean_pat
print(good.months)
```

Bad Months Are The Opposite Of Good Months !

```
bad.months <- !good.months
print(bad.months)
```

The Best Month Is Where Profit After Tax Was Equal To The Maximum

```
best.month <- profit.after.tax == max(profit.after.tax)
print(best.month)
```

The Worst Month Is Where Profit After Tax Was Equal To The Minimum

```
worst.month <- profit.after.tax == min(profit.after.tax)
print(worst.month)
```

Convert All Calculations To Units Of One Thousand Dollars

```
revenue.1000 <- round(revenue / 1000, 0)
expenses.1000 <- round(expenses / 1000, 0)
profit.1000 <- round(profit / 1000, 0)
profit.after.tax.1000 <- round(profit.after.tax / 1000, 0)
```

Print Results

```
print(revenue.1000)
print(expenses.1000)
print(profit.1000)
print(profit.after.tax.1000)
print(profit.margin)
print(good.months)
```

```
print(bad.months)
print(best.month)
print(worst.month)
```

```
> print(revenue.1000)
[1] 15  8  9  9  8  8 11 10 10 14 11 15

> print(expenses.1000)
[1] 12  6 12 12  9  1  3  6  7 17 10  4

> print(profit.1000)
[1]  3  2 -4 -3 -1  7  8  4  3 -2  1 12

> print(profit.after.tax.1000)
[1]  2  1 -3 -2  0  5  6  3  2 -2  0  8

> print(profit.margin)
[1]  5  8 -13 -10 -2 27 21 12 10 -5  2 23

> print(good.months)
[1] TRUE FALSE FALSE FALSE FALSE TRUE TRUE TRUE TRUE FALSE FALSE
TRUE

> print(bad.months)
[1] FALSE TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE TRUE TRUE
FALSE

> print(best.month)
[1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
TRUE

> print(worst.month)
[1] FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE
```

BONUS:

Preview Of What's Coming In The Next Section

```
M <- rbind(
  revenue.1000,
  expenses.1000,
  profit.1000,
  profit.after.tax.1000,
  profit.margin,
  good.months,
  bad.months,
  best.month,
```

```
worst.month
)
```

Print The Matrix

```
print(M)
```

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]
[,11] [,12]										
revenue.1000	15	8	9	9	8	8	11	10	10	14
11 15										
expenses.1000	12	6	12	12	9	1	3	6	7	17
10 4										
profit.1000	3	2	-4	-3	-1	7	8	4	3	-2
1 12										
profit.after.tax.1000	2	1	-3	-2	0	5	6	3	2	-2
0 8										
profit.margin	5	8	-13	-10	-2	27	21	12	10	-5
2 23										
good.months	1	0	0	0	0	1	1	1	1	0
0 1										
bad.months	0	1	1	1	1	0	0	0	0	1
1 0										
best.month	0	0	0	0	0	0	0	0	0	0
0 1										
worst.month	0	0	1	0	0	0	0	0	0	0
0 0										