

Material
for workshop
discussion

NOTATION CONCEPT FOR SCALES

Do we need it?

If yes – how should it look?

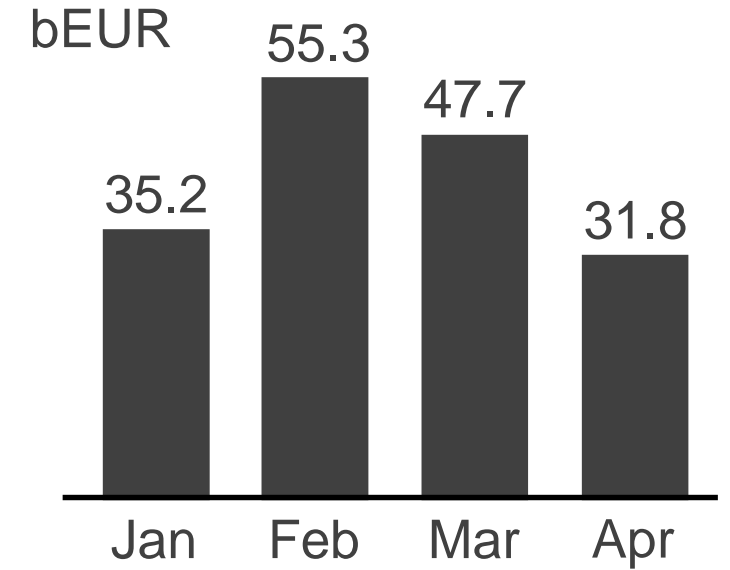
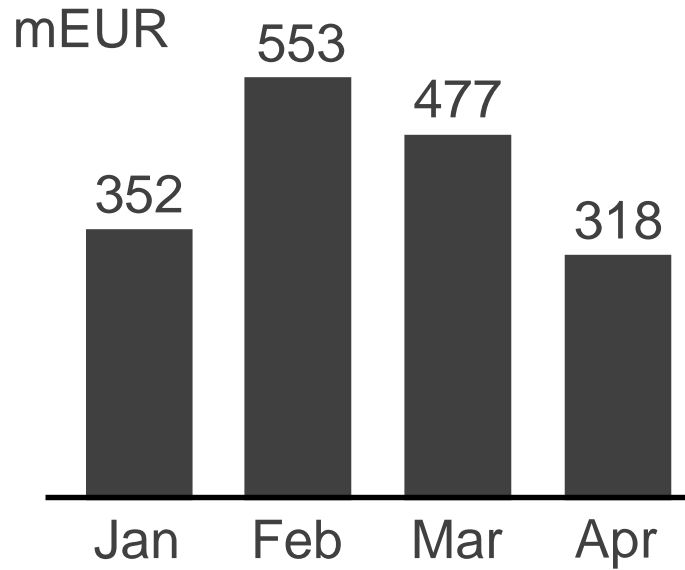
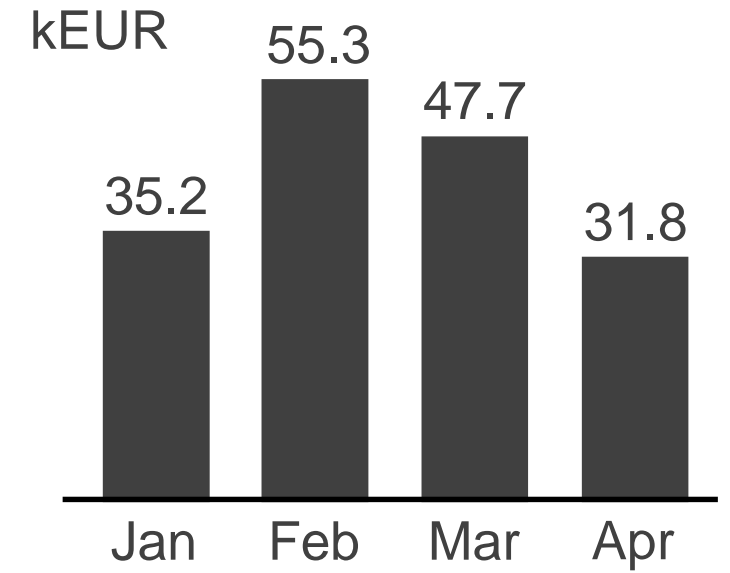
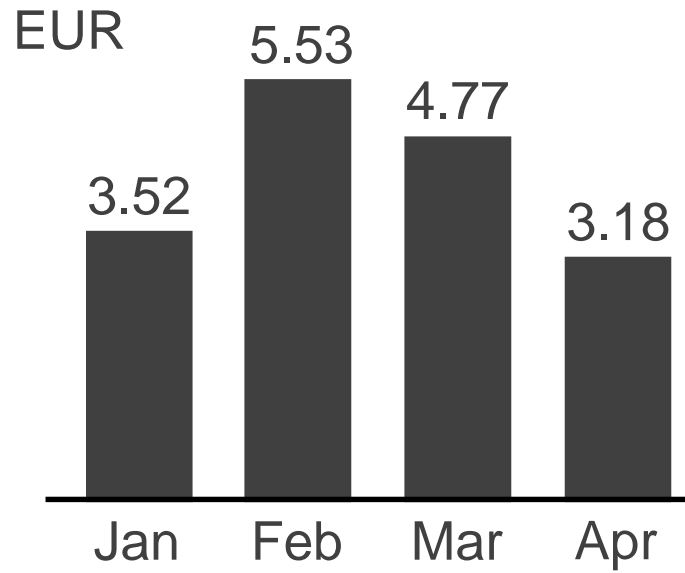
Rolf Hichert and Jürgen Faisst

Presentation at the Annual Conference
in London of 2018

June 8, 2018

Here is no visual help
to distinguish:

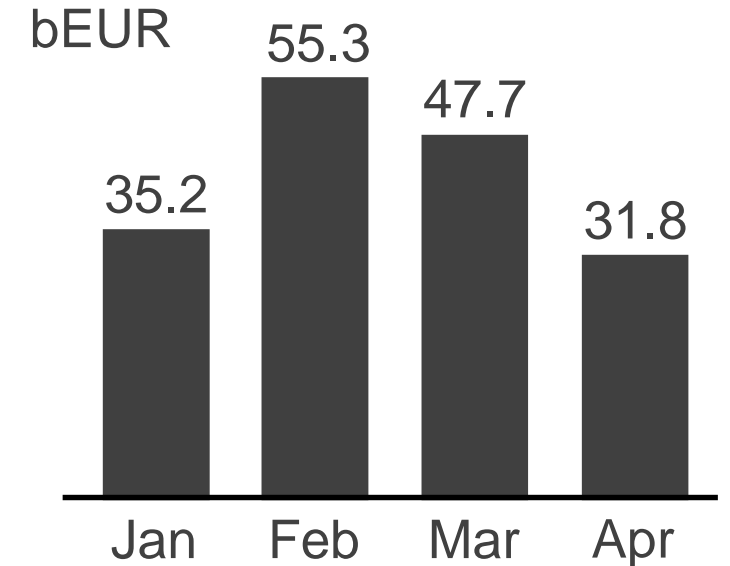
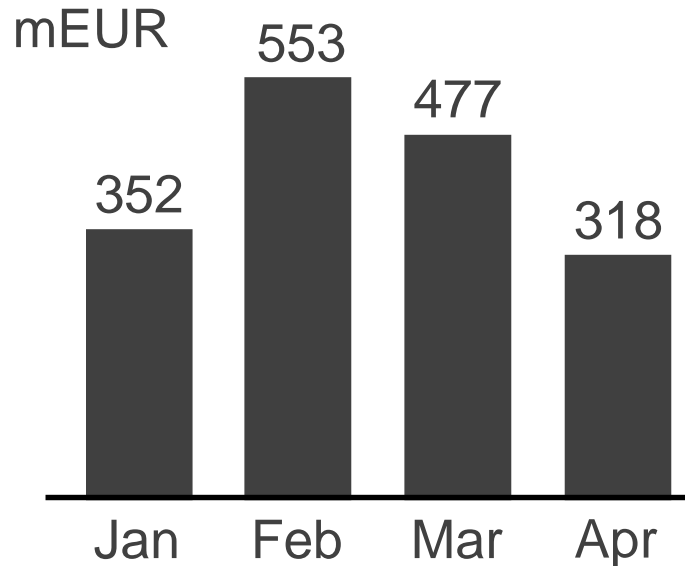
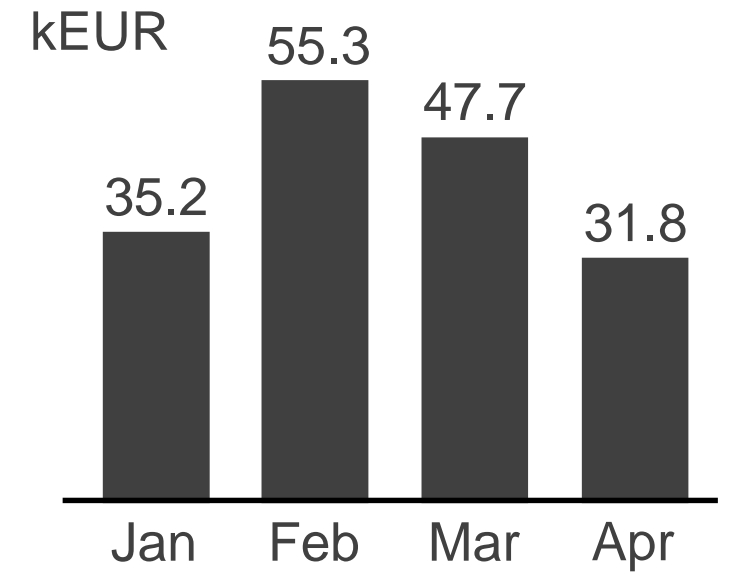
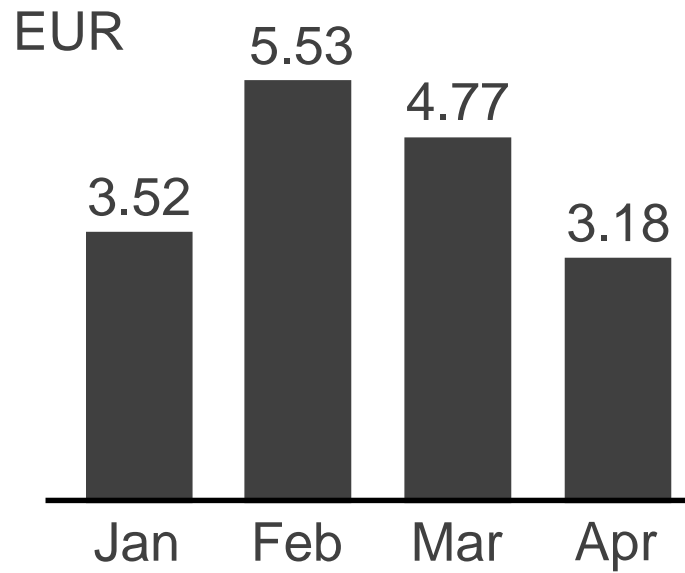
3
35 200
352 000 000
35 200 000 000



Here is no visual help to distinguish:

3
35 200
352 000 000
35 200 000 000

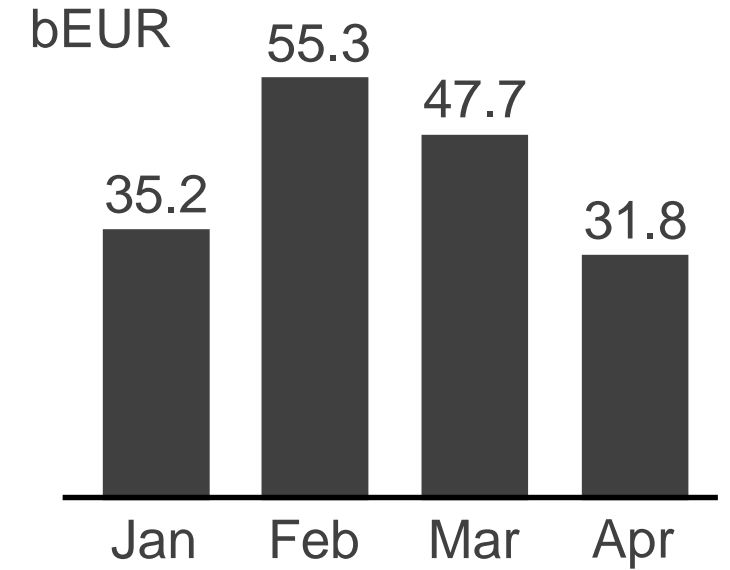
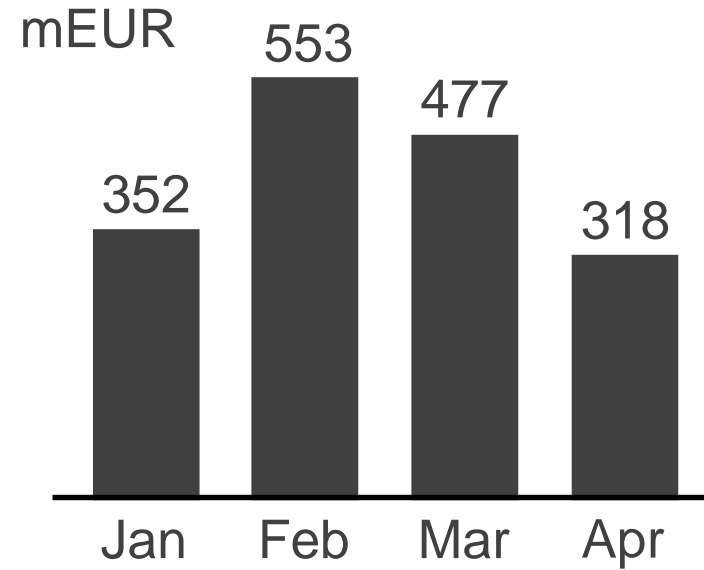
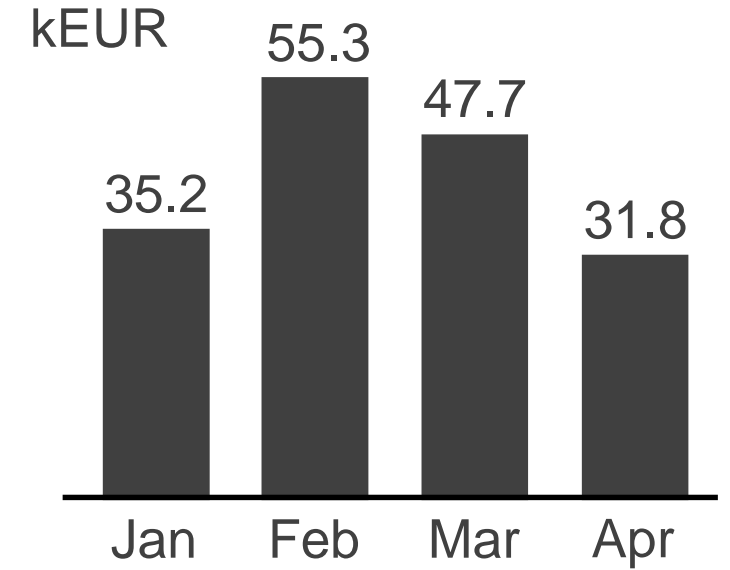
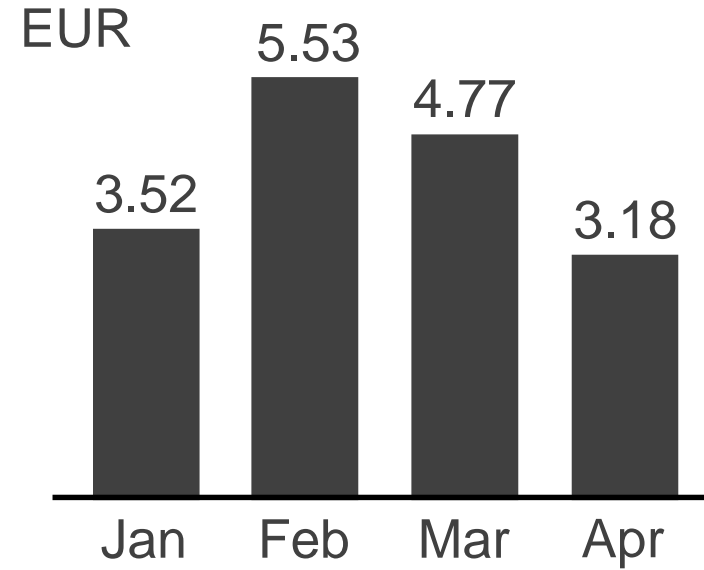
Please keep in mind that this example with 4 different scales on 1 page **might not be realistic** – but it could be 4 charts with different scales on 4 consecutive pages.



Question 1

Should we visually recognize different „powers of thousand“?

- 1 - one
- 1 000 – one thousand
- 1 000 000 – one million
- 1 000 000 000 – one billion*?



*here we use the labels of the „short scale“

Question 1

Should we visually recognize different „powers of thousand“?

1 - one

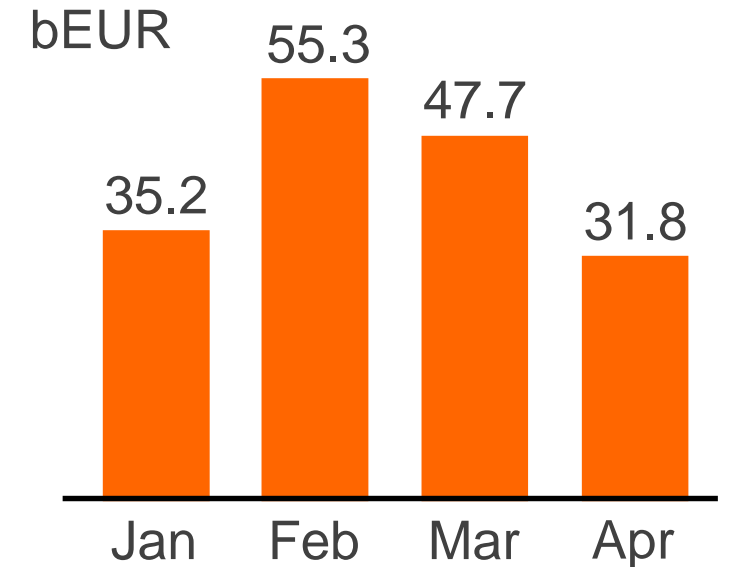
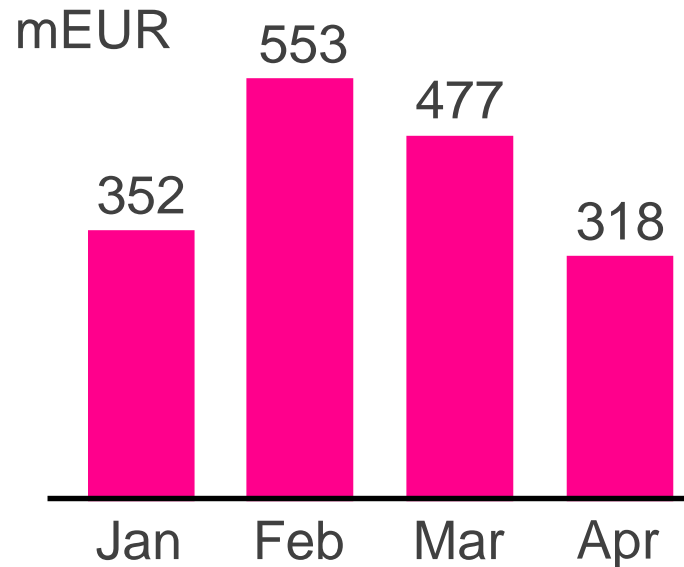
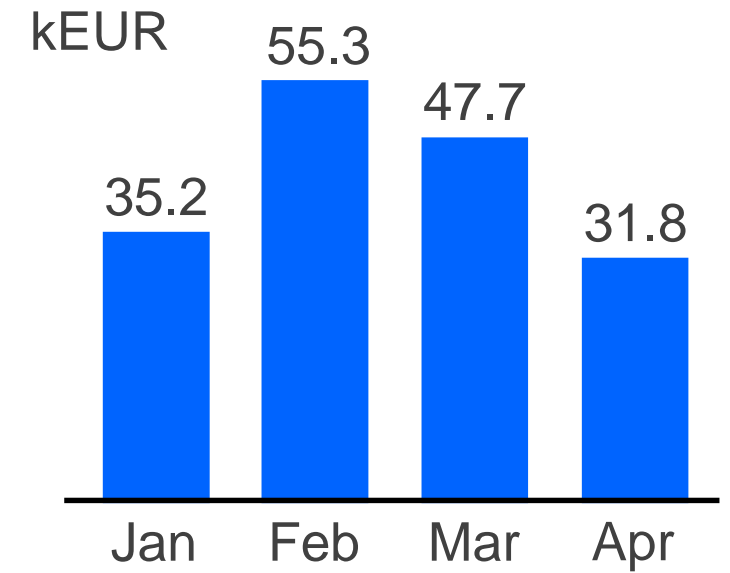
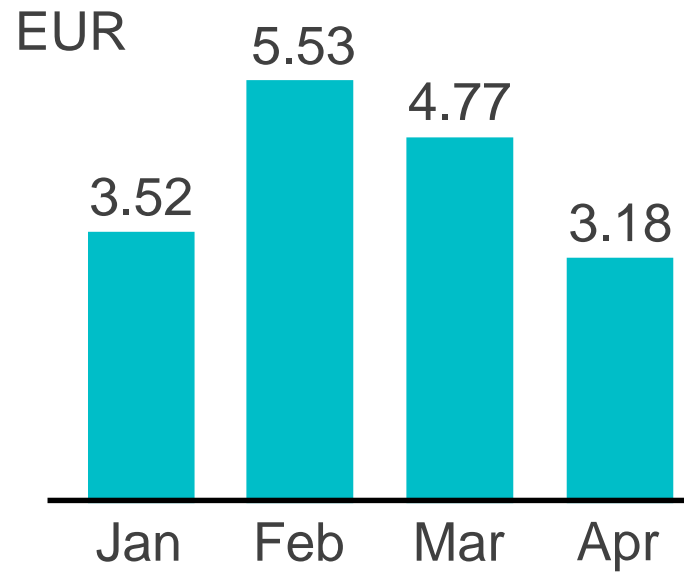
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution A

Colored visualization elements



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

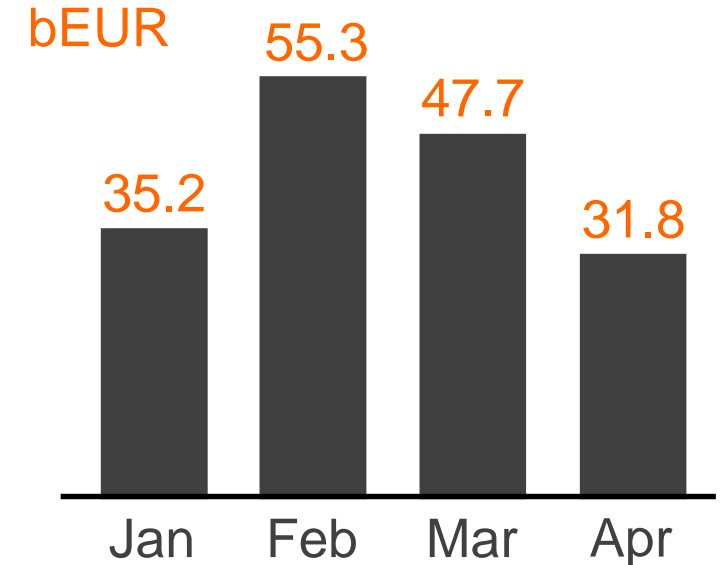
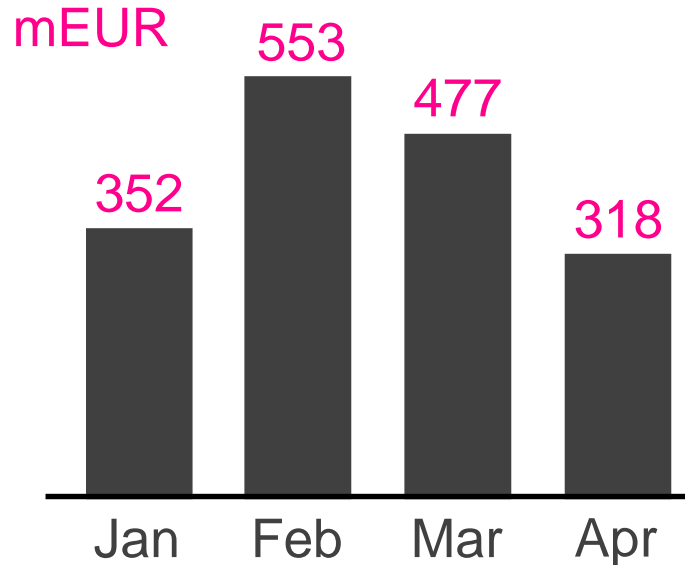
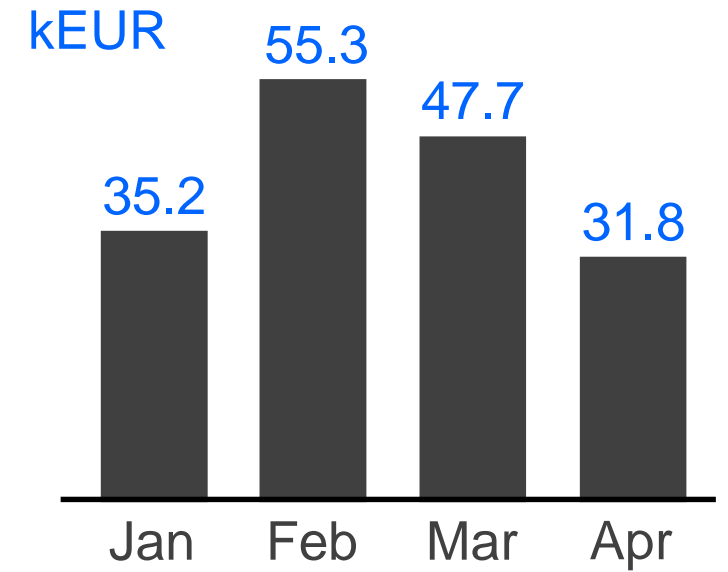
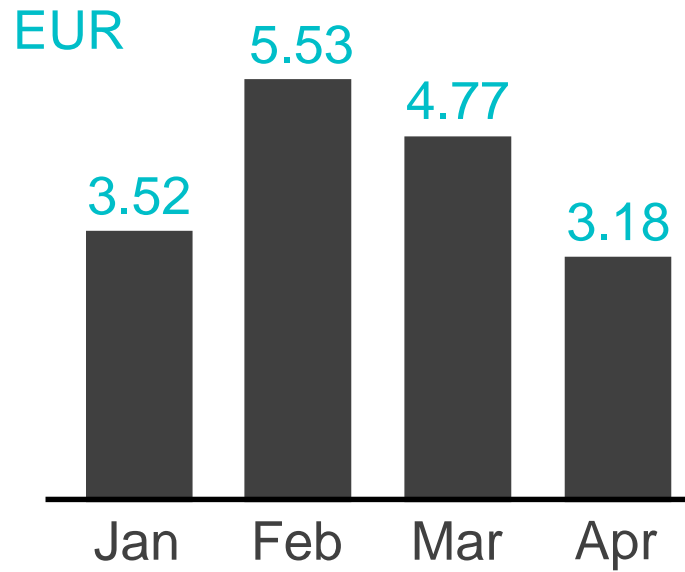
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution B

Colored labels



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

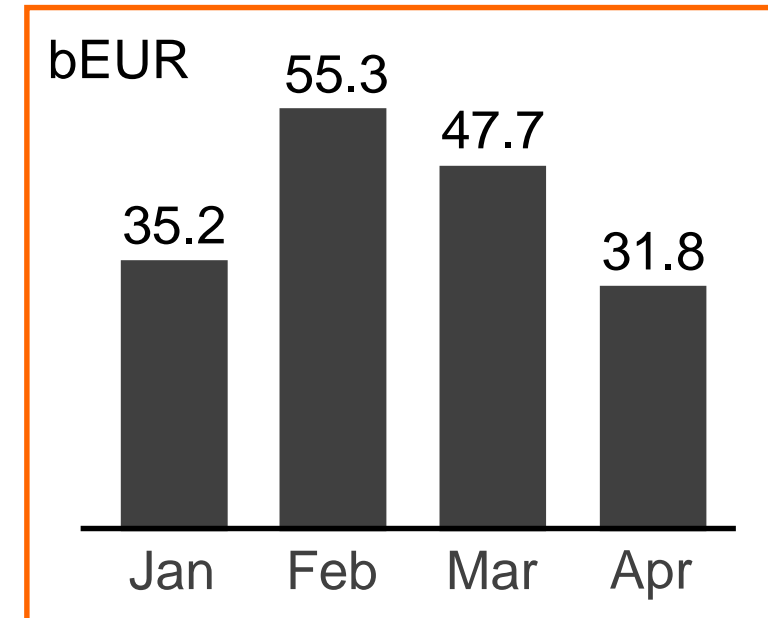
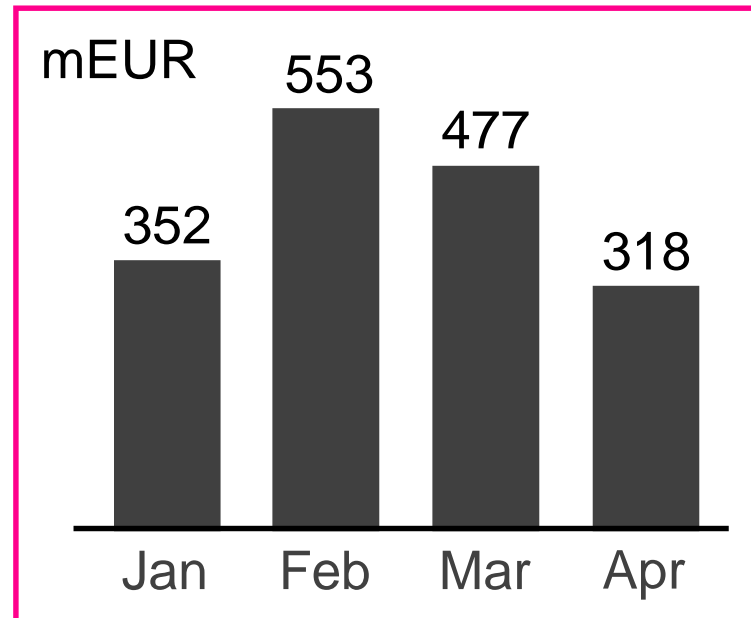
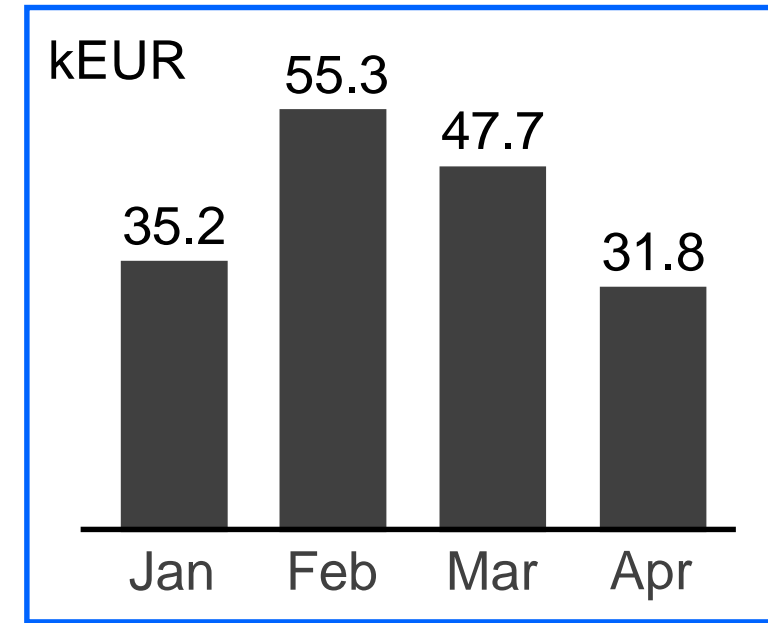
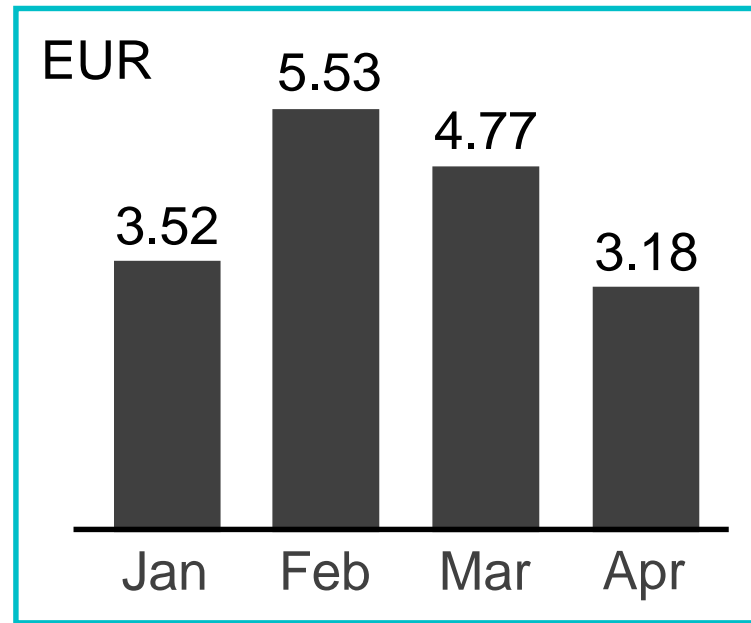
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution C

Colored frames



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

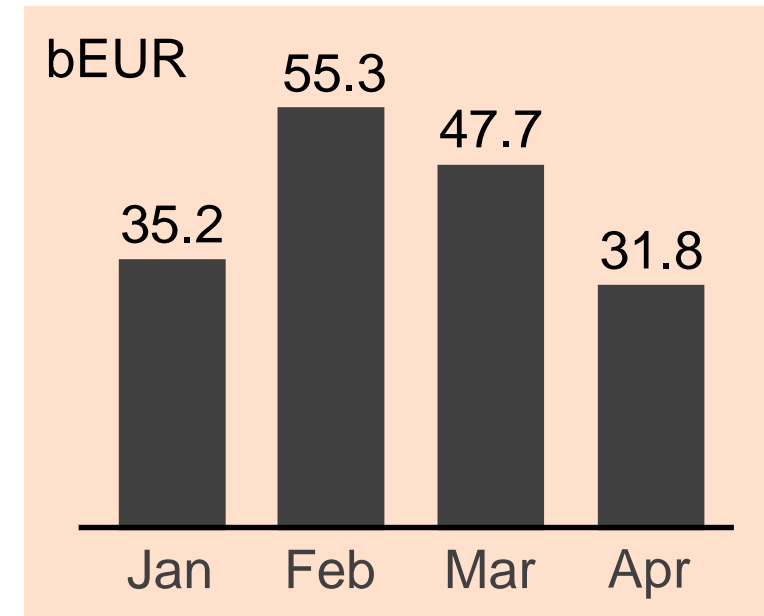
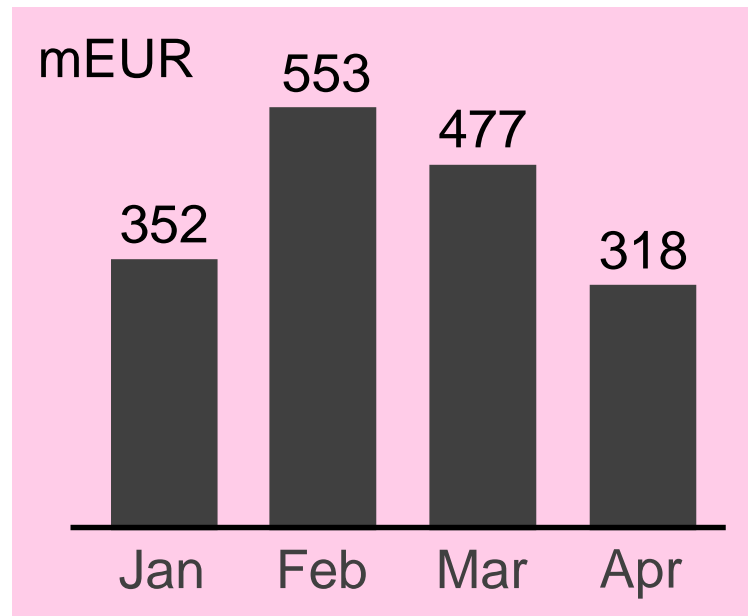
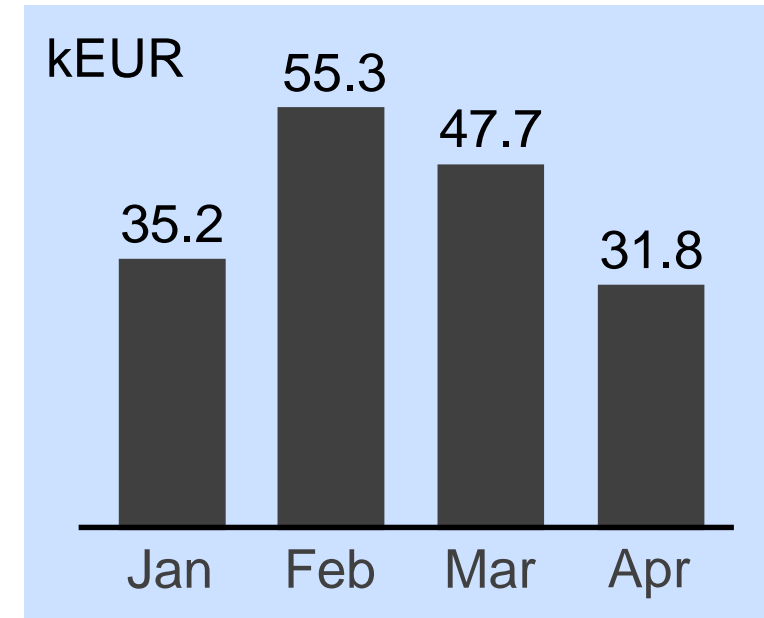
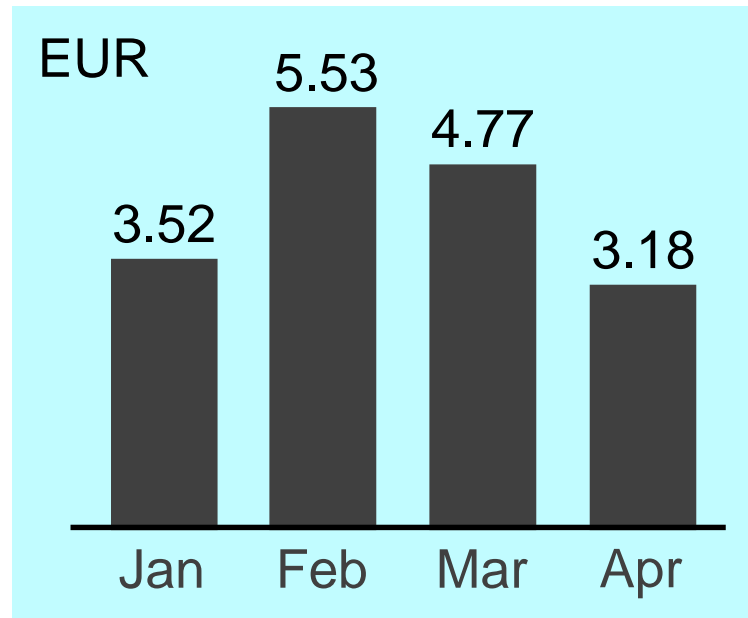
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution D

Colored backgrounds



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

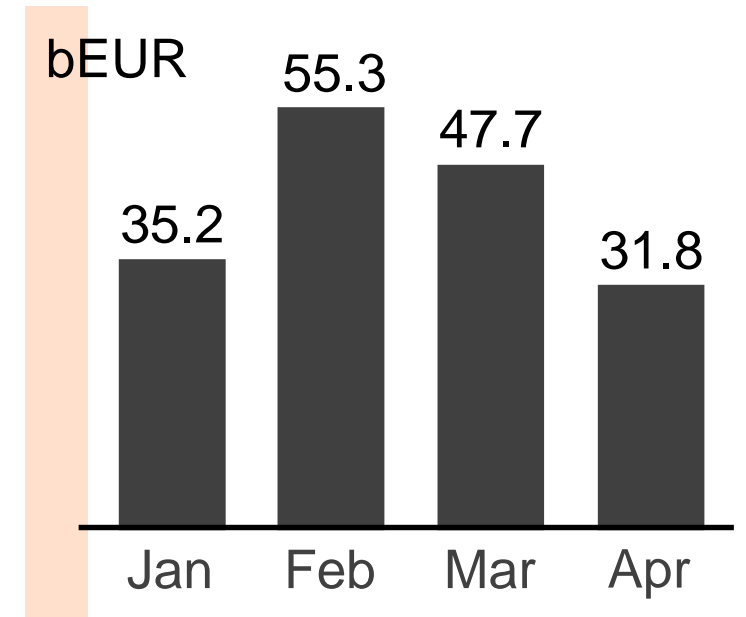
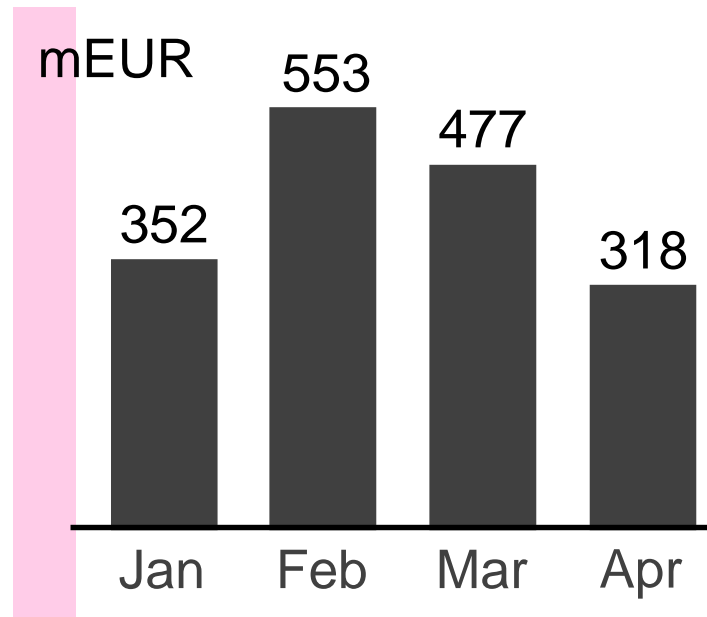
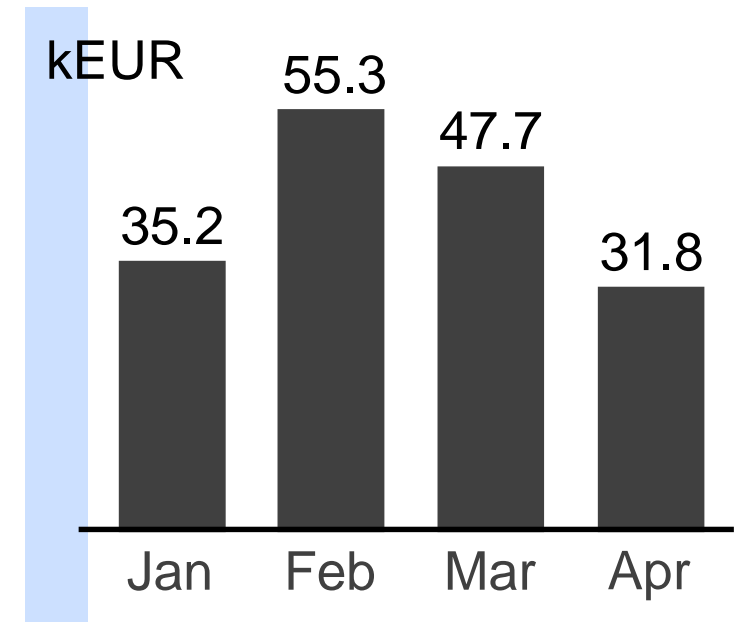
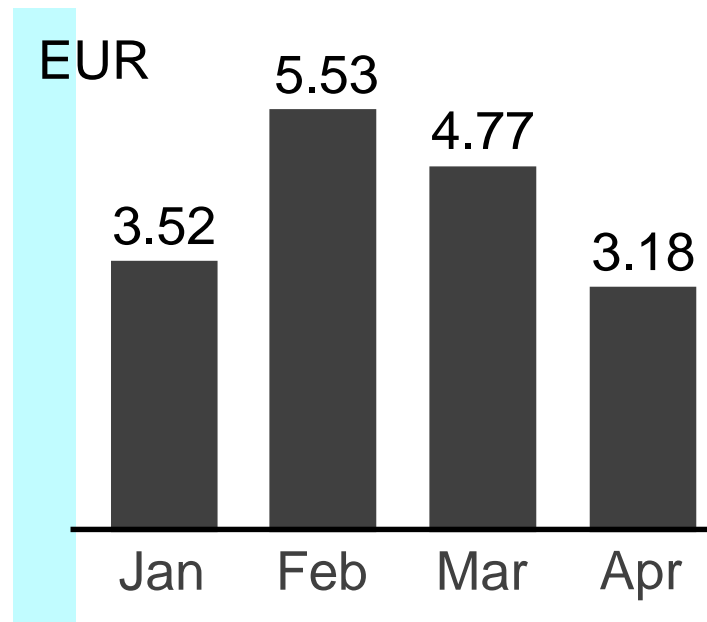
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution E

Colored backgrounds, reduced



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

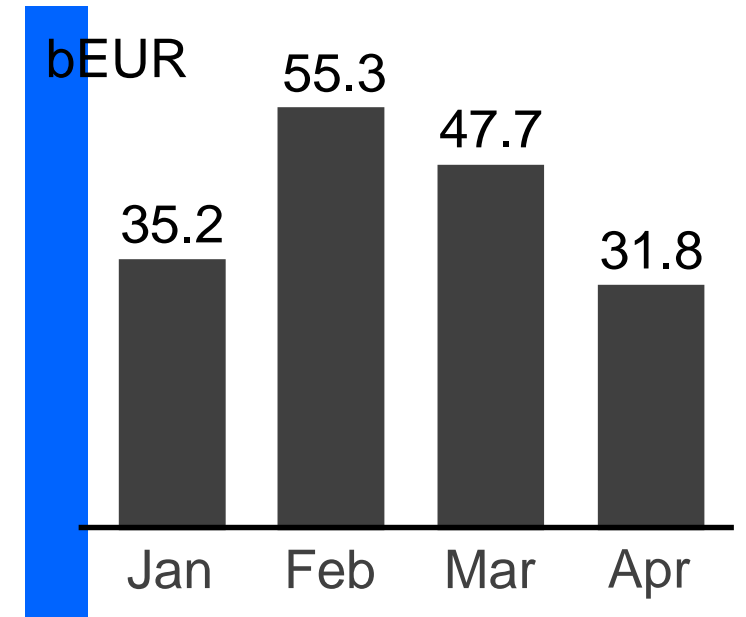
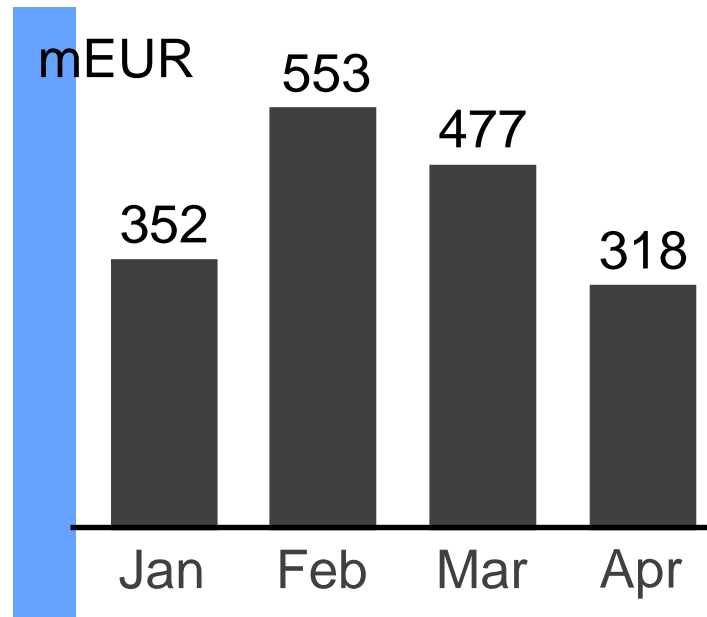
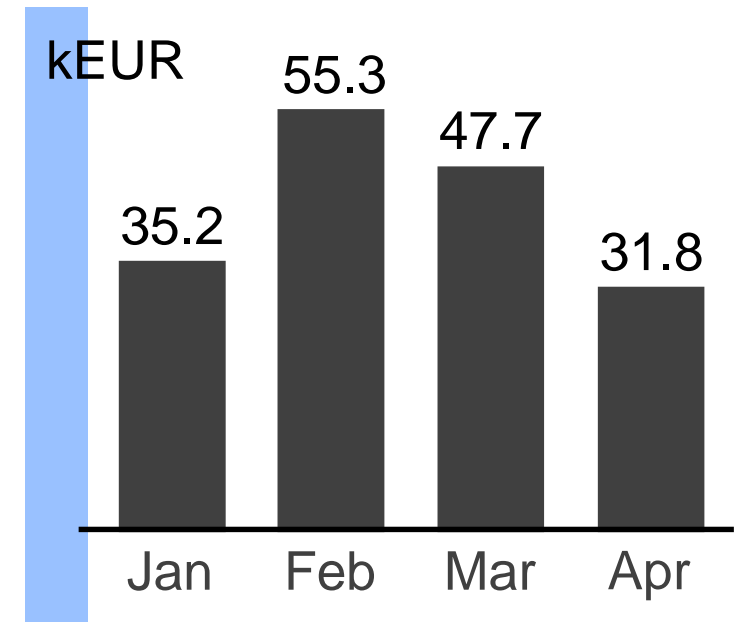
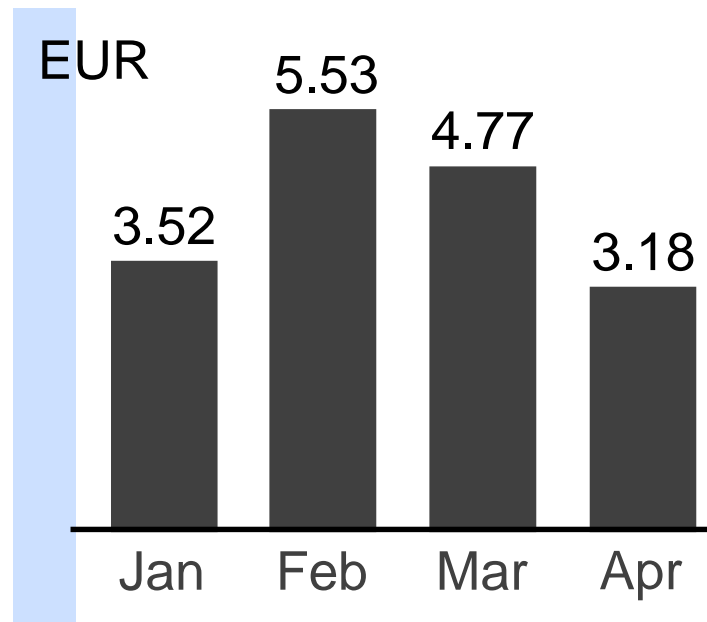
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution F

Different opacity



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

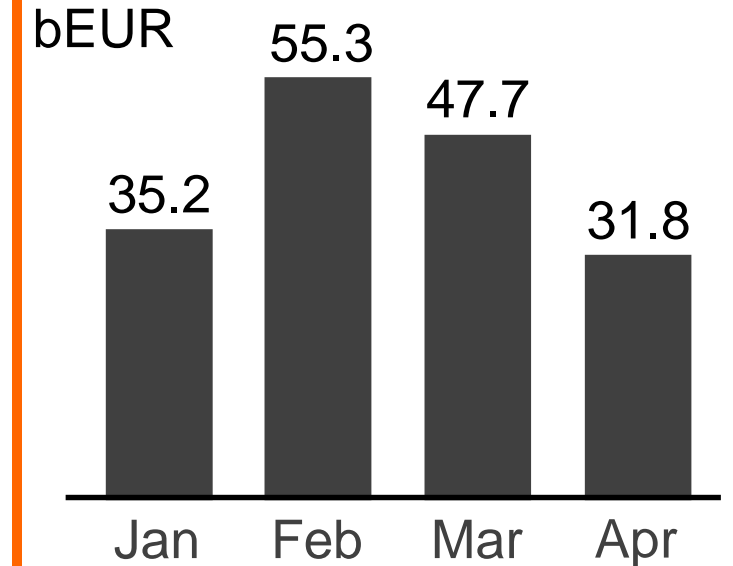
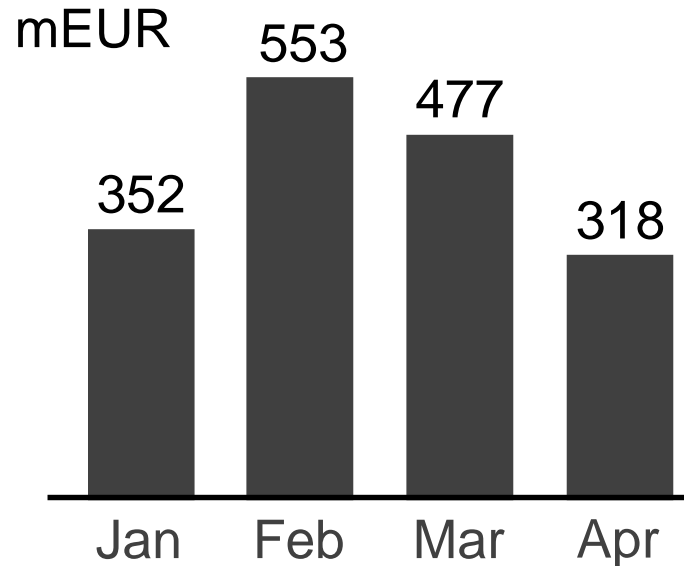
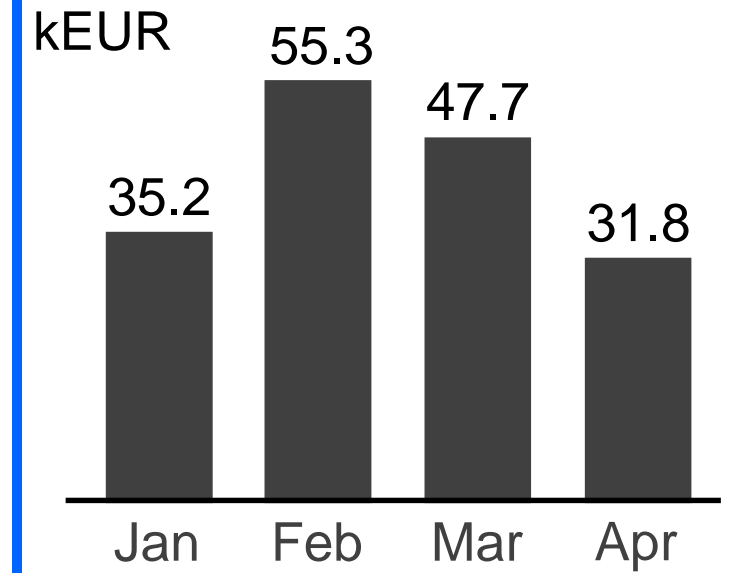
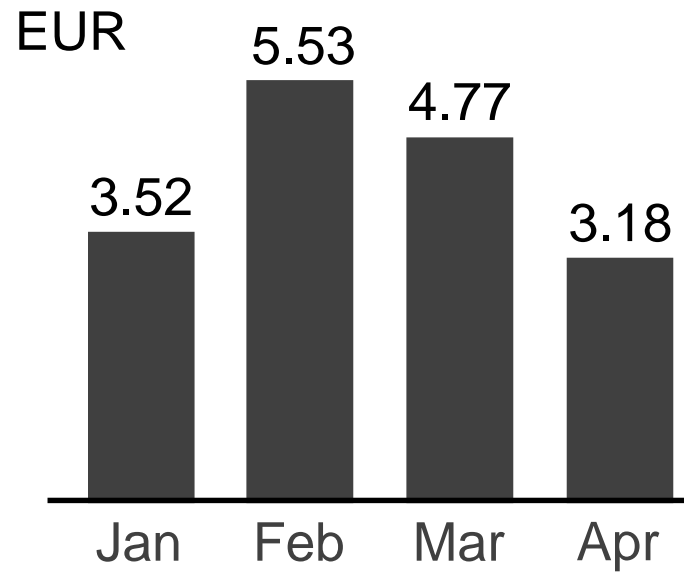
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution G

Vertical lines



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

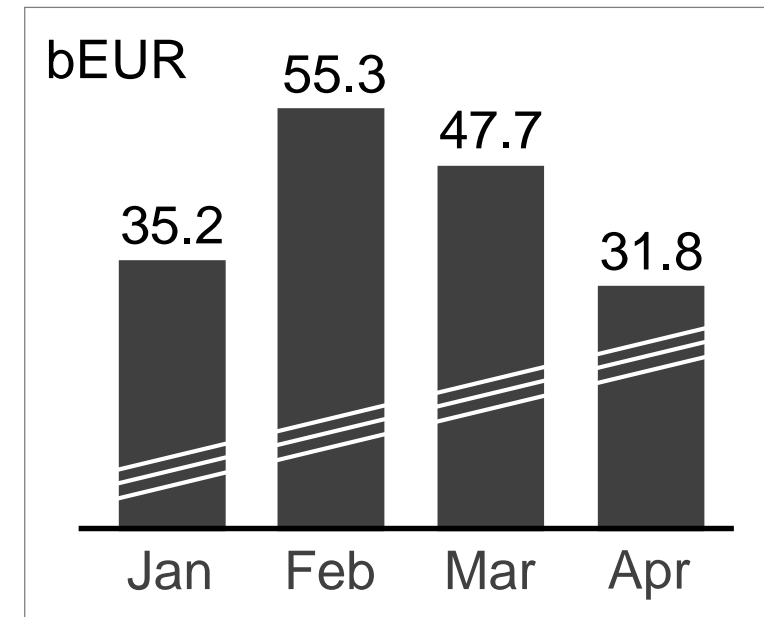
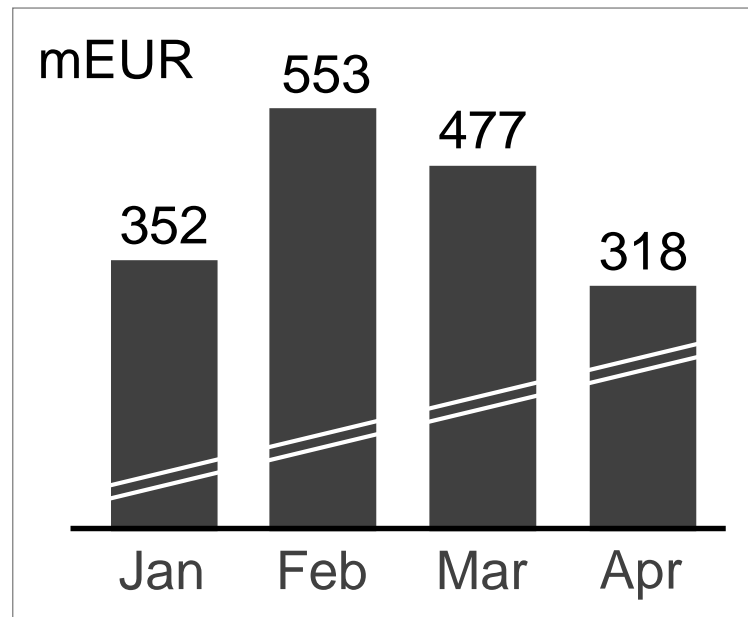
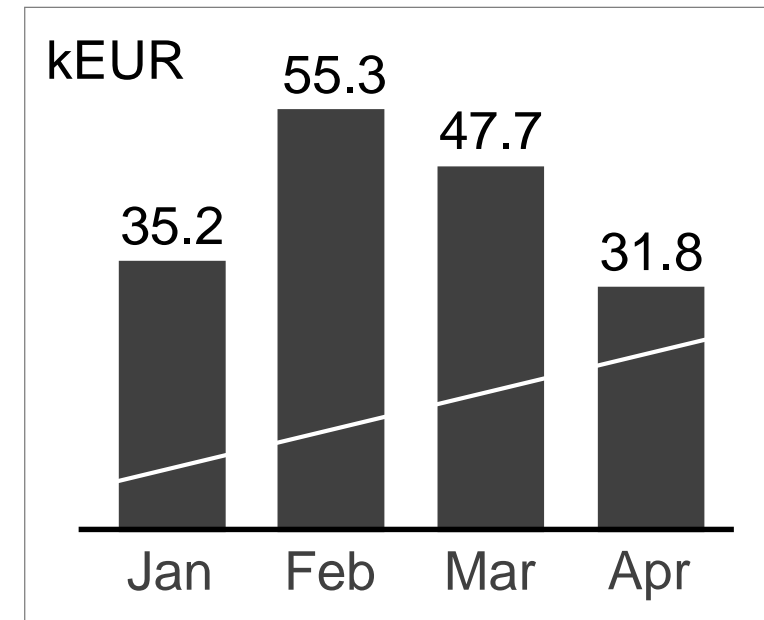
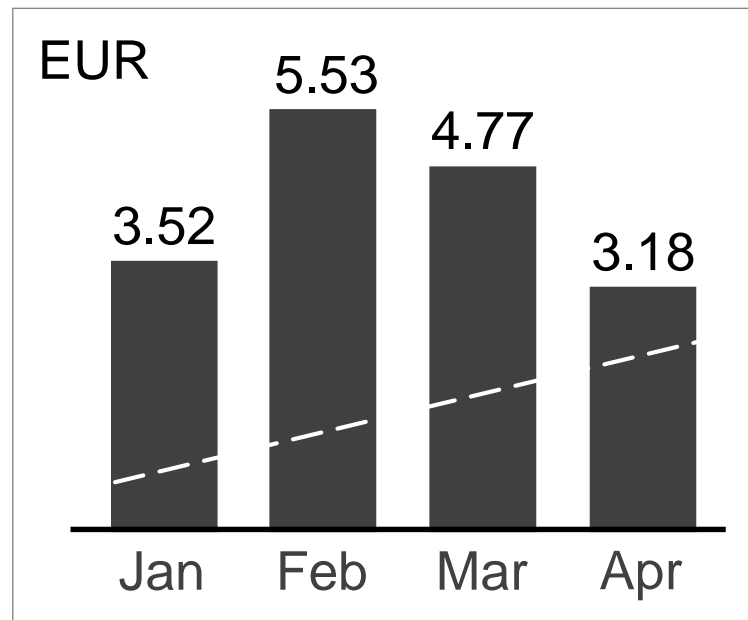
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution H

Diagonal lines



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

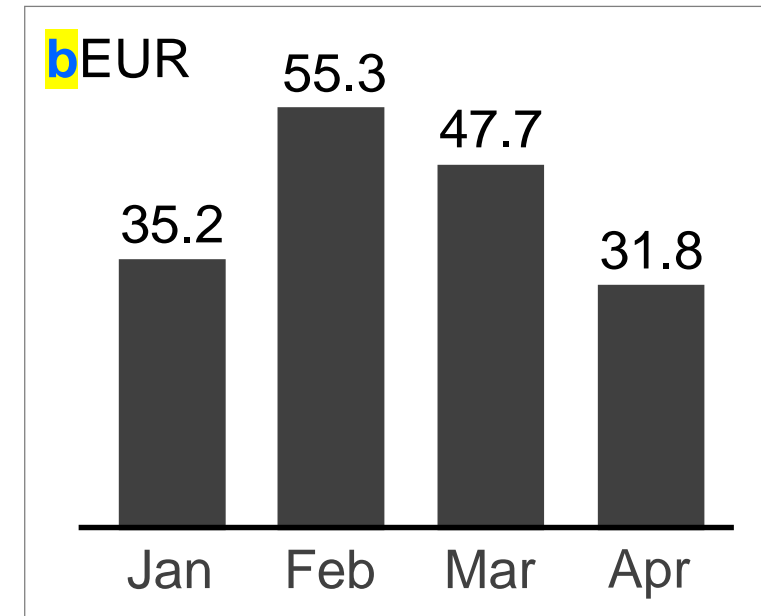
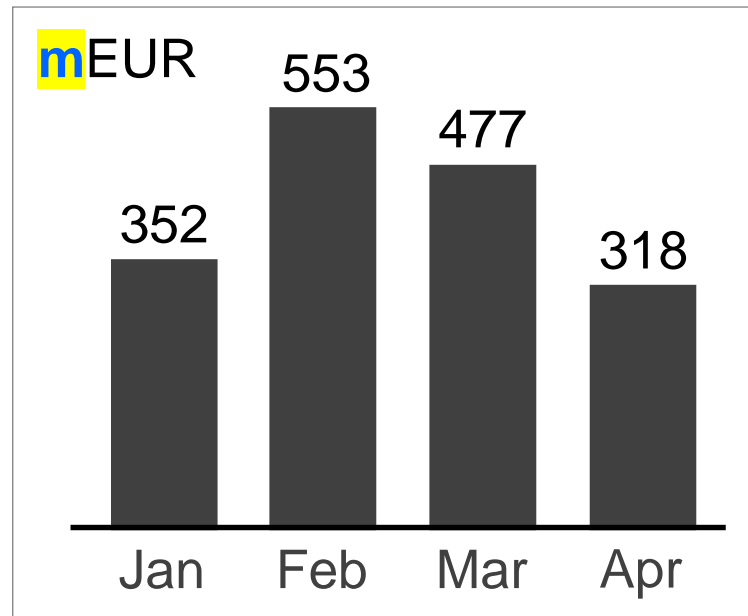
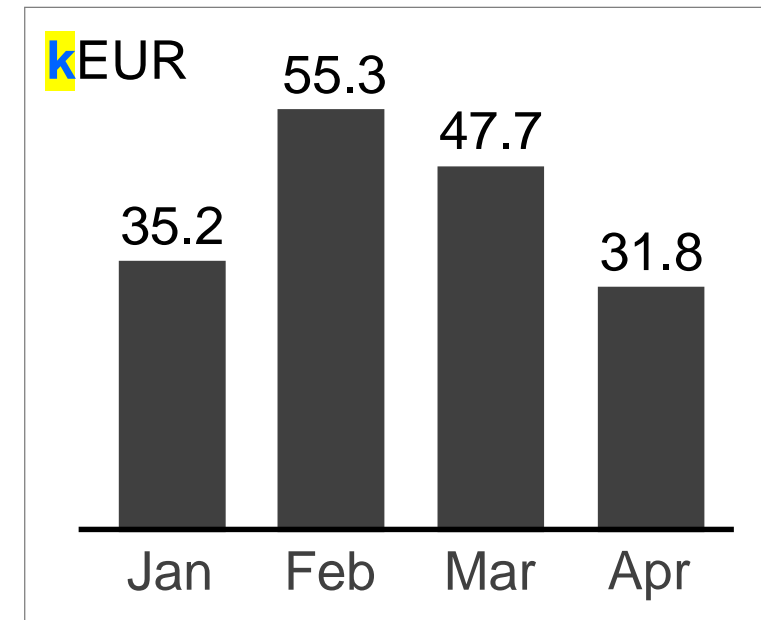
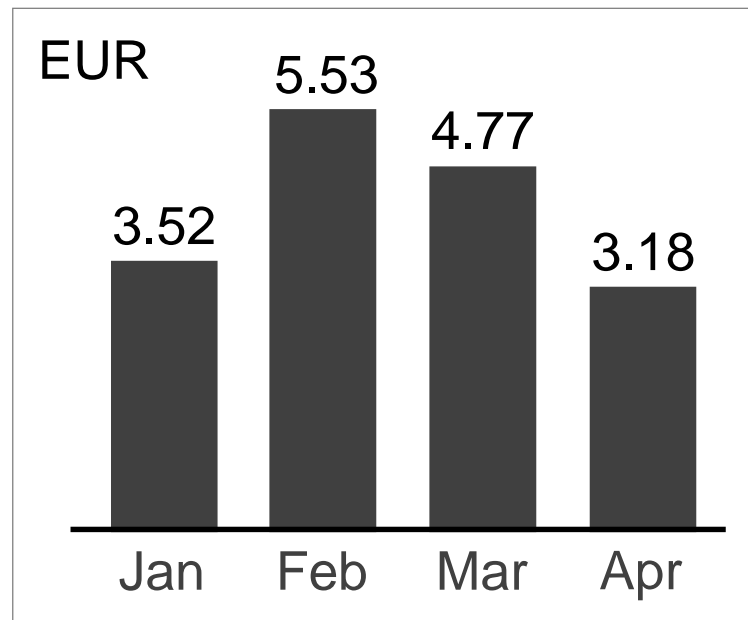
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution J

Highlighting k, m, and b



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

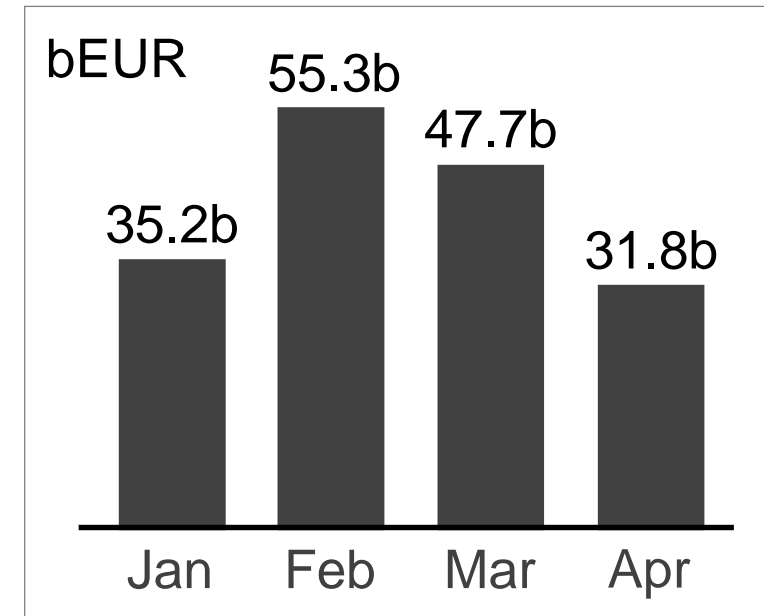
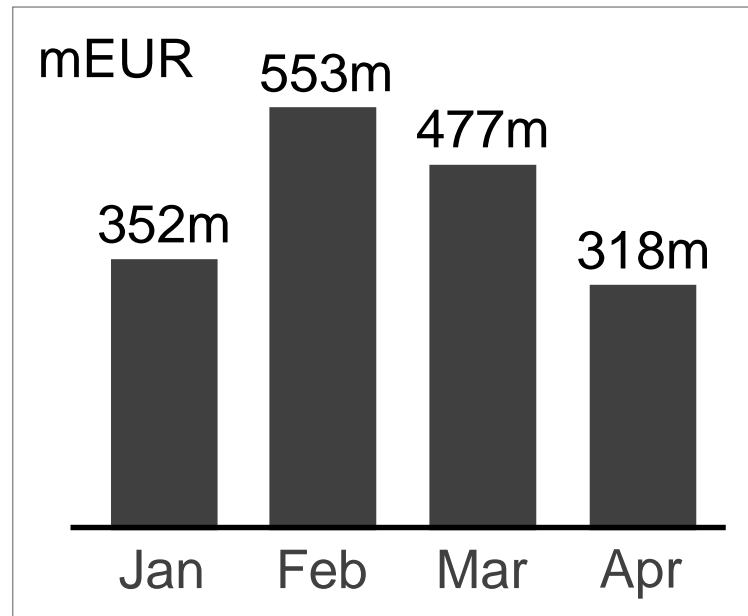
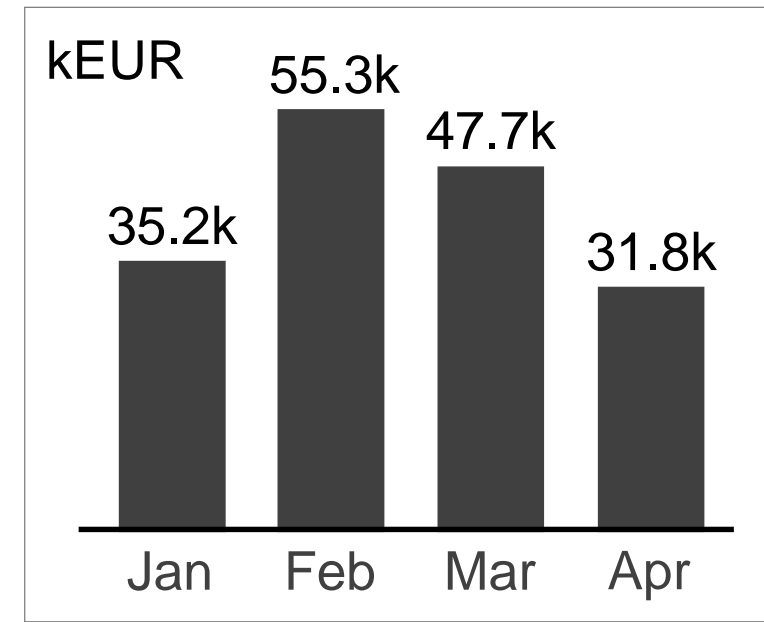
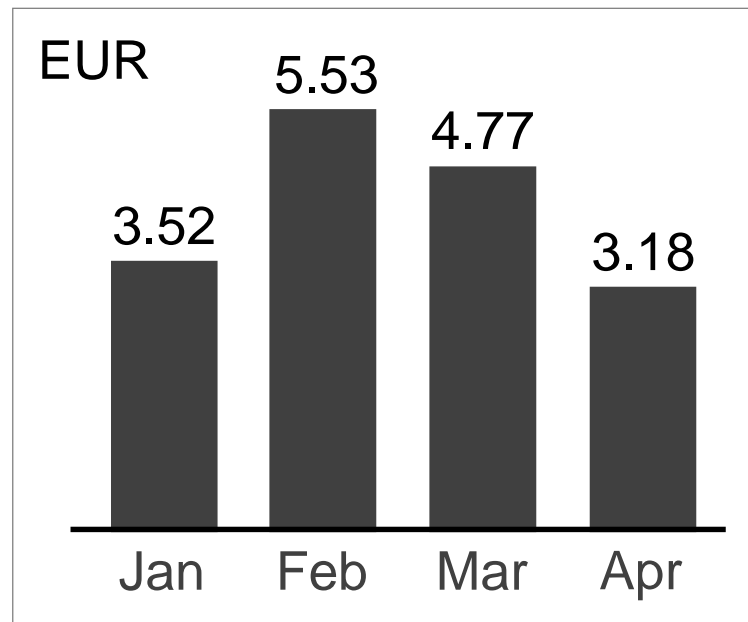
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution K

Adding k, m, and b



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

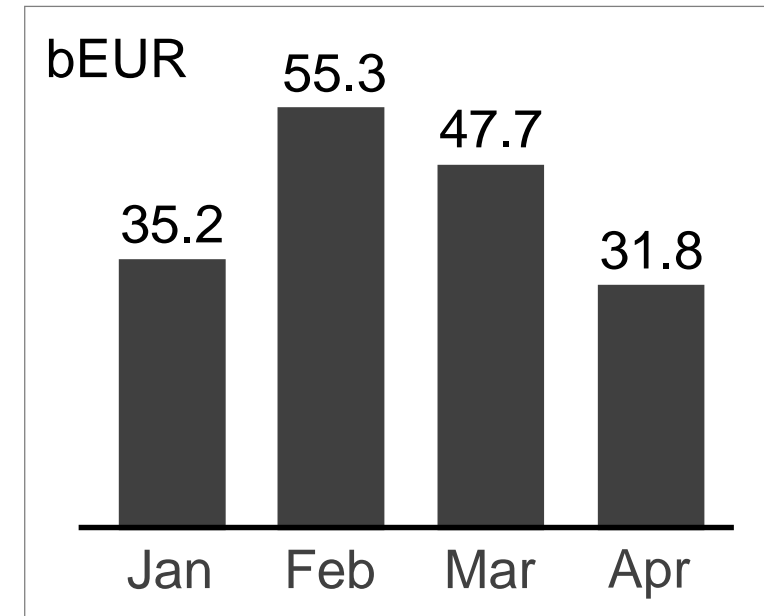
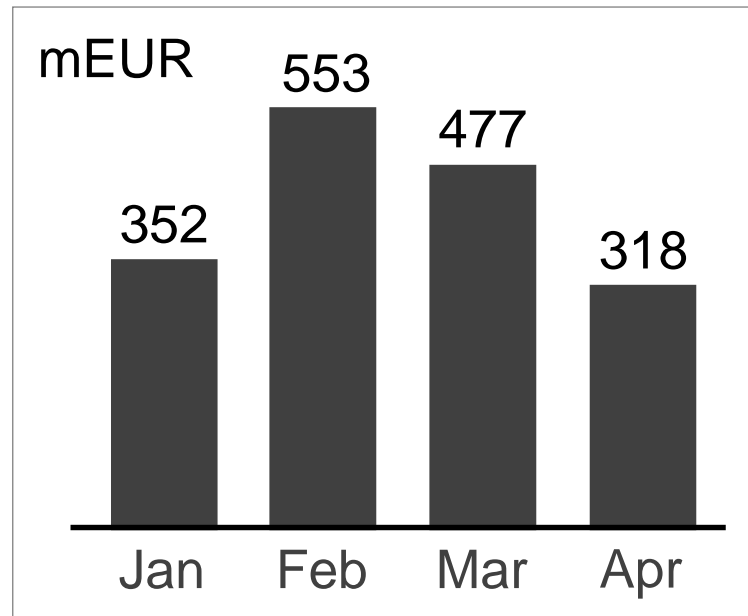
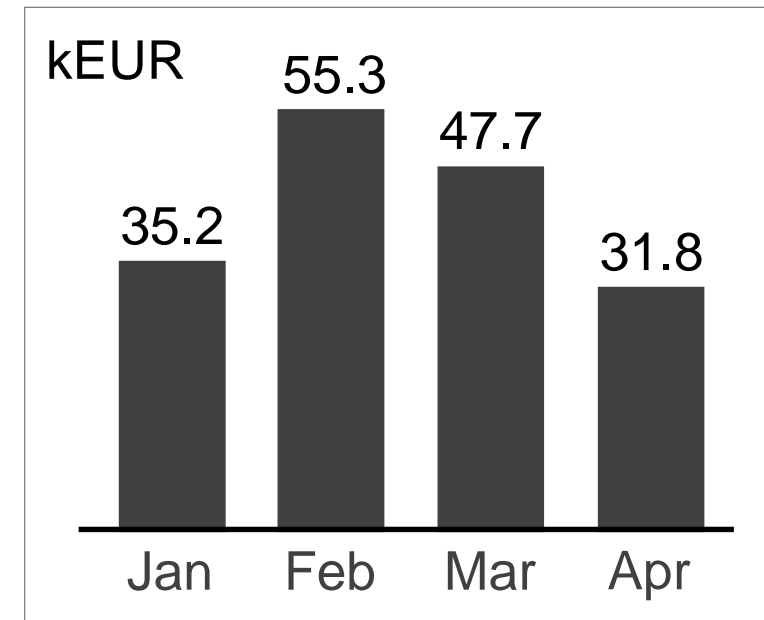
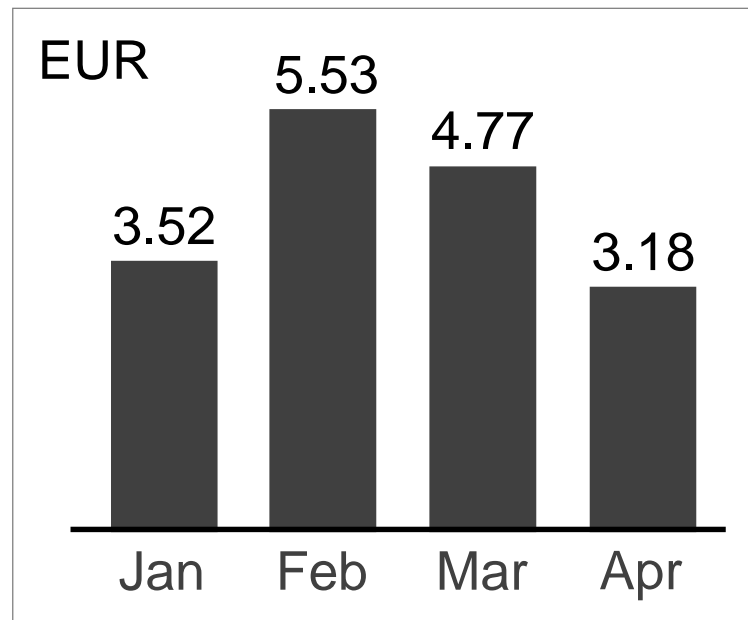
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution L

Nothing



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

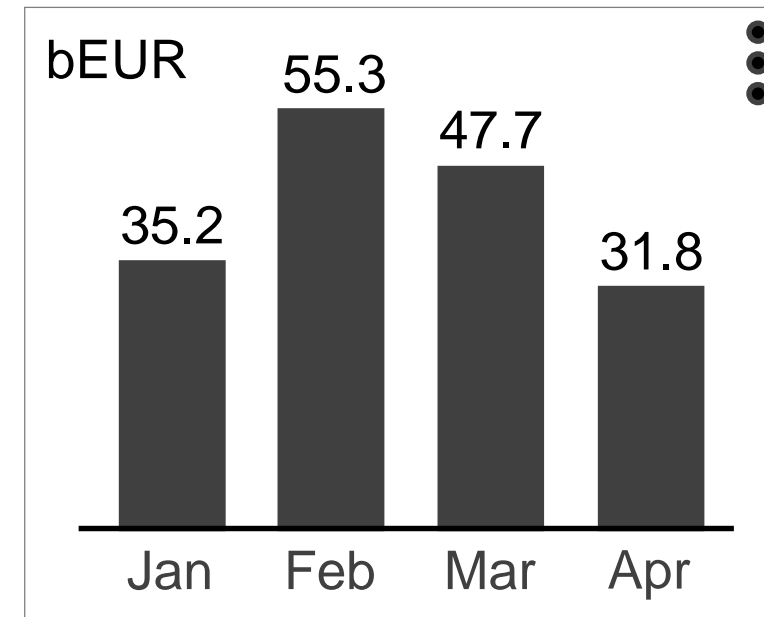
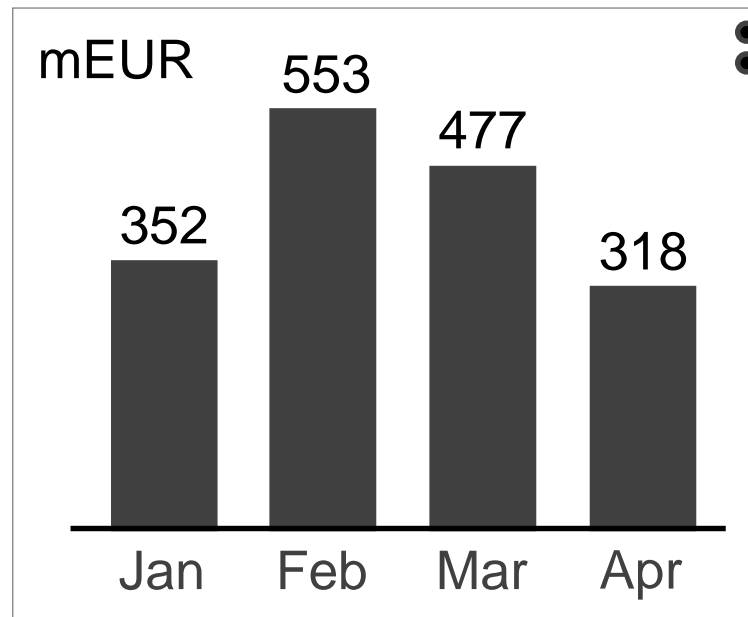
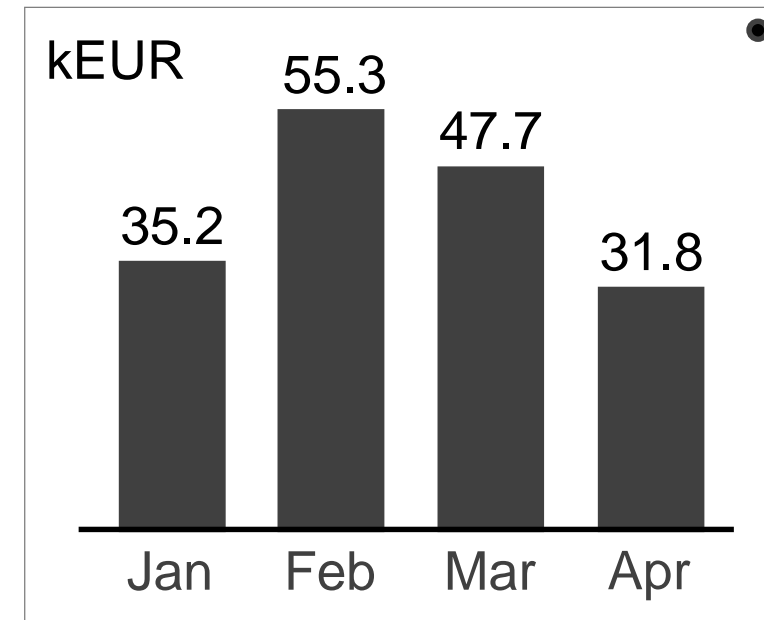
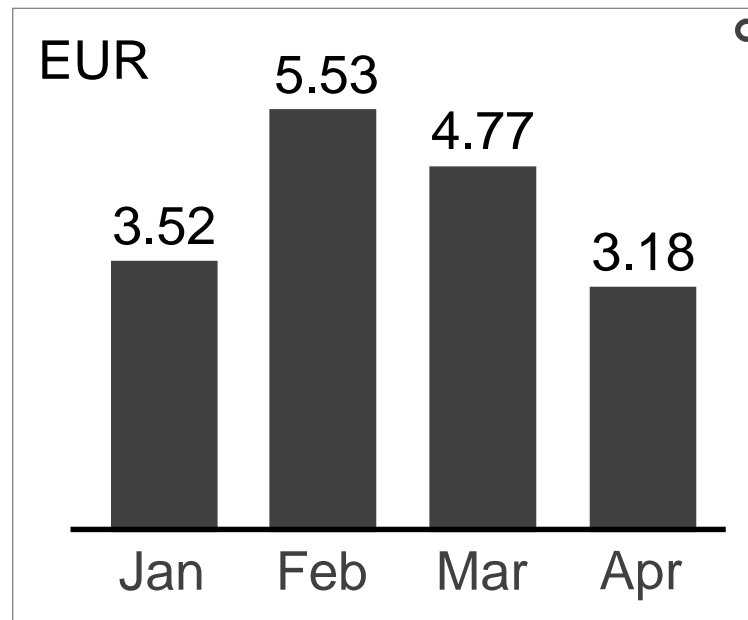
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution I

Symbols



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

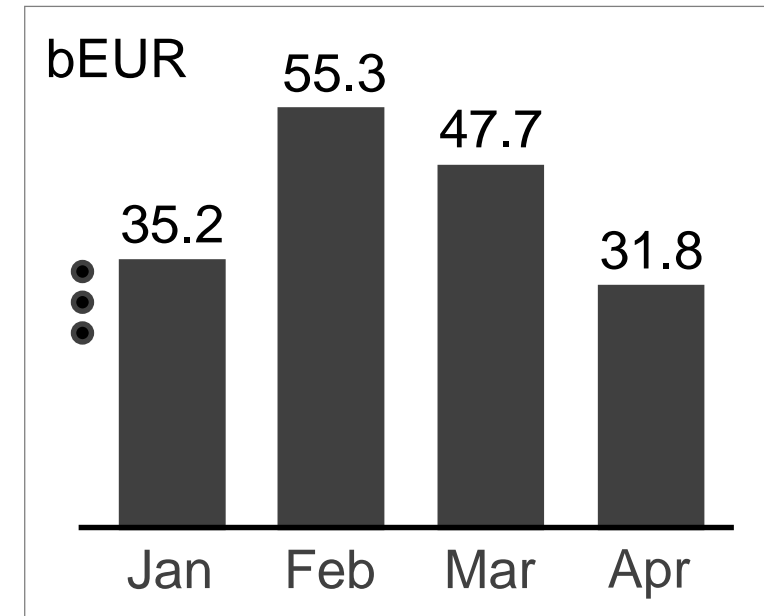
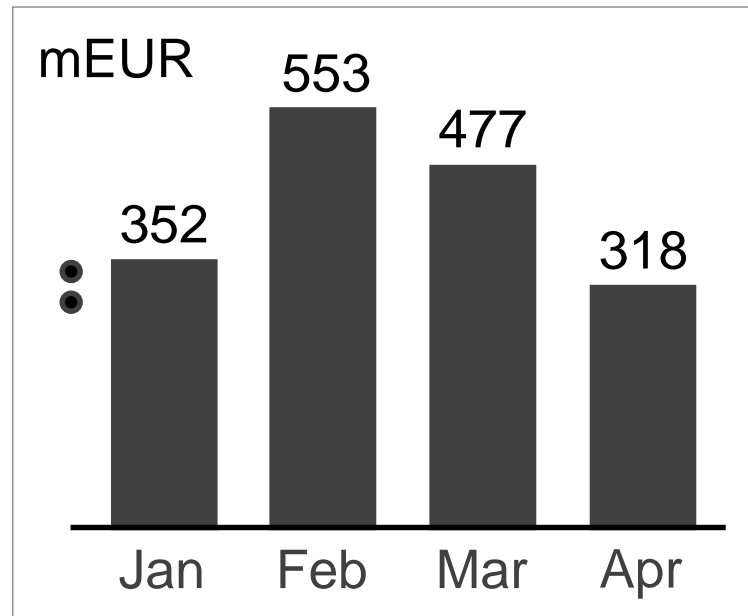
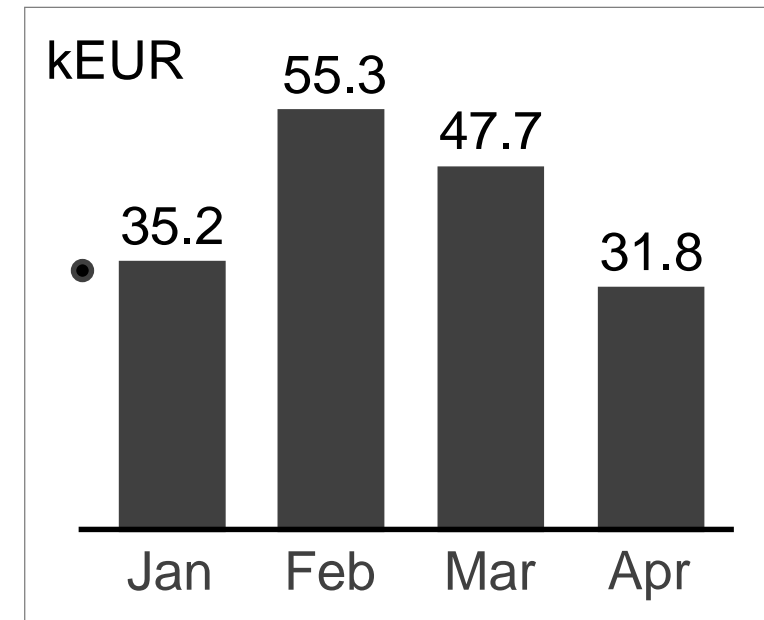
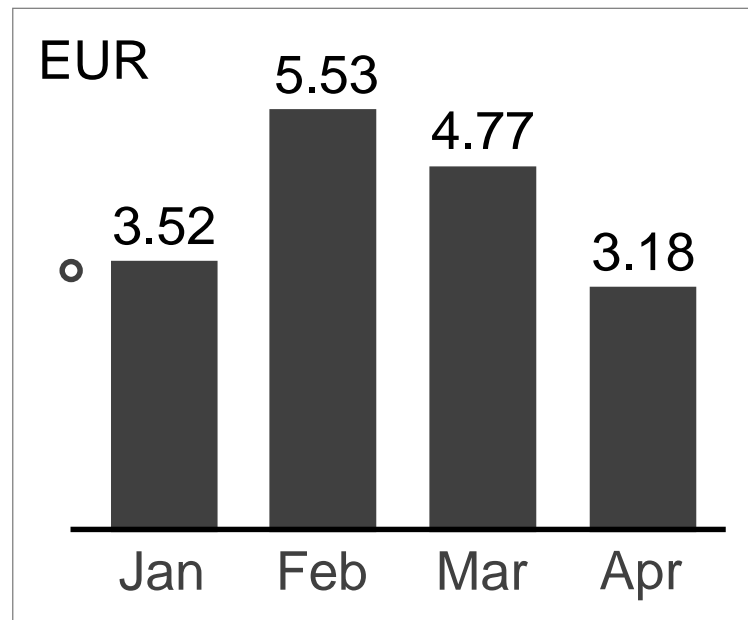
1 000 – one thousand

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Solution I

Symbols



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

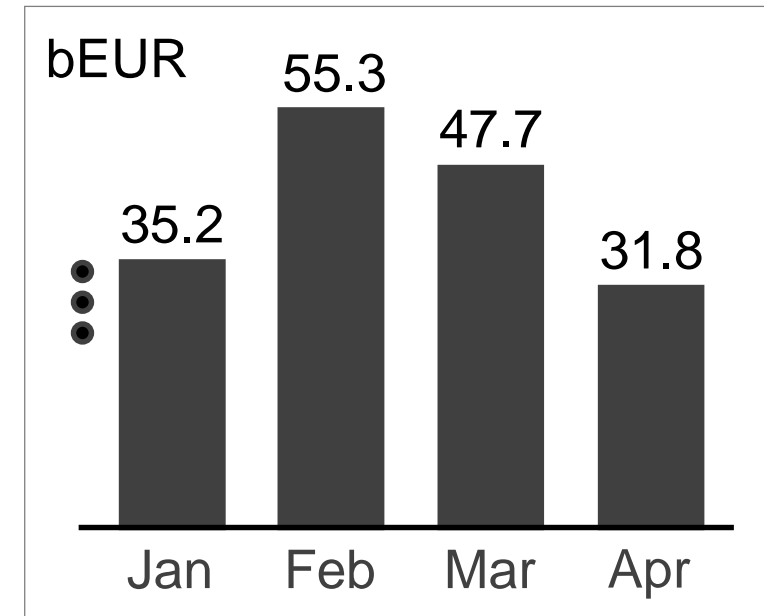
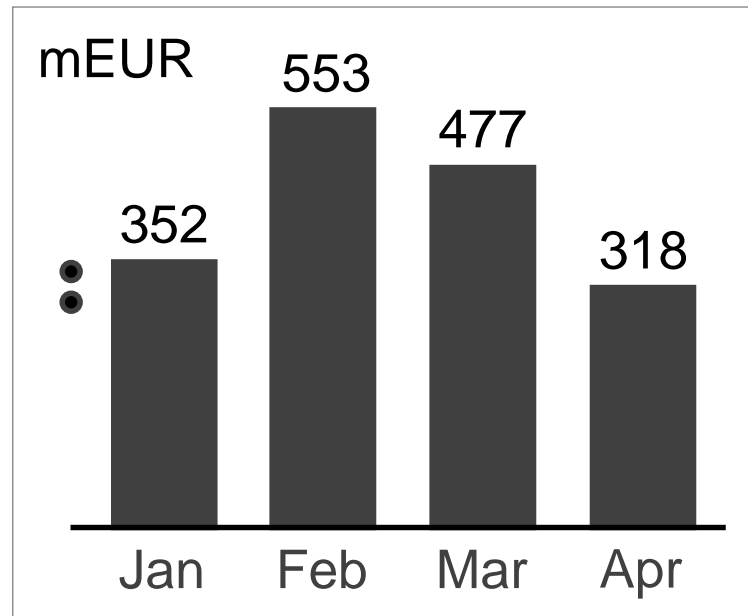
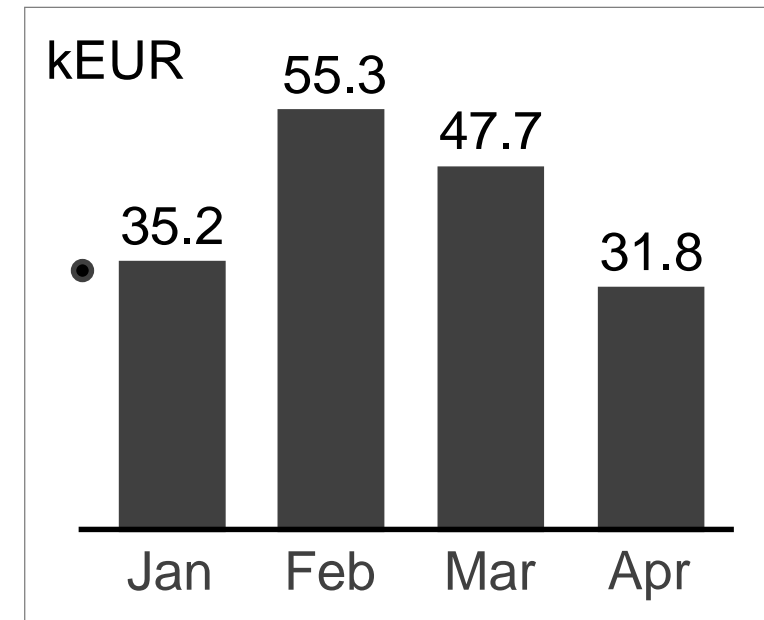
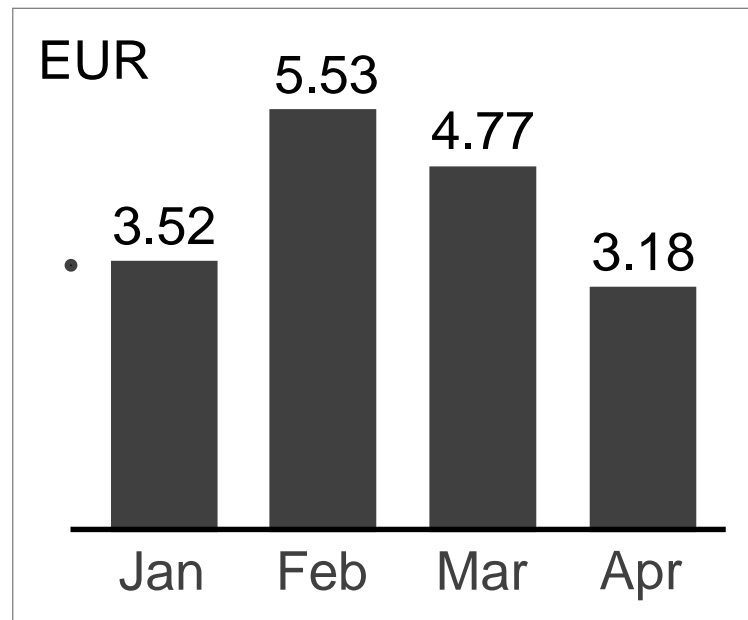
1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution I

Symbols



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution I

Symbols

The challenge is:

Our concept must work for charts with two value axes, too...

EUR



kEUR



mEUR



bEUR



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Solution I

Symbols

The challenge is:

Our concept must work for charts with two value axes, too...

EUR



kEUR



mEUR



bEUR



Question 1

Should we visually recognize different „powers of thousand“?

1 - one

1 000 – one thousand

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Solution I

Symbols

The challenge is:

Our concept must work for charts with two value axes, too...

EUR



kEUR



mEUR



bEUR



Question 1

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Question 1

Should we visually recognize different „powers of thousand“?

1 - one

1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

Conclusion

There *are* means to allow us to **distinguish** different scales.

Question 1

Should we visually recognize different „powers of thousand“?

1 - one

1 000 – one thousand

1 000 000 – one million

1 000 000 000 – one billion?

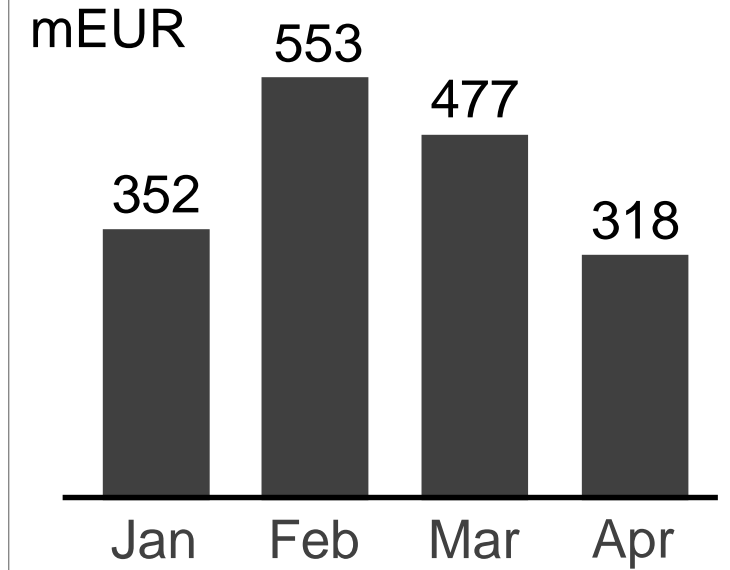
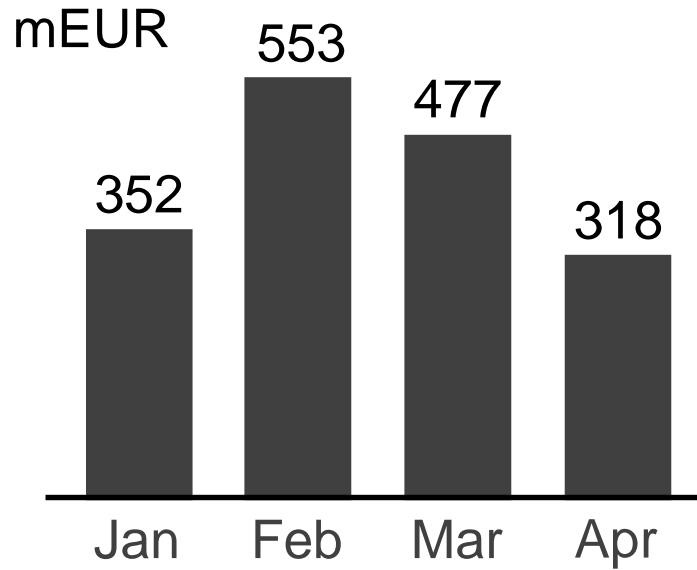
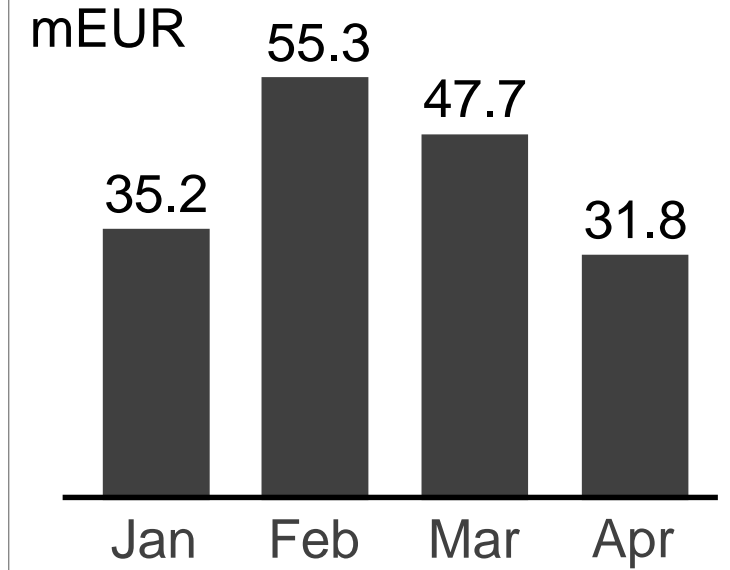
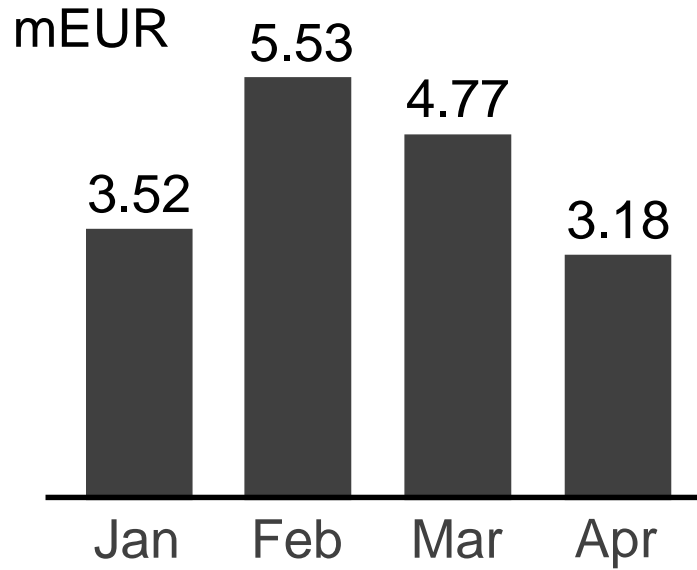
Conclusion

There *are* means to allow us to **distinguish** different scales.

But - whatever we do – we will not be able to effectively **compare** charts with scales of different „powers of thousand“.

Here is no visual help
to distinguish:

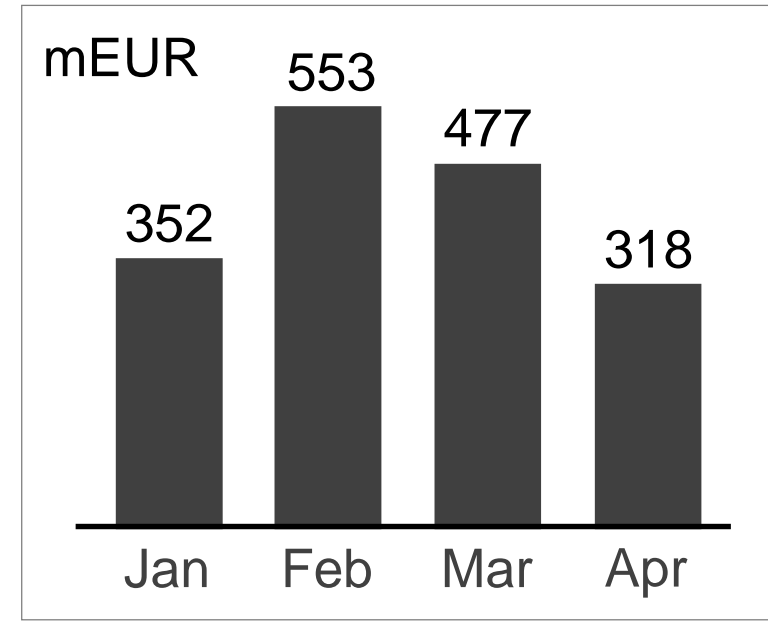
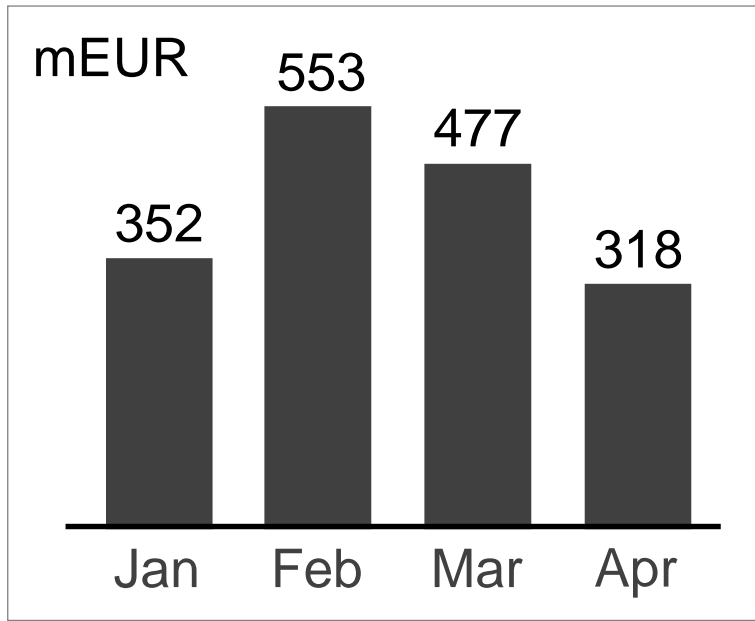
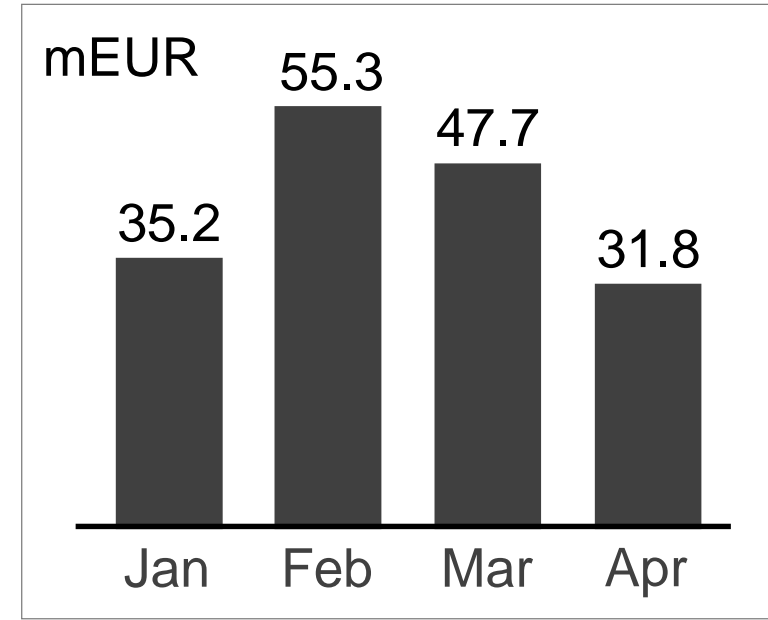
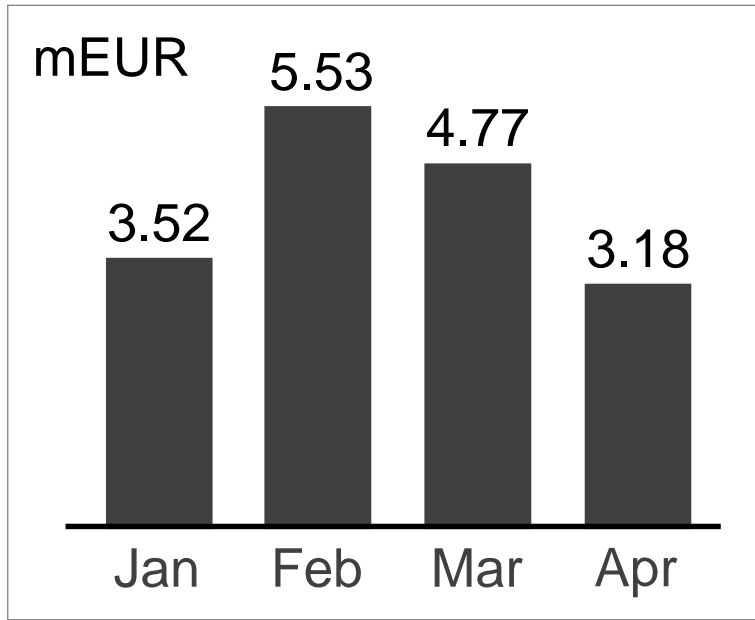
3 520 000
35 200 000
352 000 000



Question 2

Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

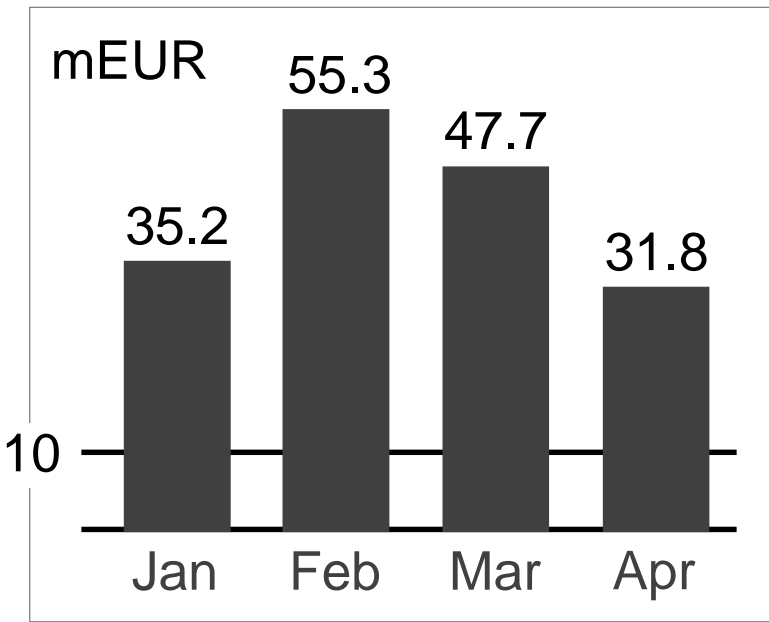
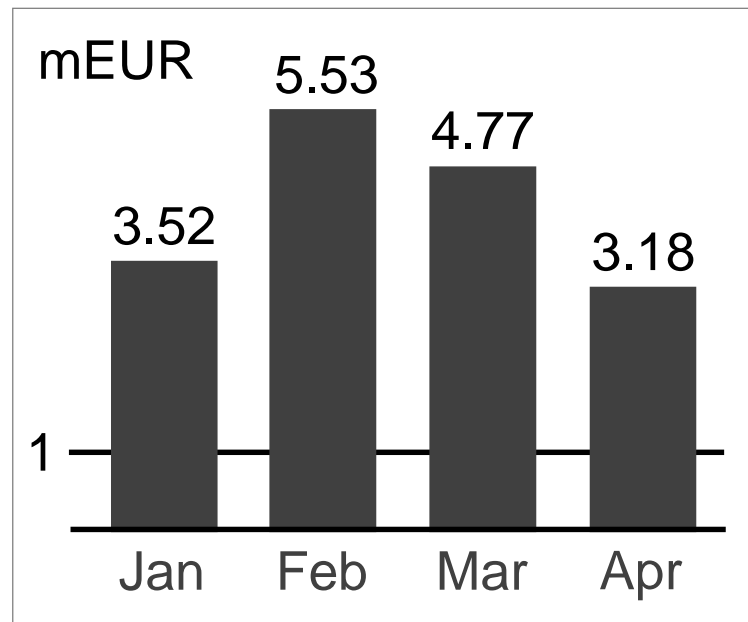
5.53
55.3
553



Question 2

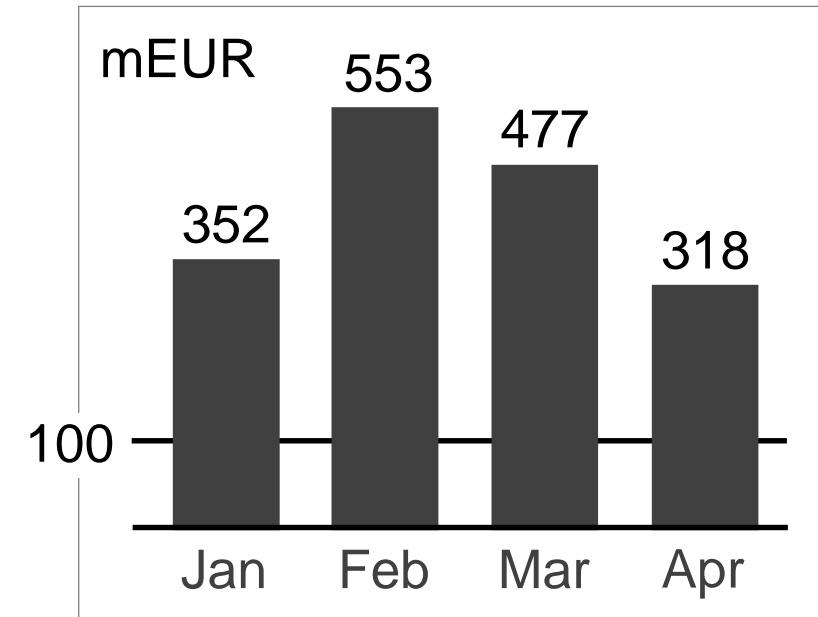
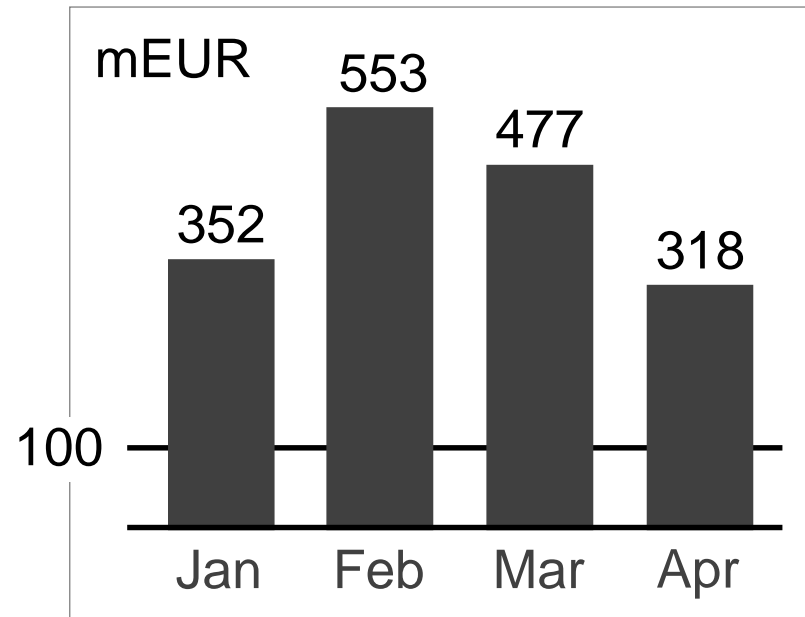
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
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Solution B

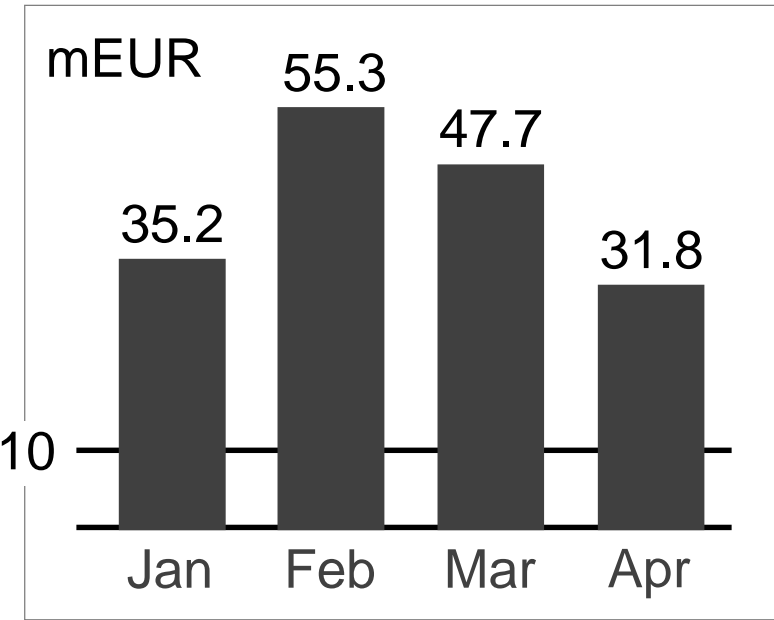
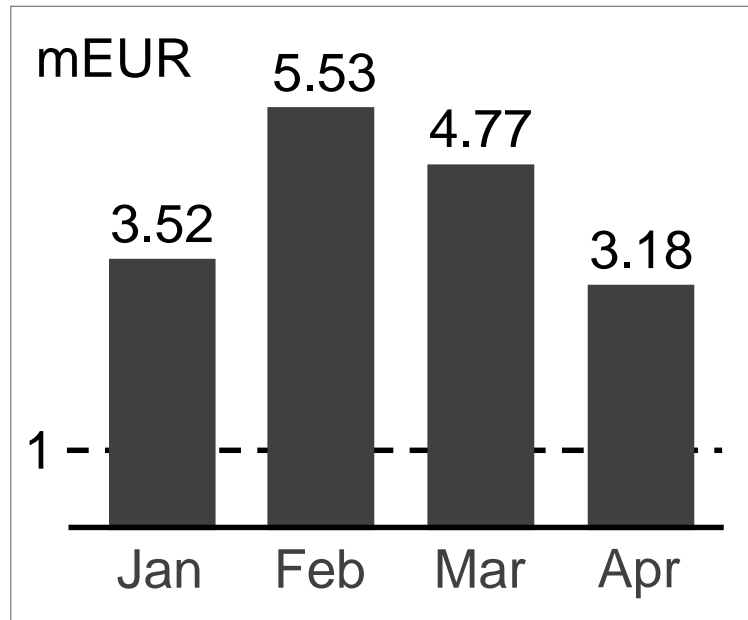
Bullets



Question 2

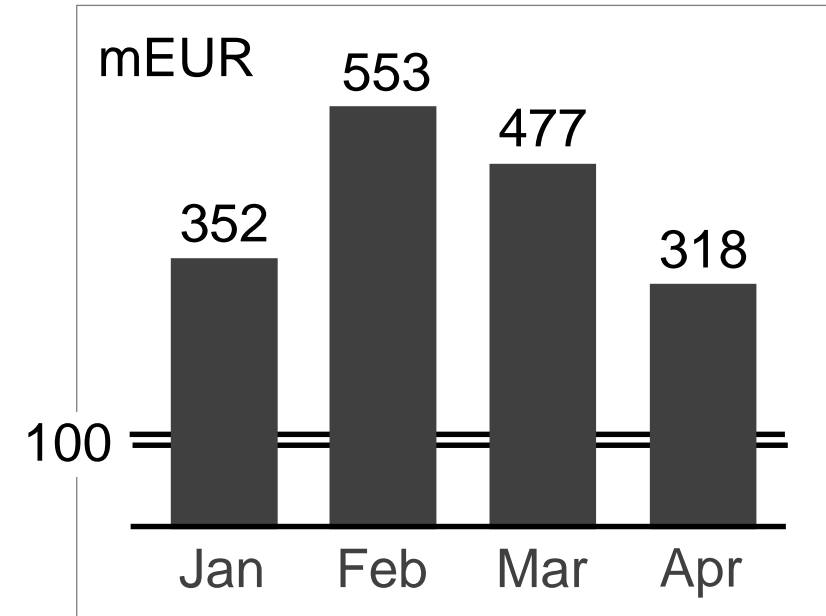
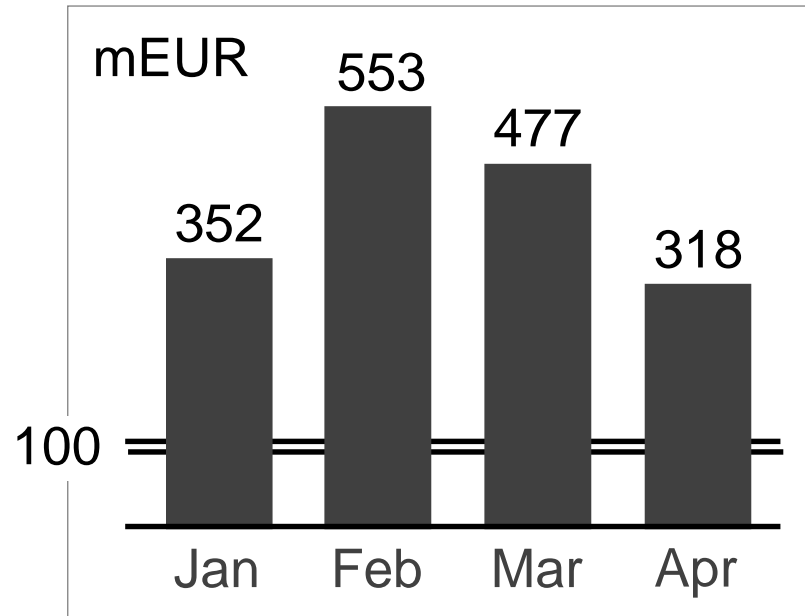
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
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Solution A

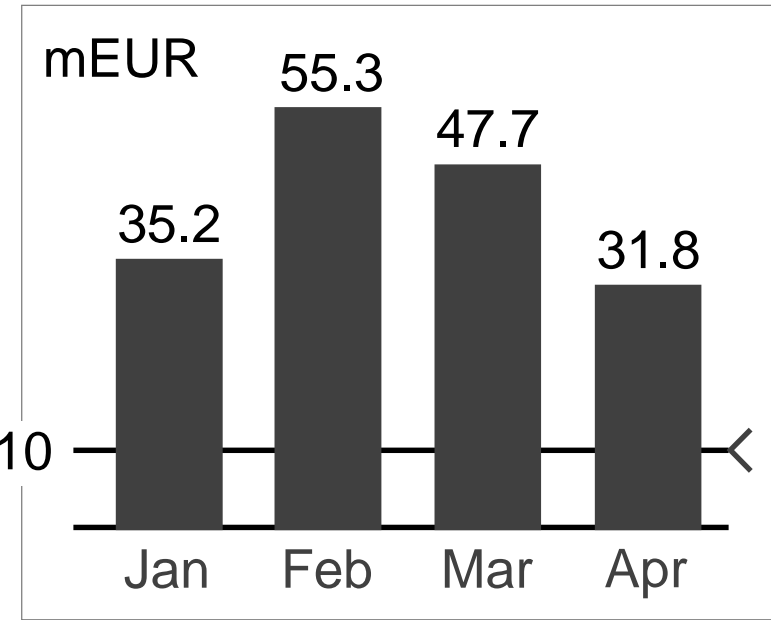
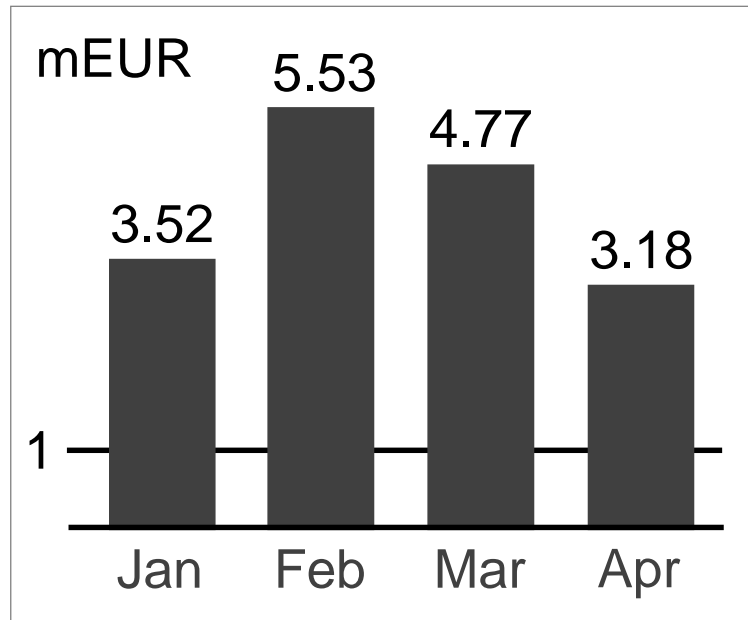
Horizontal lines, different types



Question 2

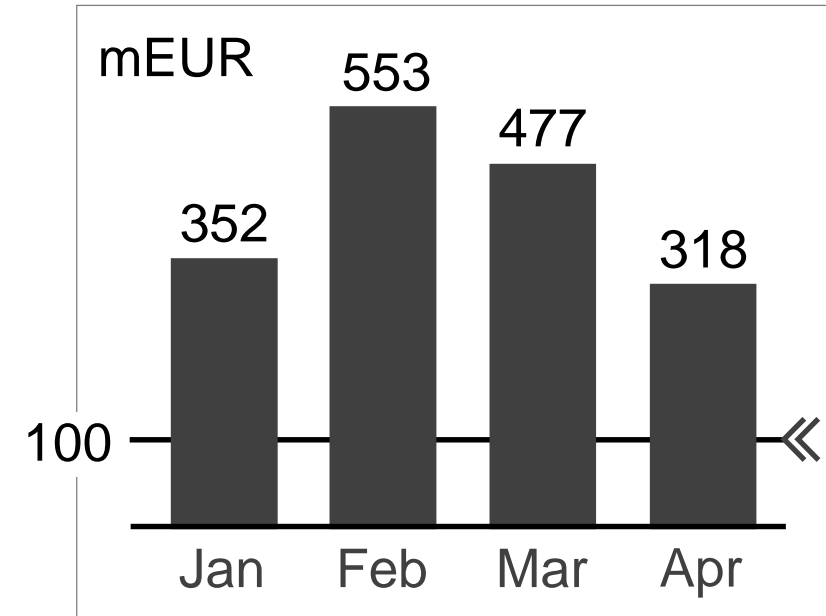
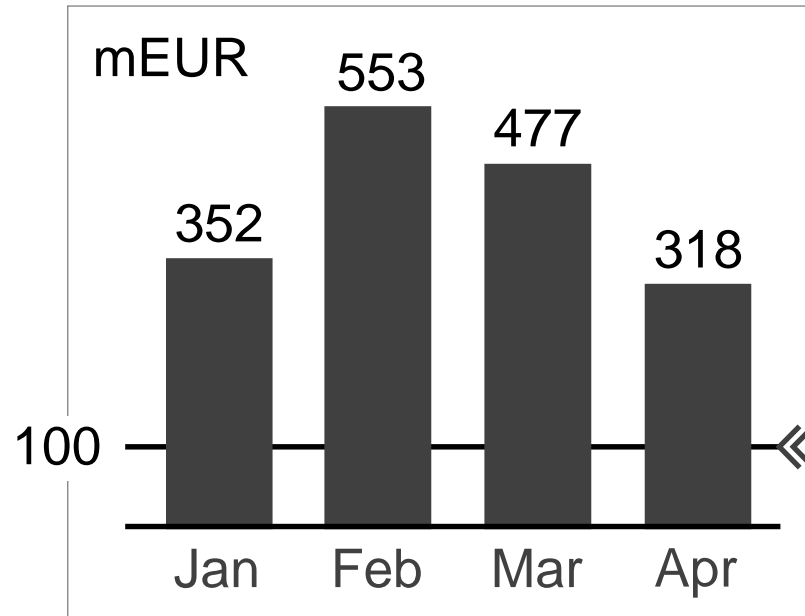
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
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Solution C

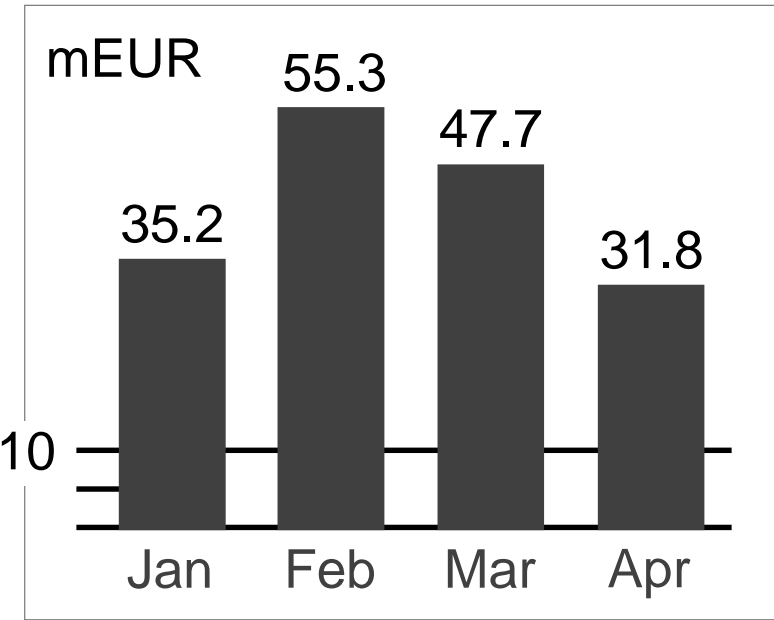
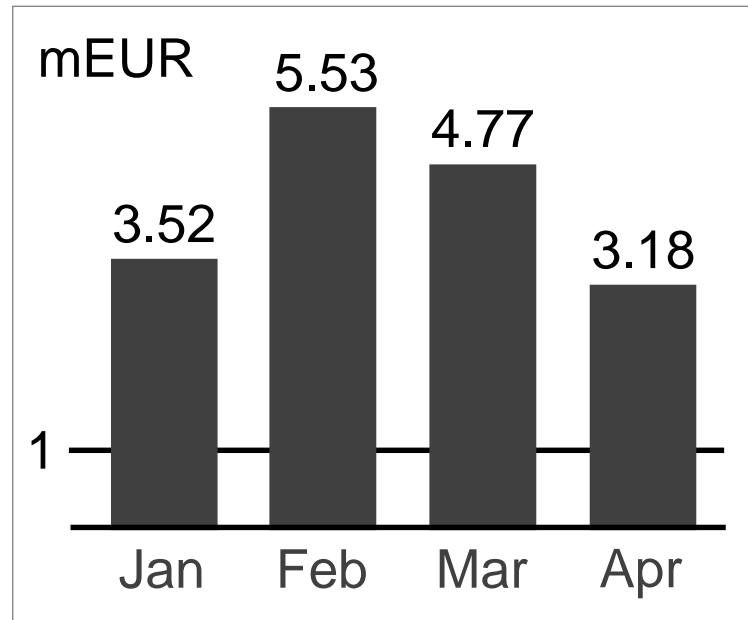
Chevrons



Question 2

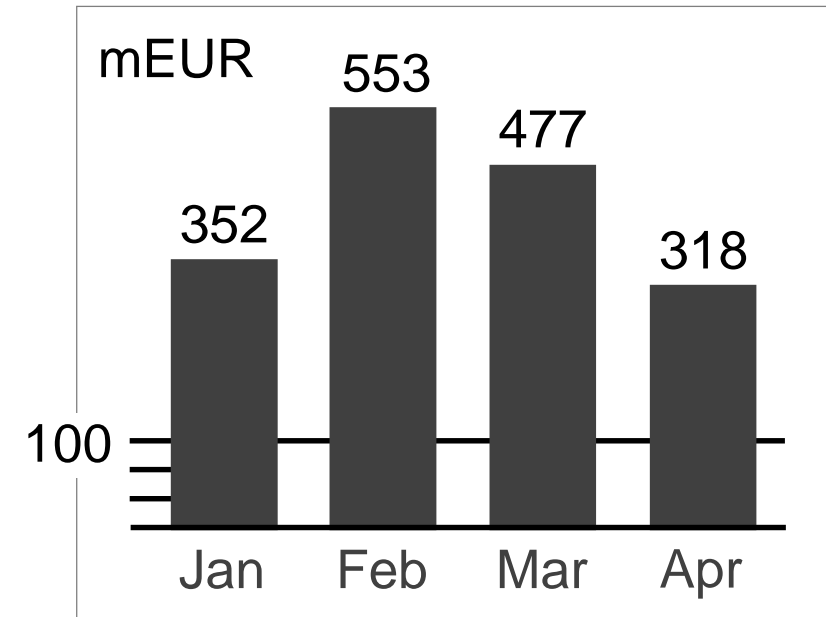
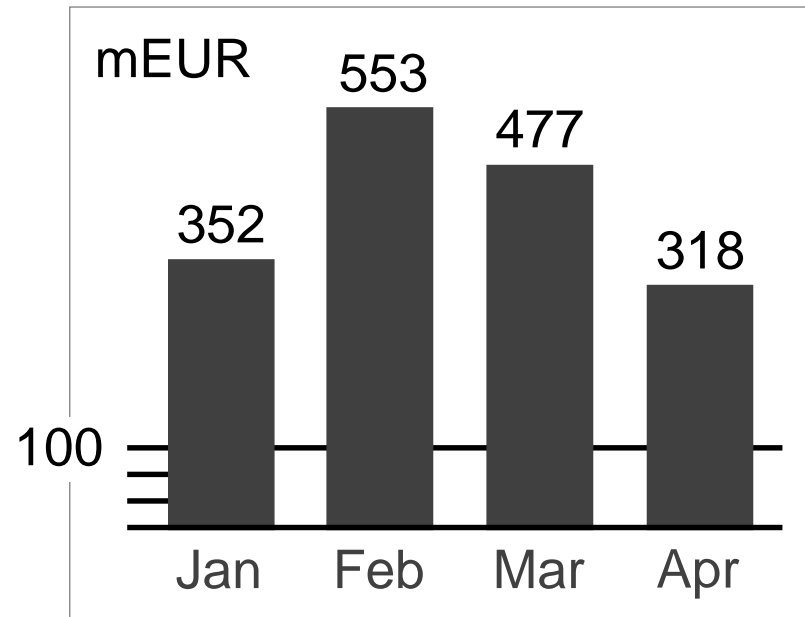
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
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Solution D

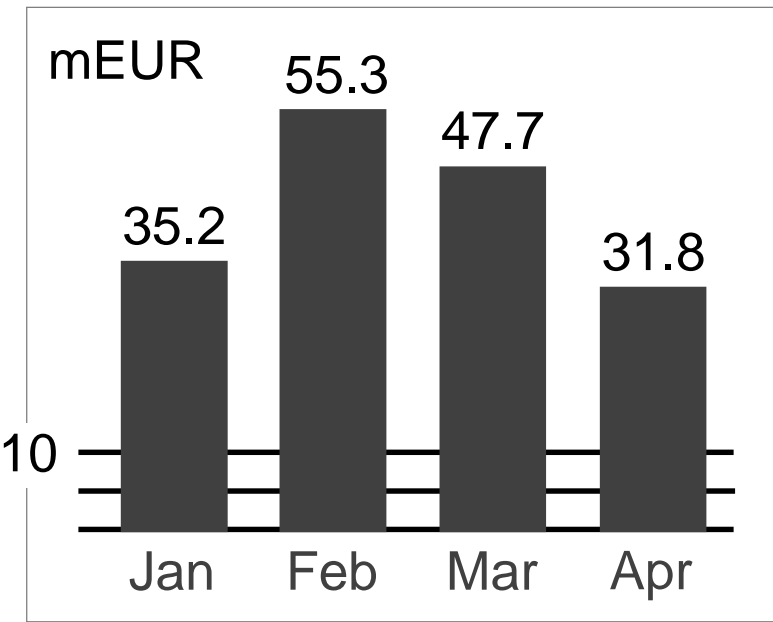
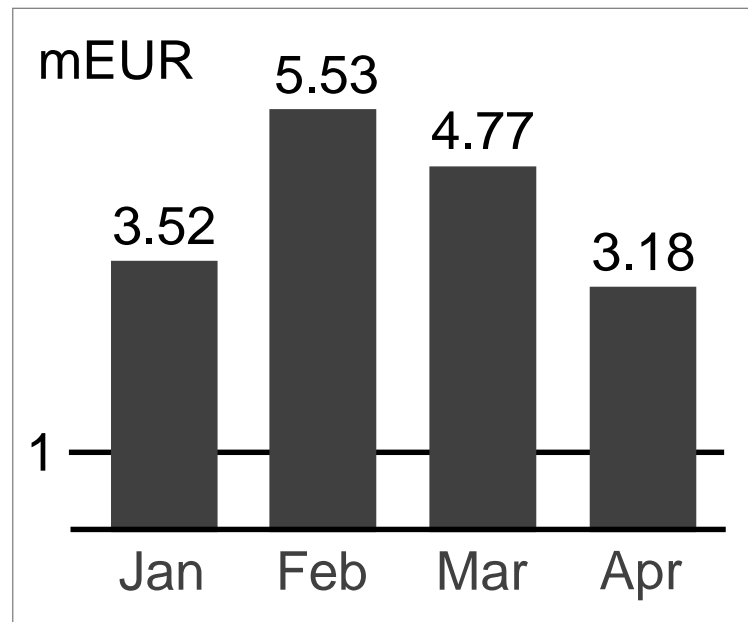
Horizontal lines



Question 2

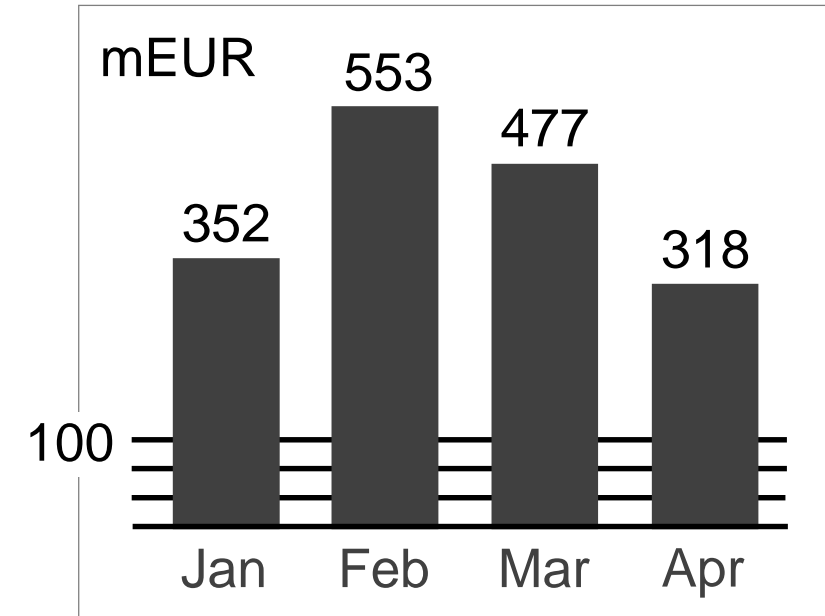
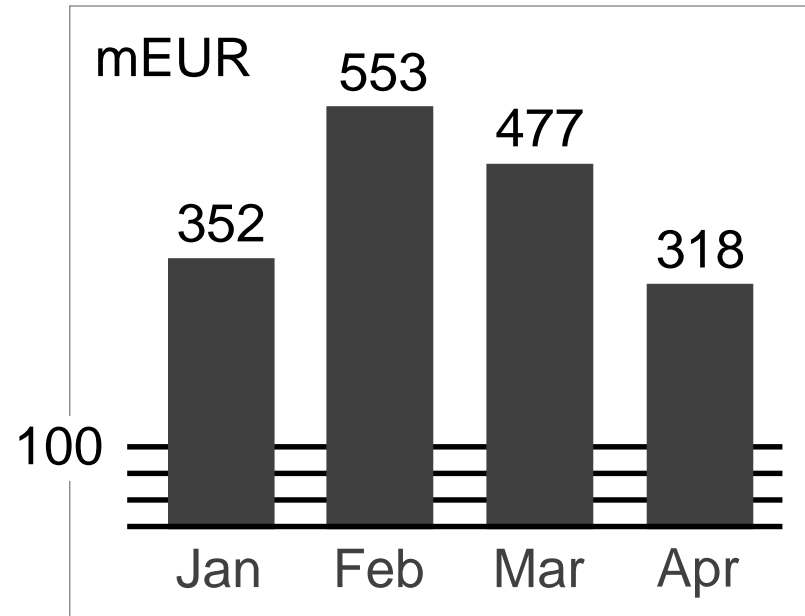
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
553



Solution D

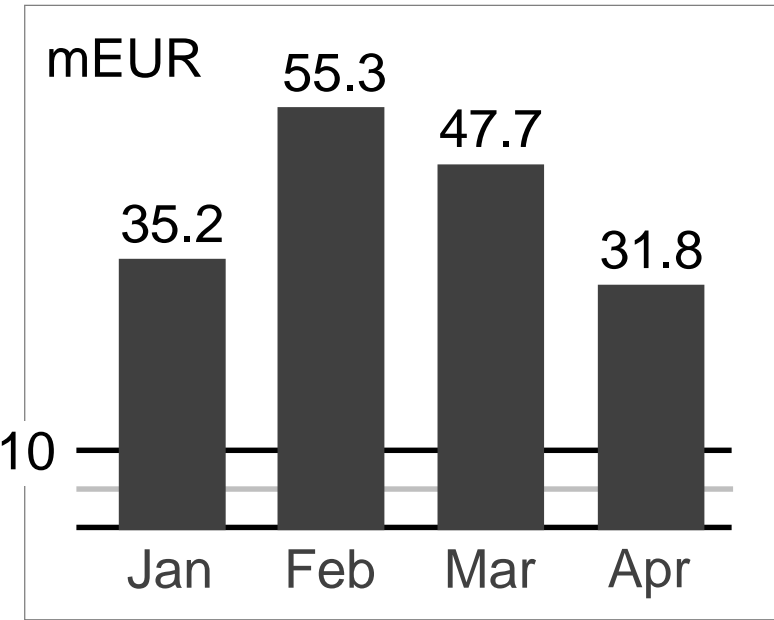
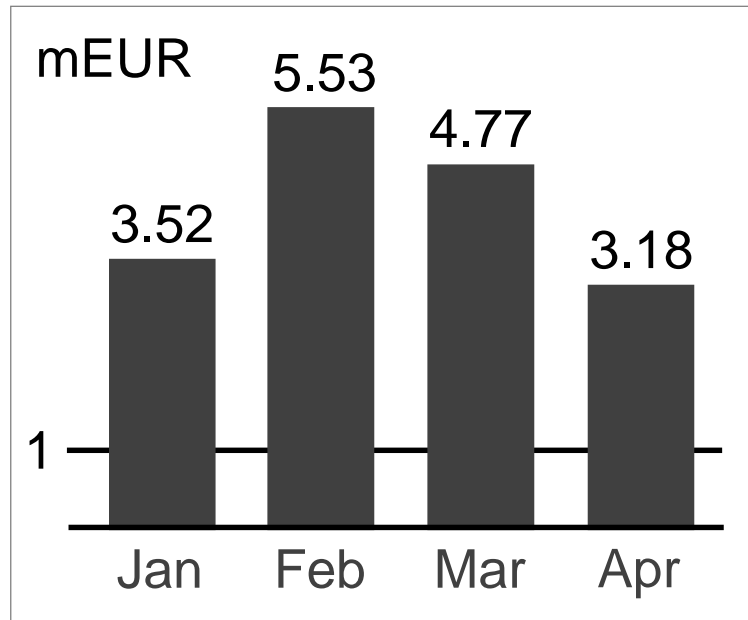
Horizontal lines



Question 2

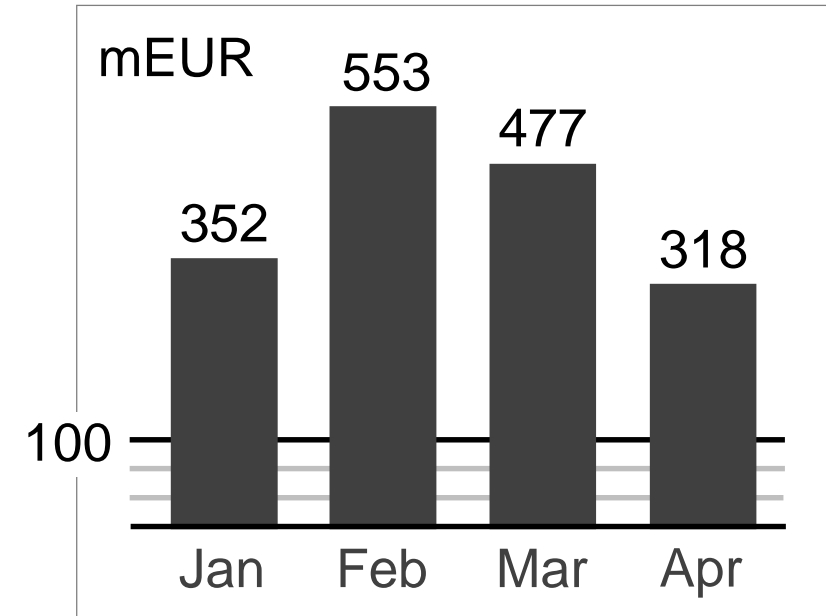
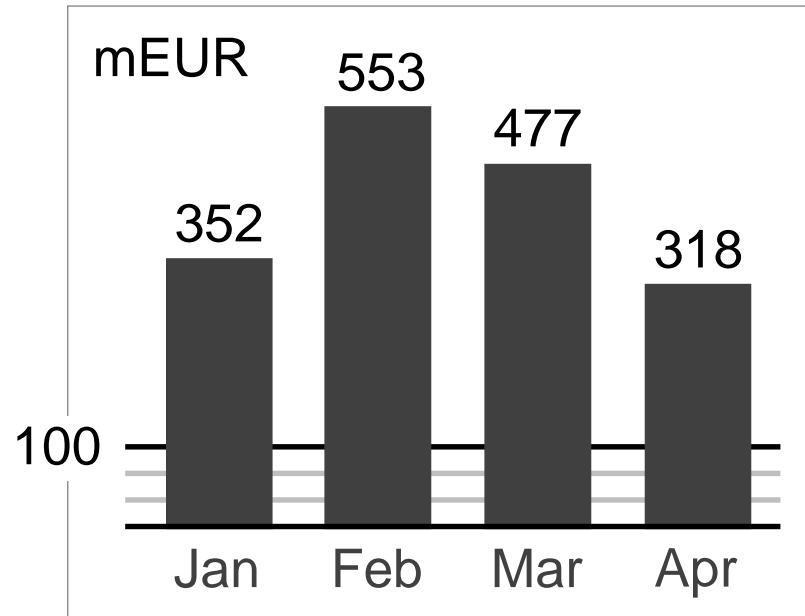
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

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55.3
553



Solution D

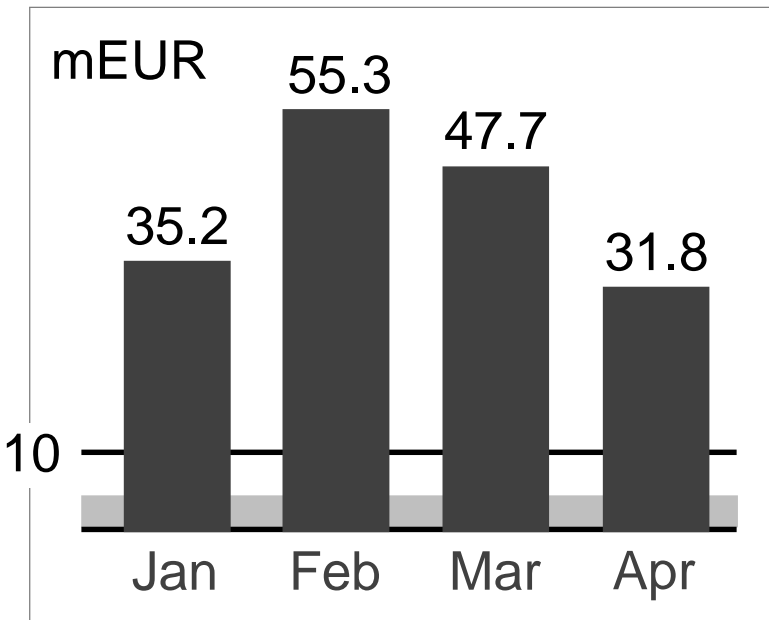
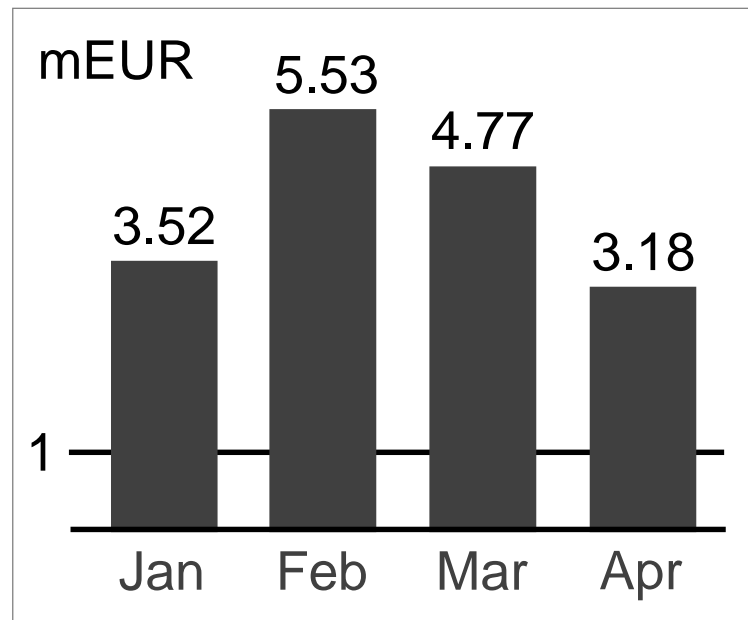
Horizontal lines



Question 2

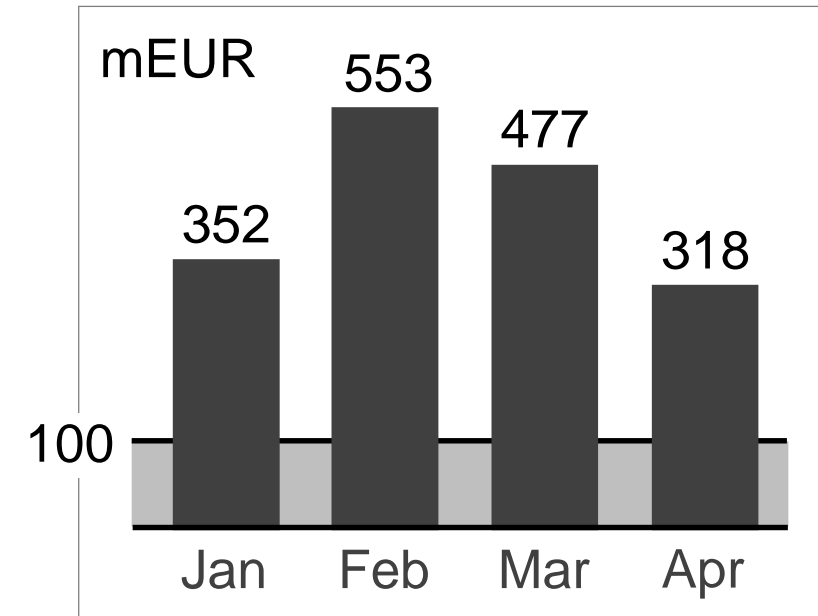
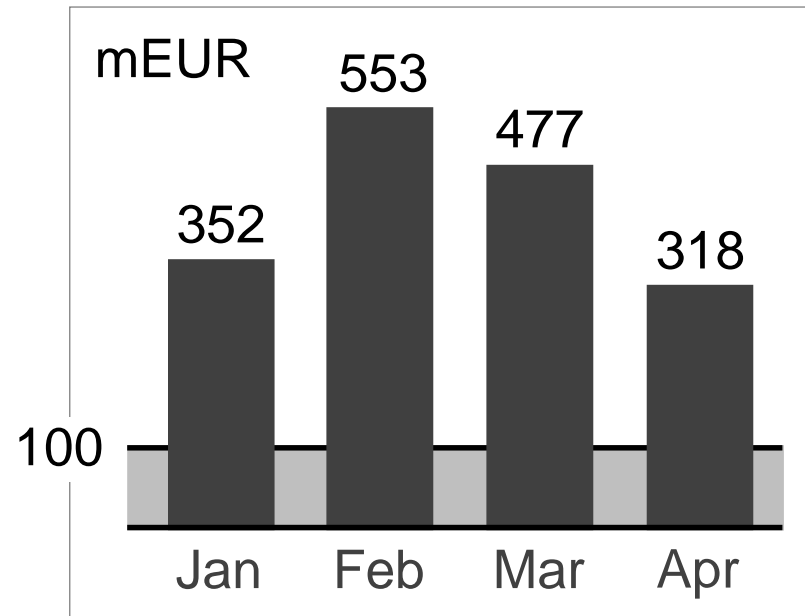
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
553



Solution E

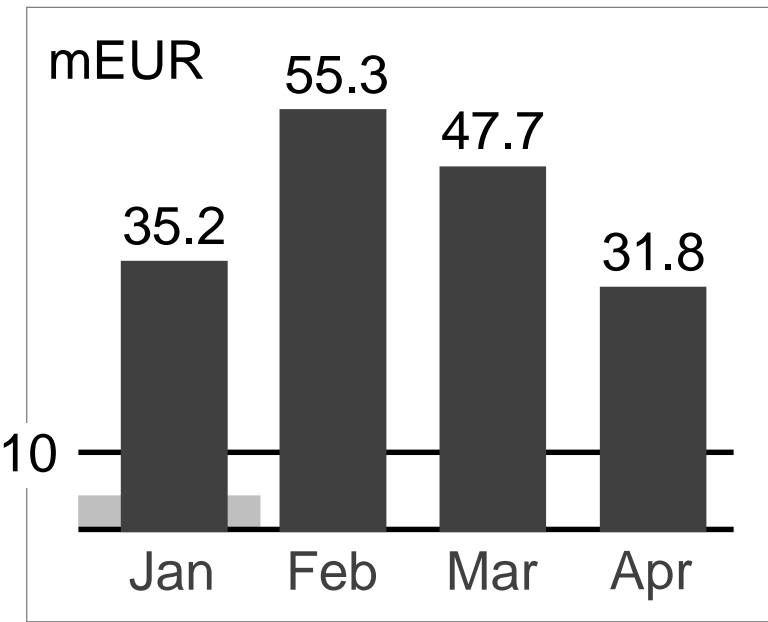
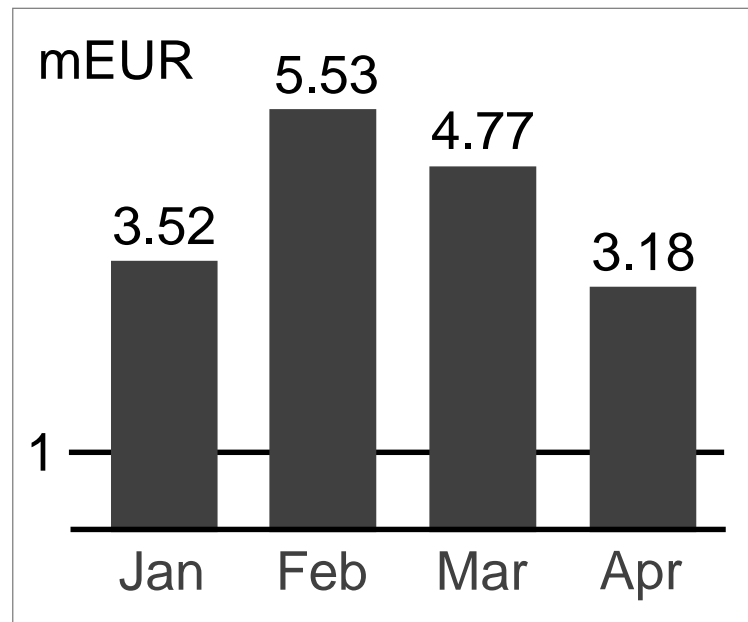
Horizontal bars



Question 2

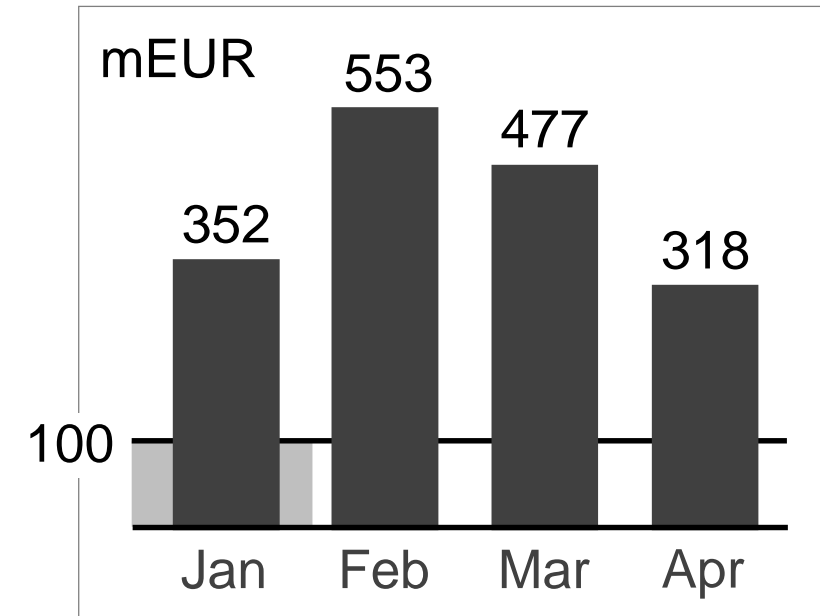
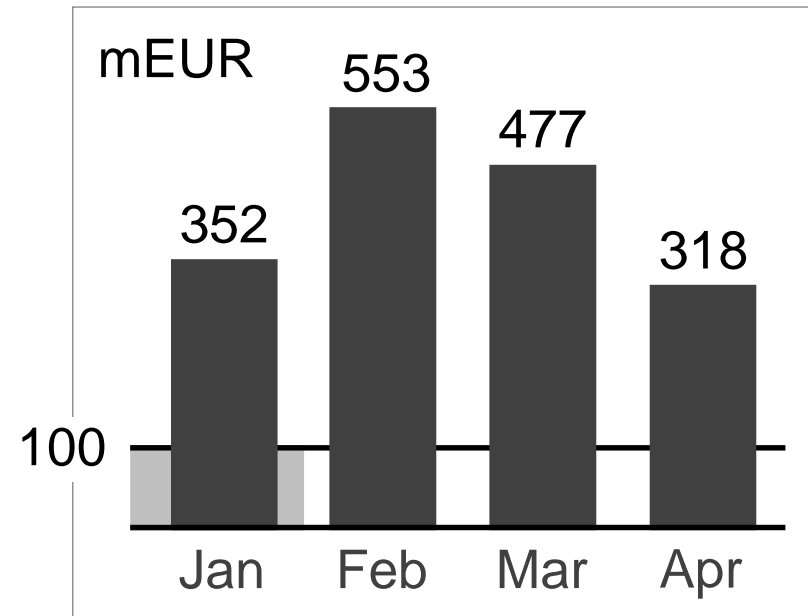
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
553



Solution E

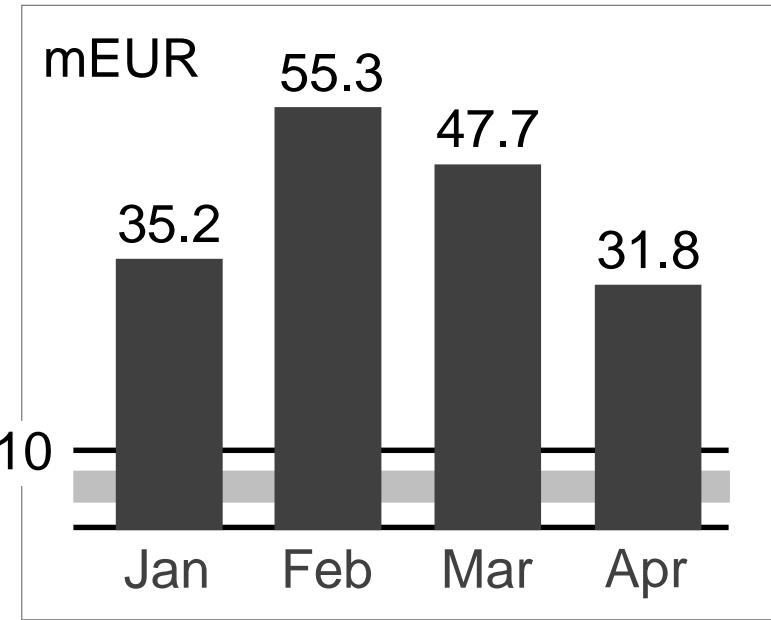
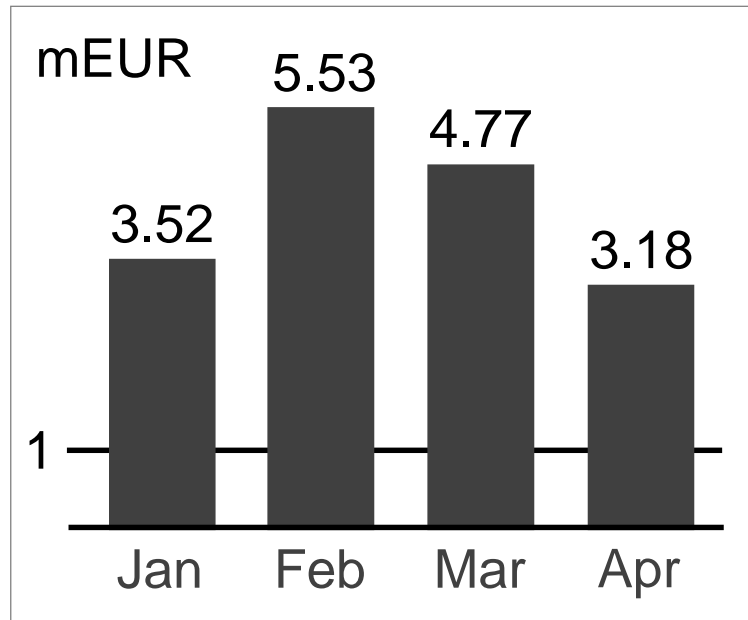
Horizontal bars



Question 2

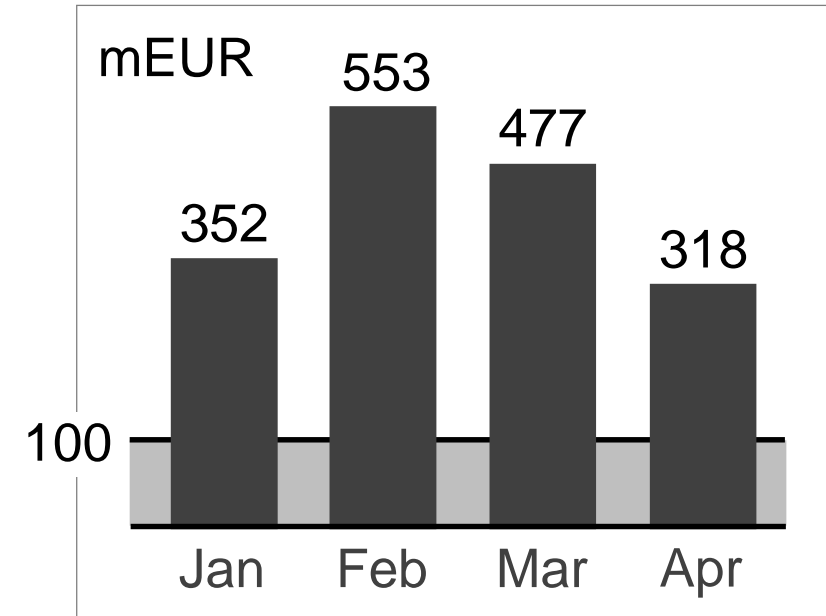
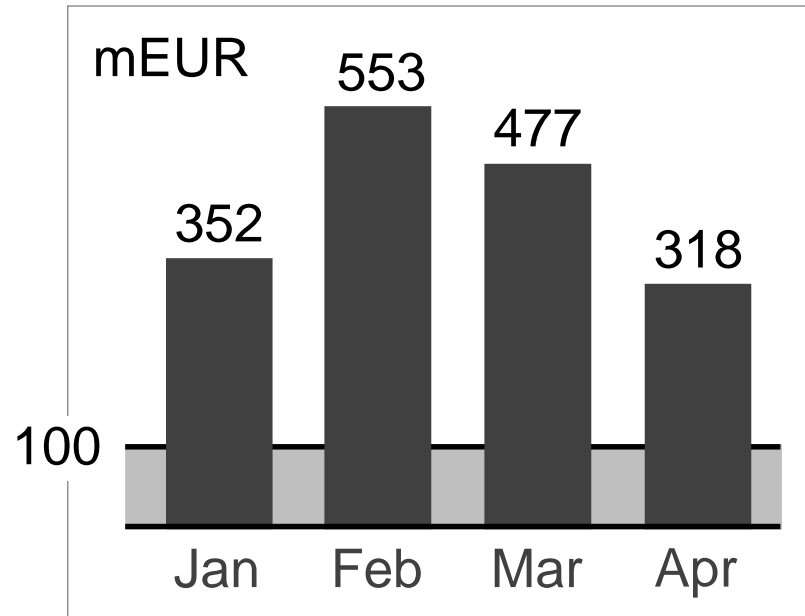
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
55.3
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Solution E

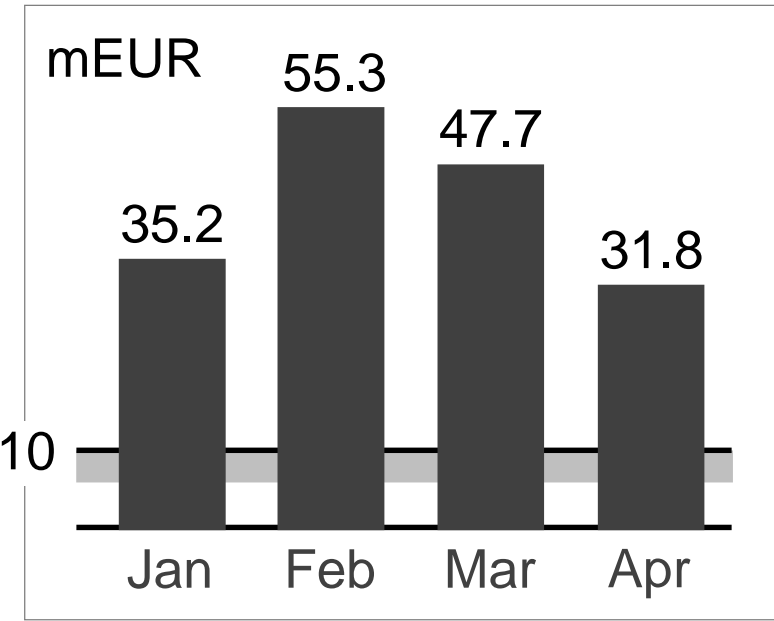
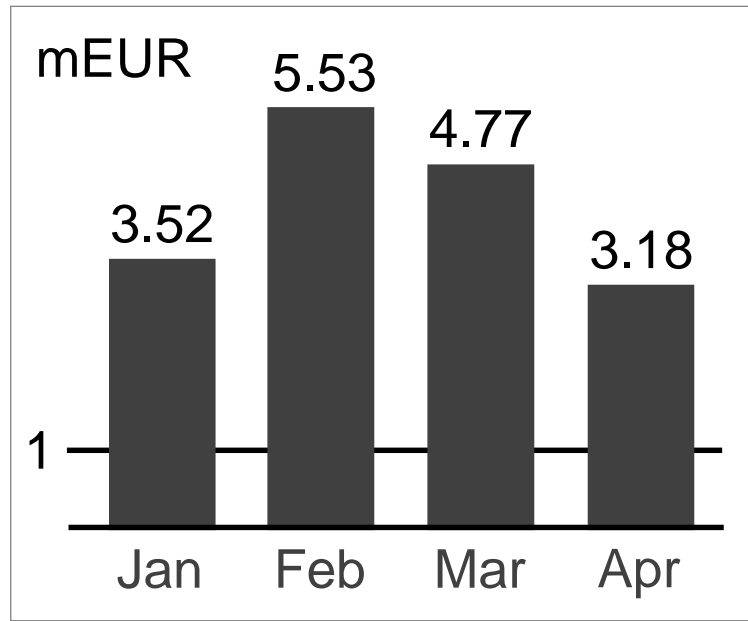
Horizontal bars



Question 2

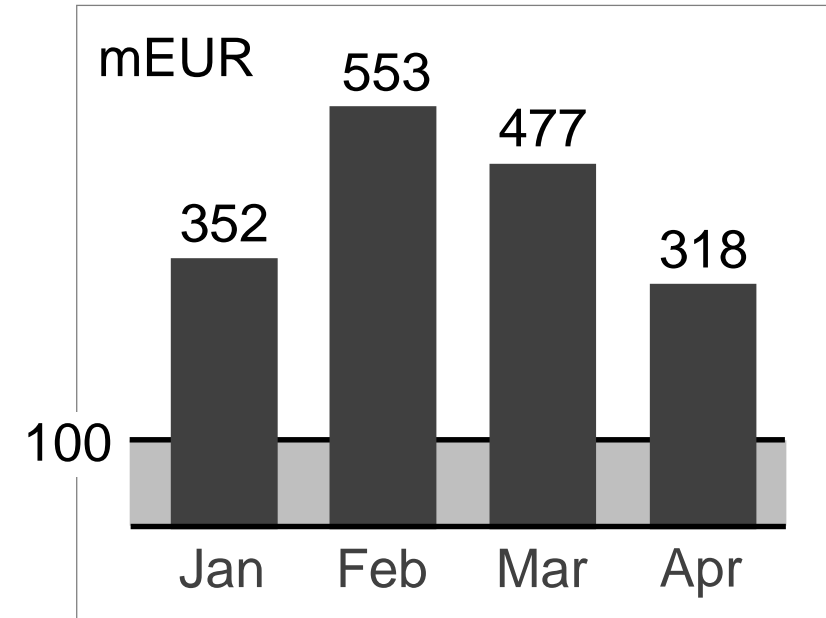
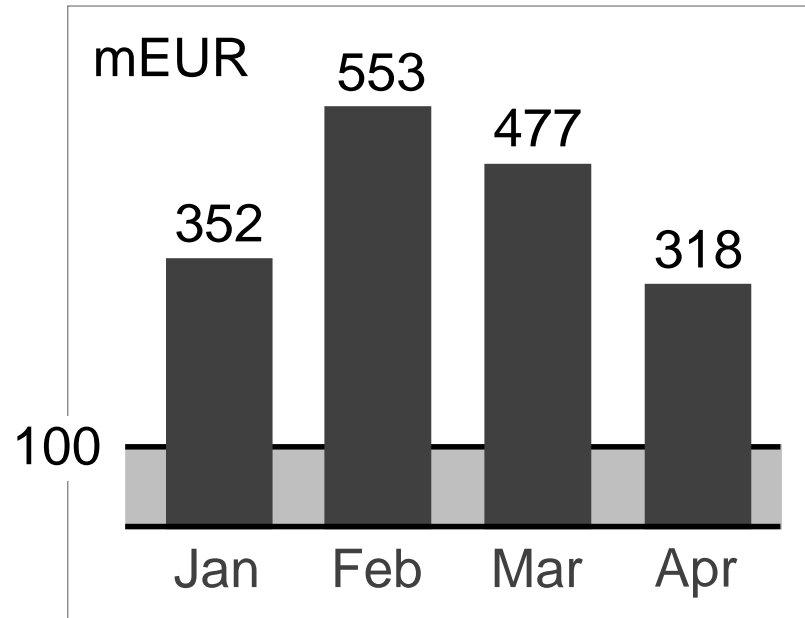
Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

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Solution E

Horizontal bars



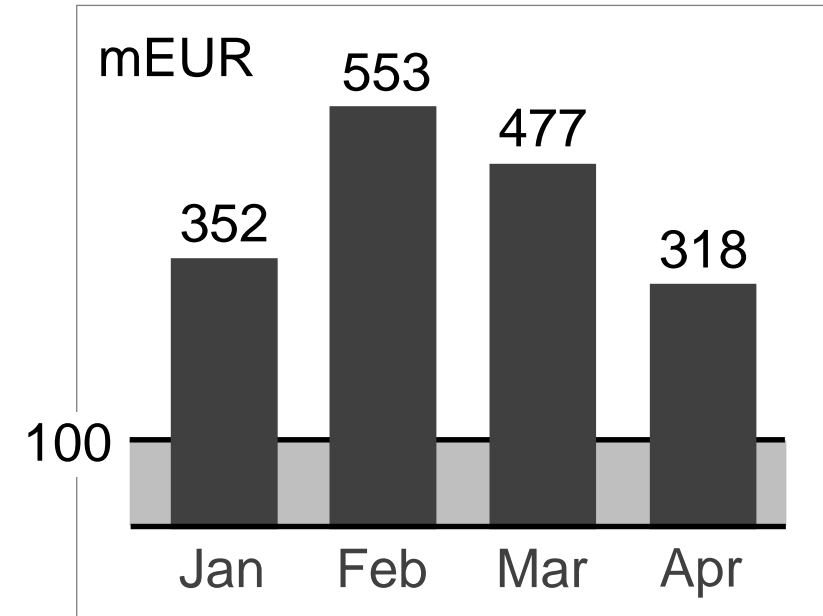
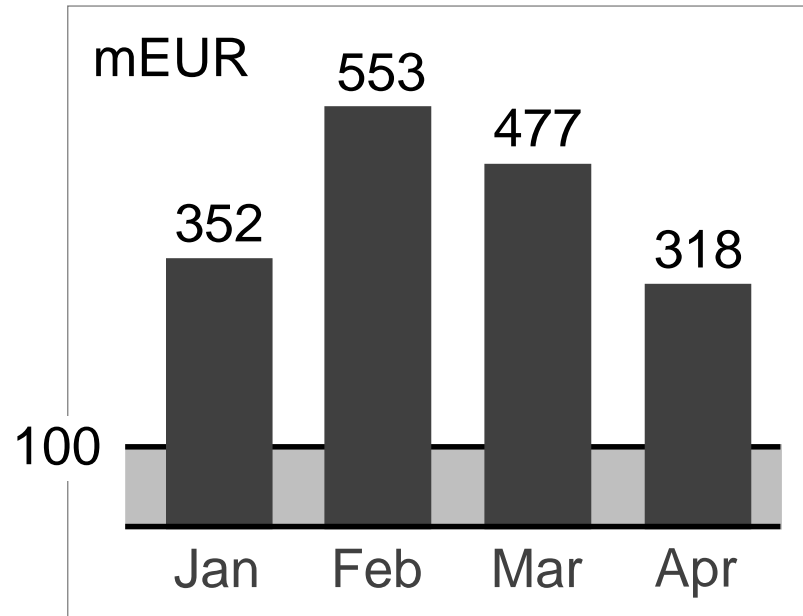
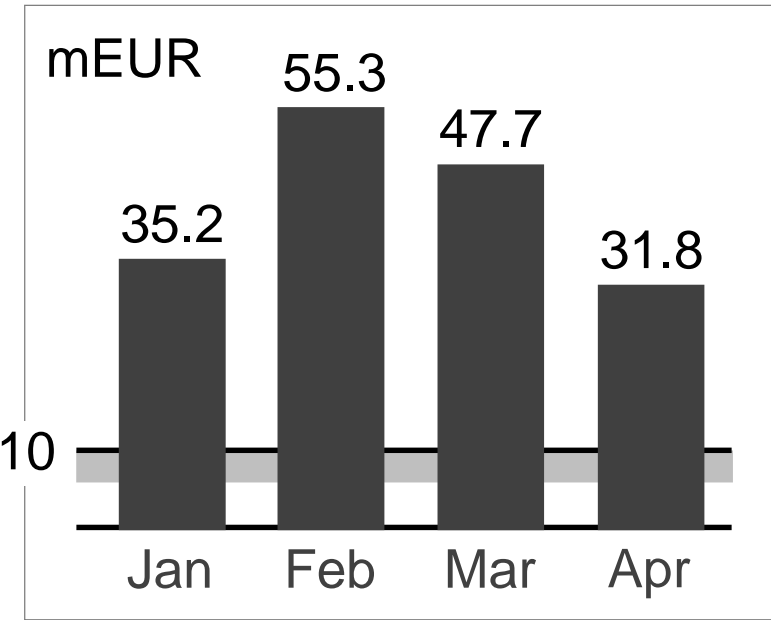
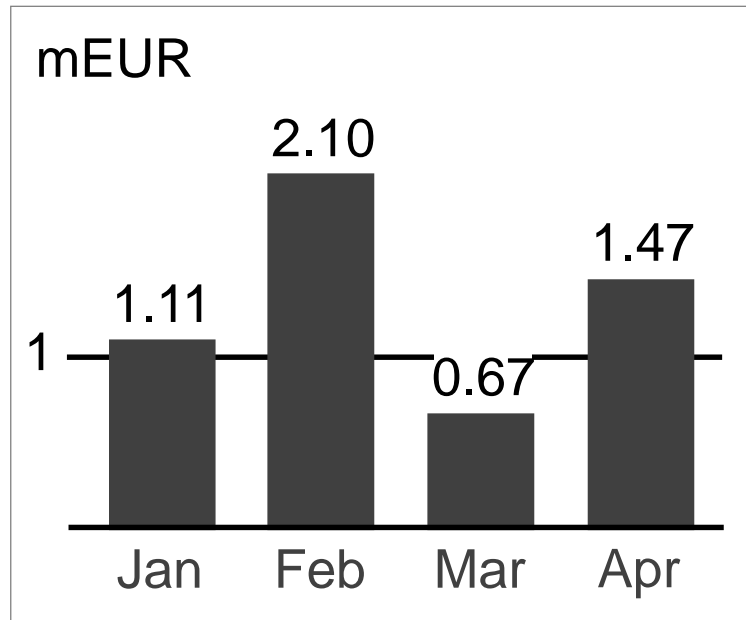
Question 2

Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53
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Solution E

Horizontal bars



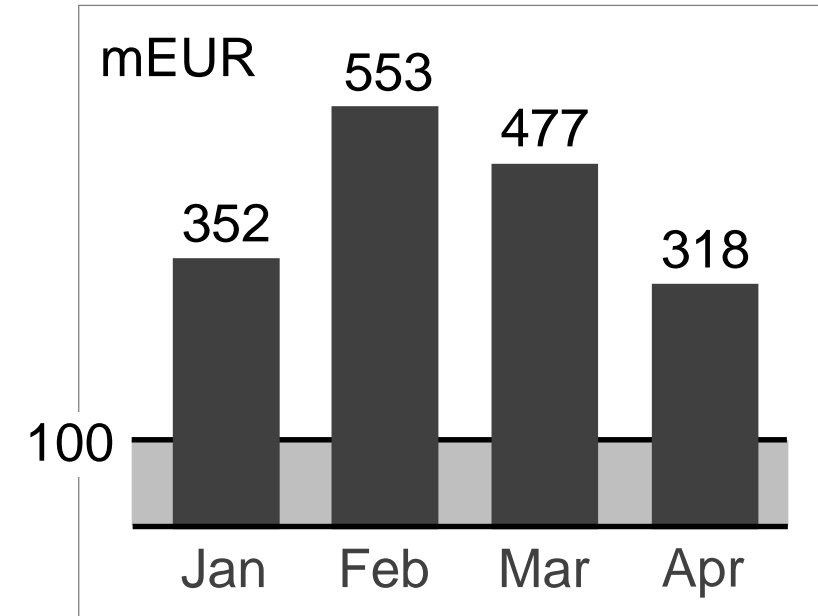
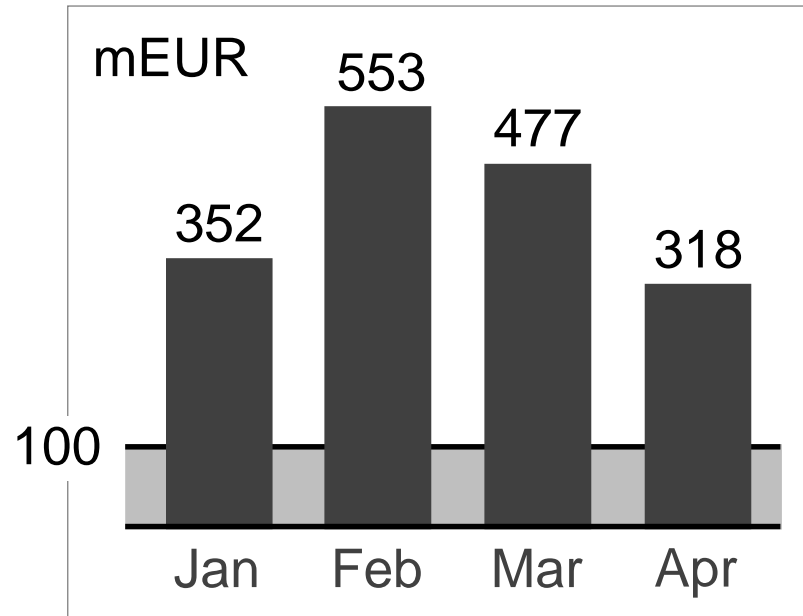
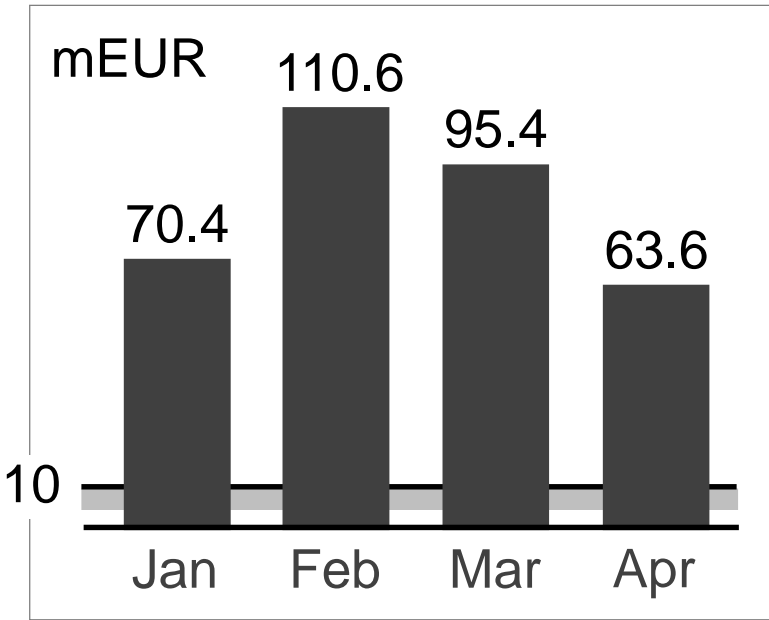
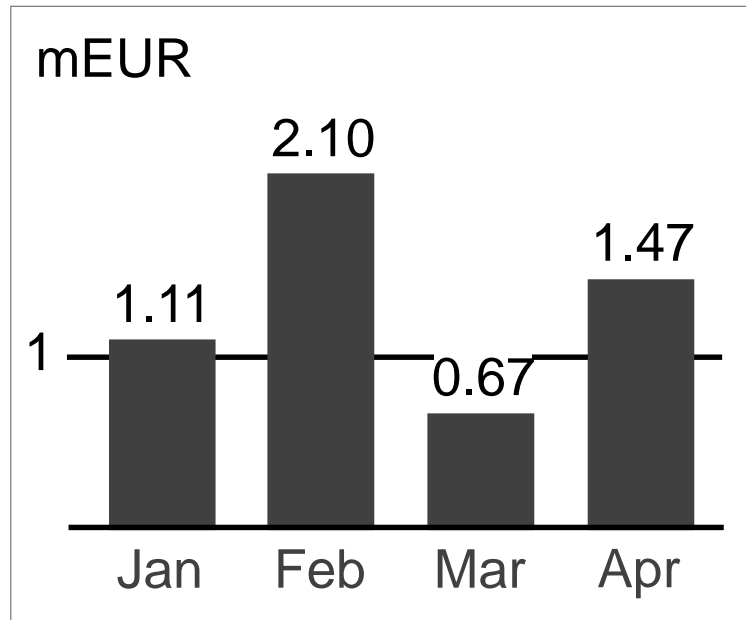
Question 2

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Solution E

Horizontal bars



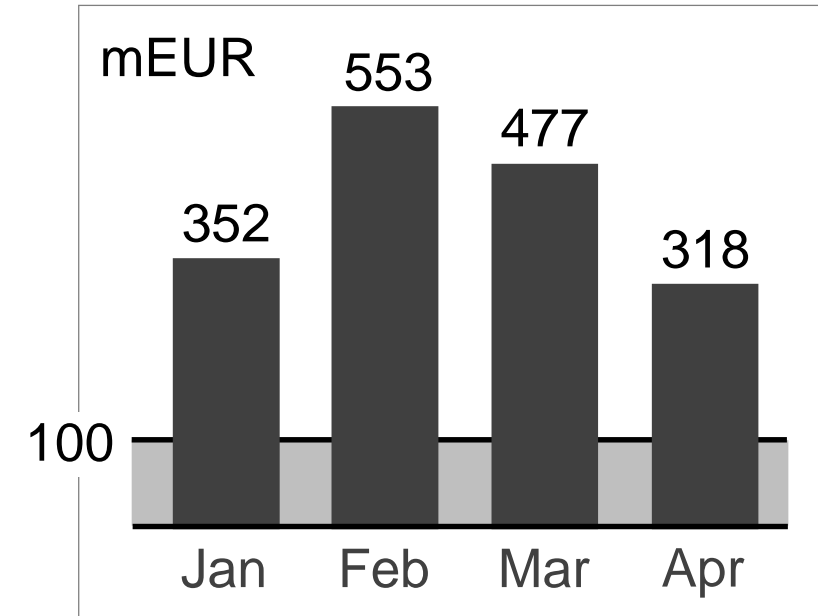
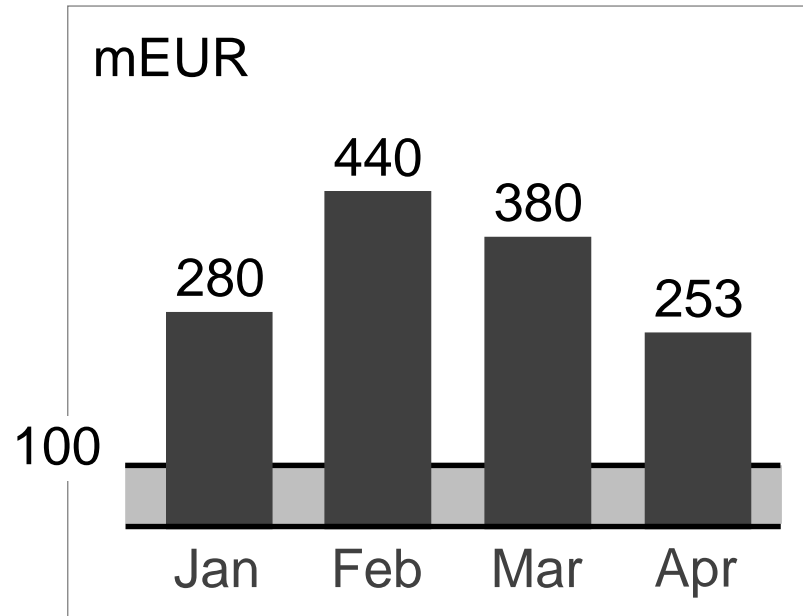
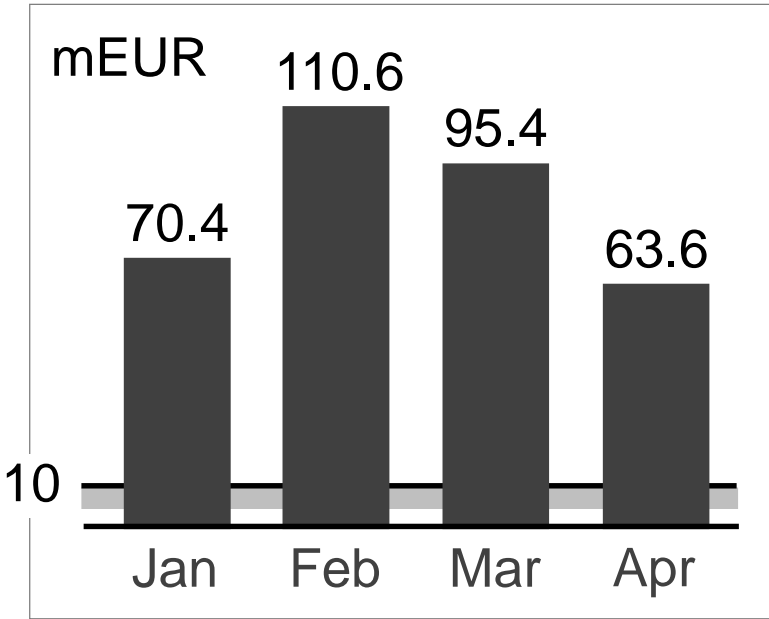
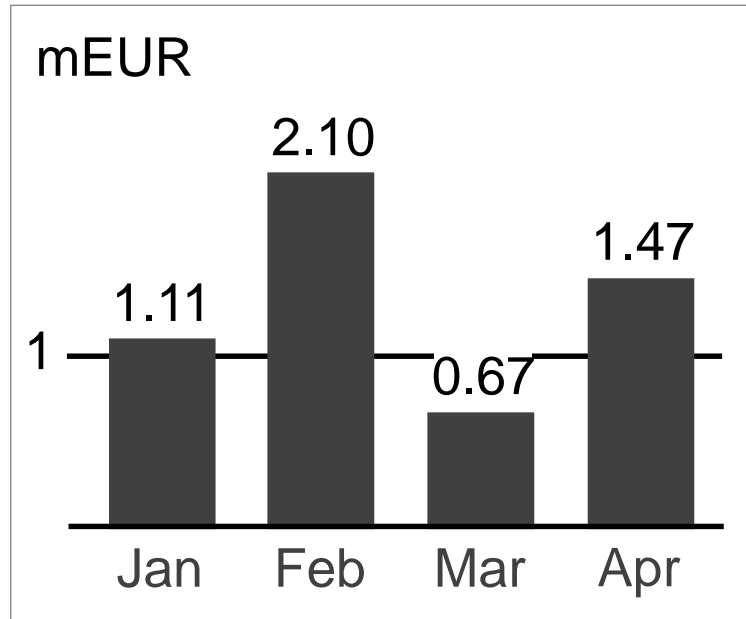
Question 2

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Solution E

Horizontal bars



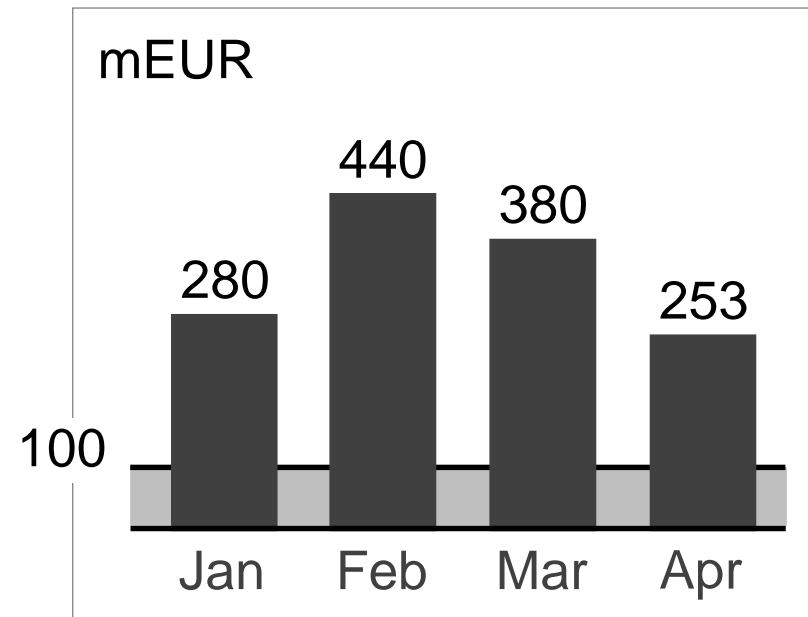
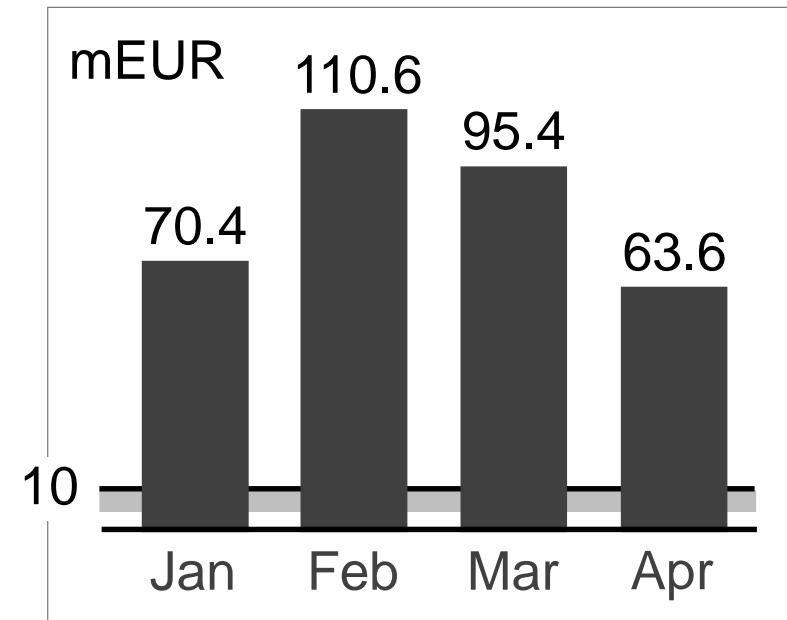
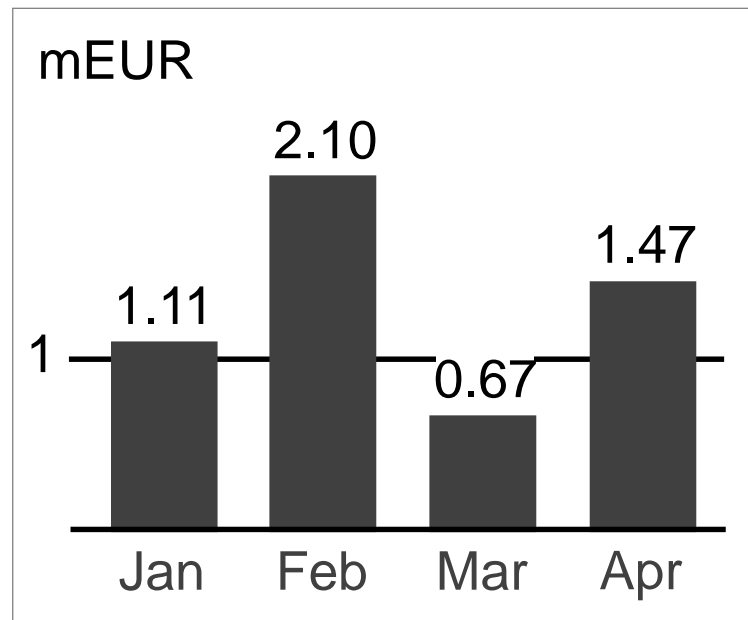
Question 2

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Solution E

Horizontal bars



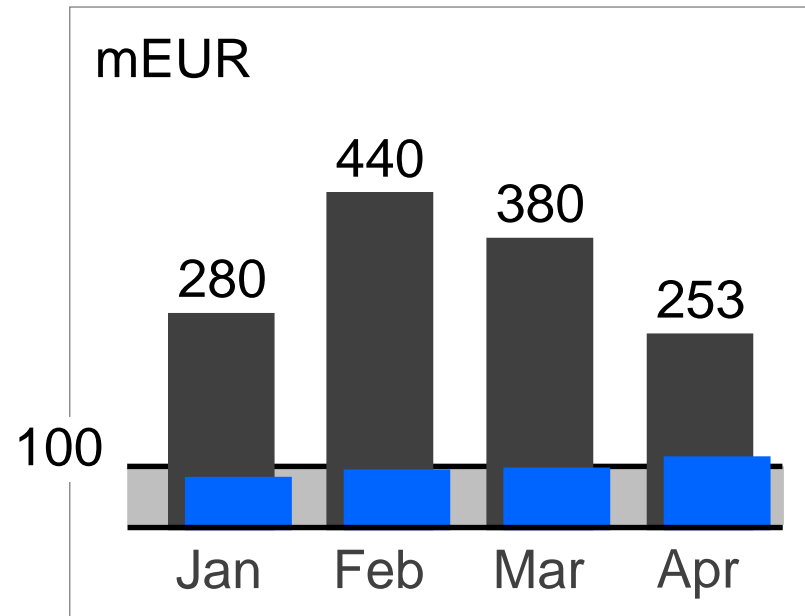
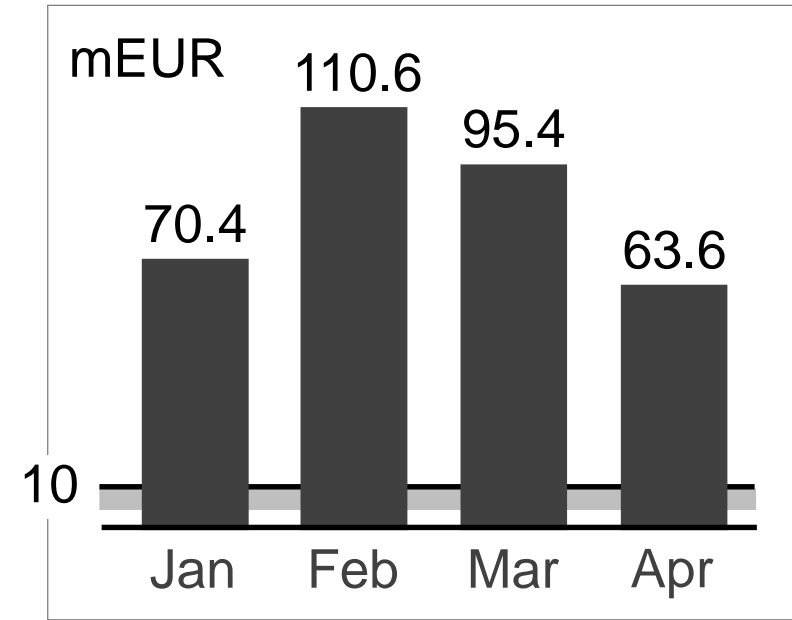
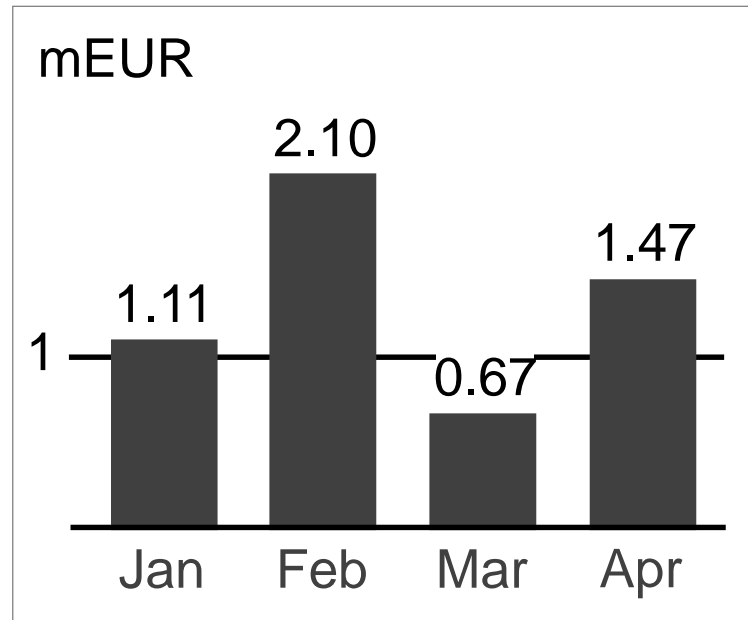
Question 2

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5.53
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Solution E

Horizontal bars



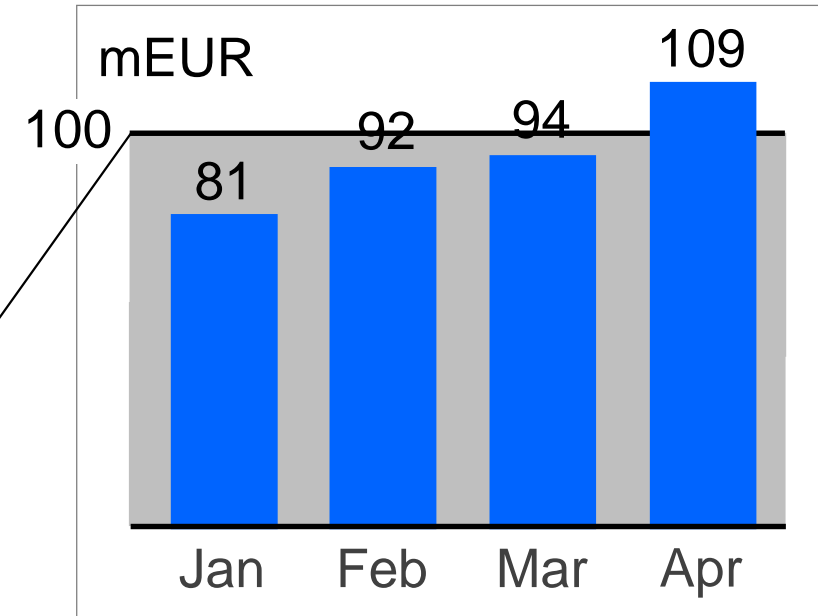
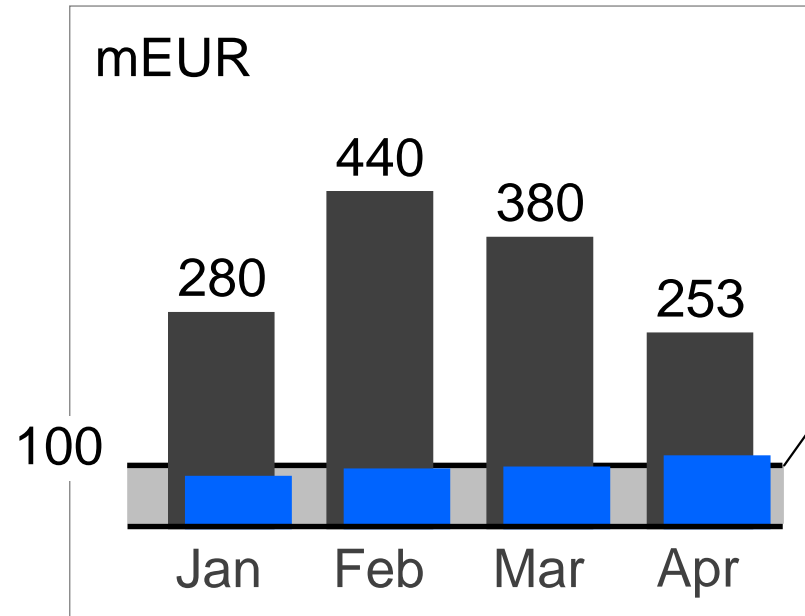
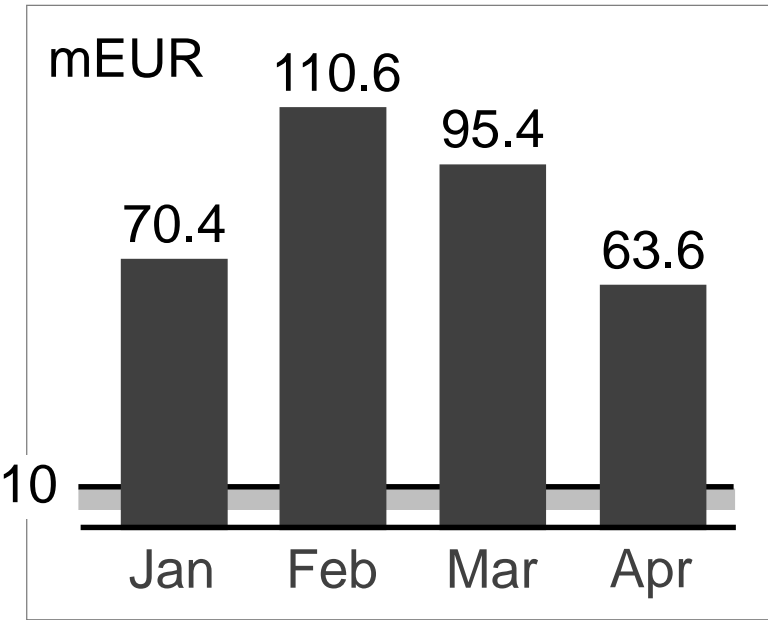
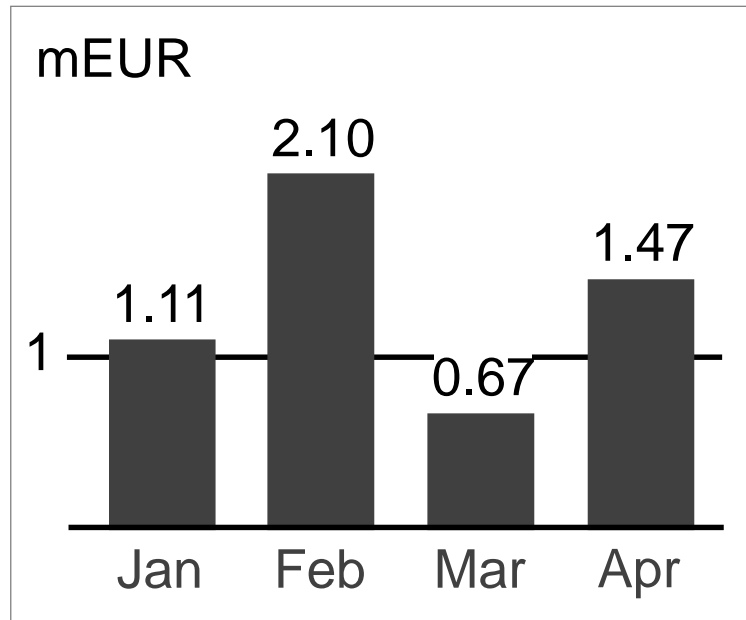
Question 2

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Solution E

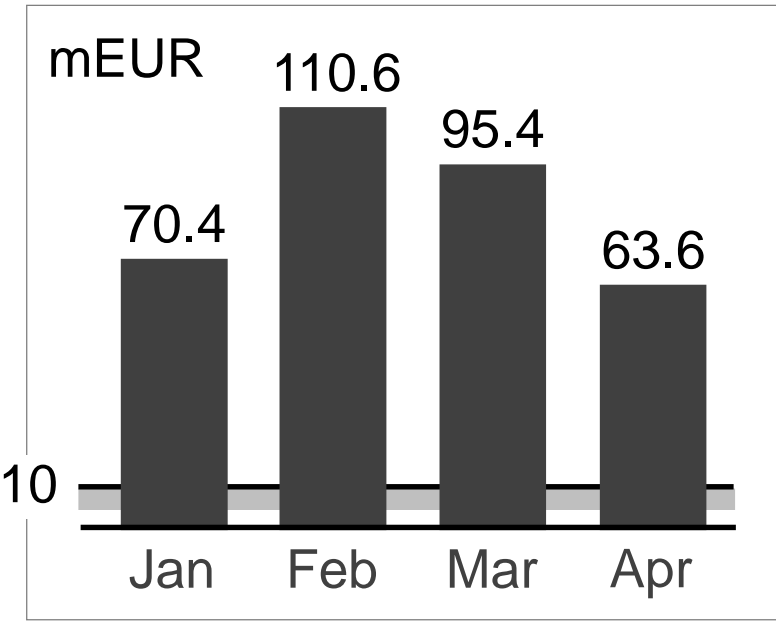
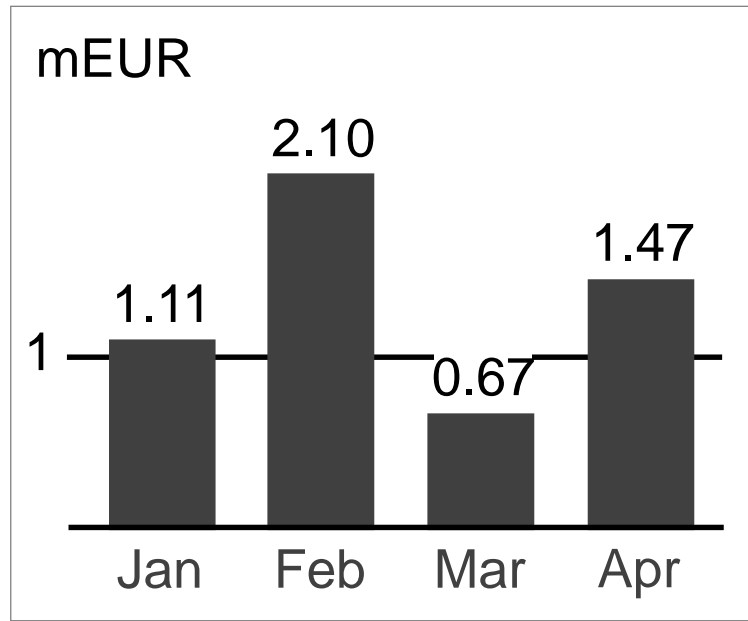
Horizontal bars



Question 2

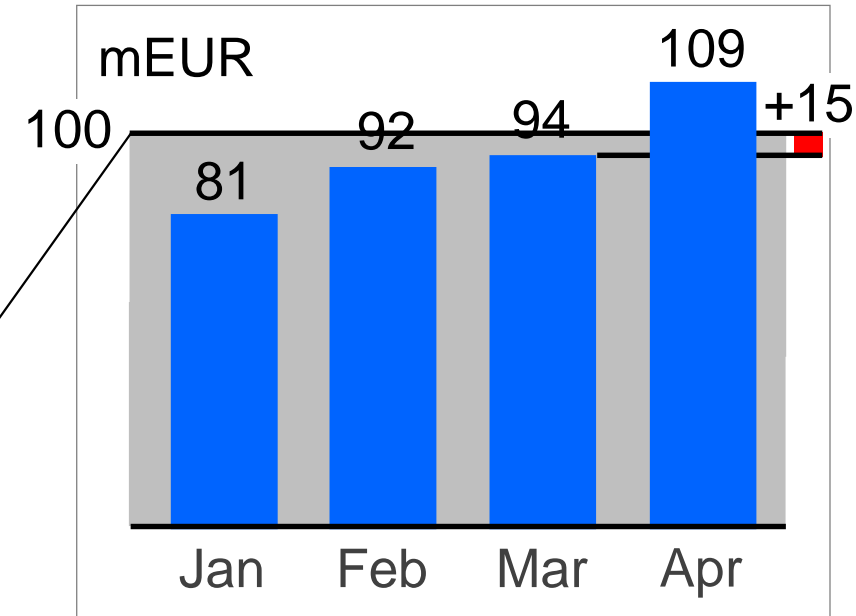
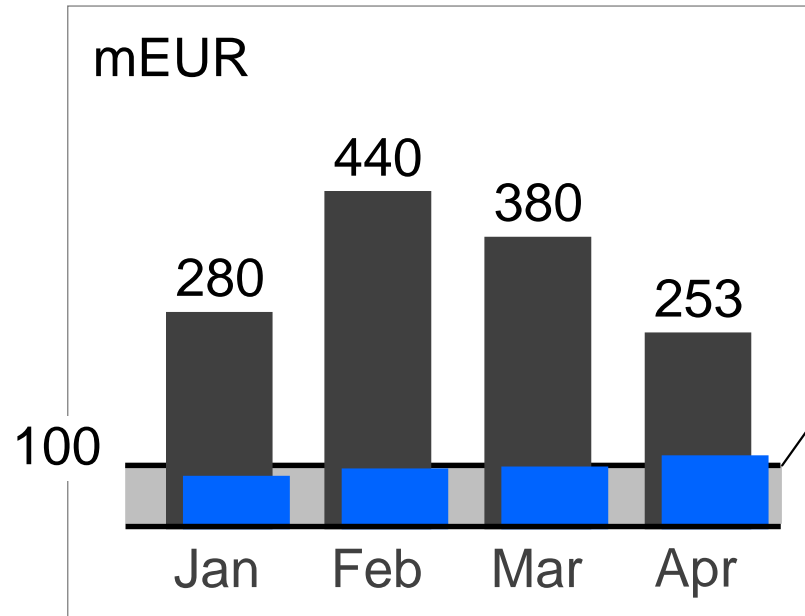
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Solution E

Horizontal bars



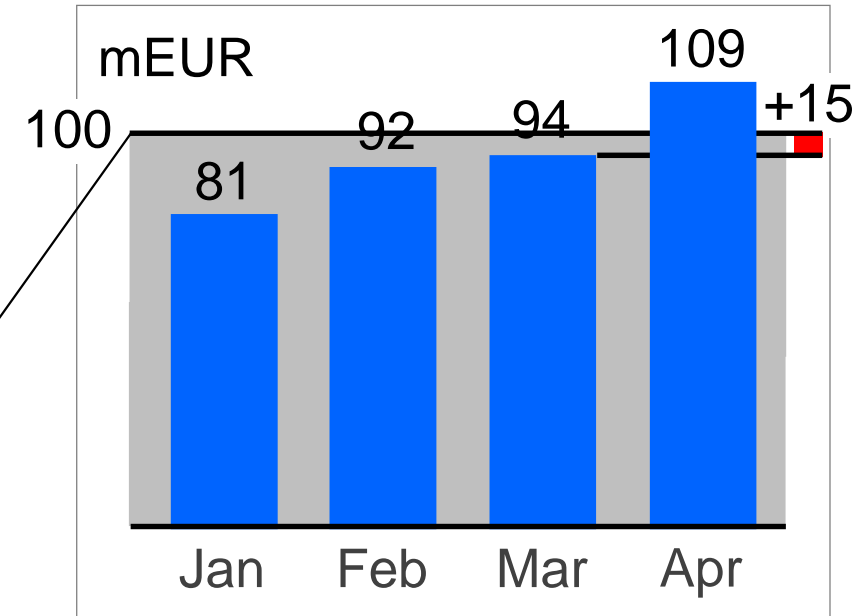
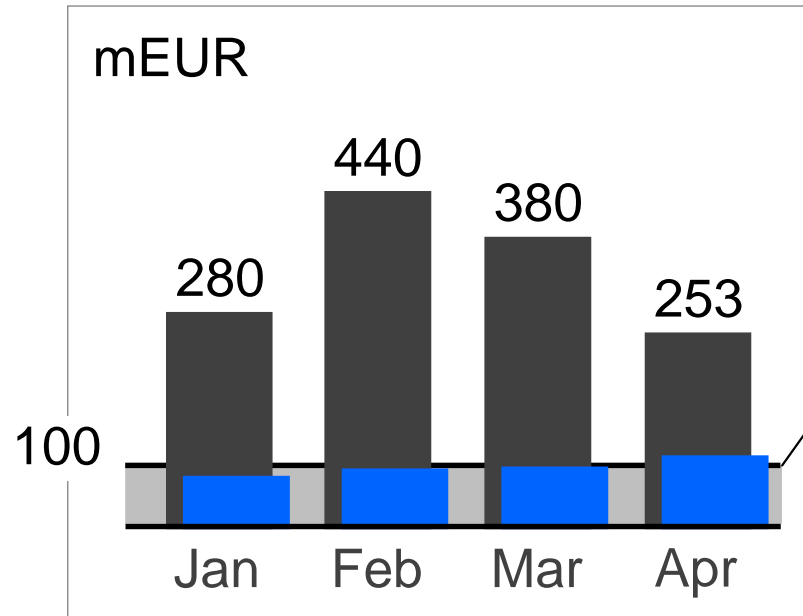
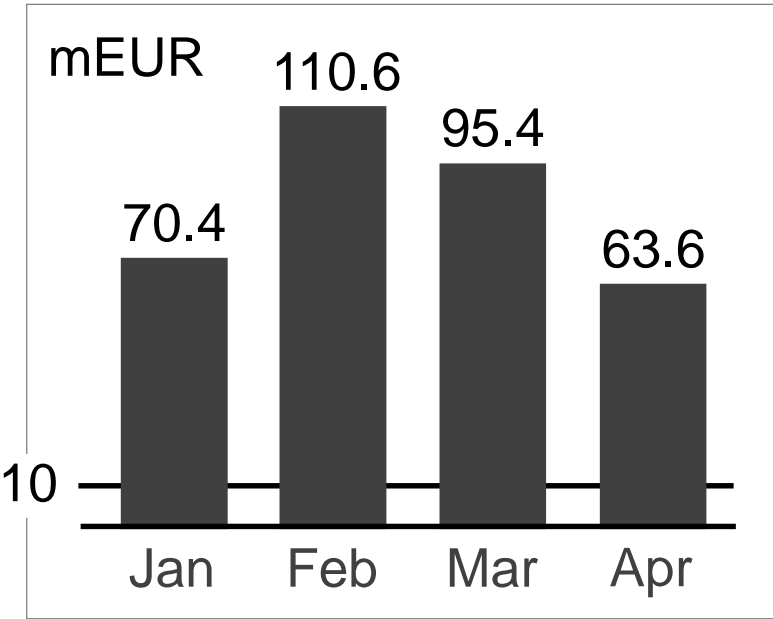
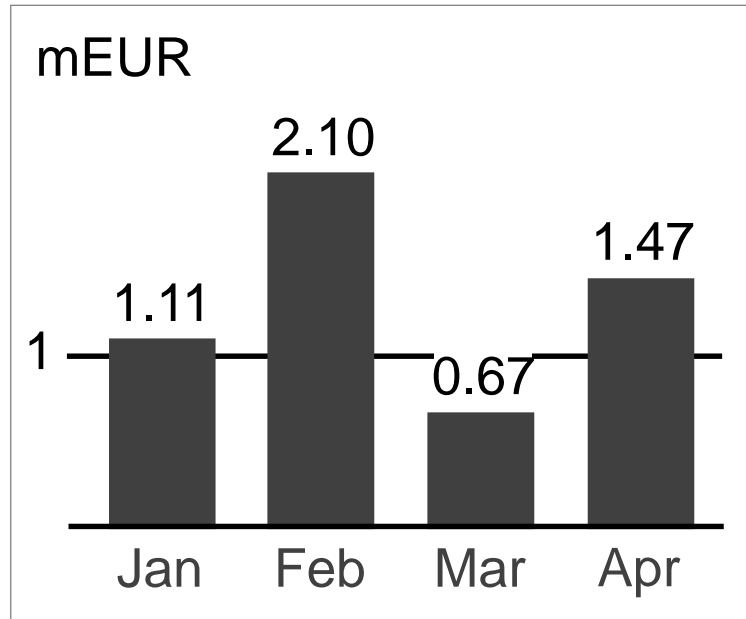
Question 2

Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

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Solution E

Horizontal bars



Question 2

Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

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Conclusion

There *are* means to allow us to **distinguish** different scales.

But - whatever we do – we will not be able to effectively **compare** charts with scales of different „powers of thousand“.

Question 2

Should we visually recognize different „powers of ten“ within ones, thousands, millions, and billions?

5.53

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Conclusion

There *are* means to allow us to **distinguish** different scales.

But - whatever we do – we will not be able to effectively **compare** charts with scales of different „powers of thousand“.

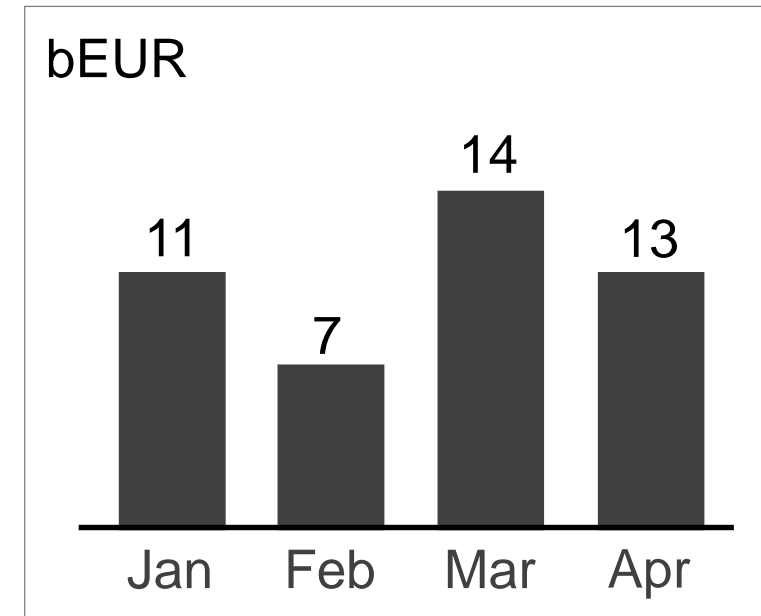
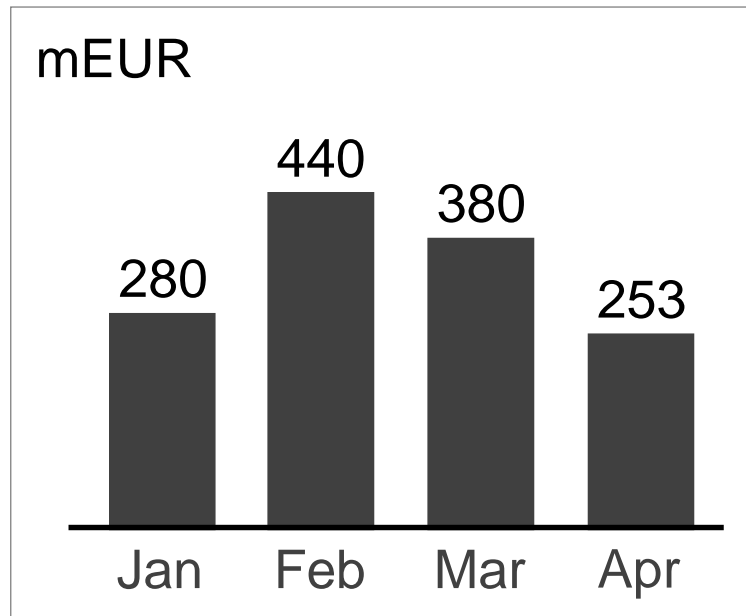
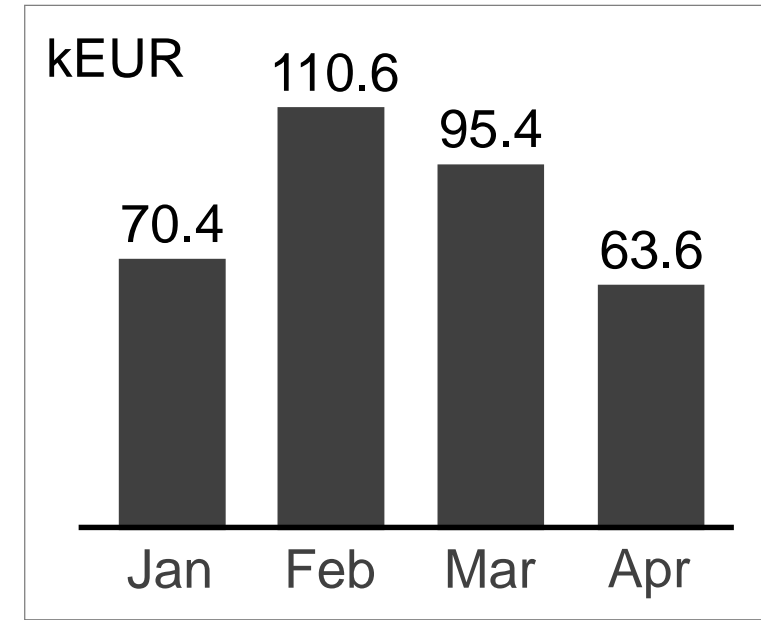
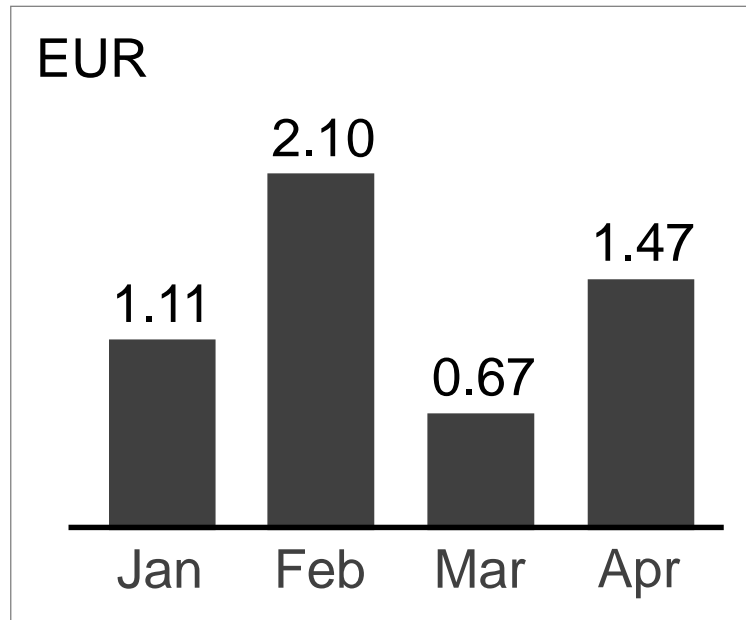
There is one exception: We can **compare** with the help of „scaling bars“ (with scales of the same order of magnitude)

Question 3

Can we combine the notations for „powers of thousand“ and for „powers of ten“?

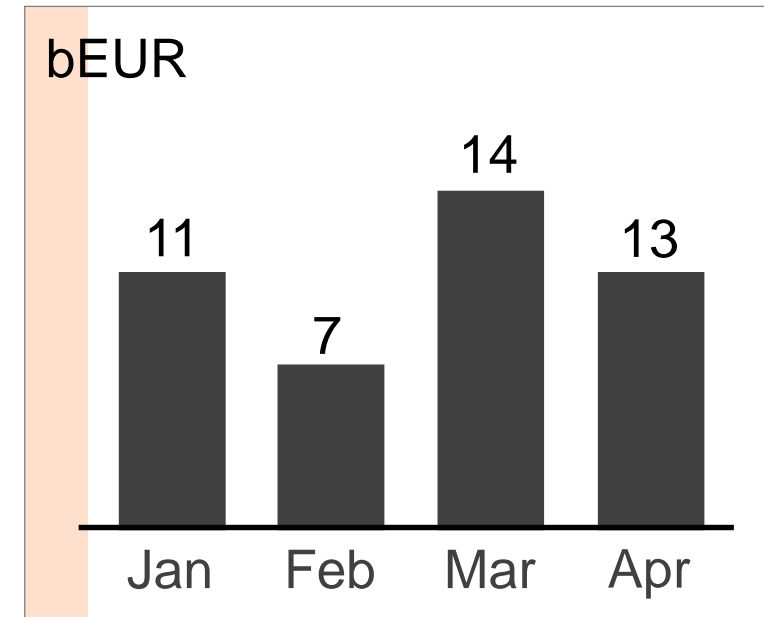
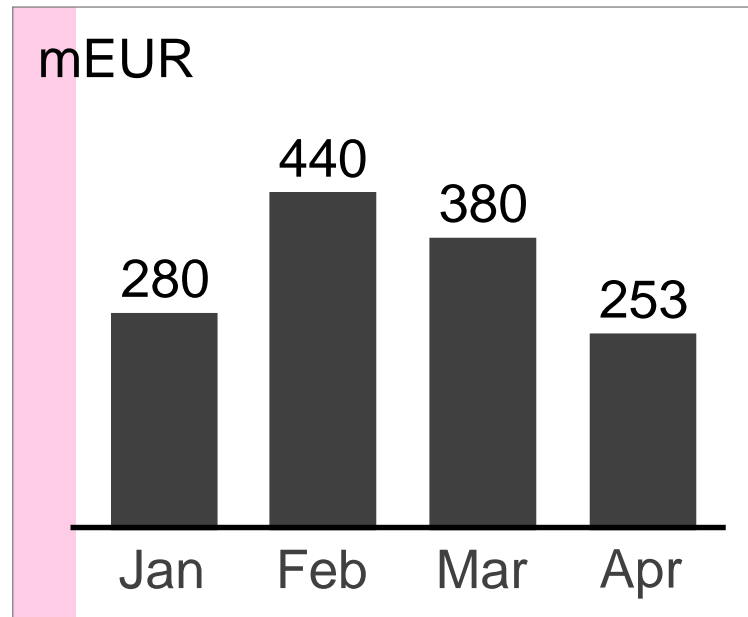
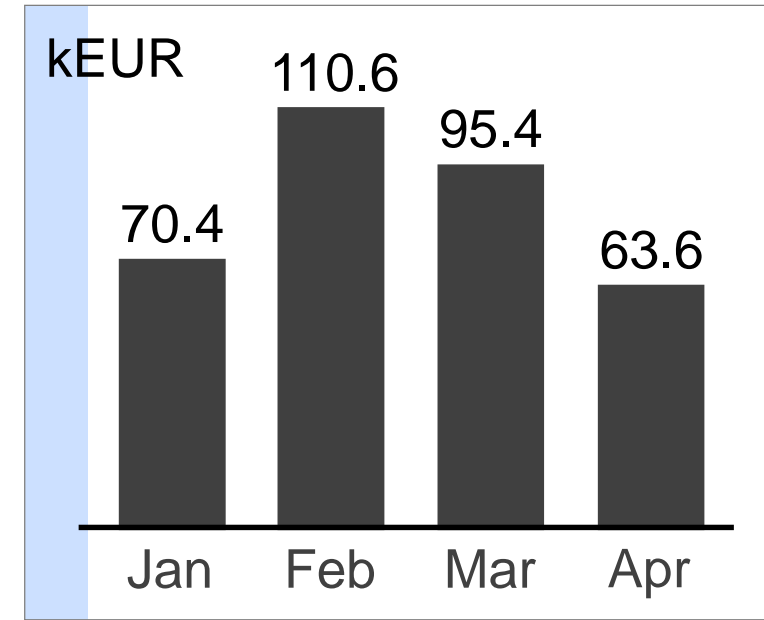
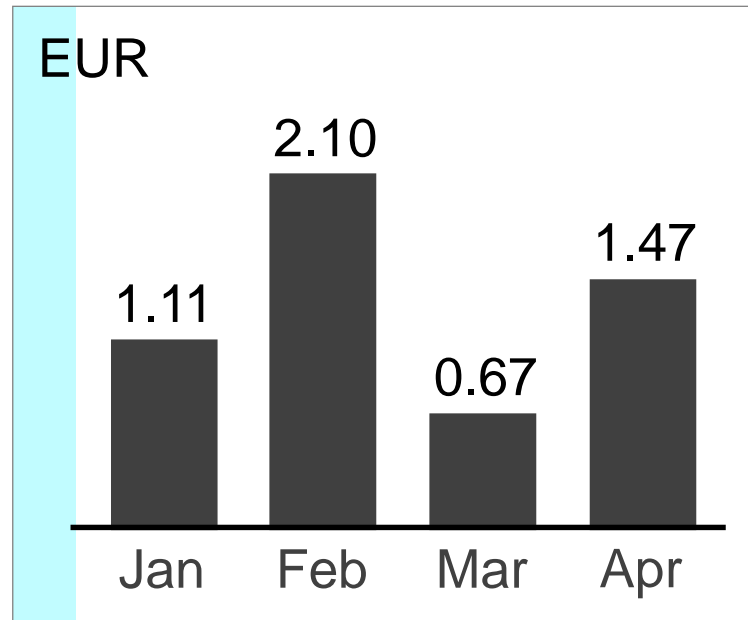
Question 3

Can we combine the notations for „powers of thousand“ and for „powers of ten“?



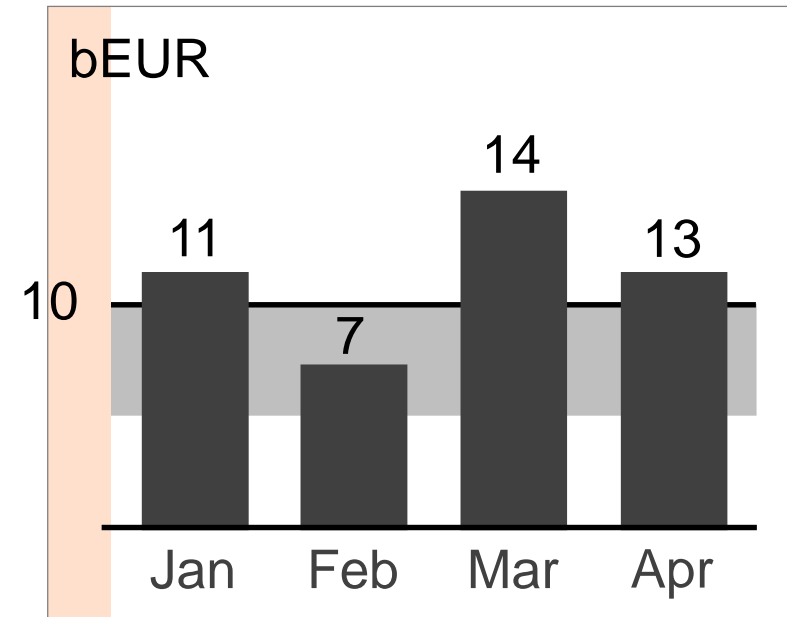
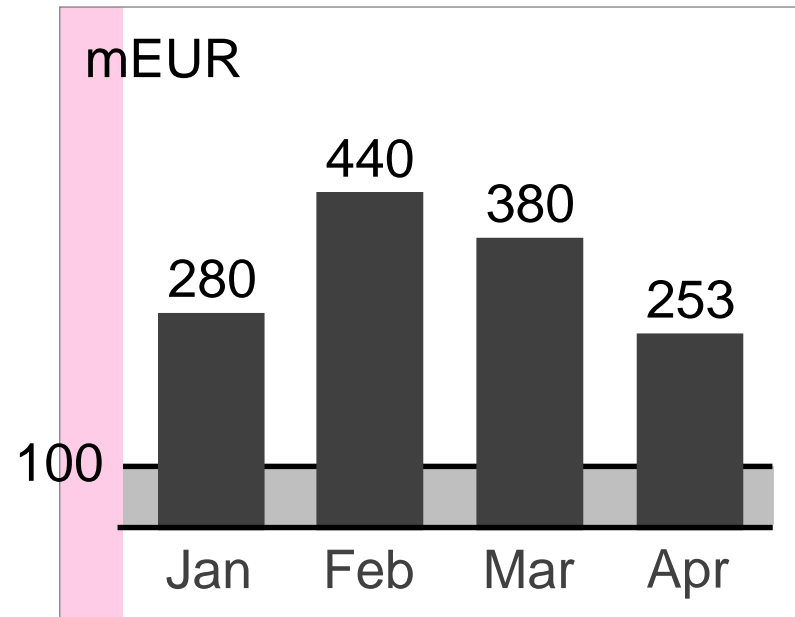
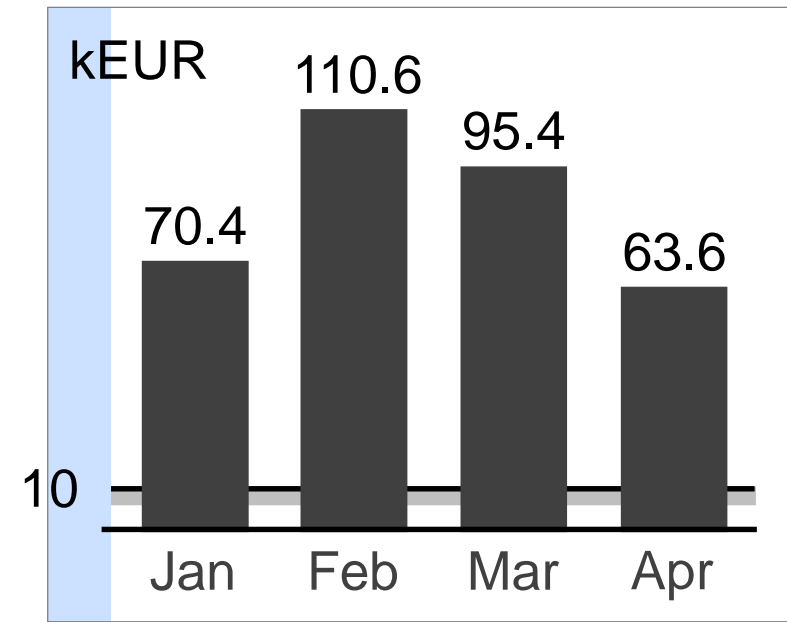
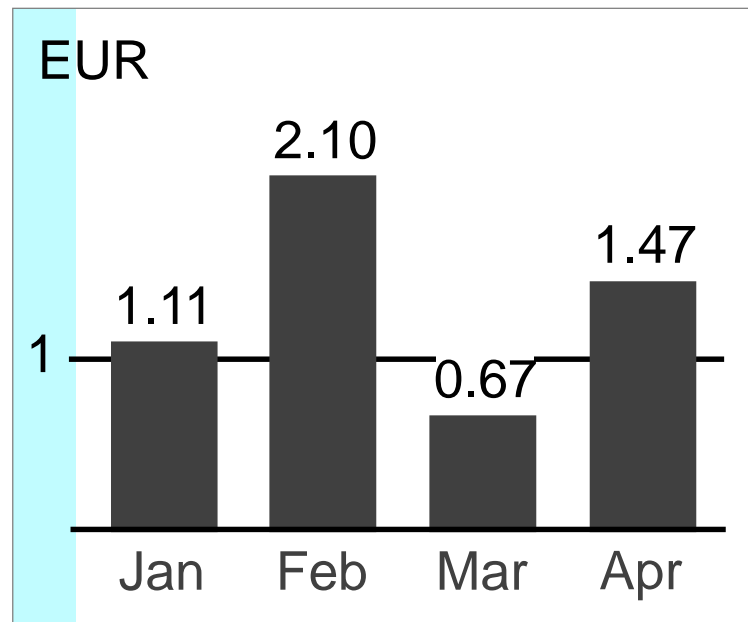
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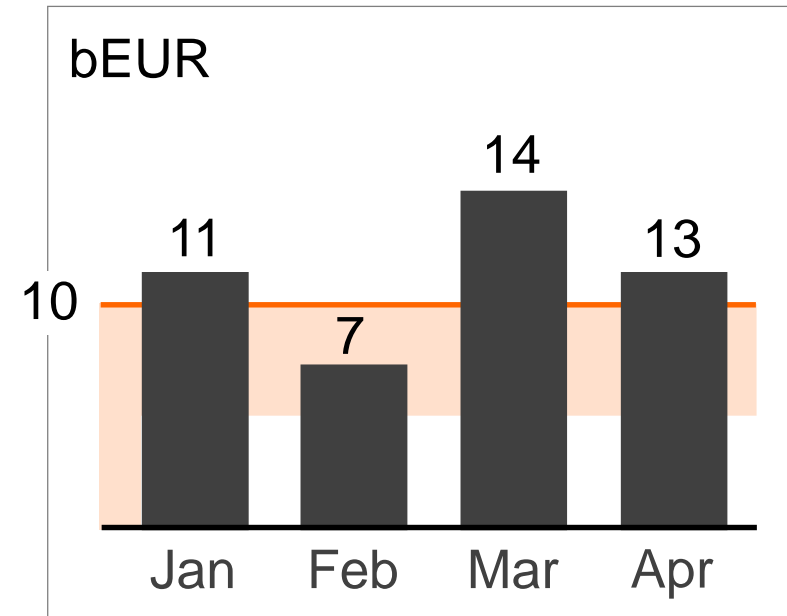
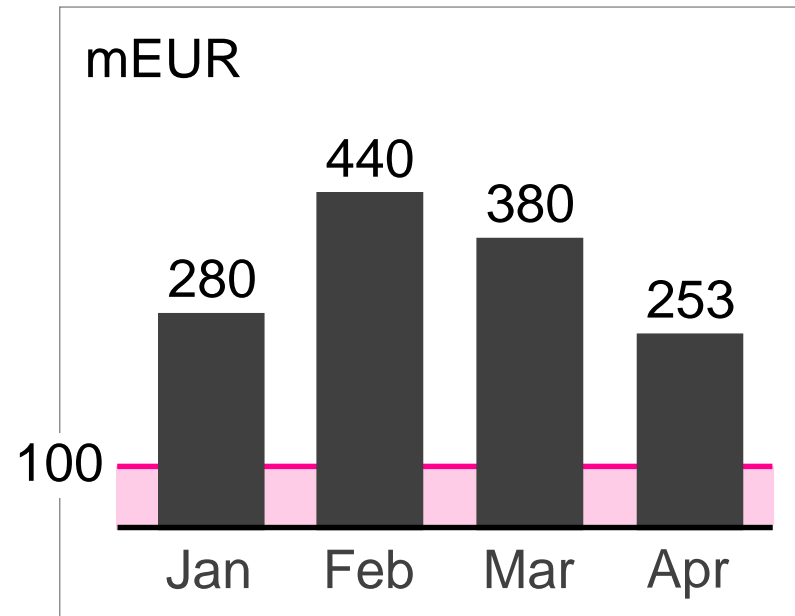
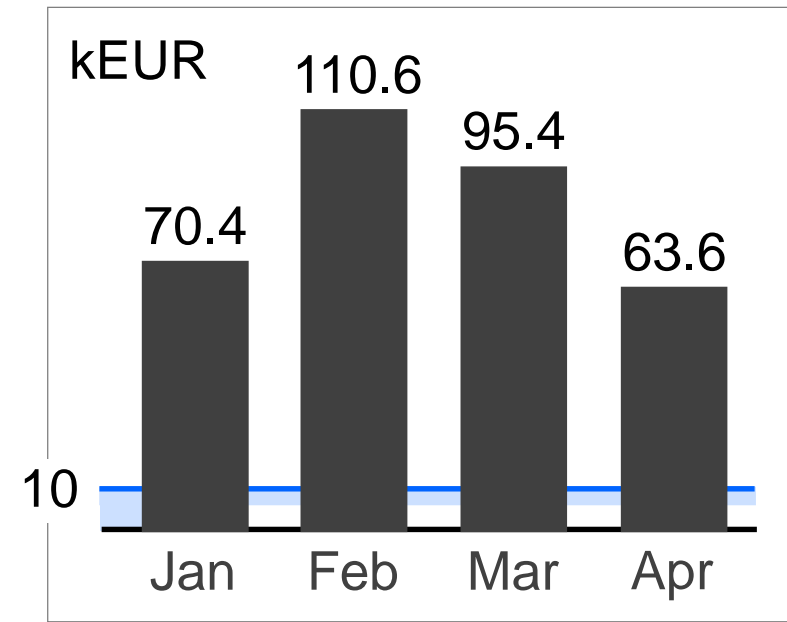
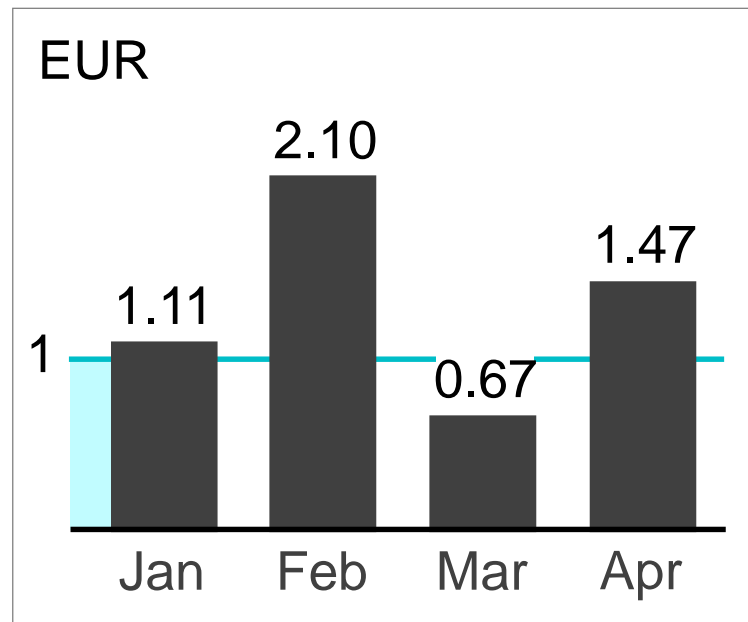
Question 3

Can we combine the notations for „powers of thousand“ and for „powers of ten“?



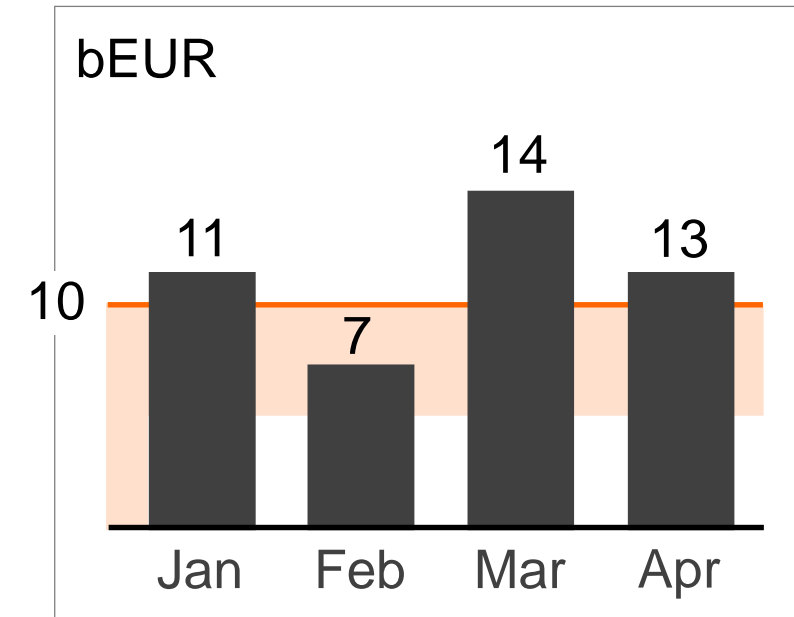
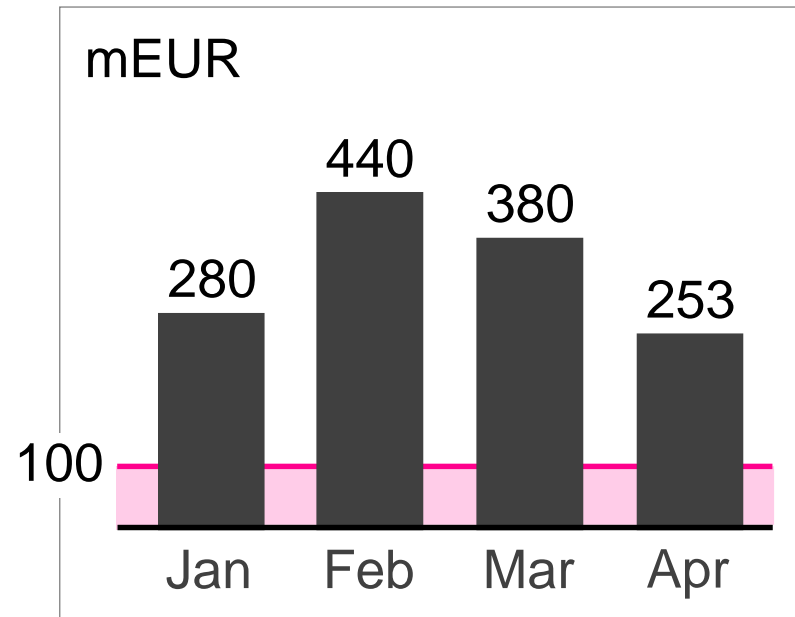
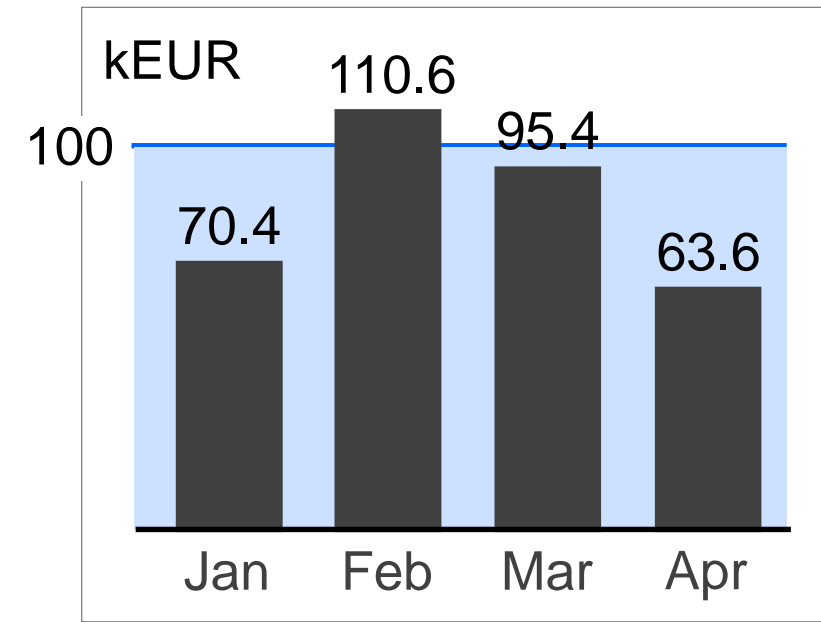
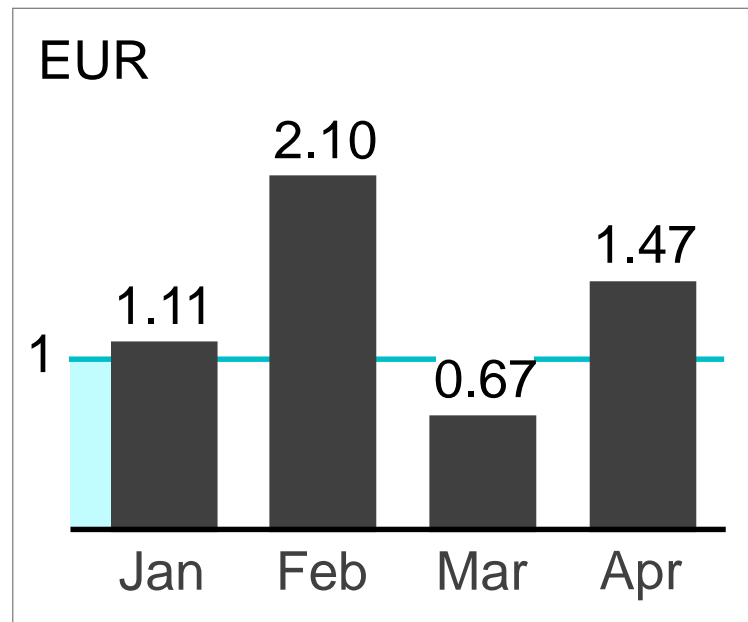
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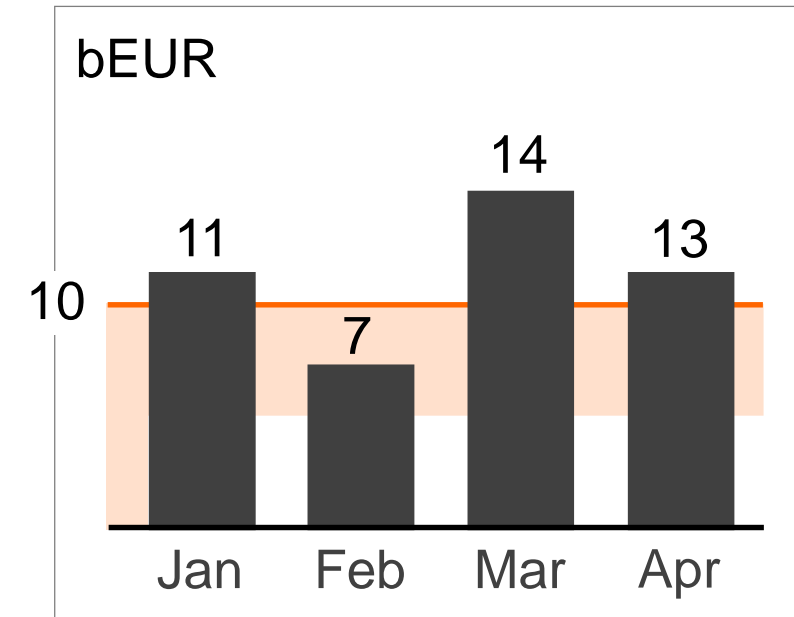
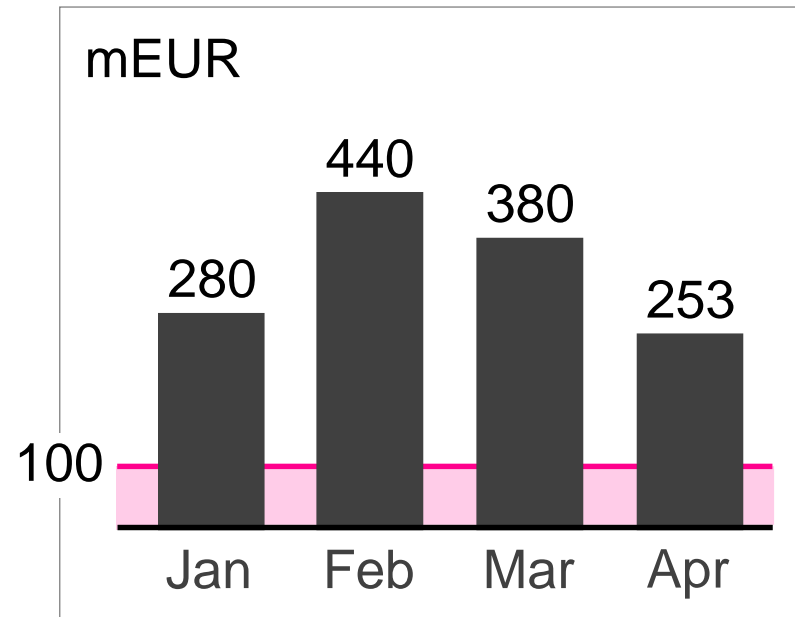
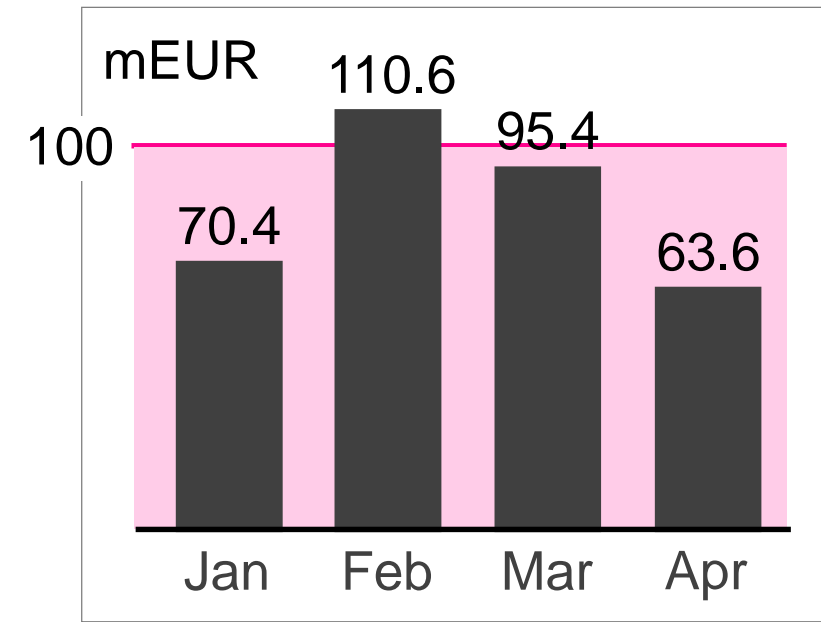
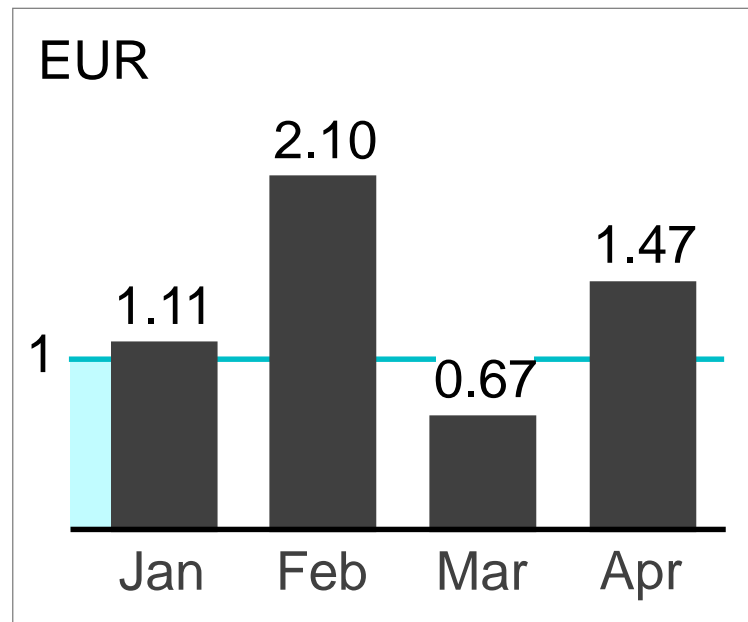
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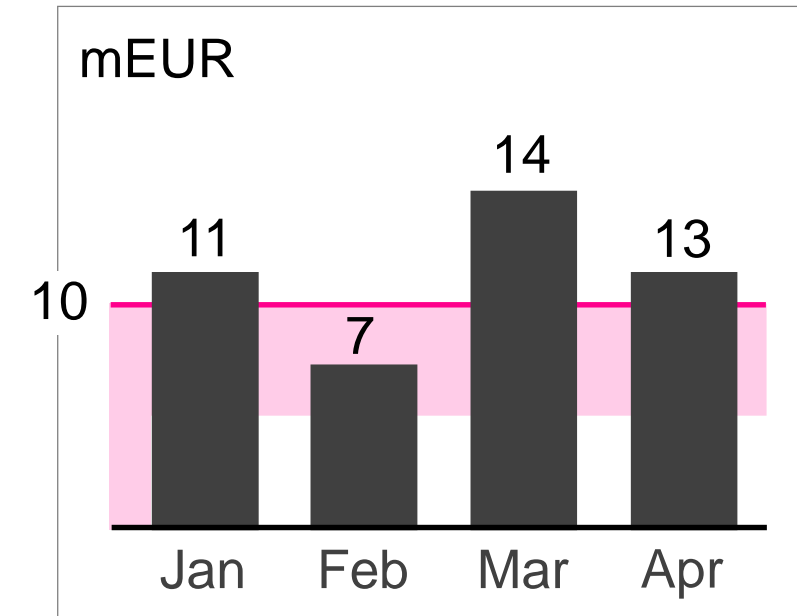
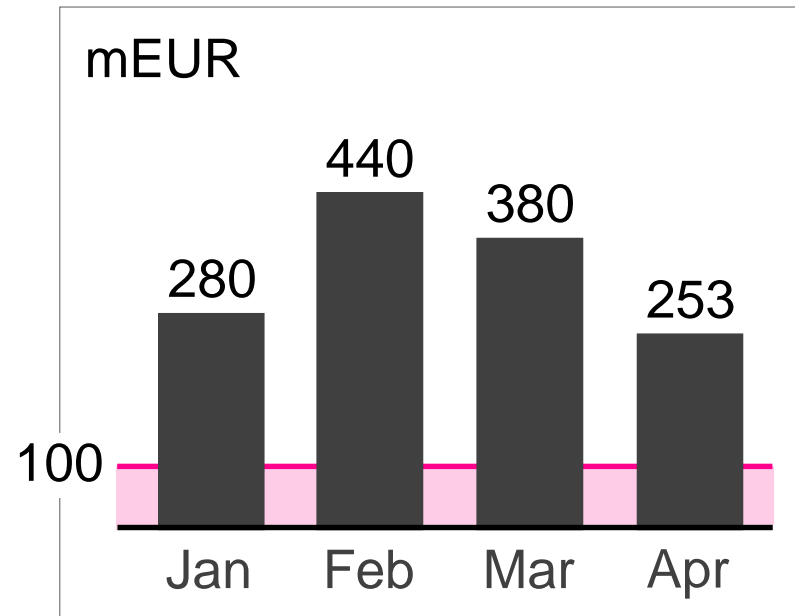
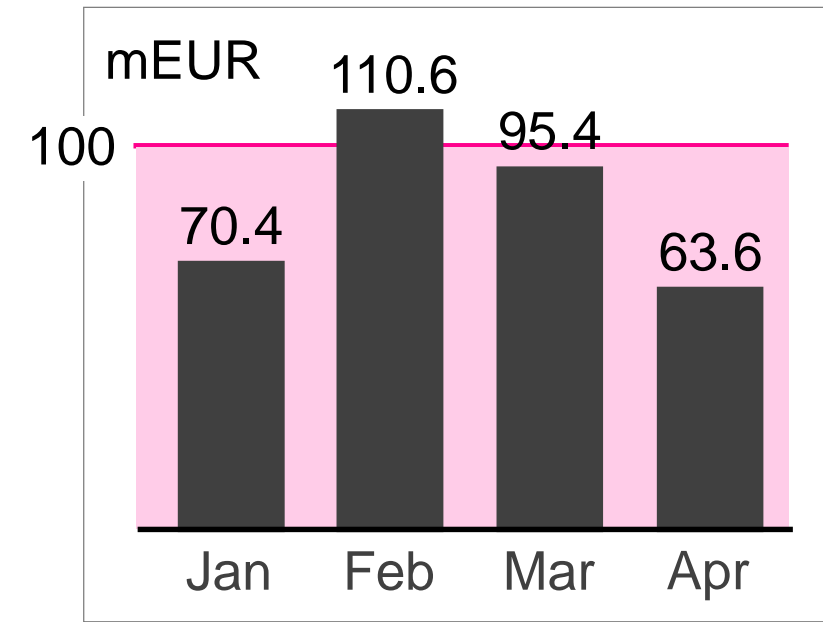
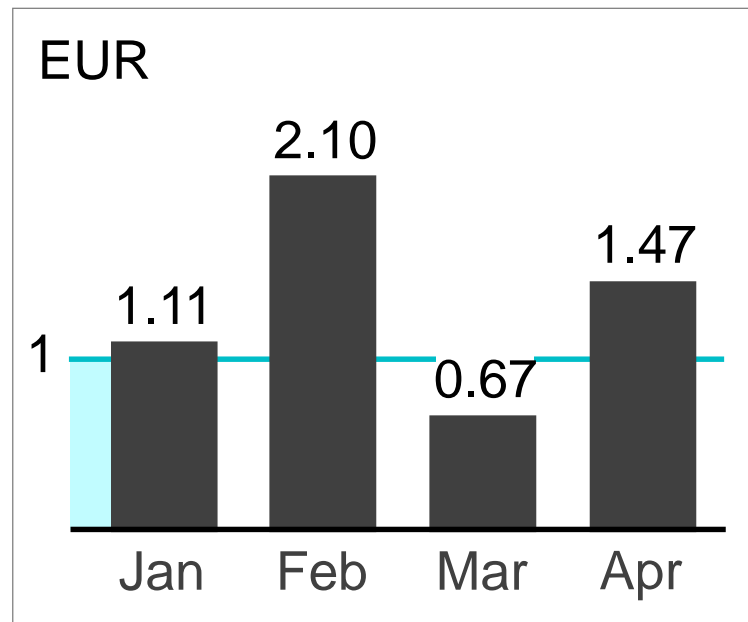
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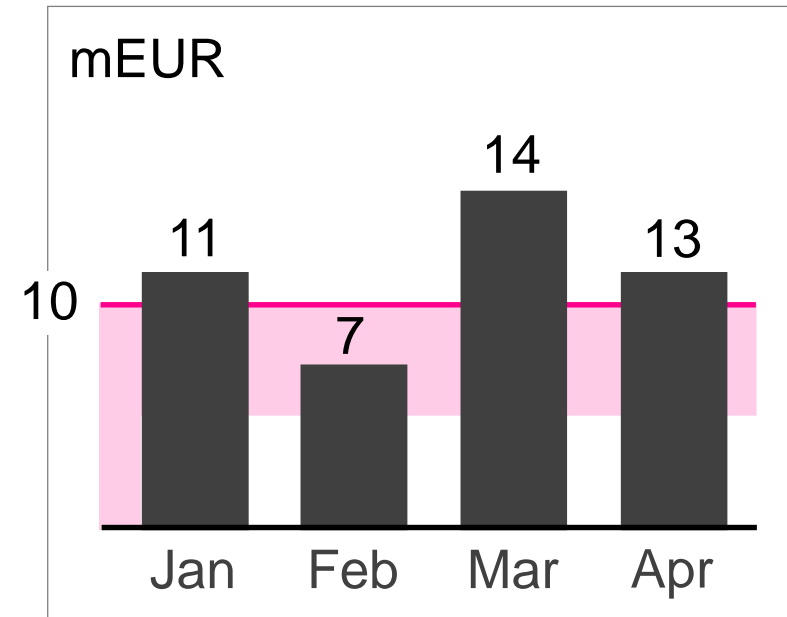
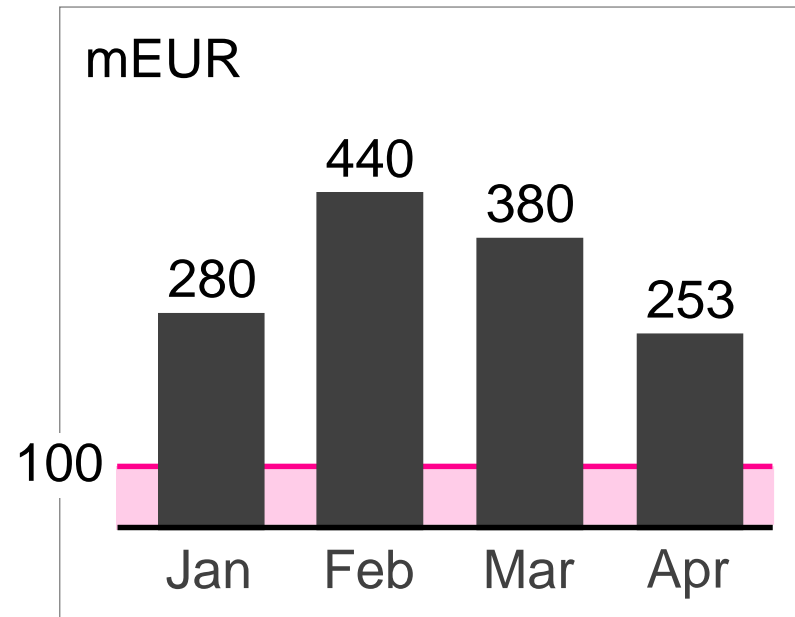
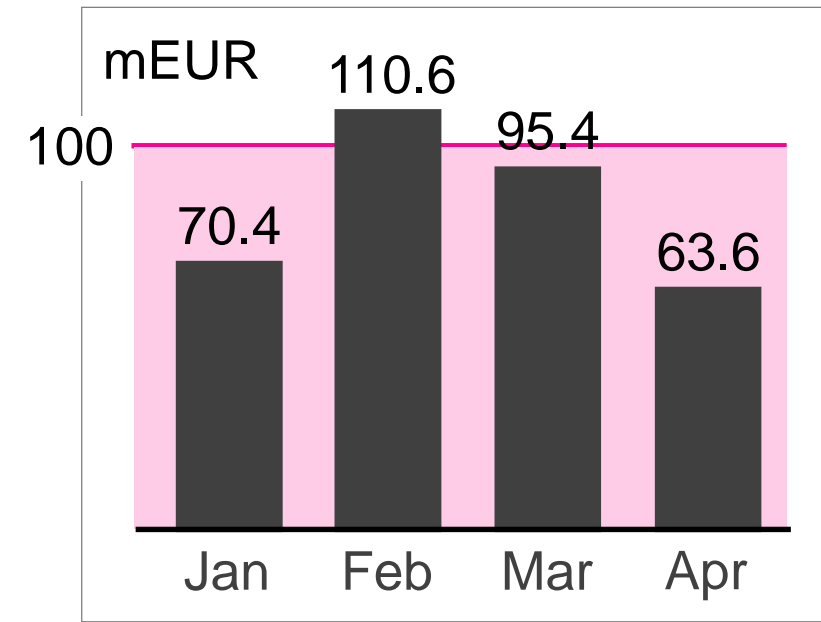
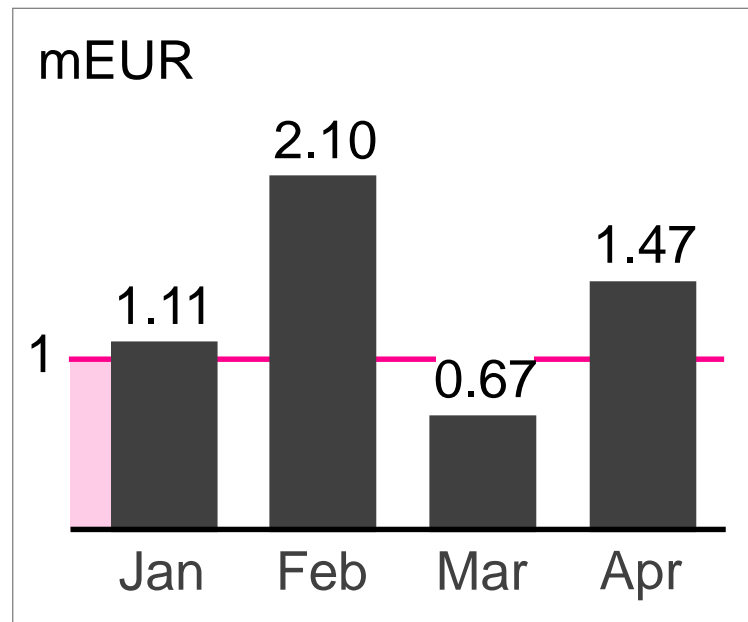
Question 3

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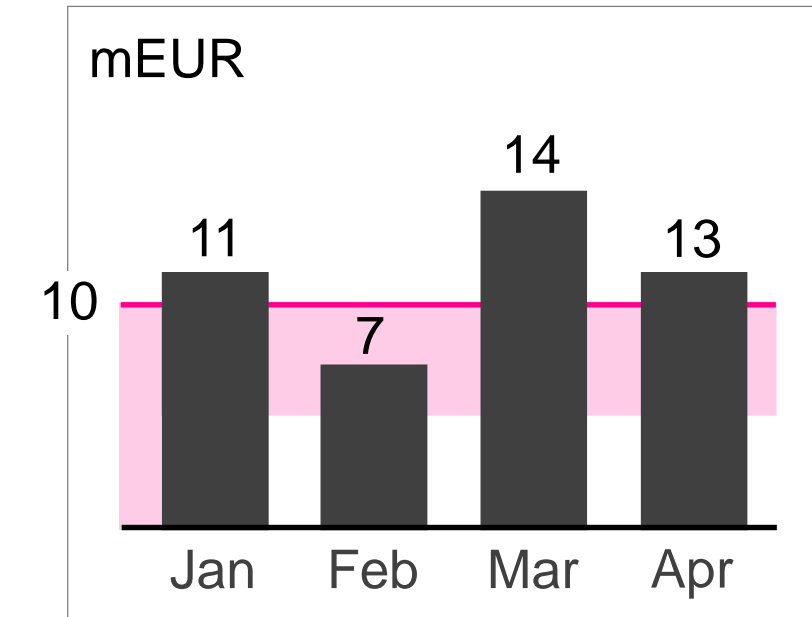
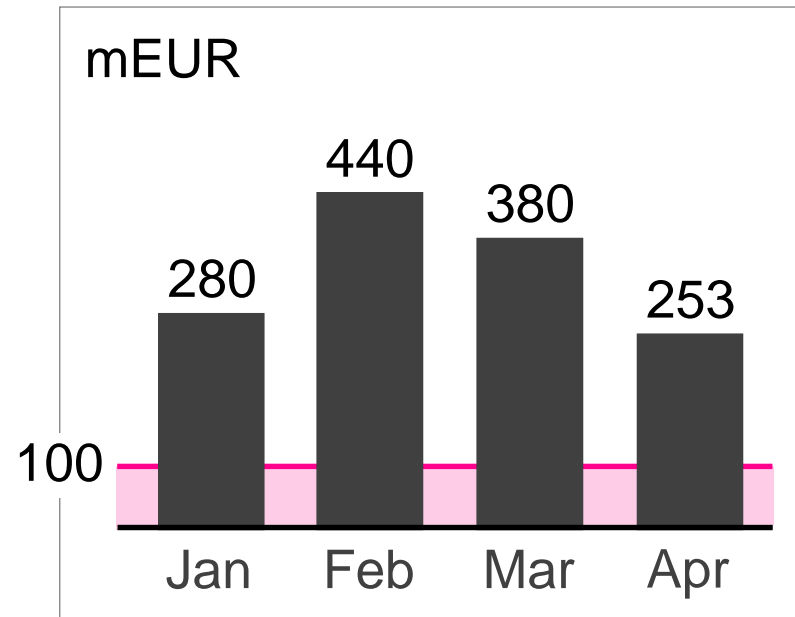
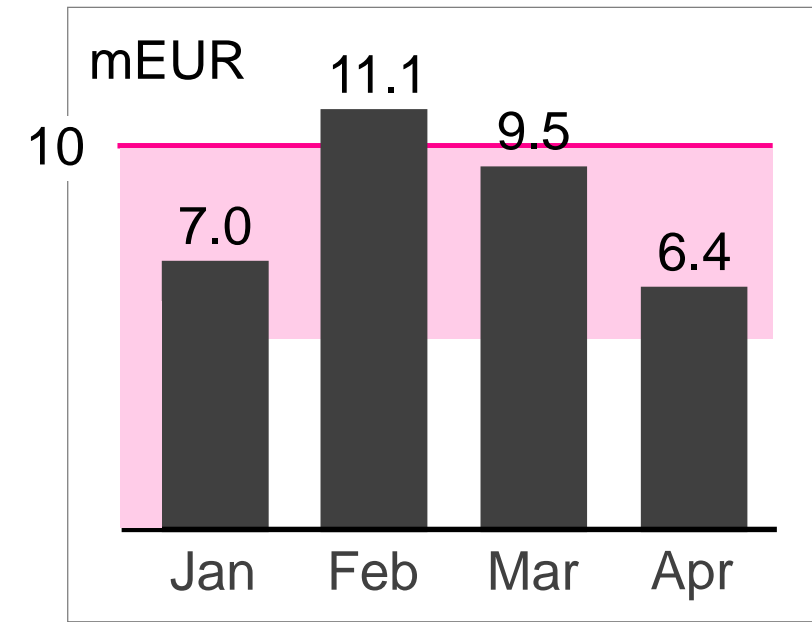
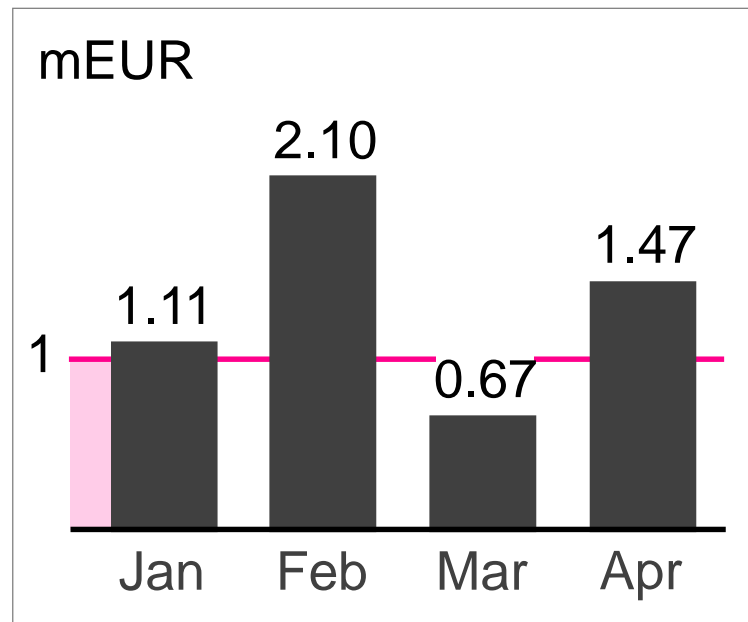
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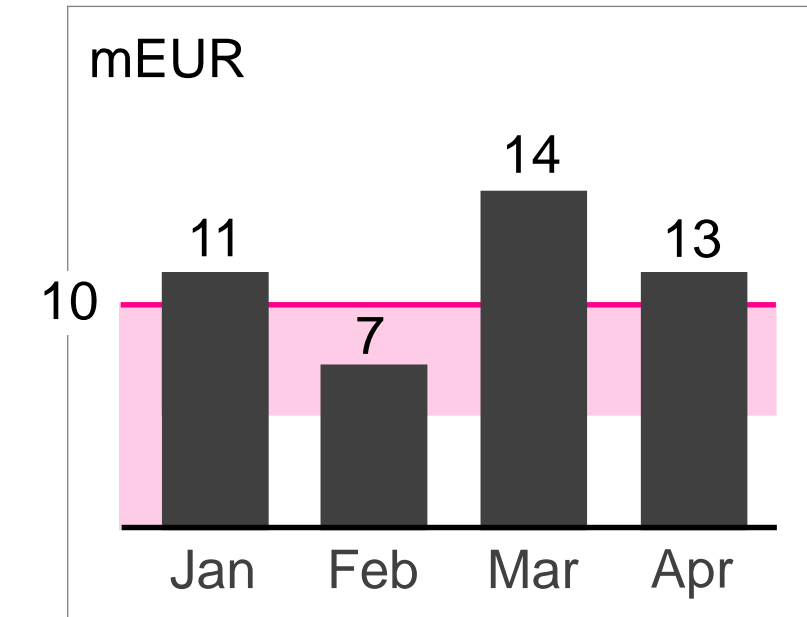
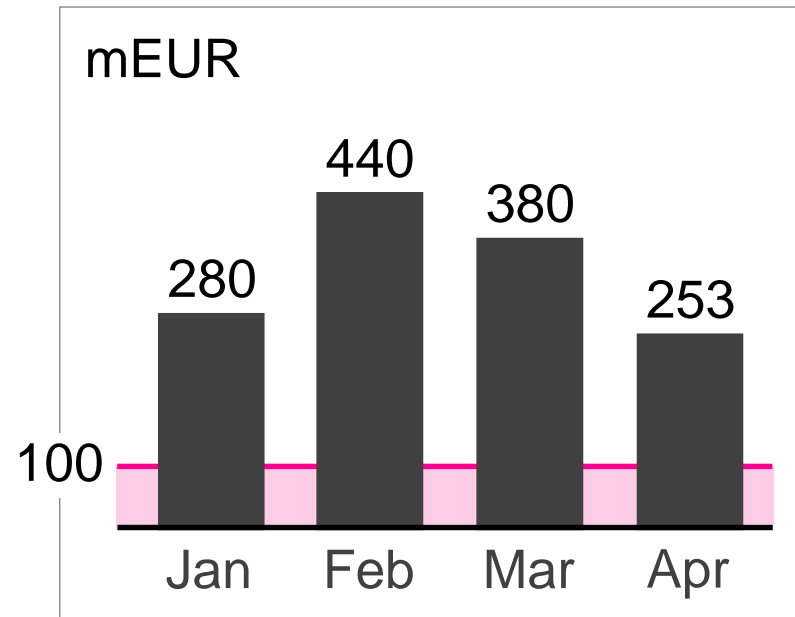
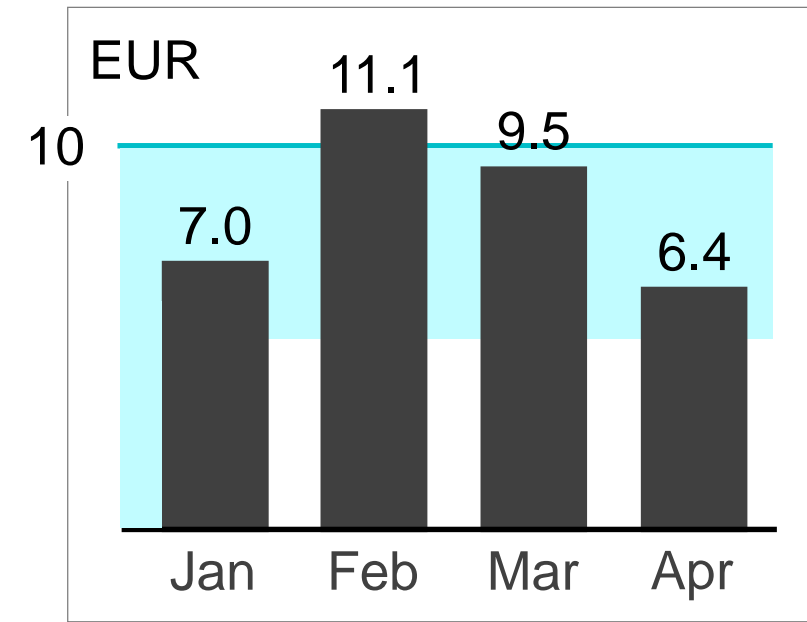
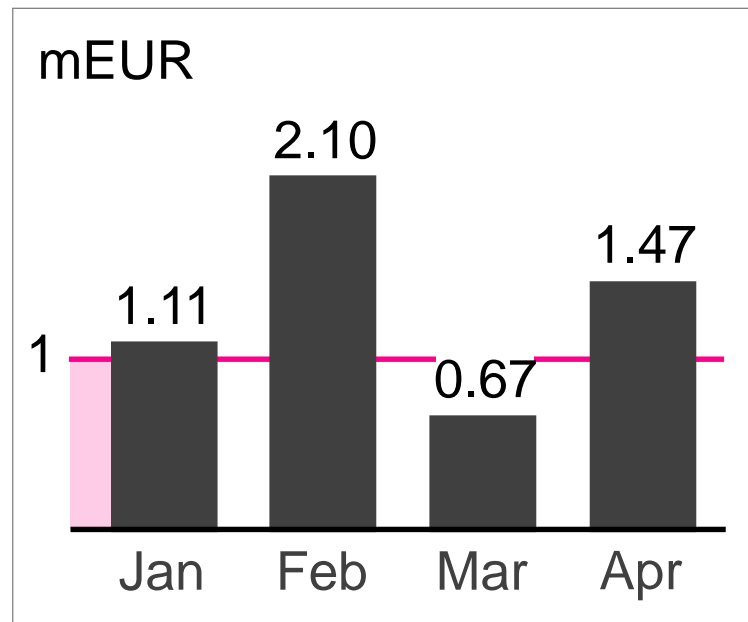
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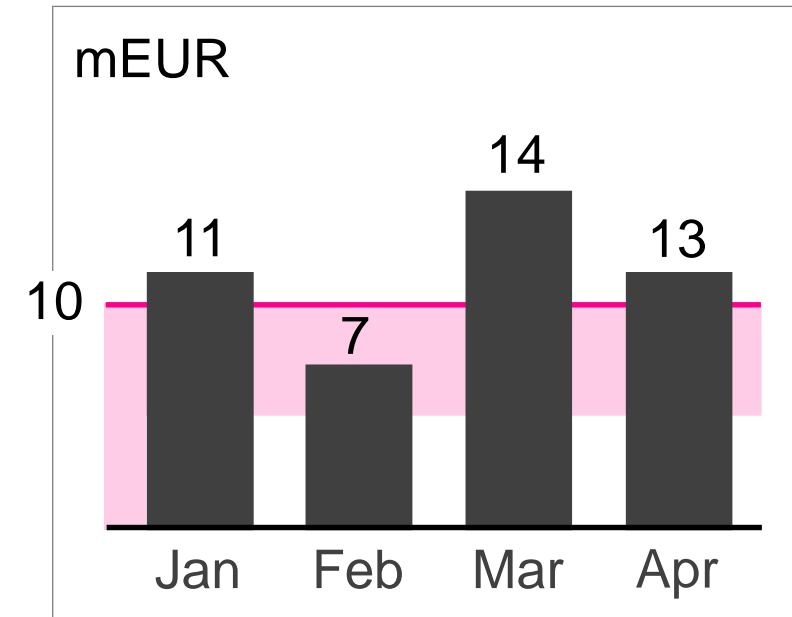
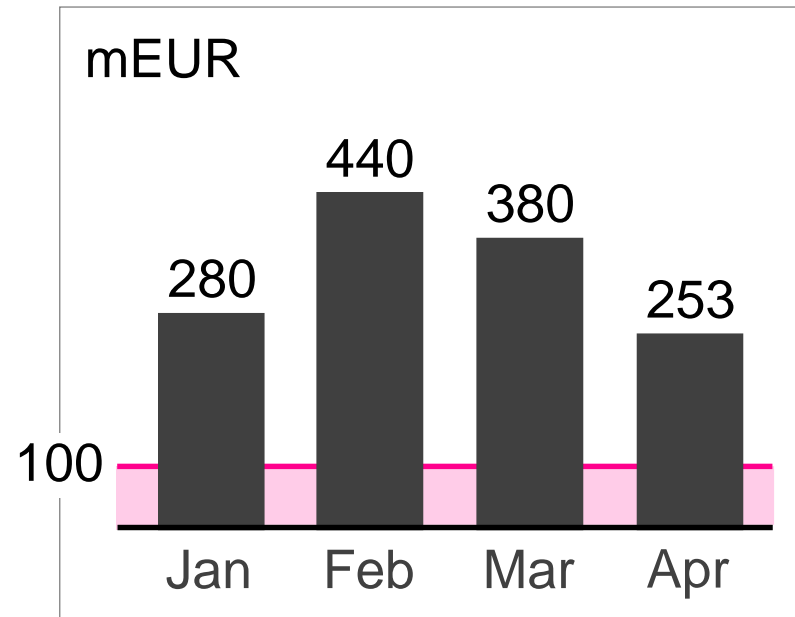
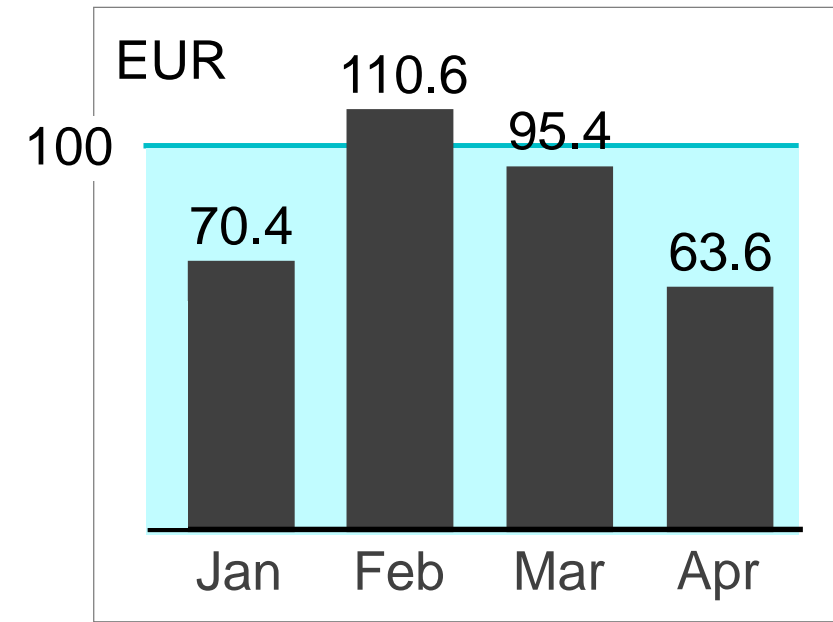
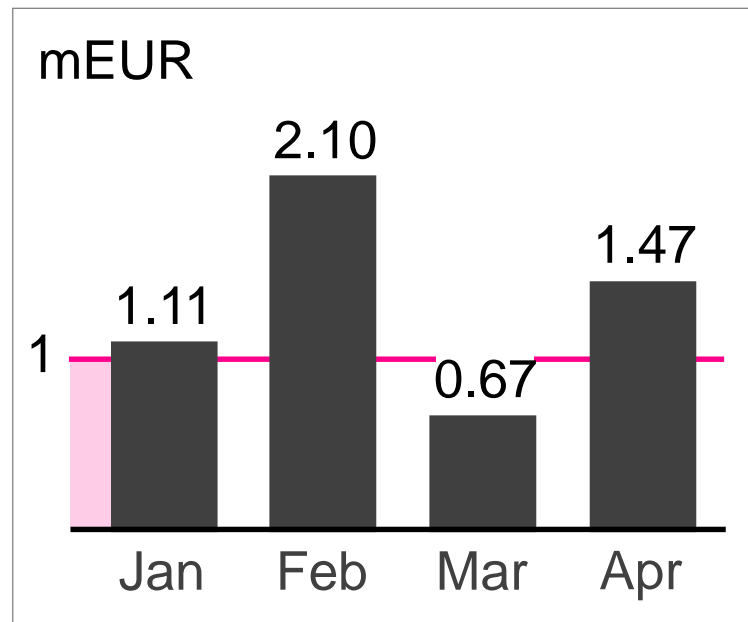
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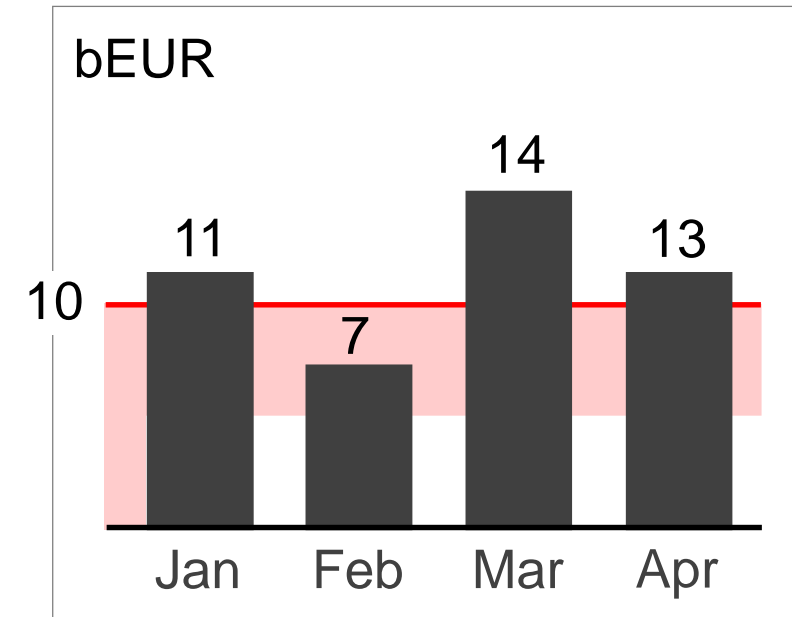
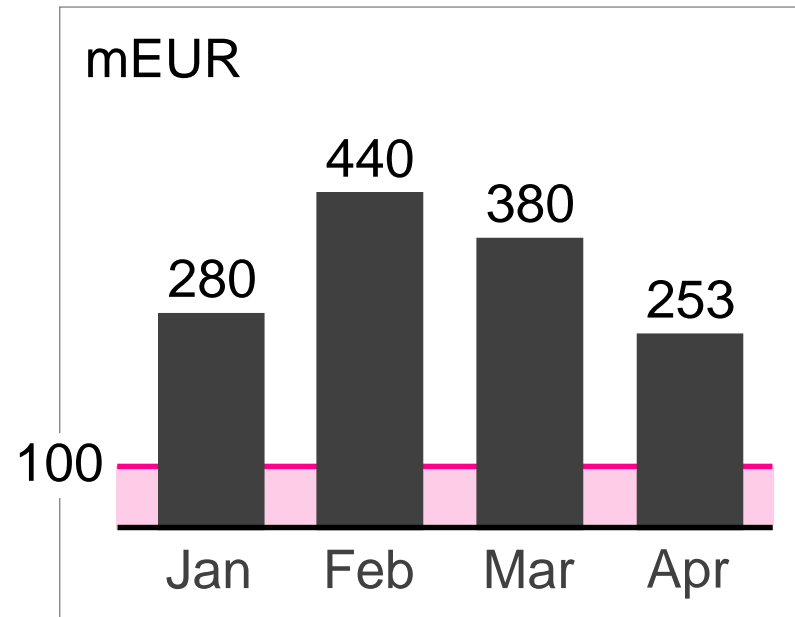
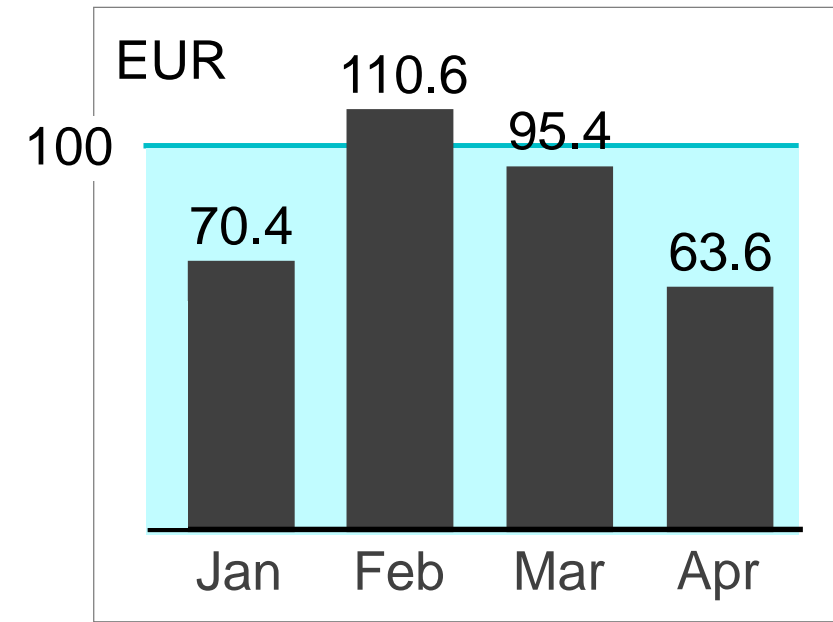
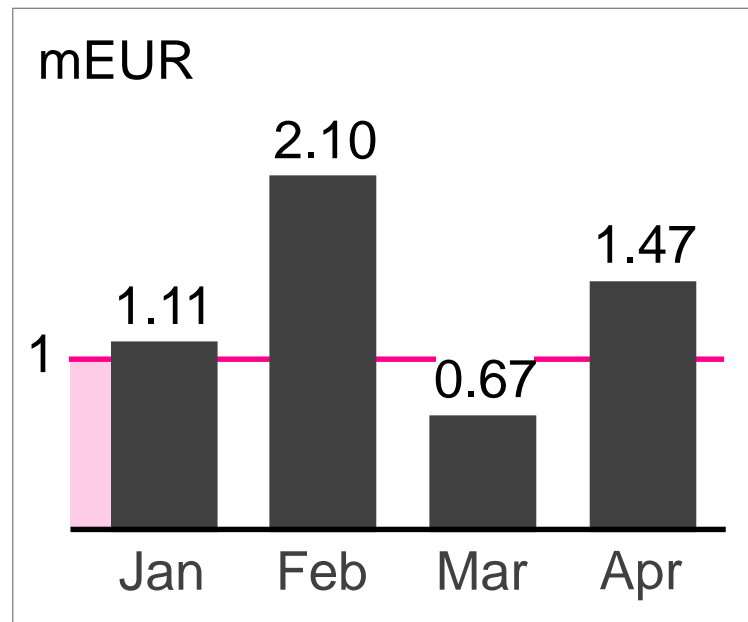
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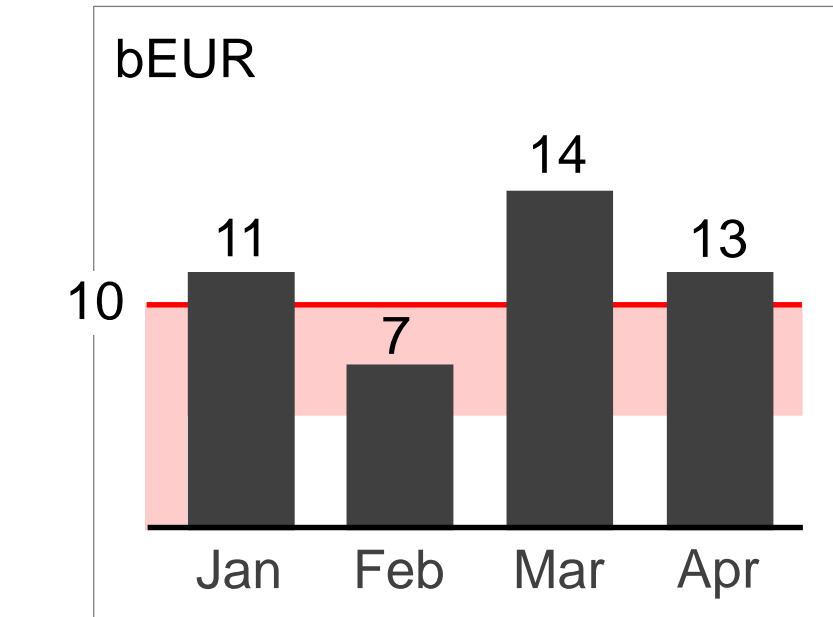
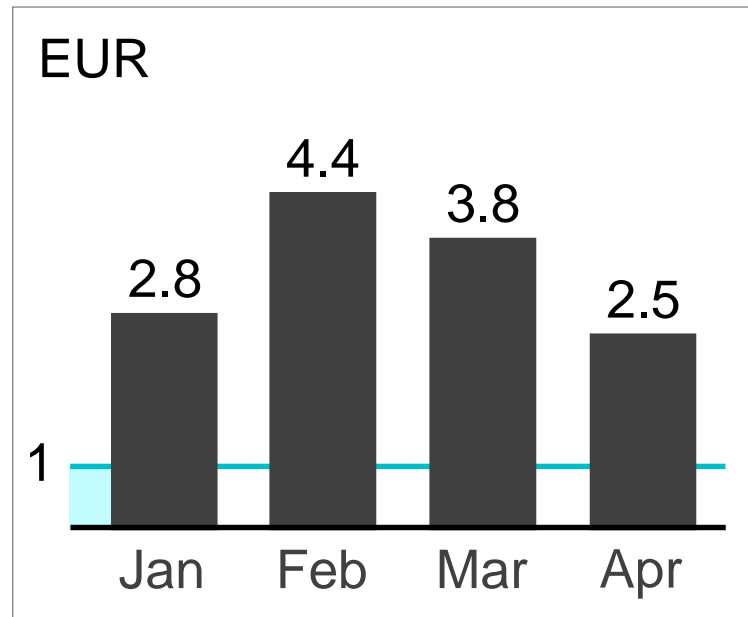
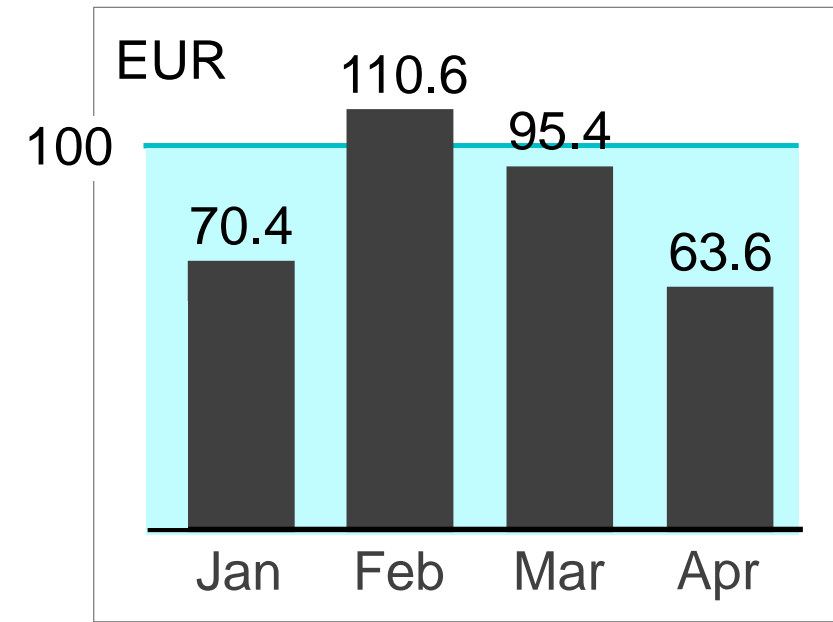
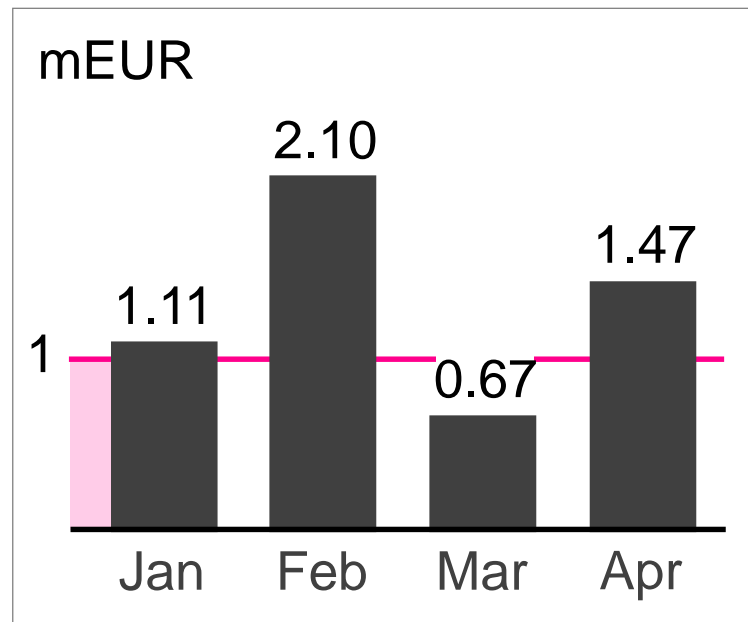
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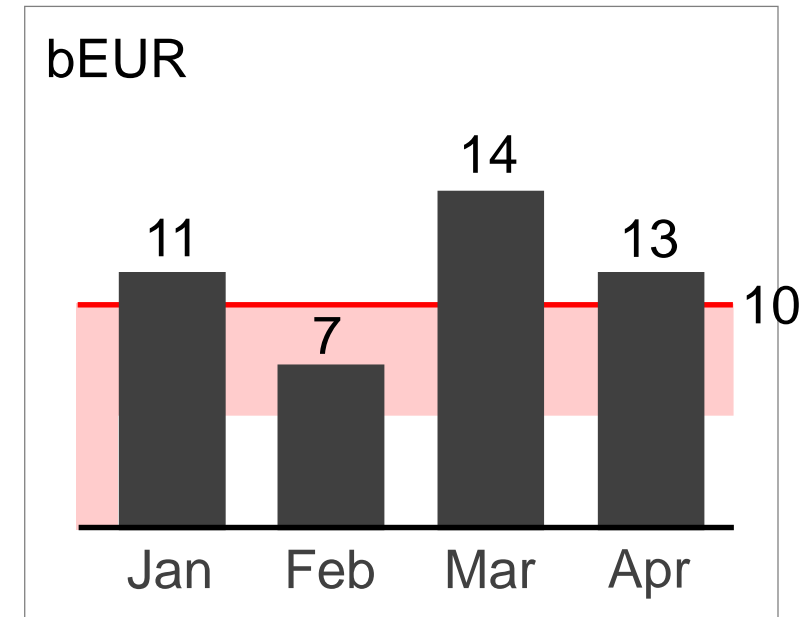
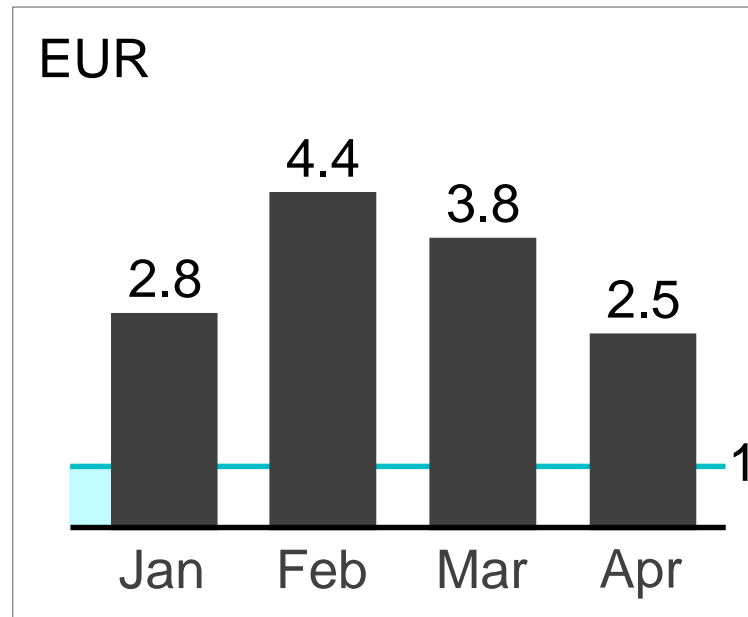
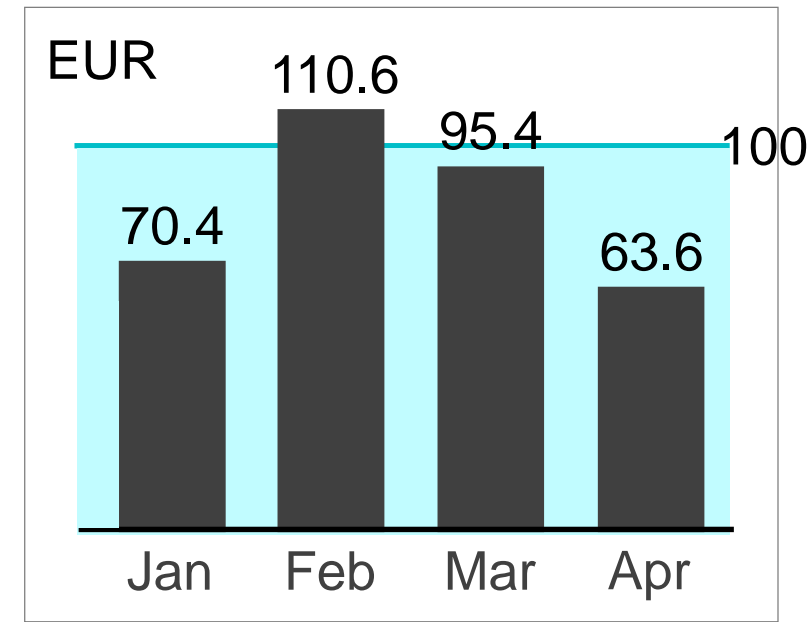
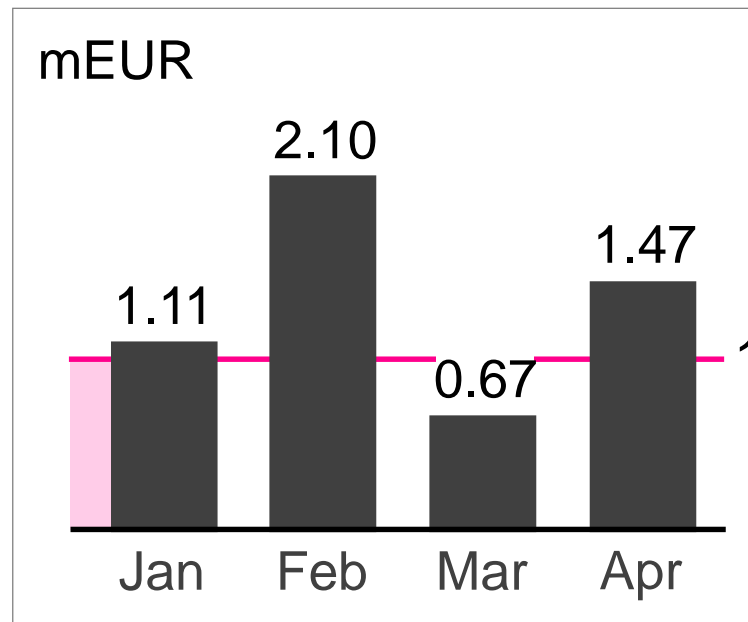
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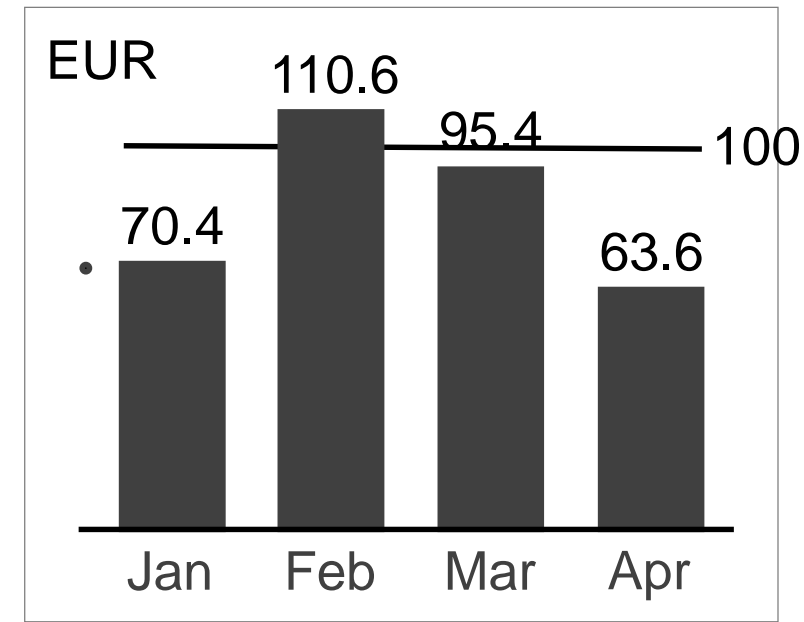
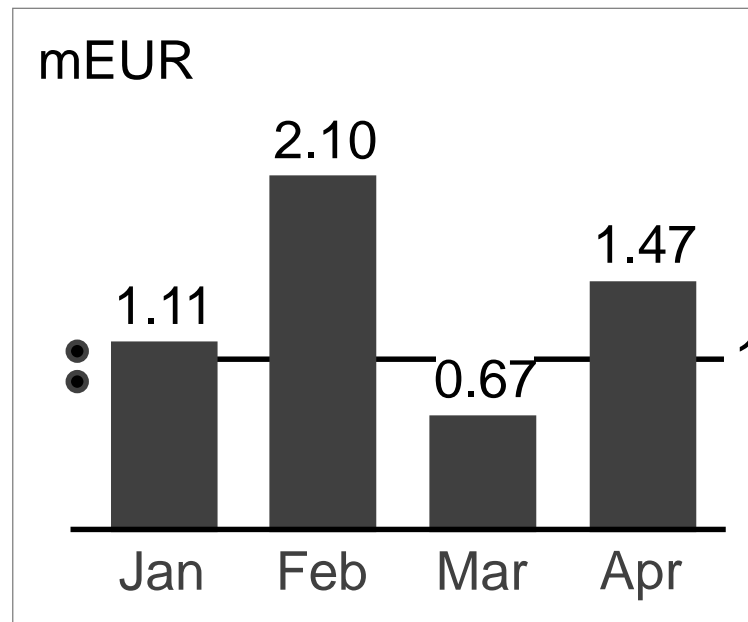
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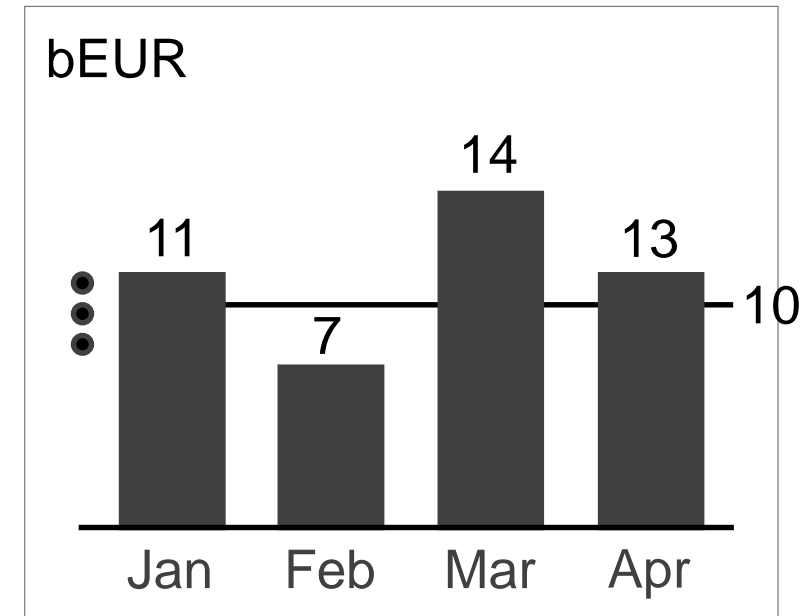
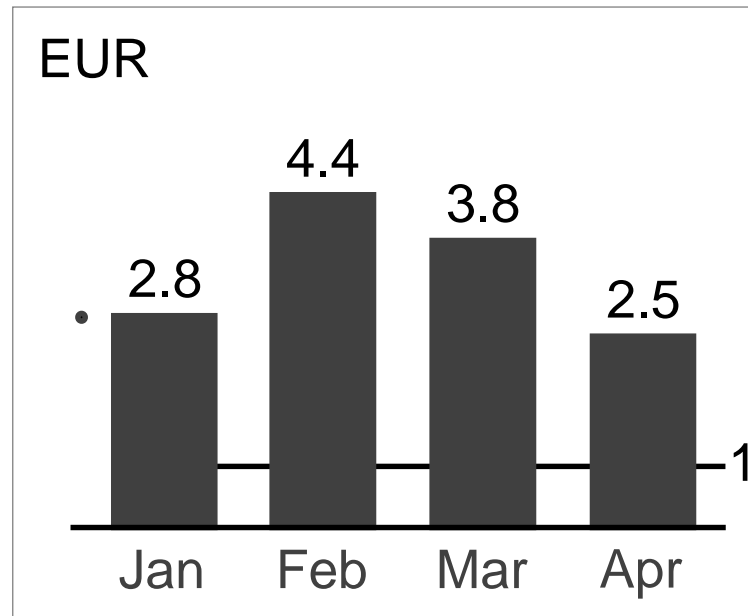


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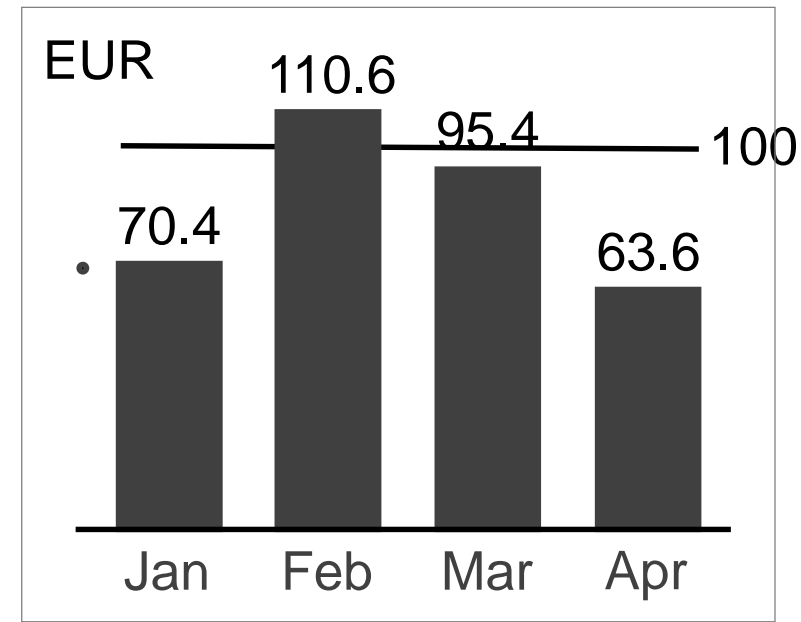
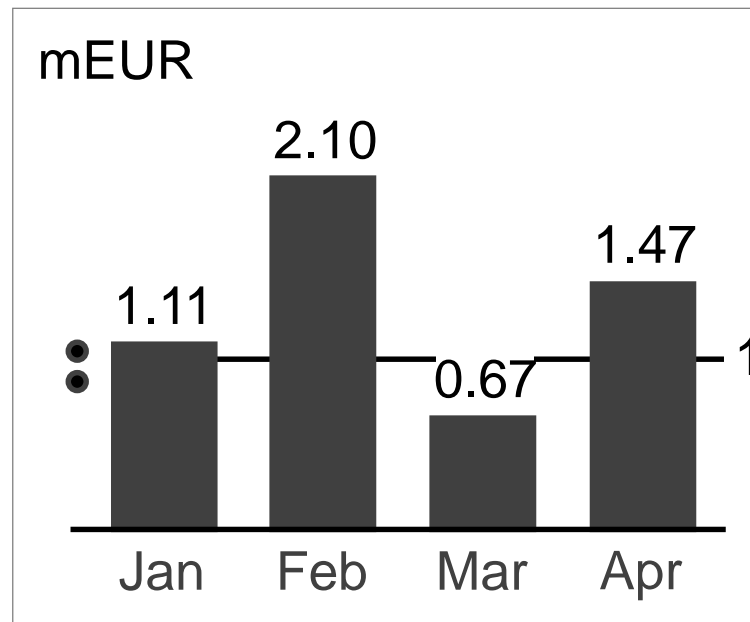


Is this a practical solution?

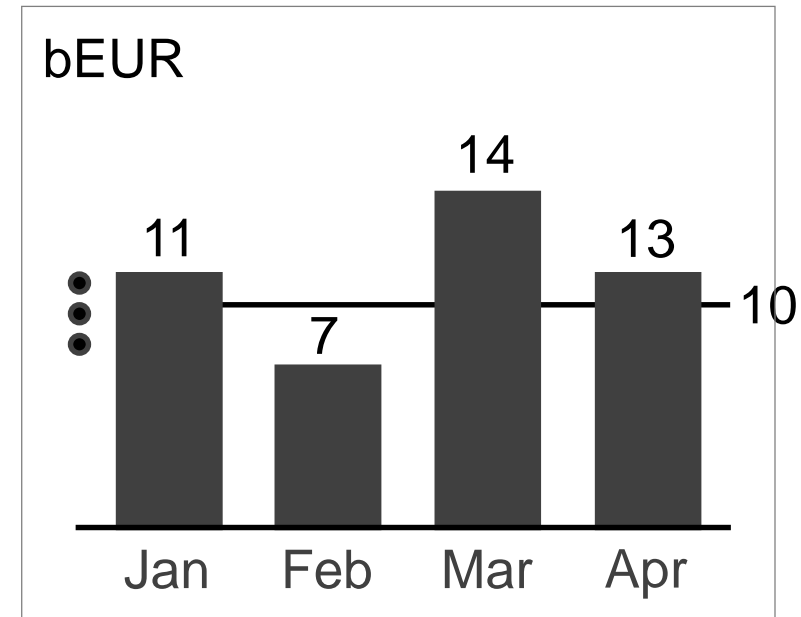
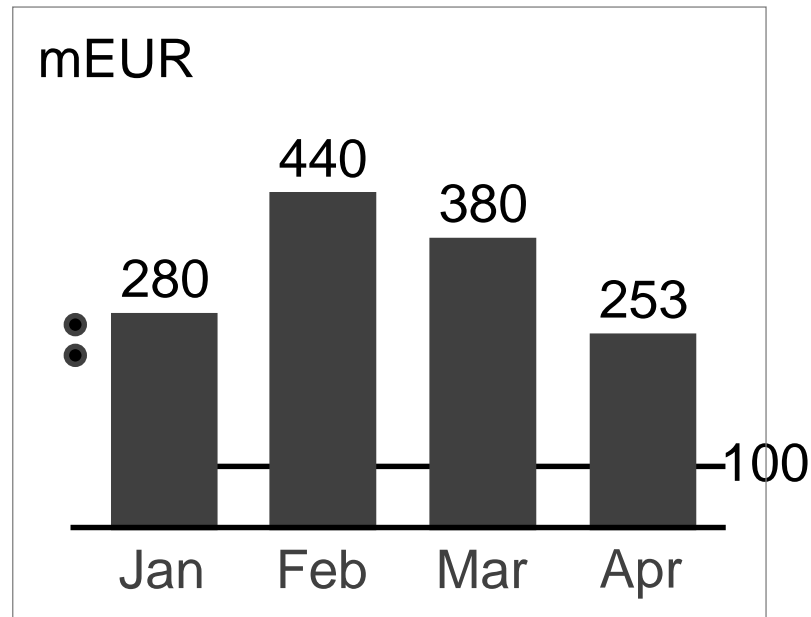


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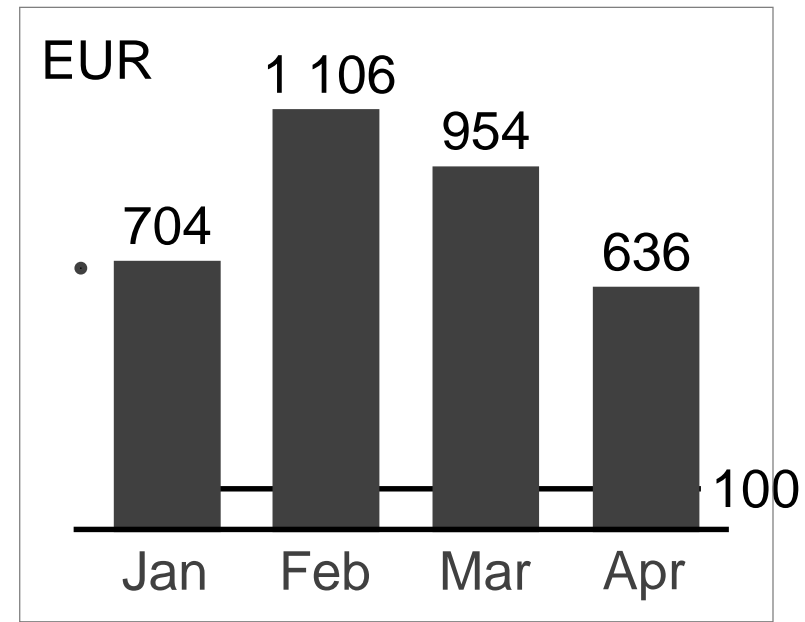
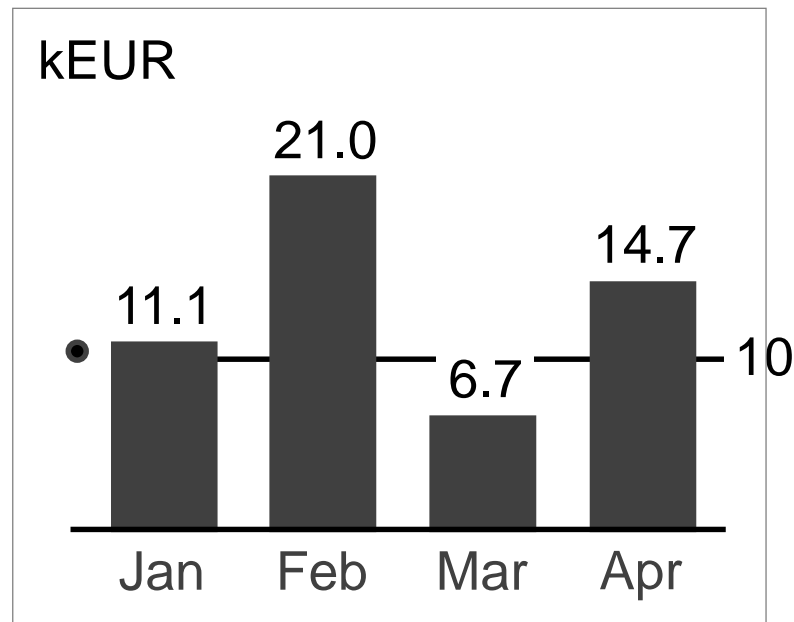


Is this a practical solution?

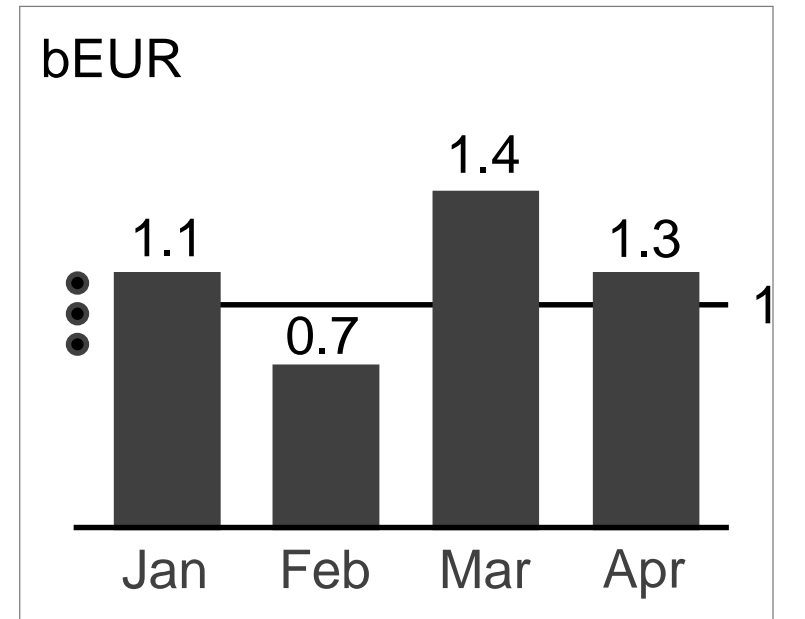
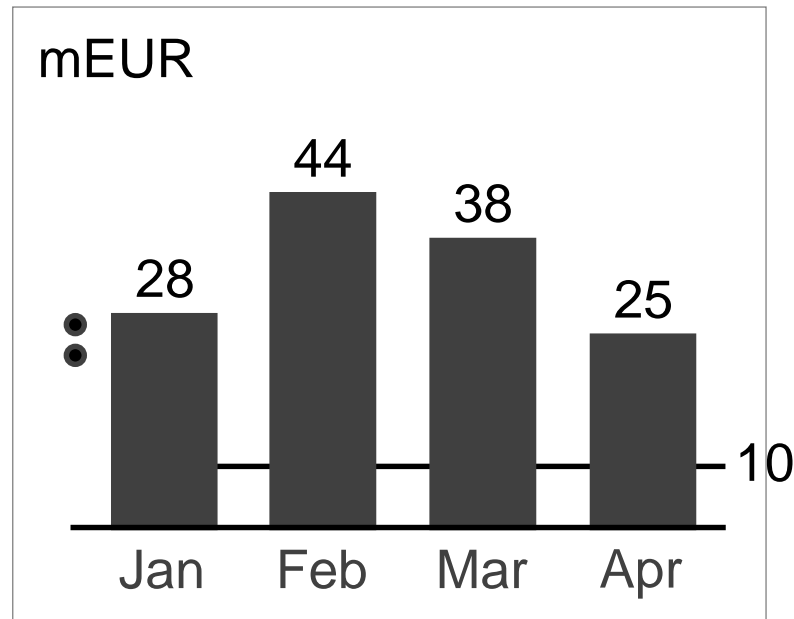


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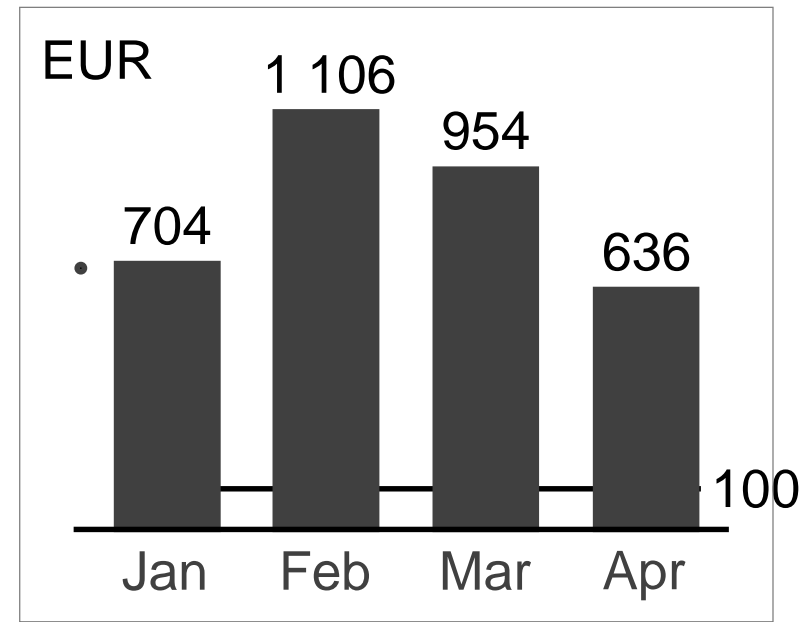
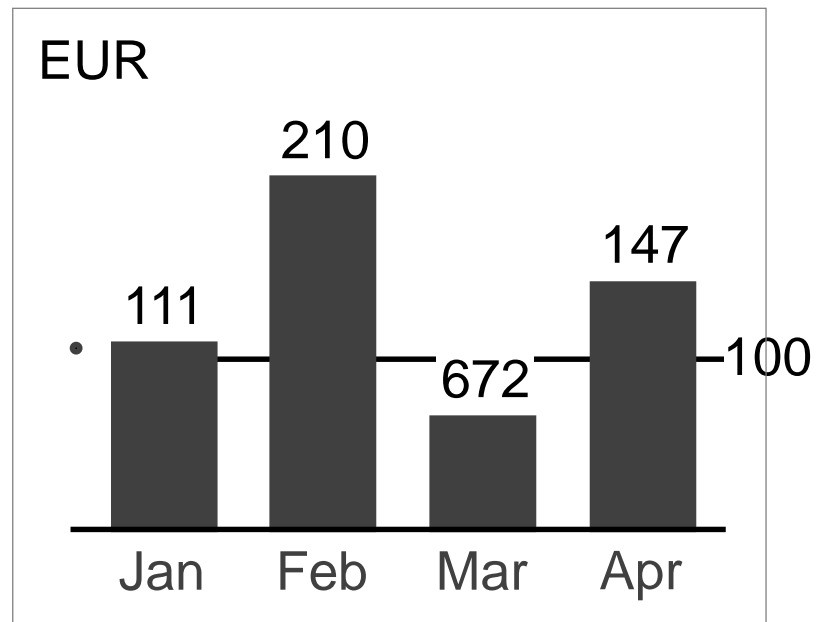


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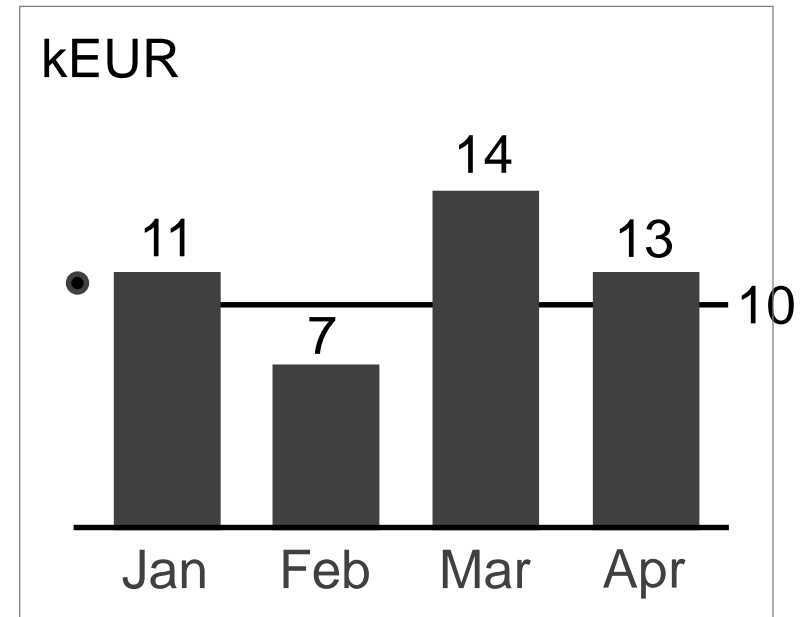
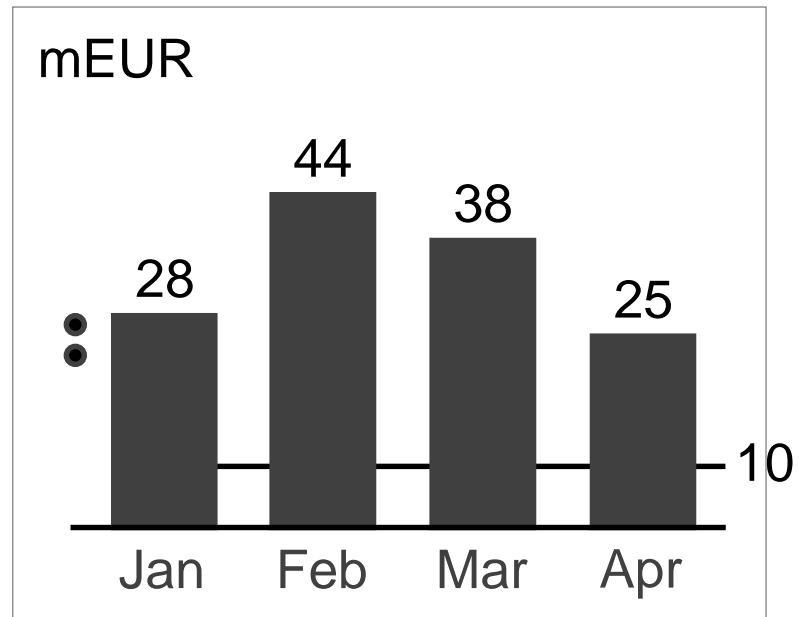


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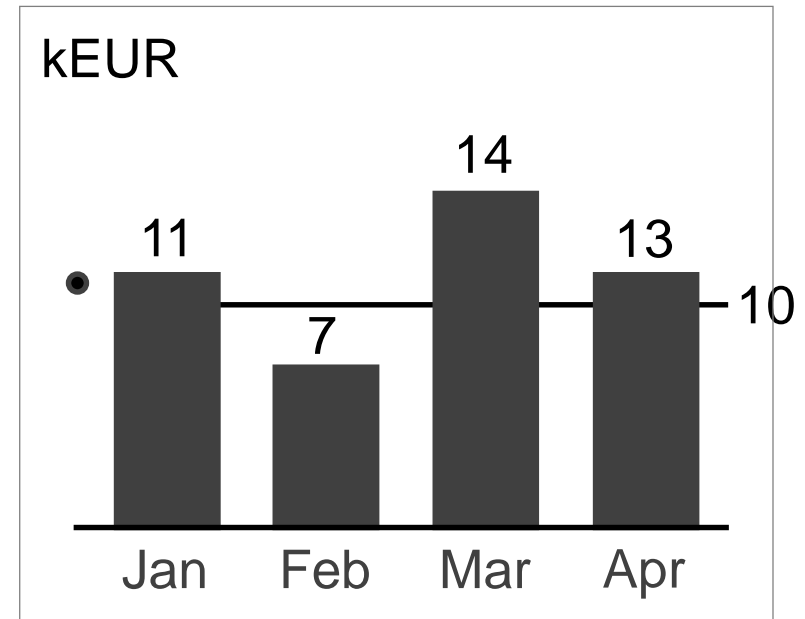
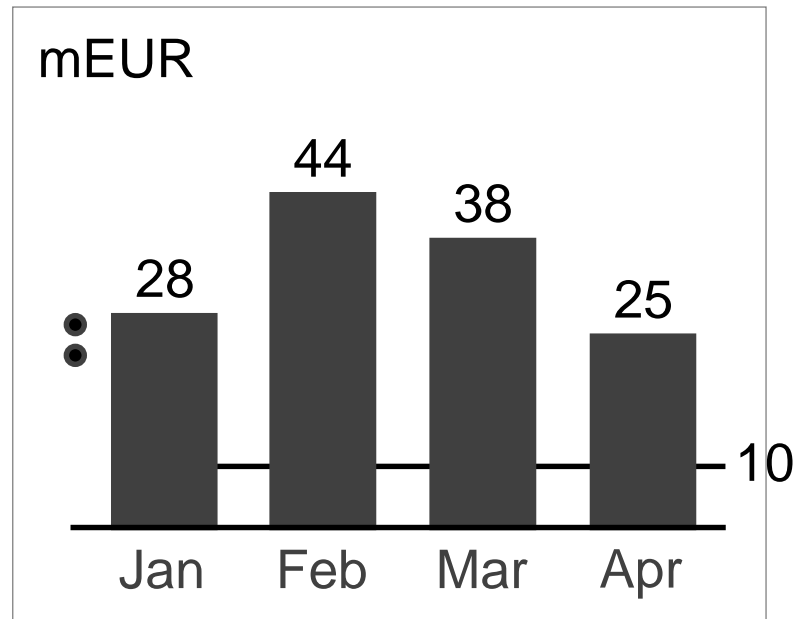
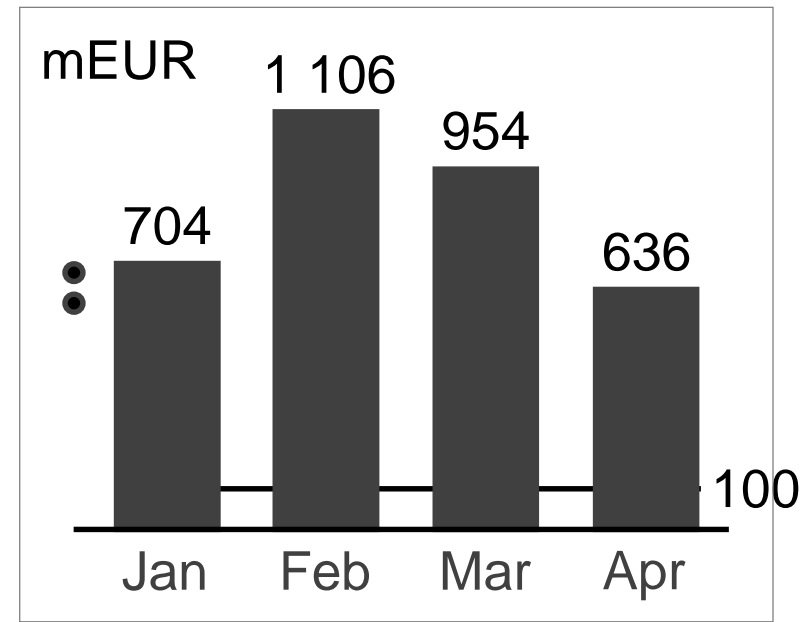
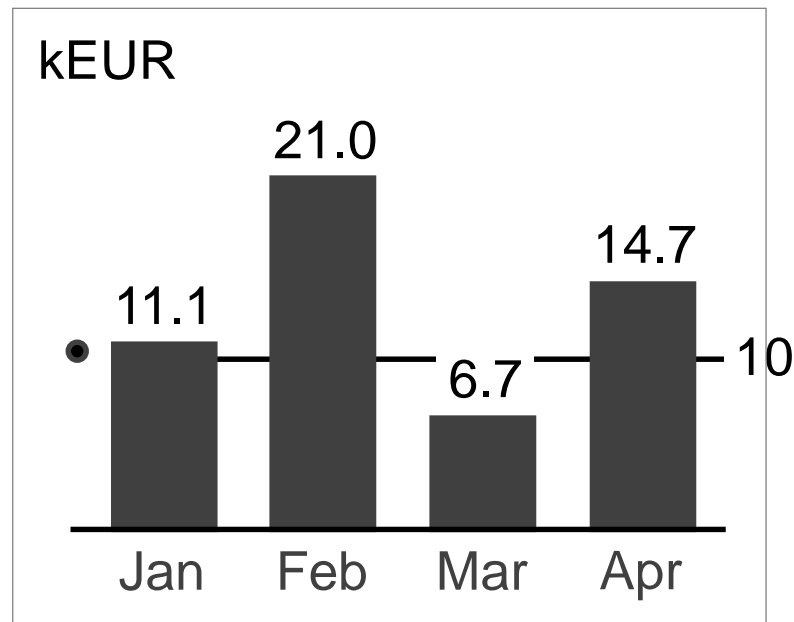


Is this a practical solution?



Question 3

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Conclusion

There *are* means to allow us to **distinguish** different scales.

But - whatever we do – we will not be able to effectively **compare** charts with scales of different „powers of thousand“.

We suggest to build a work group within the IBCS Association to discuss this and come up with a concrete suggestion.