



Roassal3 updates: To infinity and beyond

Inria



Milton Mamani

1 September 2023
Lyon

Who I am?

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Country: Bolivia



Canvas Shapes Announcer Raw Breakpoints Meta

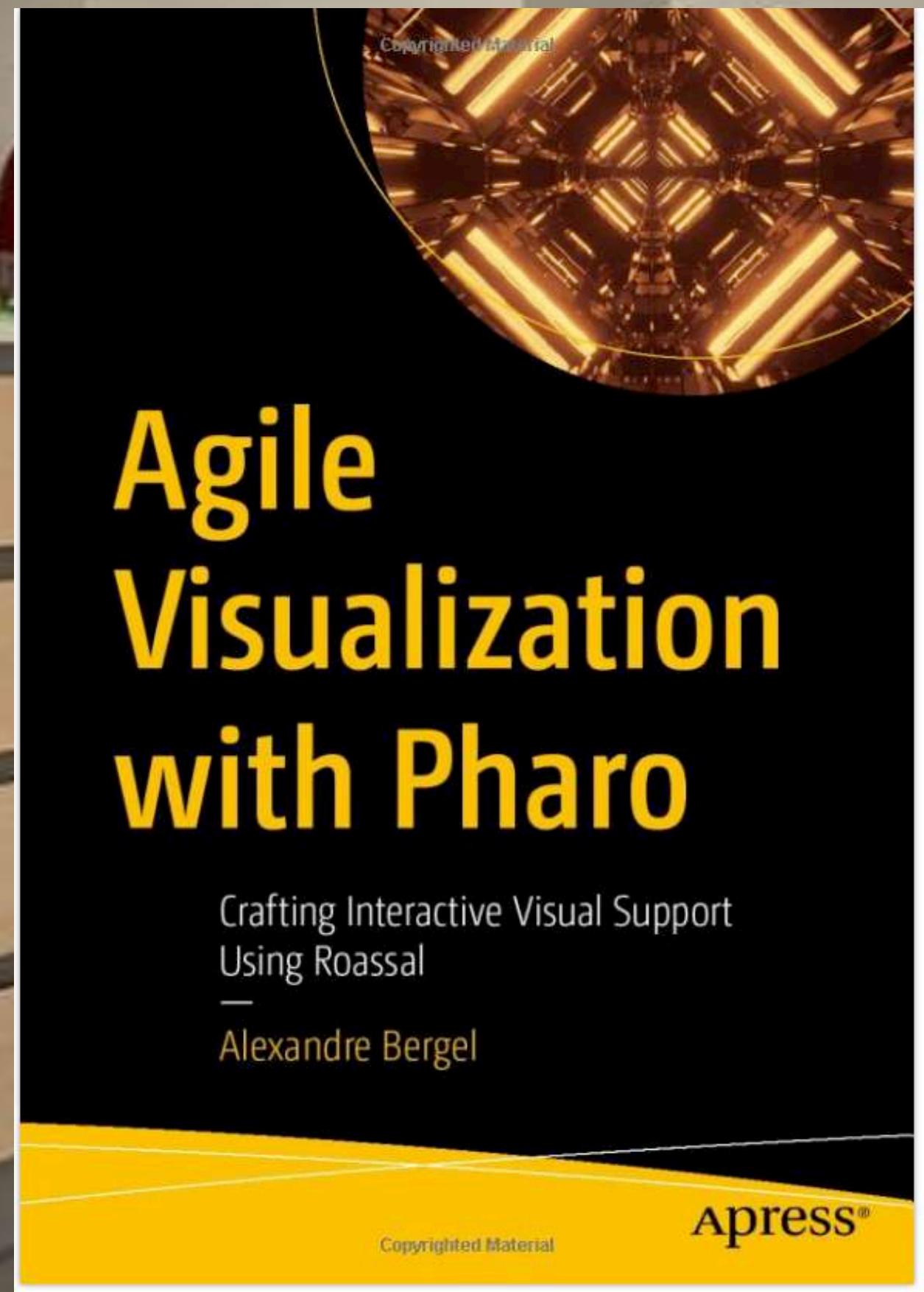


What is Roassal?

A tool to visualize data

6





Created by:
**Alexandre
Bergel**
<http://bergel.eu/>

ObjectProfile/Roassal3: The Ro... +

github.com/ObjectProfile/Roassal3

ObjectProfile / Roassal3

Code Issues 36 Pull requests Actions Projects 10 Wiki Security ...

Roassal3 Public Edit Pins Unwatch 12 Fork 53 Starred 94

master Go to file Add file Code About

Branches Tags

akevalion Merge pull request #591 fro... ... × yesterday 3,374

.github/workfl... update test for release 8 2 months ago

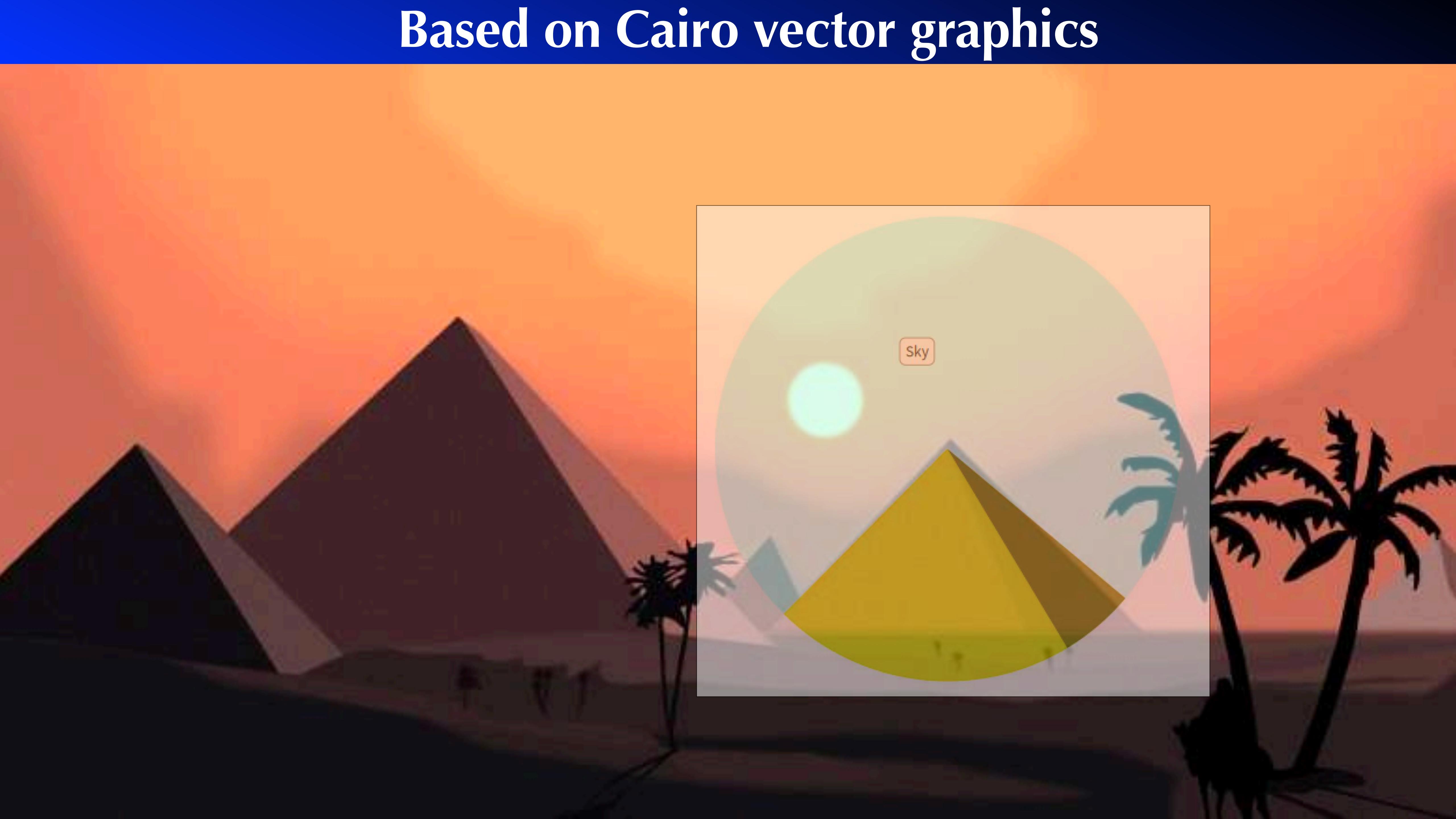
ci_data Add changes 9 months ago

The Roassal Visualization Engine

visualization smalltalk pharo
pharo-smalltalk roassal

Readme MIT license

Based on Cairo vector graphics



What is data visualization?

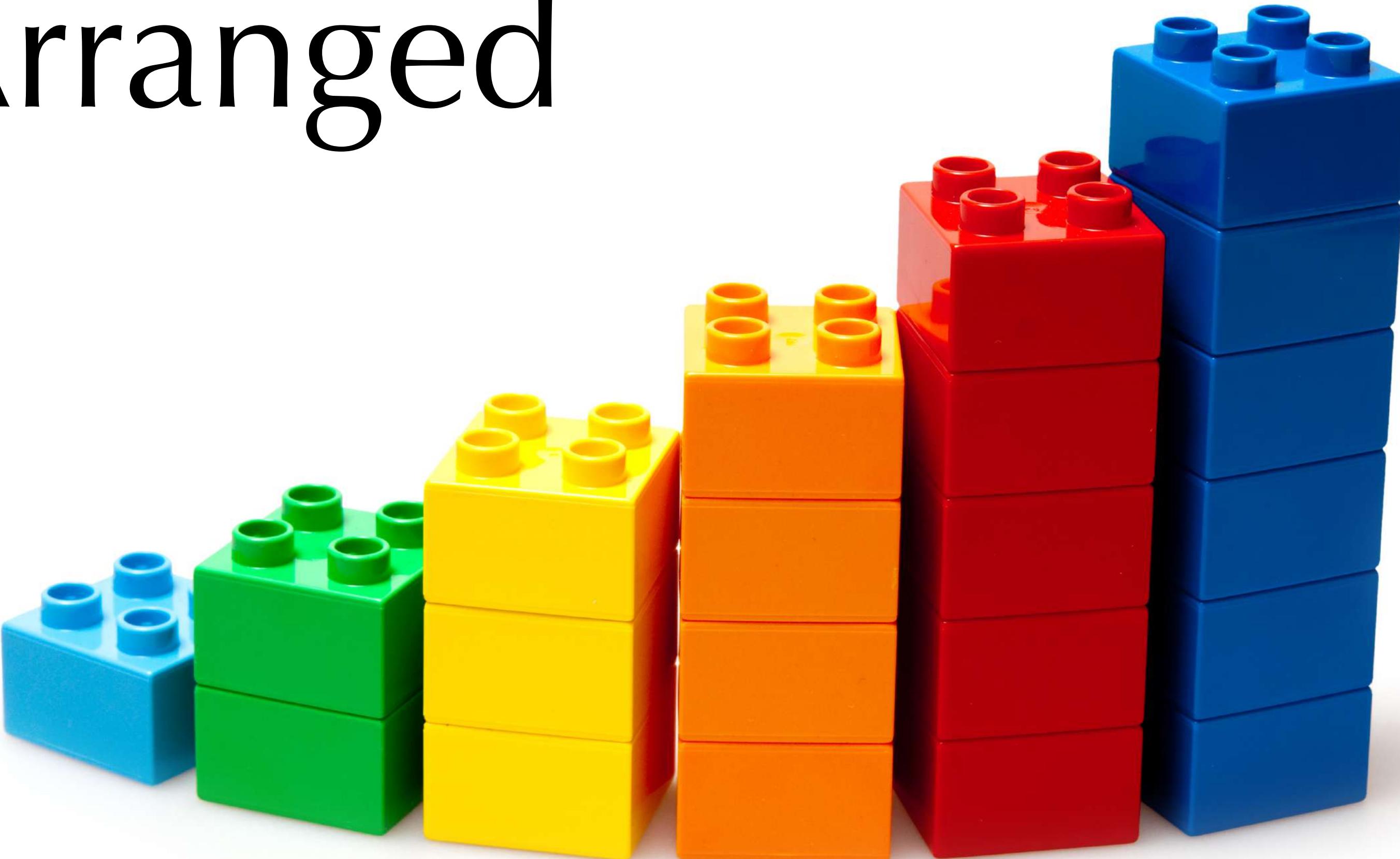
Data



Sorted



Arranged



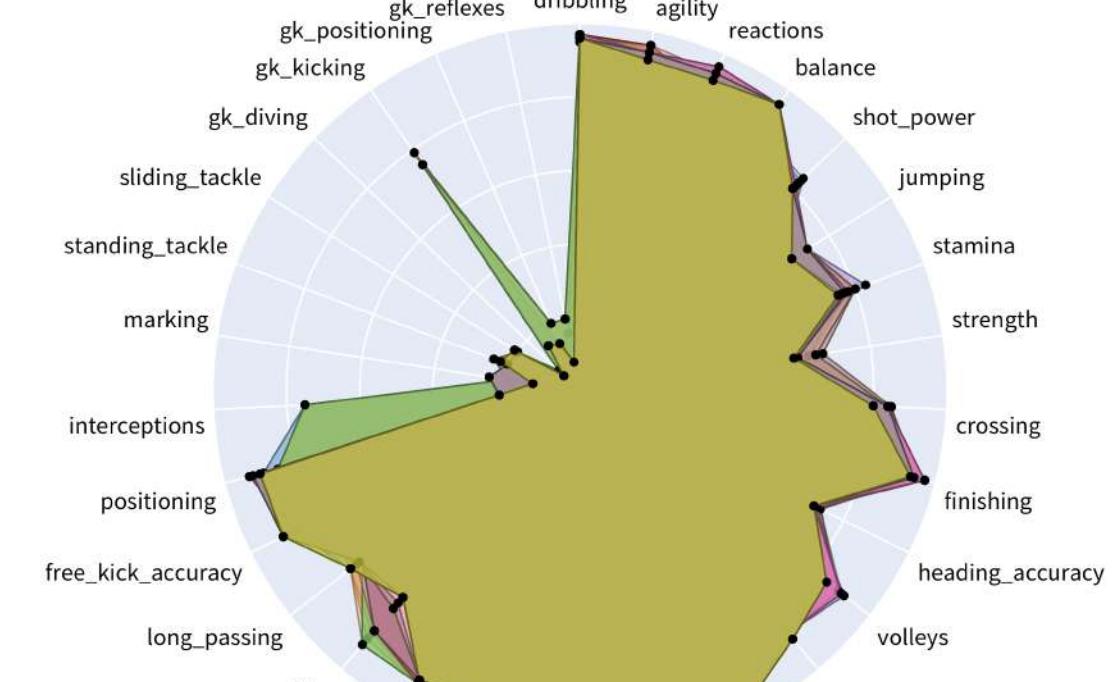
Explained
with a story



Data can have many presentations

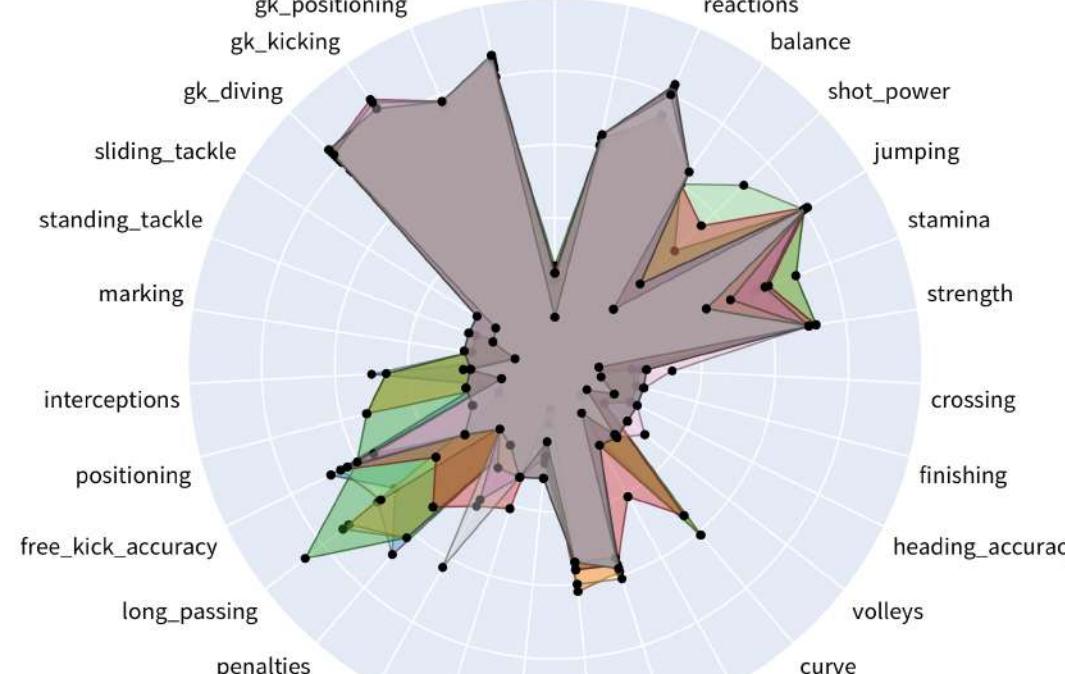


A striker

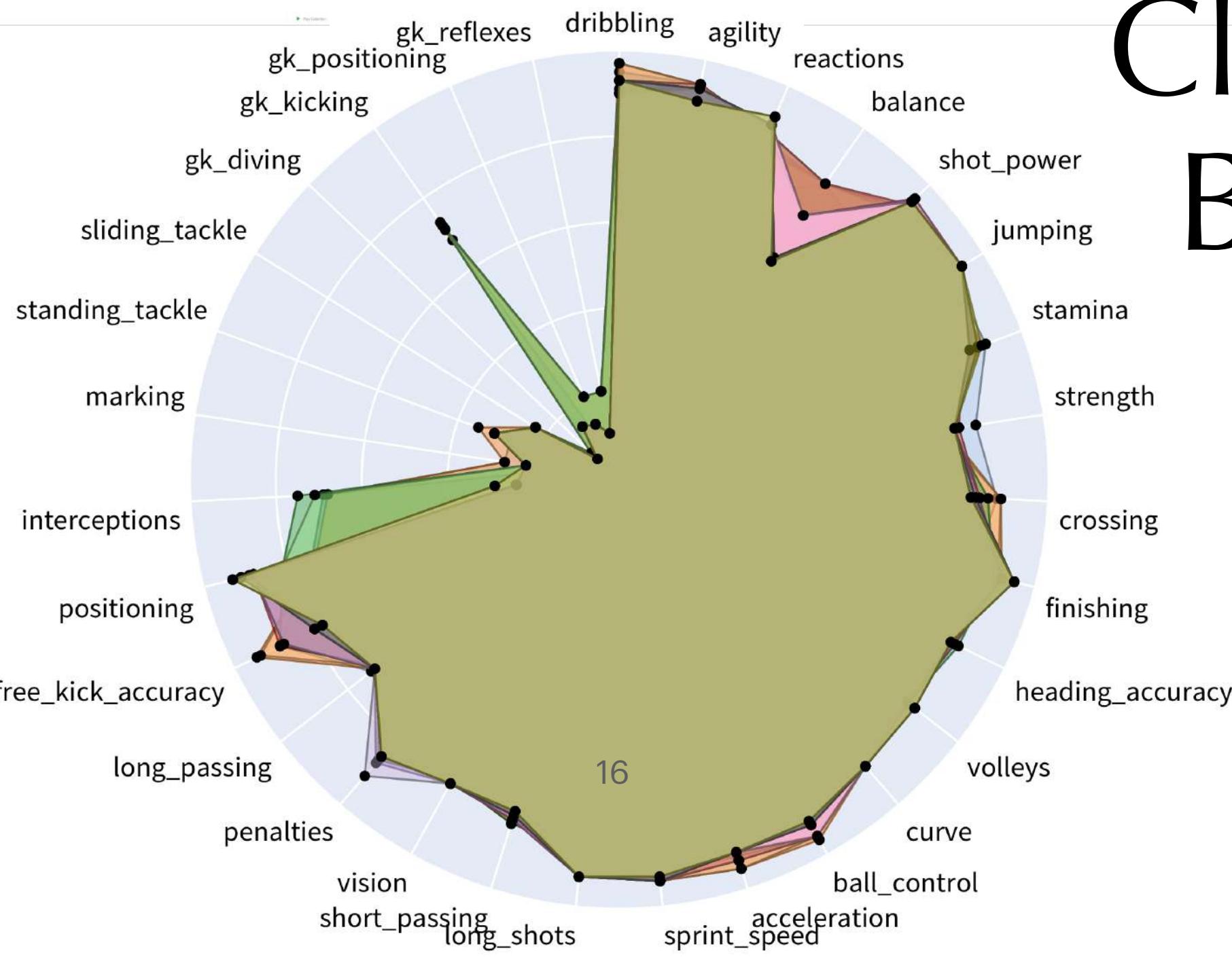


Lionel Messi

A goalkeeper



Claudio Bravo



Cristiano Ronaldo

DEMO

Noises and Animations



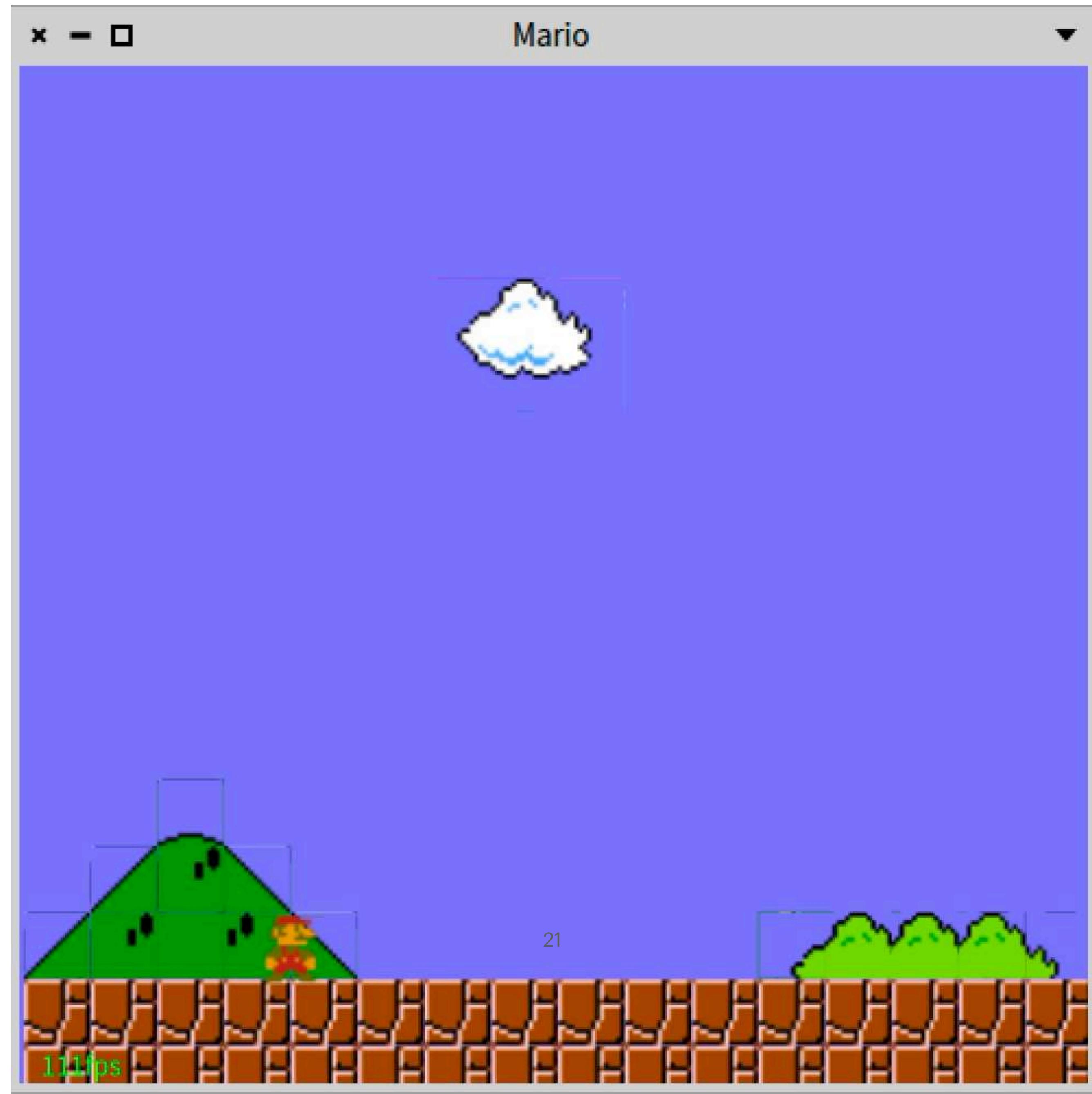


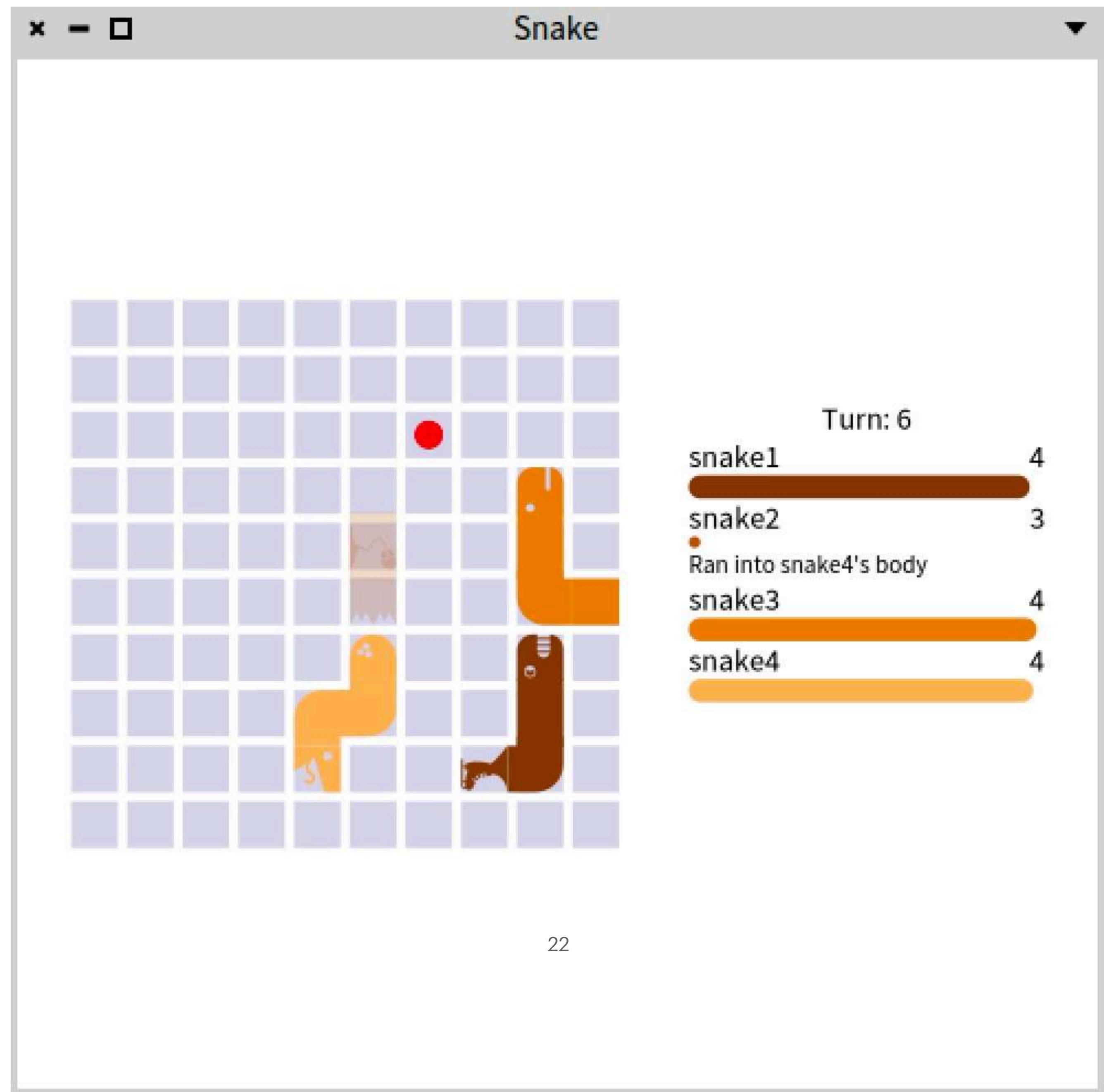
x - □

Do it Publish Bindings Versions Pages

1 RSCat new run

Line: 1:1







new features

Charts

You can(not) plot

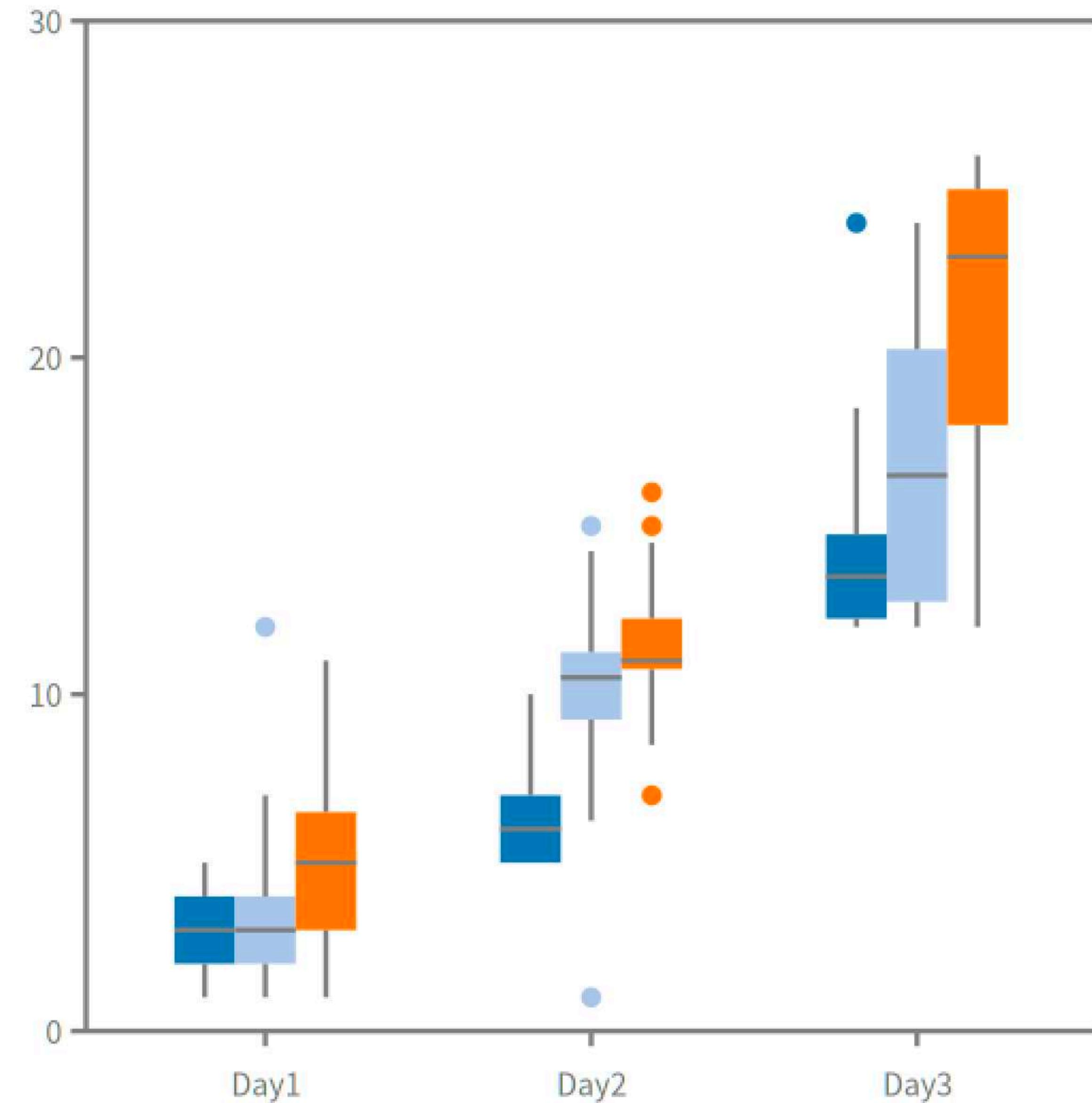
```
1 | c p p2 p3 y y2 y3 size x |
2 x := { 'Day1'. 'Day2'. 'Day3' }.
3 y := { { 1. 2. 3. 4. 5. },
4          { 5. 6. 7. 5. 10. },
5          { 12. 12. 13. 14. 15. 24. } }.
6
7 y2 := { { 1. 2. 2. 2. 3. 4. 3. 5. 12. },
8          { 1. 12. 7. 10. 11. 11. 15. 10. },
9          { 12. 12. 13. 15. 18. 20. 21. 24. } }.
10
11 y3 := { { 1. 2. 3. 3. 5. 3. 5. 5. 7. 8. 5. 6. 10. 11. },
12          { 12. 7. 10. 11. 11. 13. 10. 11. 12. 11. 15. 16. },
13          { 12. 12. 13. 15. 18. 20. 21. 24. 25. 24. 25. 26. 24. 23. 23. 25. 25. } }.
```

You can(not) plot

```
15 c := RSChart new.  
16 p := RSBoxPlot new y: y.  
17  
18 "size controls the width of the bars"  
19 size := 12.  
20 p barSize: size.  
21 p barOffset: size * -1.  
22  
23 p2 := RSBoxPlot new y: y2.  
24 p2 barSize: size.  
25 p2 barOffset: 0.  
26  
27 p3 := RSBoxPlot new y: y3.  
28 p3 barSize: size.  
29 p3 barOffset: size.  
30  
31 c addPlot: p.  
32 c addPlot: p2.  
33 c addPlot: p3.  
34 c addDecoration: (RSHorizontalTick new fromNames: x).  
35 c addDecoration: (RSVerticalTick new integer).  
36  
37 ^ c
```

You can(not) plot

```
15 c := RSChart new.  
16 p := RSBoxPlot new y: y.  
17  
18 "size controls the width of the bars"  
19 size := 12.  
20 p barSize: size.  
21 p barOffset: size * -1.  
22  
23 p2 := RSBoxPlot new y: y2.  
24 p2 barSize: size.  
25 p2 barOffset: 0.  
26  
27 p3 := RSBoxPlot new y: y3.  
28 p3 barSize: size.  
29 p3 barOffset: size.  
30  
31 c addPlot: p.  
32 c addPlot: p2.  
33 c addPlot: p3.  
34 c addDecoration: (RSHorizontalTick new fromNames: x).  
28  
35 c addDecoration: (RSVerticalTick new integer).  
36  
37 ^ c
```

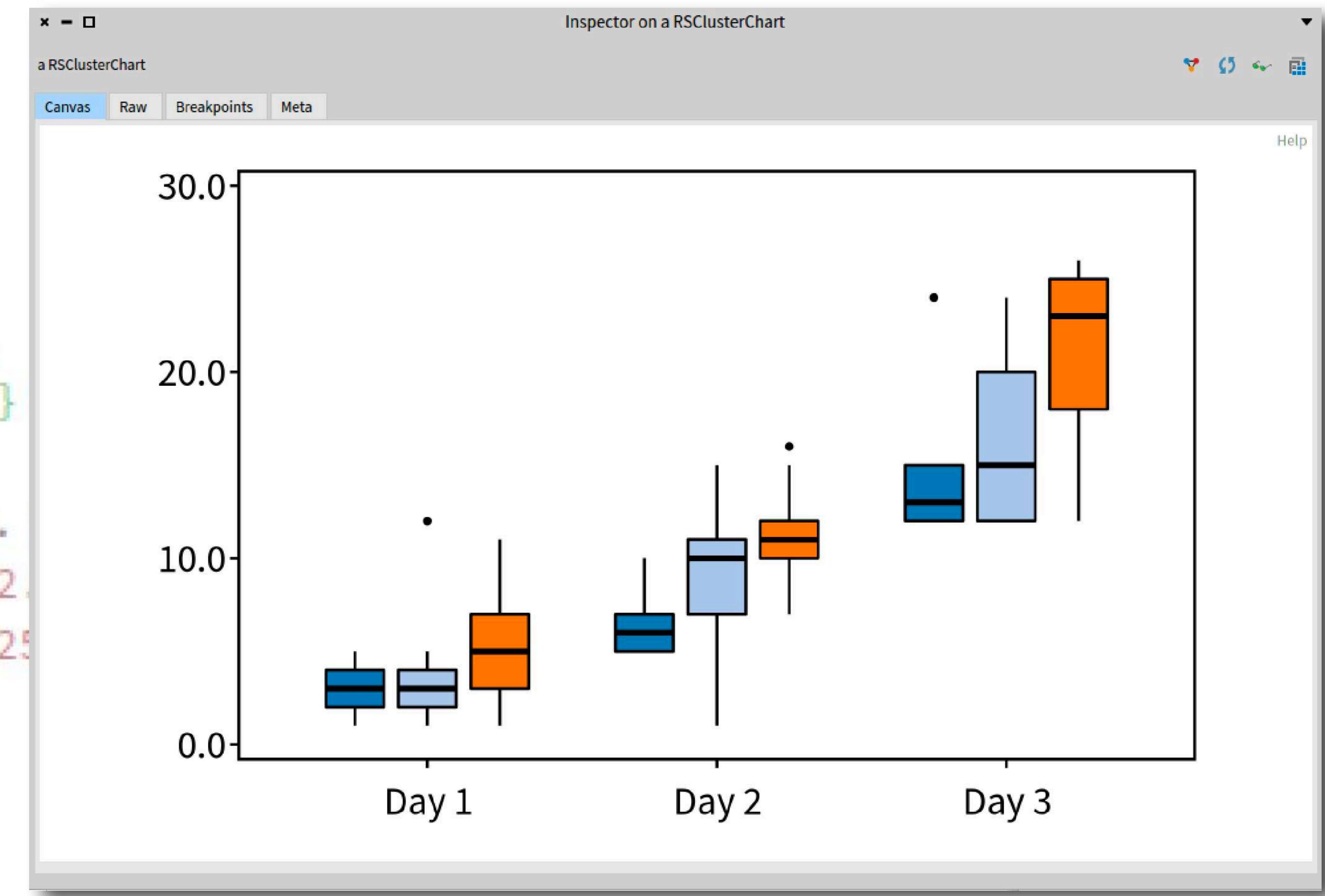


You can(not) plot

```
1 | chart p1 p2 p3 y1 y2 y3 |
2 | y1 := { { 1. 2. 3. 4. 5. }.
3 |           { 5. 6. 7. 5. 10. }.
4 |           { 12. 12. 13. 14. 15. 24. } }.
5 |
6 | y2 := { { 1. 2. 2. 2. 3. 4. 3. 5. 12. }.
7 |           { 1. 12. 7. 10. 11. 11. 15. 10. }.
8 |           { 12. 12. 13. 15. 18. 20. 21. 24. } }.
9 |
10 | y3 := { { 1. 2. 3. 3. 5. 3. 5. 5. 7. 8. 5. 6. 10. 11. }.
11 |           { 12. 7. 10. 11. 11. 13. 10. 11. 12. 11. 15. 16. }.
12 |           { 12. 12. 13. 15. 18. 20. 21. 24. 25. 24. 25. 26. 24. 23. 23. 25. 25. } }.
13 |
14 | p1 := RSBoxPlot data: y1. "blue"
15 | p2 := RSBoxPlot data: y2. "sky blue"
16 | p3 := RSBoxPlot data: y3. "orange"
17 | chart := p1 + p2 + p3.
18 | chart xTickLabels: { 'Day 1'. 'Day 2'. 'Day 3' }.
19 | ^ chart.
```

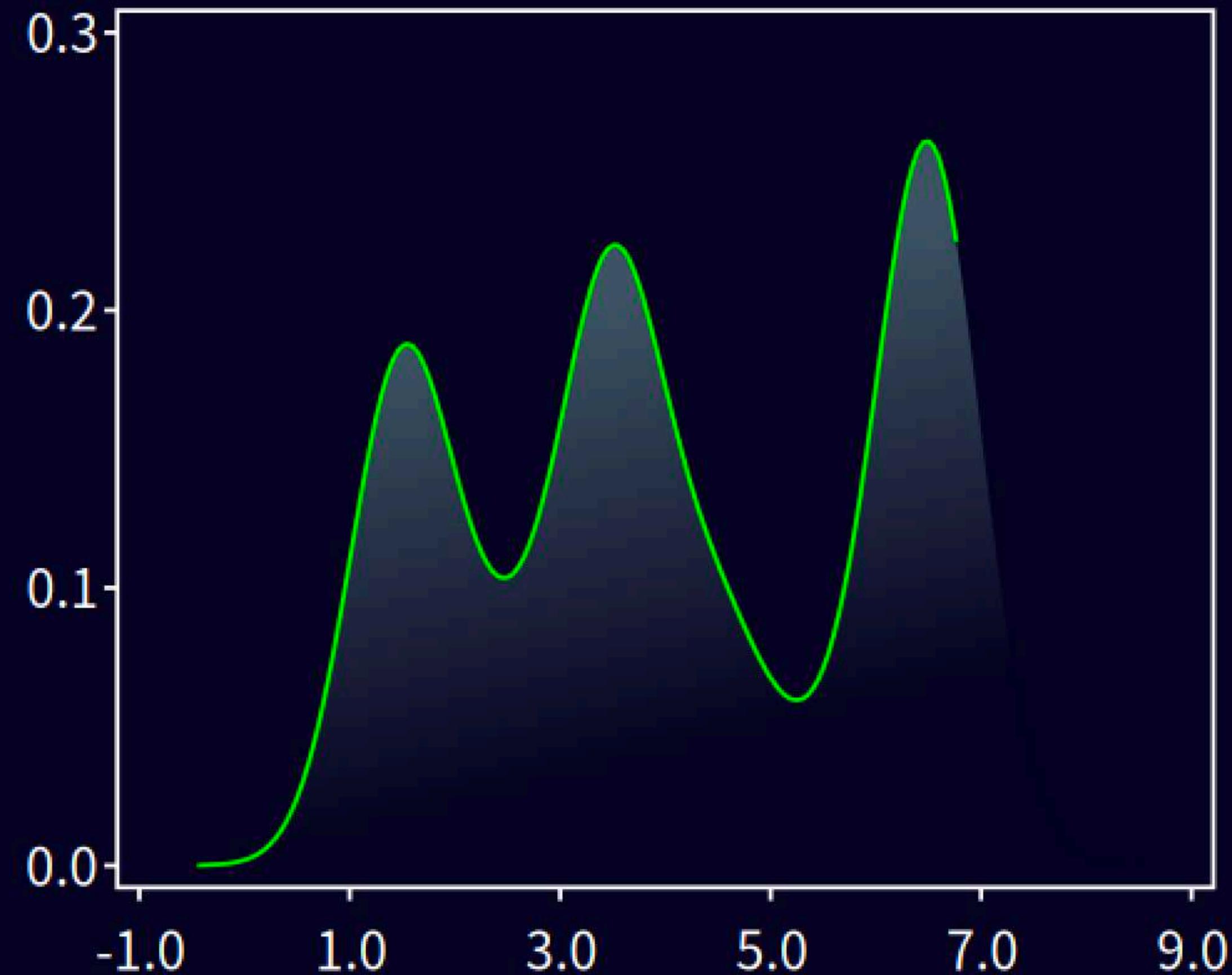
You can(not) plot

```
1 | chart pl p2 p3 y1 y2 y3 |
2 | y1 := { { 1. 2. 3. 4. 5. },
3 |           { 5. 6. 7. 5. 10. },
4 |           { 12. 12. 13. 14. 15. 24. } } .
5 |
6 | y2 := { { 1. 2. 2. 2. 3. 4. 3. 5. 12. },
7 |           { 1. 12. 7. 10. 11. 11. 15. 10. },
8 |           { 12. 12. 13. 15. 18. 20. 21. 24. } } .
9 |
10 | y3 := { { 1. 2. 3. 3. 3. 5. 3. 5. 5. 7. 8. },
11 |           { 12. 7. 10. 11. 11. 13. 10. 11. 12. },
12 |           { 12. 12. 13. 15. 18. 20. 21. 24. 25. } } .
13 |
14 | p1 := RSBoxPlot data: y1. "blue"
15 | p2 := RSBoxPlot data: y2. "sky blue"
16 | p3 := RSBoxPlot data: y3. "orange"
17 | chart := p1 + p2 + p3.
18 | chart xTickLabels: { 'Day 1', 'Day 2', 'Day 3' }.
19 | ^ chart.
```

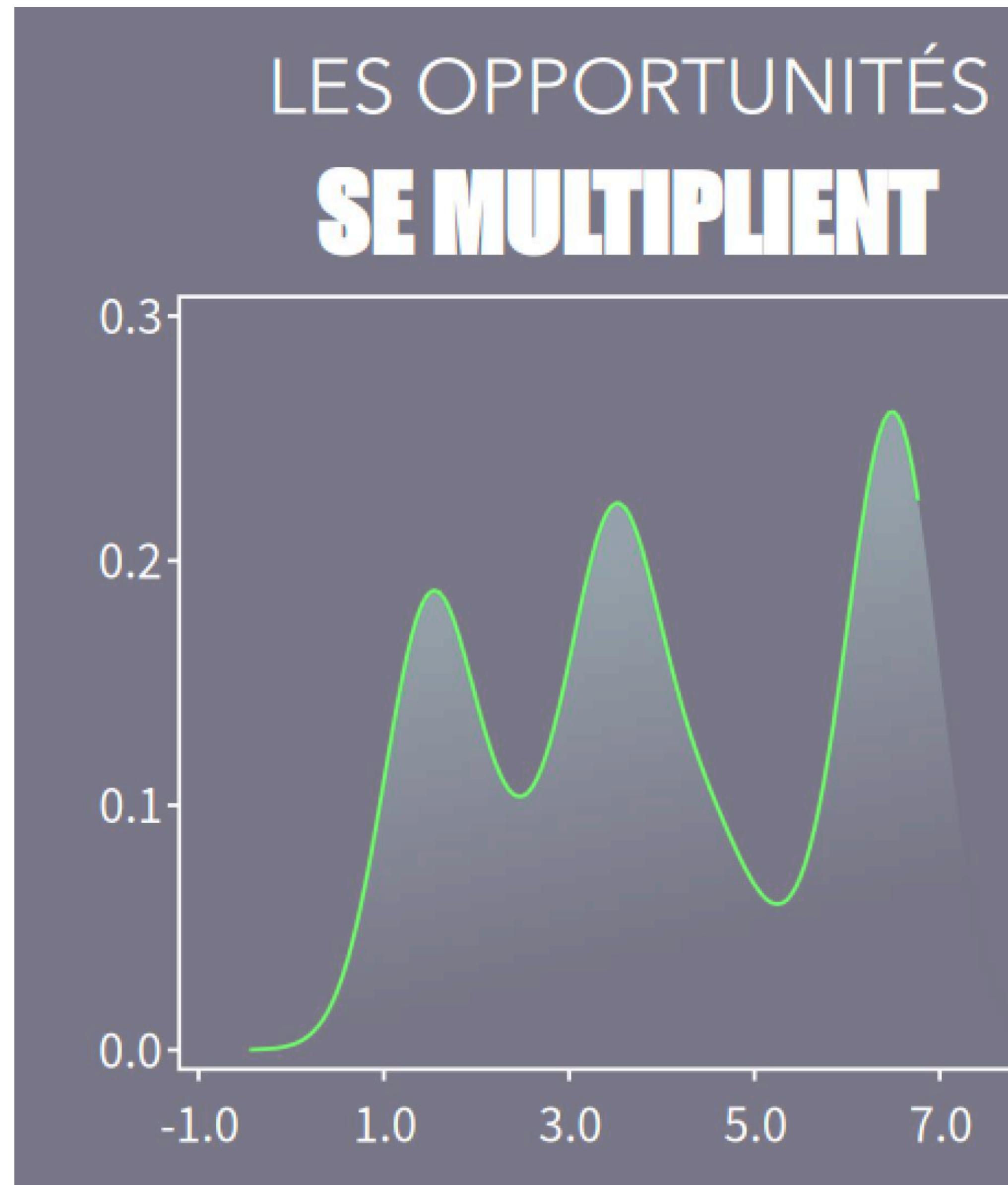


Density Plot

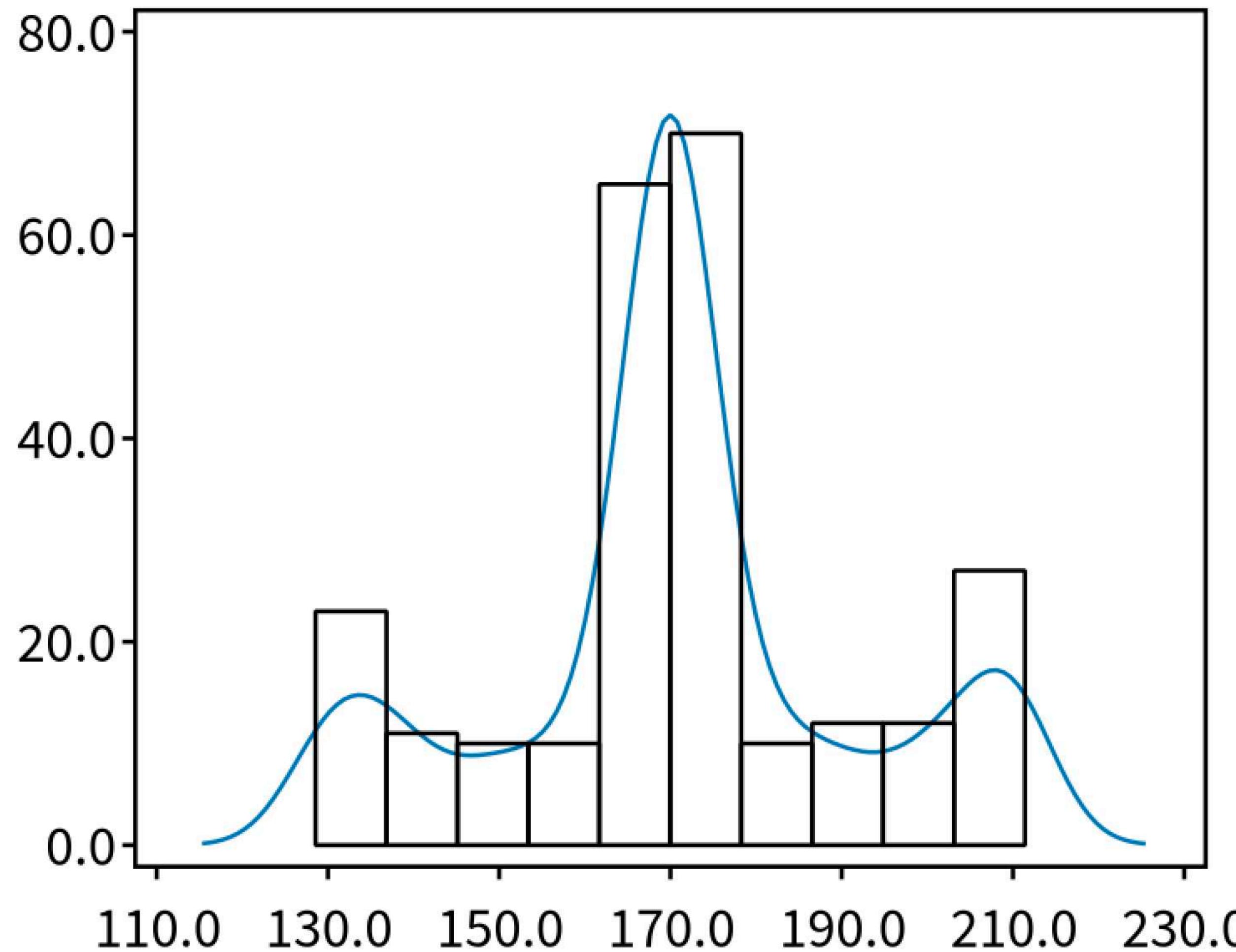
LES OPPORTUNITÉS
SE MULTIPLIENT



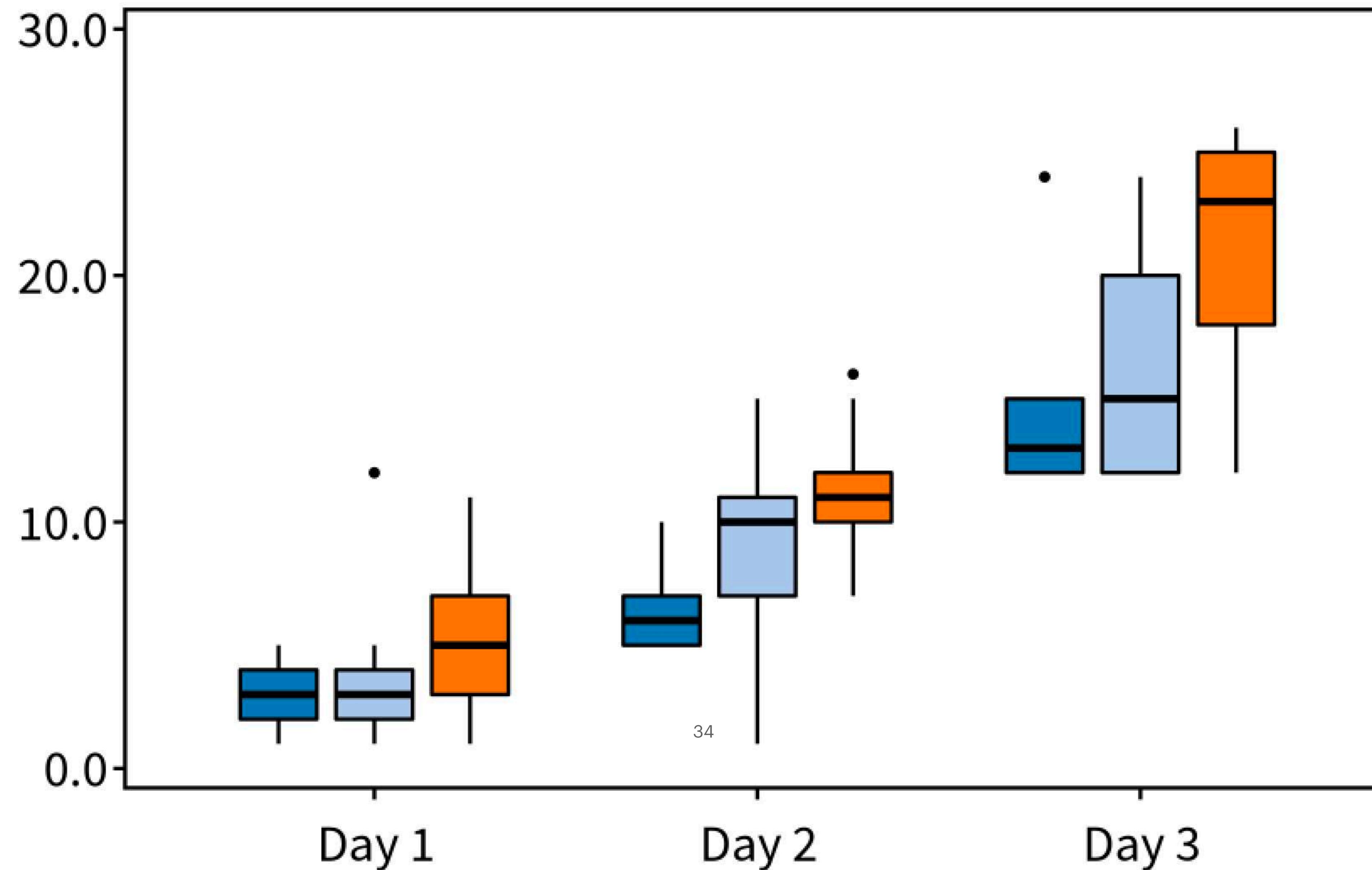
Density Plot



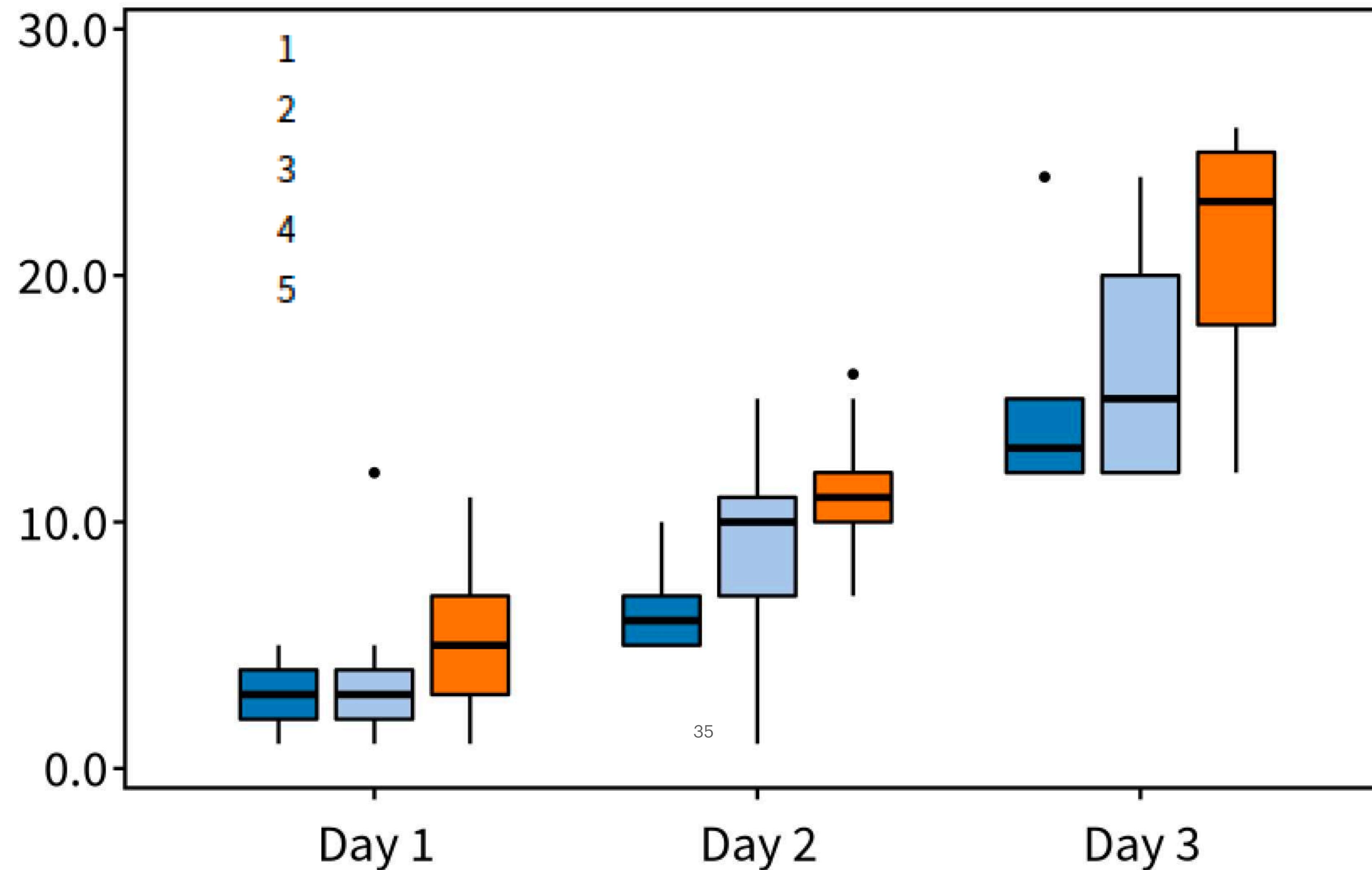
Density Plot



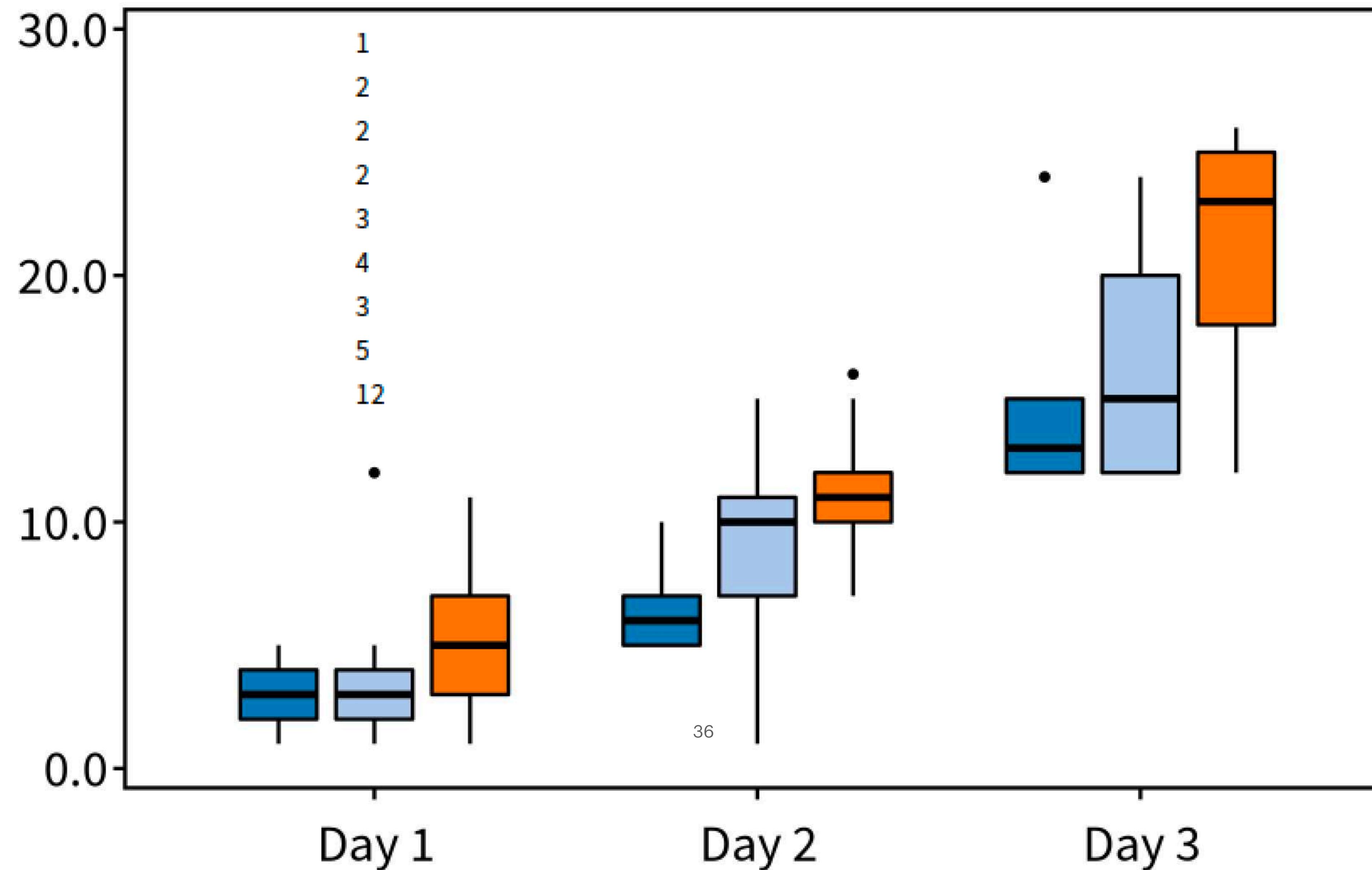
Box Plot



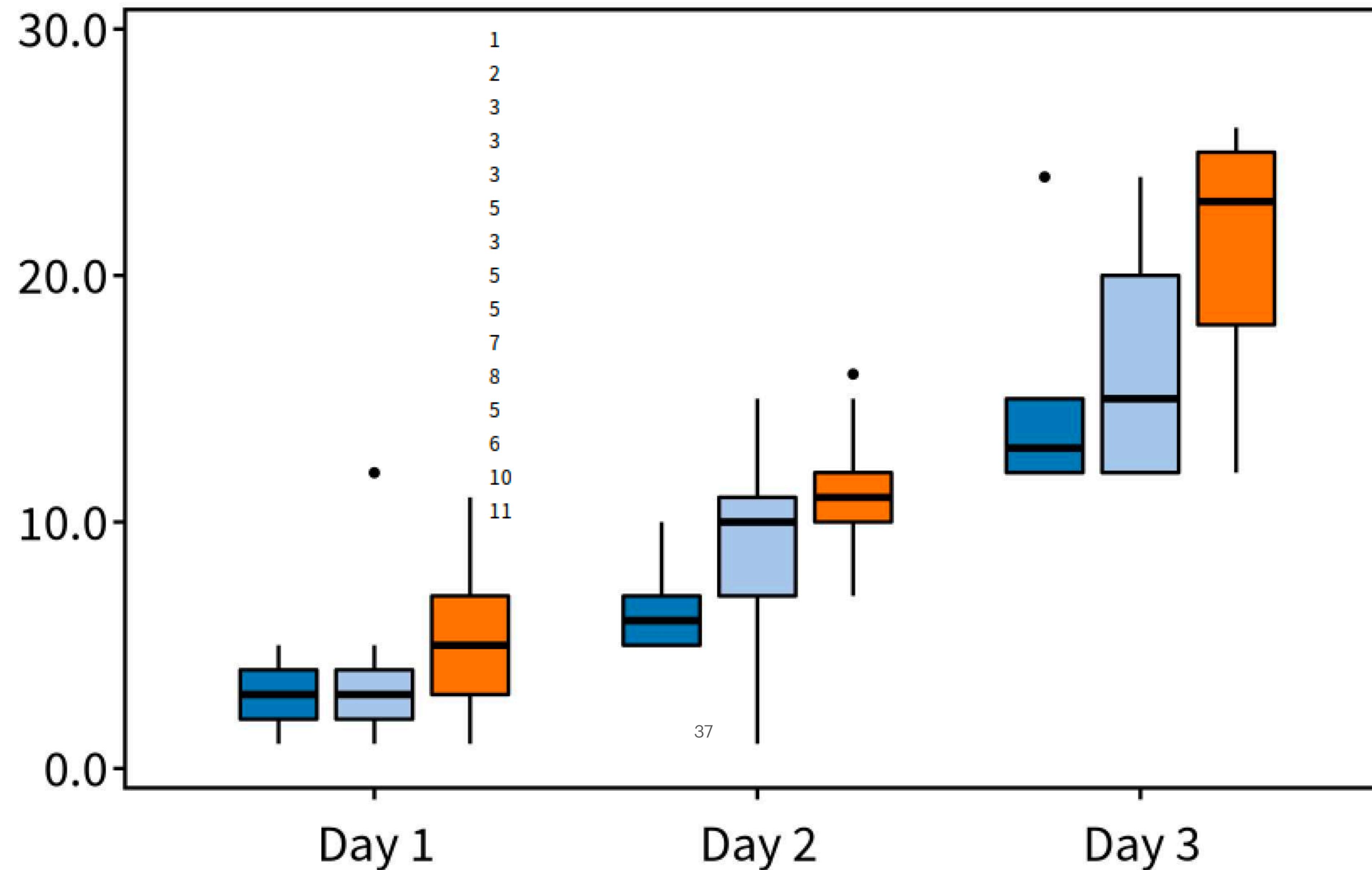
Box Plot



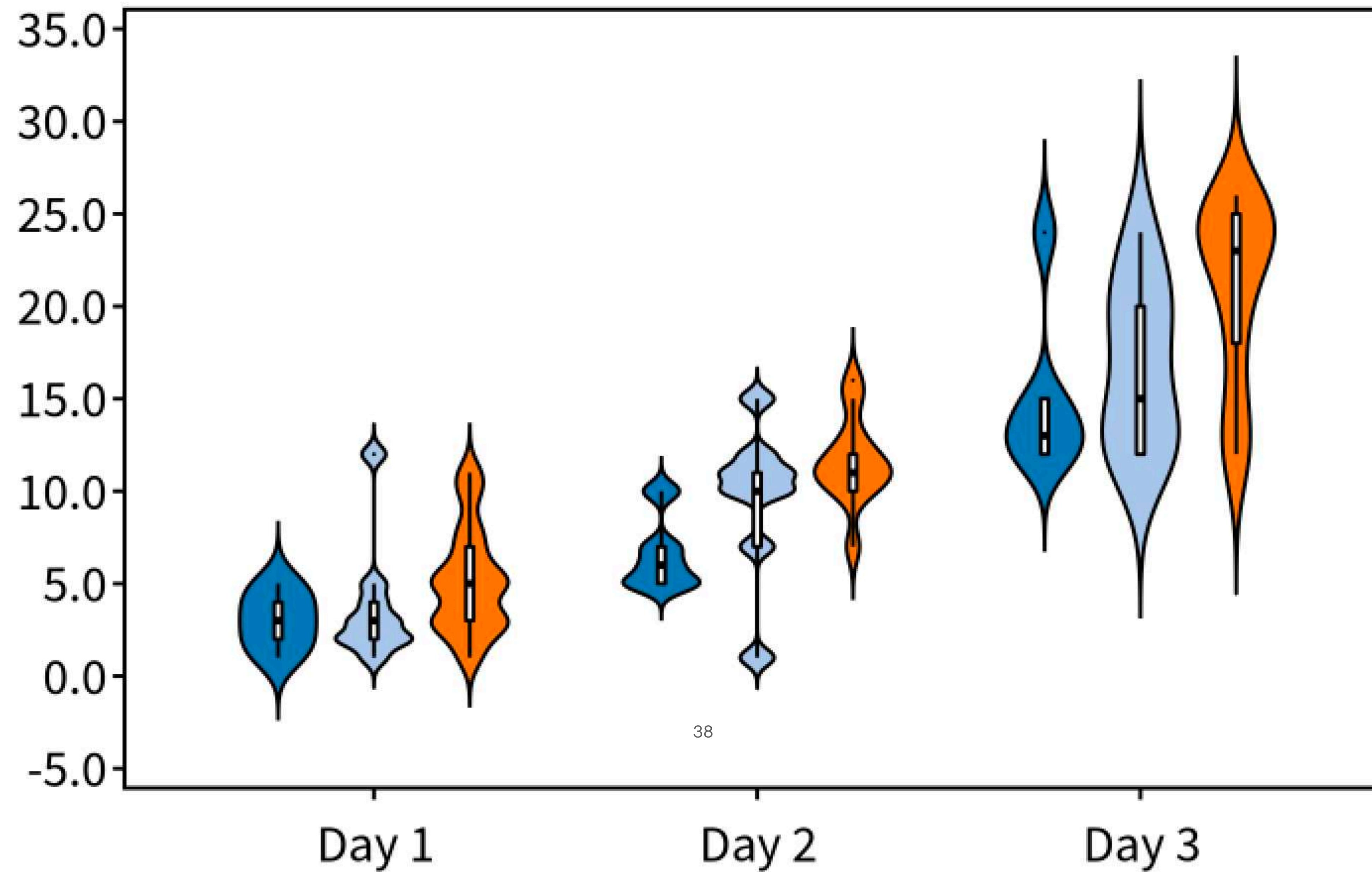
Box Plot



Box Plot

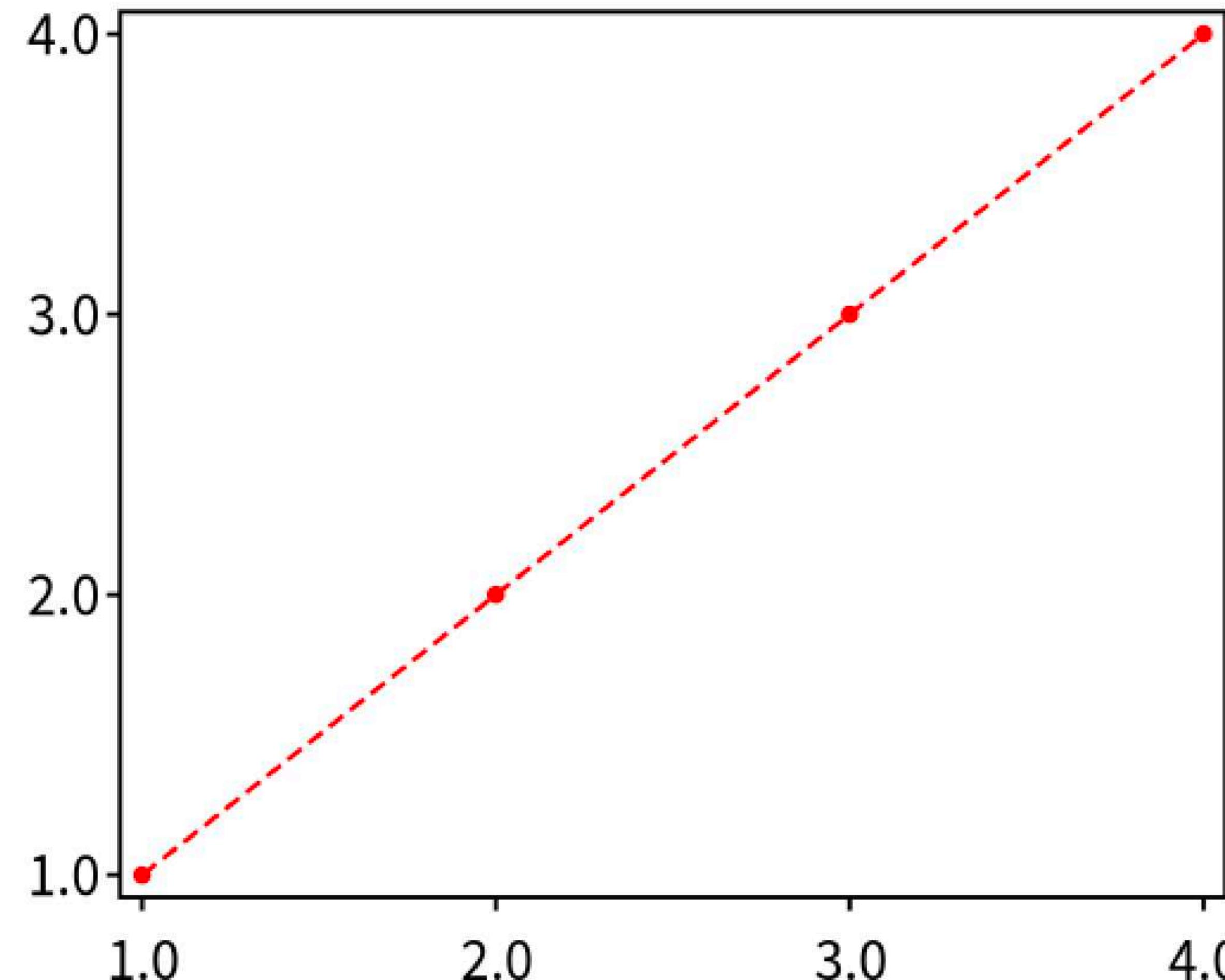


Violin Plot



One plot

```
1 | linePlot |
2 | linePlot := (RSLinePlot y: #(1 2 3 4)) format: 'or--'.
3 | ^ linePlot open.
```



Combine plot

```
1 | data histogram density plot points line |
2 " -- data --"
3 data := RSHistogramExample new randomValues.
4 " -- density --"
5 density := RSDensityPlot data: data.
6 density bandwidth: 5.
7 " -- lineplot --"
8 line := RSLinePlot points: density curvePoints.
9 " -- histogram --"
10 histogram := RSHistogramPlot new x: data.
11 histogram masterShape
12     color: Color transparent;
13     border: (RSBorder new color: Color black).
14 "combination plot"
15 plot := line + histogram.
16 ^ plot
```

Combine plot

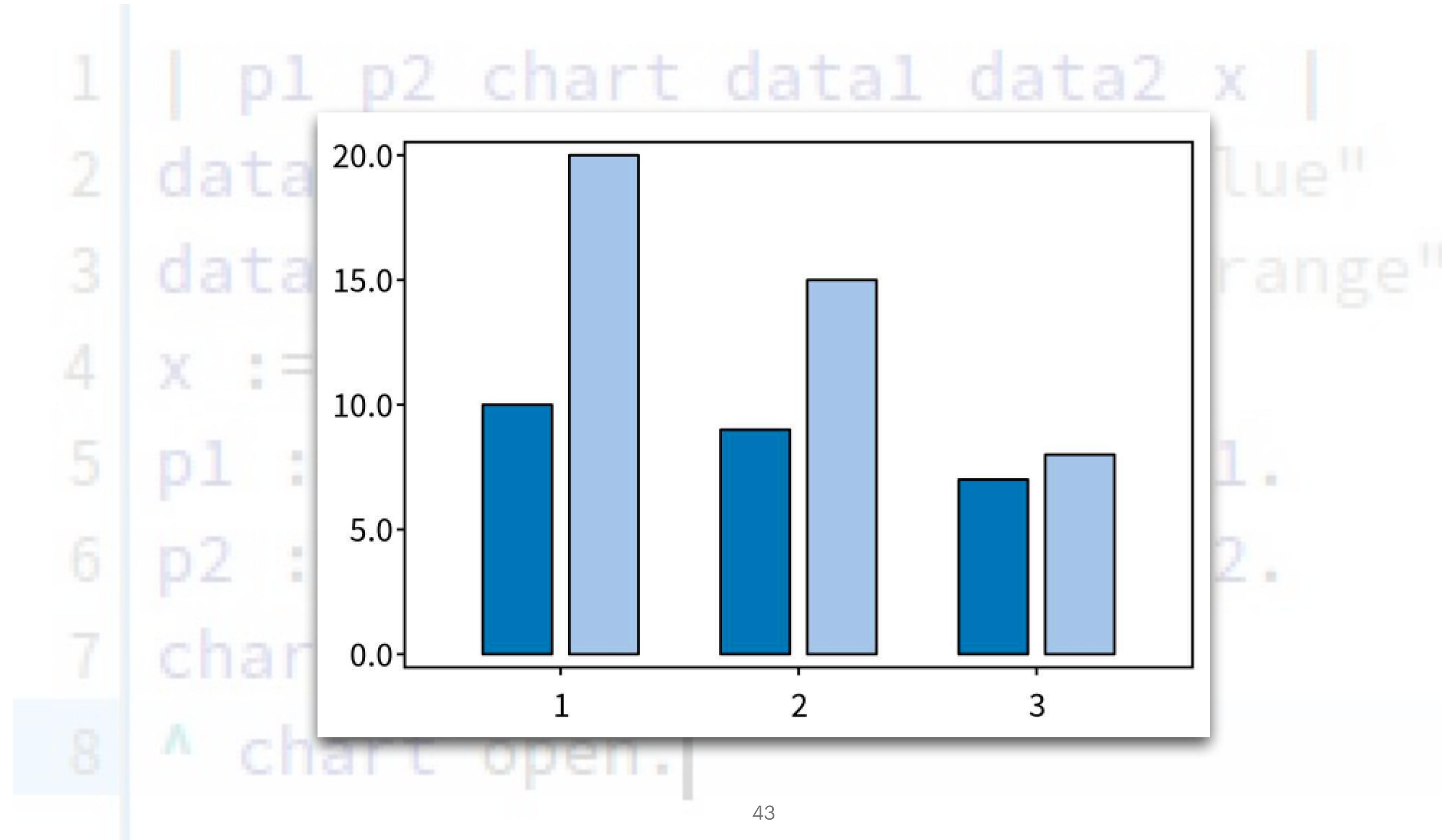
```
1 | data histogram density plot points line |
2 " --- data ---"
3 da
4 "
5 de
6 de
7 "
8 li
9 "
10 hi
11 hi
12 "
13 "
14 "c
15 plot :- time + histogram.
16 ^ plot
```

<img alt="A histogram showing the distribution of time data. The x-axis ranges from 110.0 to 230.0 with major ticks every 20 units. The y-axis ranges from 0.0 to 80.0 with major ticks every 20 units. The histogram consists of several bars: one at ~128 (height ~25), one at ~132 (height ~10), one at ~142 (height ~12), one at ~152 (height ~10), one at ~162 (height ~10), two very tall bars at ~170 (heights ~70 and ~75), one at ~182 (height ~10), one at ~192 (height ~12), one at ~202 (height ~12), and one at ~212 (height ~25). A smooth blue curve is overlaid on the histogram, peaking sharply at approximately 170.0.</pre>

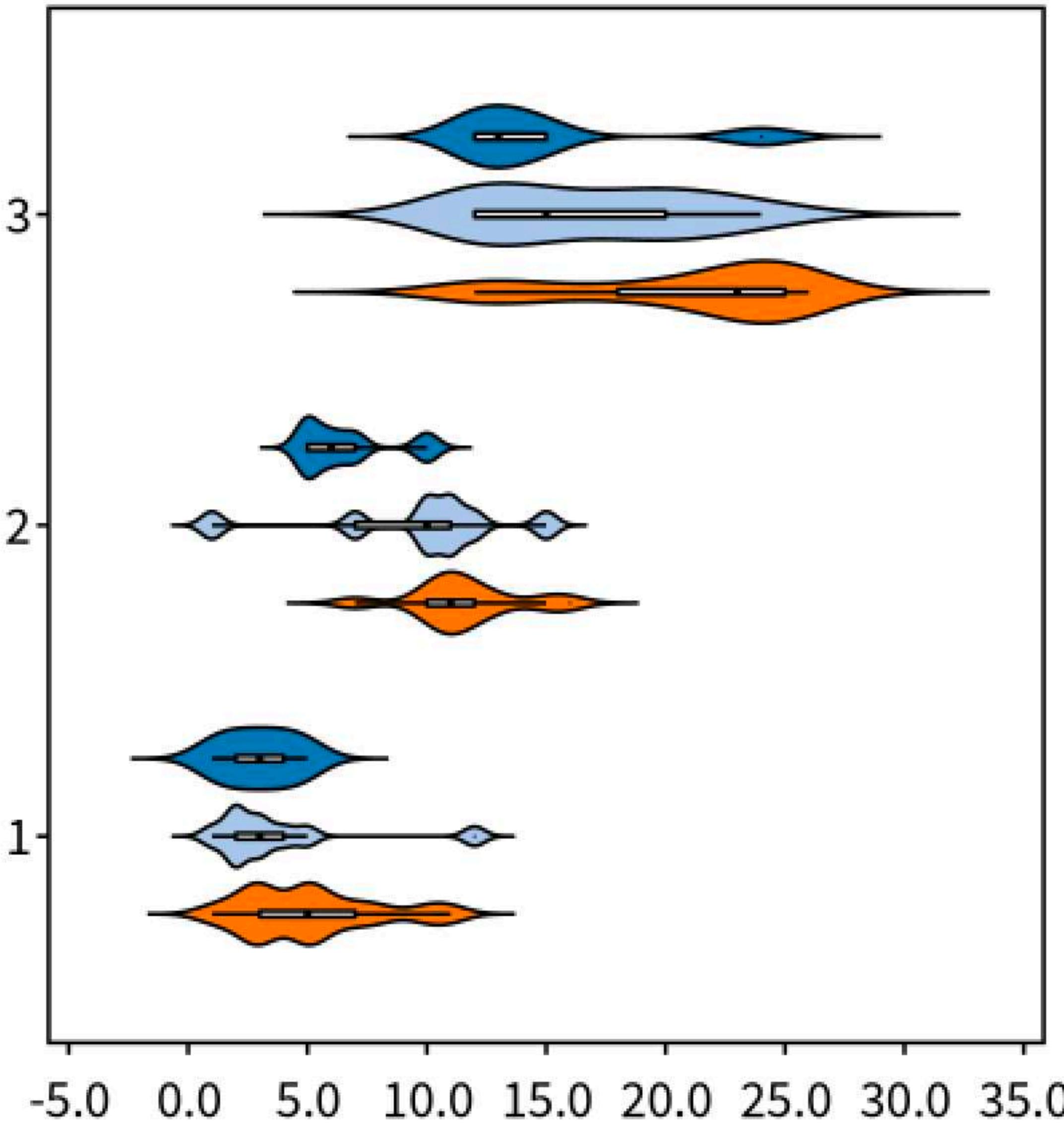
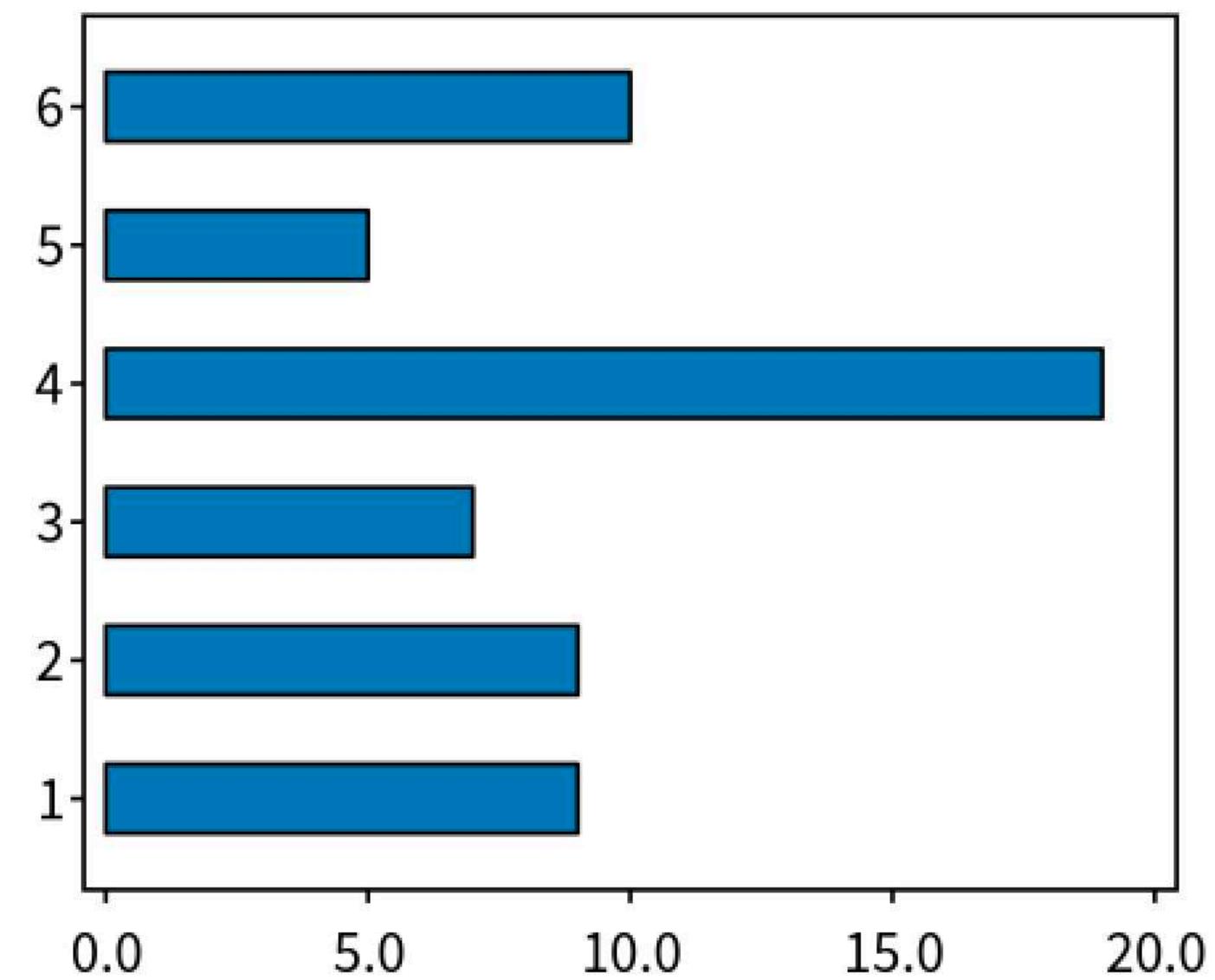
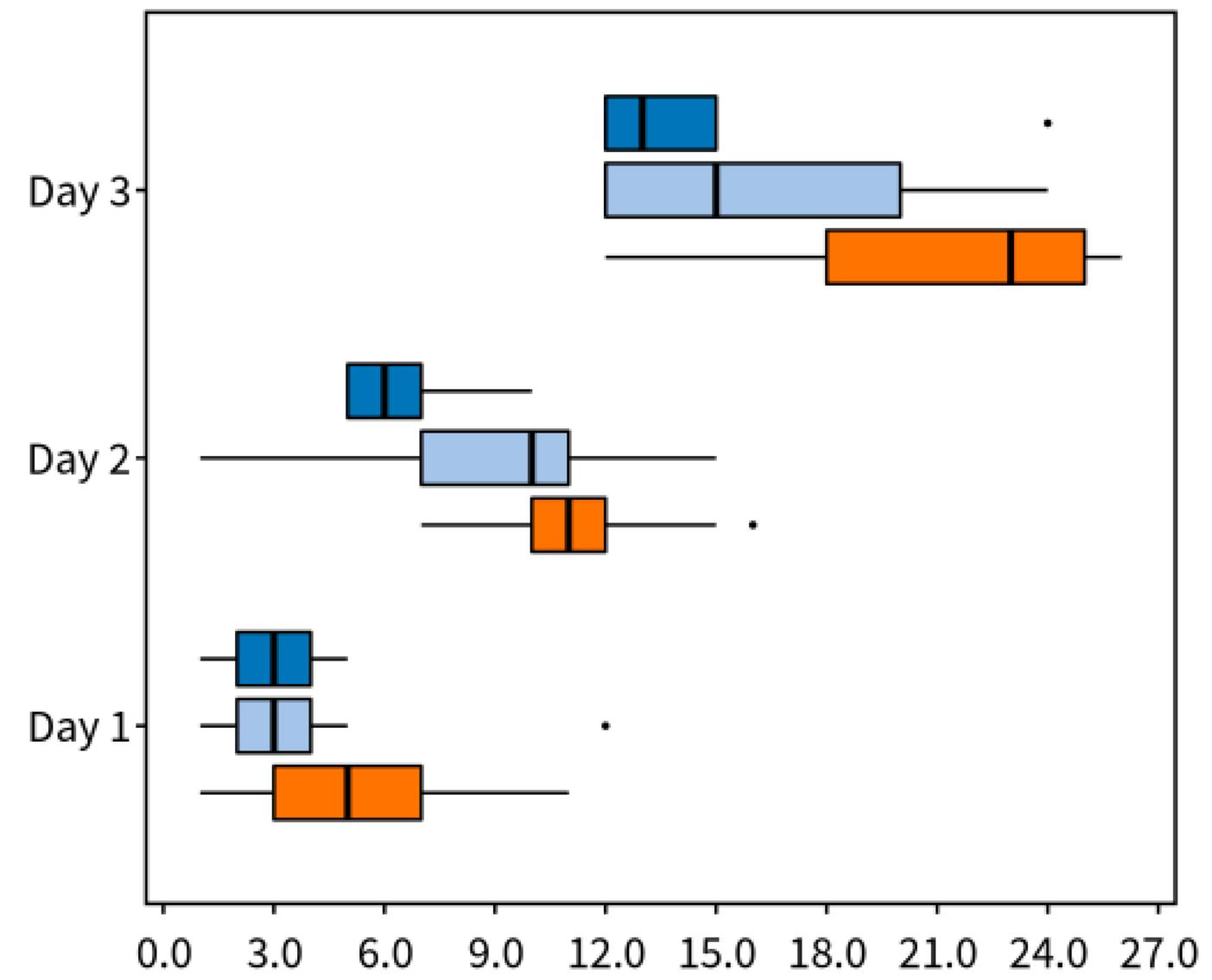
Cluster plot

```
1 | p1 p2 chart data1 data2 x |
2 data1 := { 10. 9. 7 }. "blue"
3 data2 := { 20. 15. 8 }. "orange"
4 x := { 1. 2. 3. }.
5 p1 := RSBarPlot data: data1.
6 p2 := RSBarPlot data: data2.
7 chart := p1 + p2.
8 ^ chart open.
```

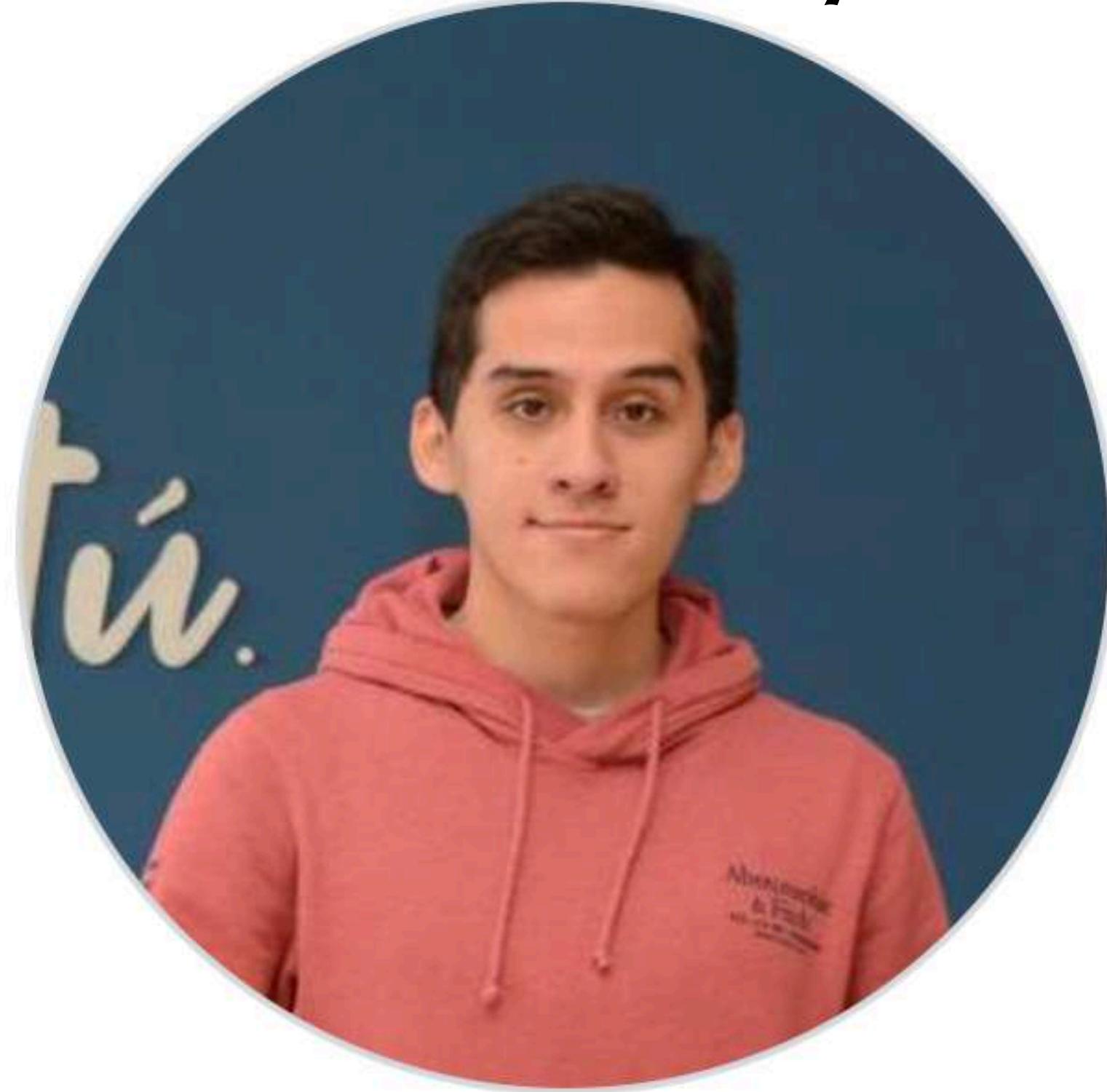
Cluster plot



Horizontal plots



Many thanks to Kevin and Pol

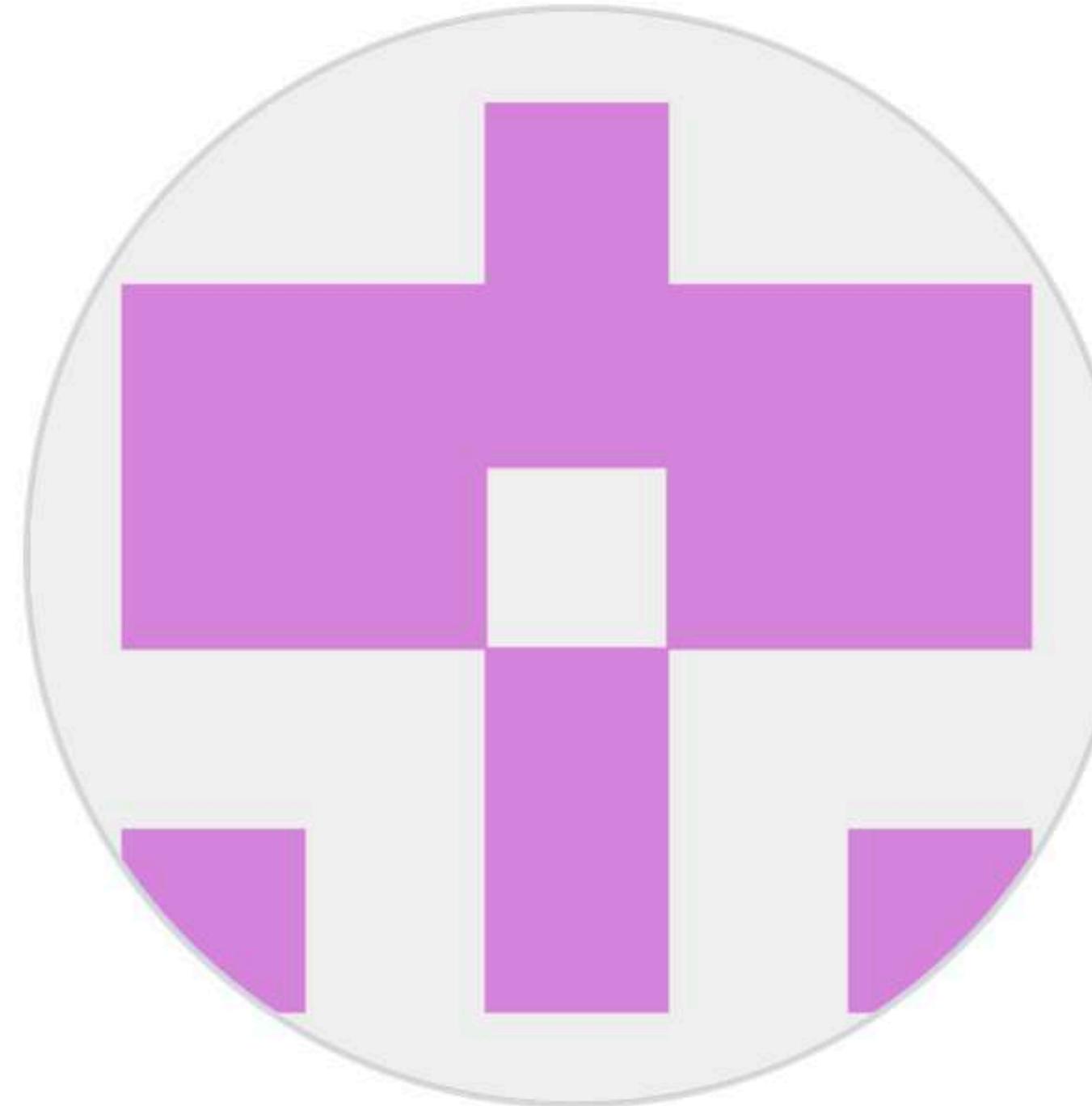


Kevin Cespedes Arancibia

kevca87 · he/him



Google Summer of Code

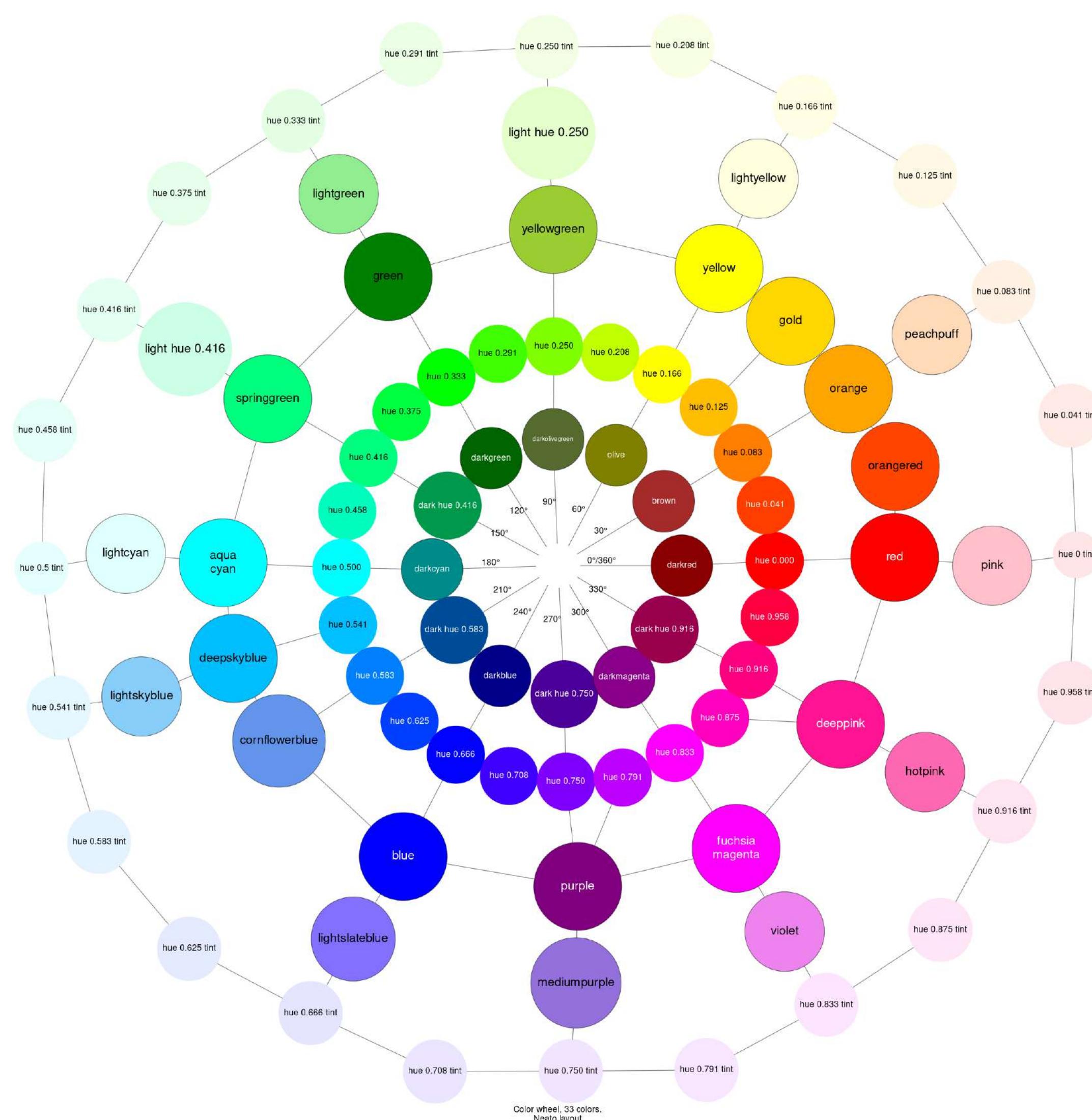


DurieuxPol

Layouts

More documentation

- More class comments
- More examples



<https://graphviz.org/>

Layout studio

Layout Studio on: RSCircleLayout

Help

Graph editor

```
1 "canvas is an instance of RSCanvas use it to render a graph"
2 RSLayoutStudio renderGraphIn: canvas
```

Initial Angle (in degrees)
0.0

Increment Angle (in degrees)
0.0

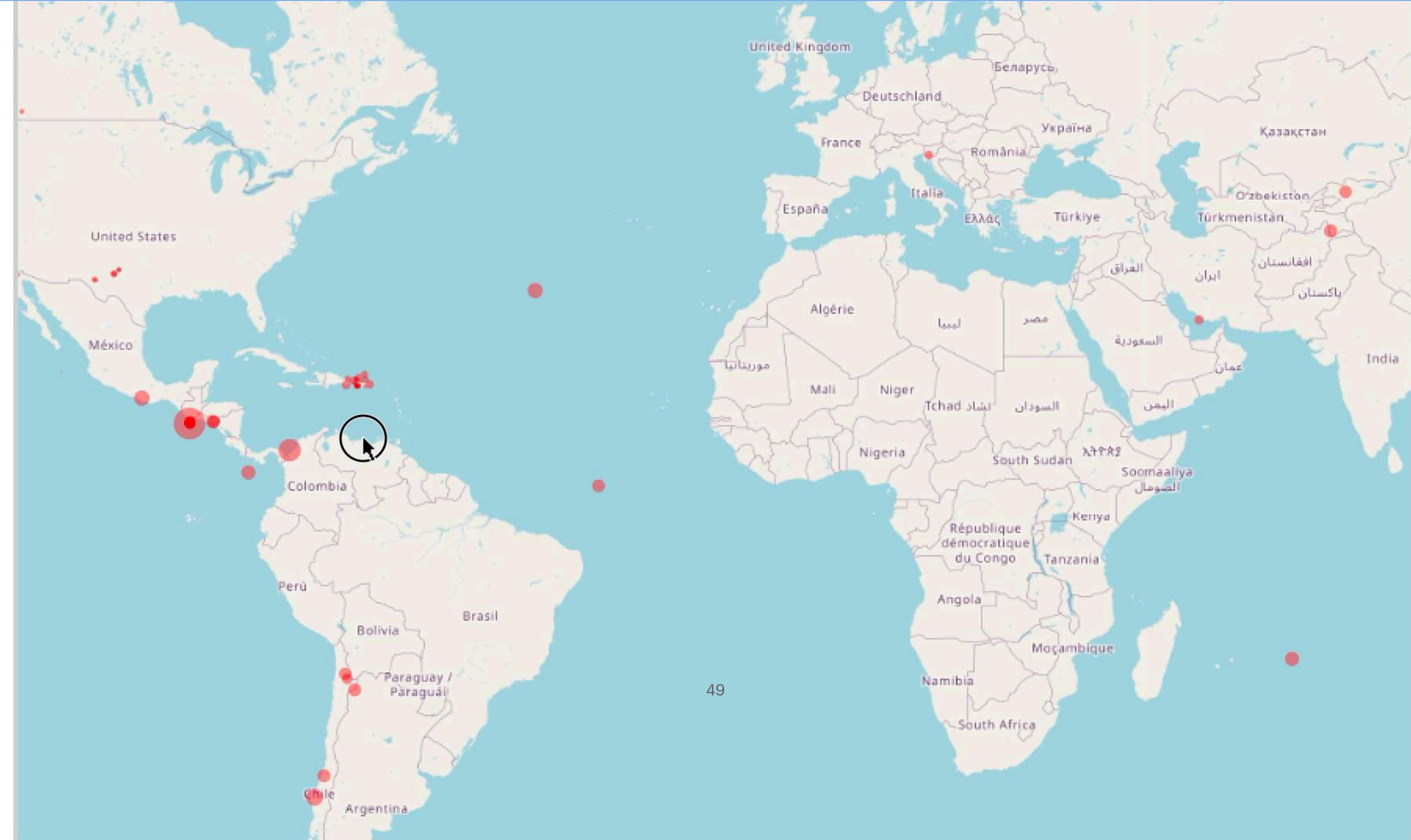
Initial Radius
0

Scale Factor
11

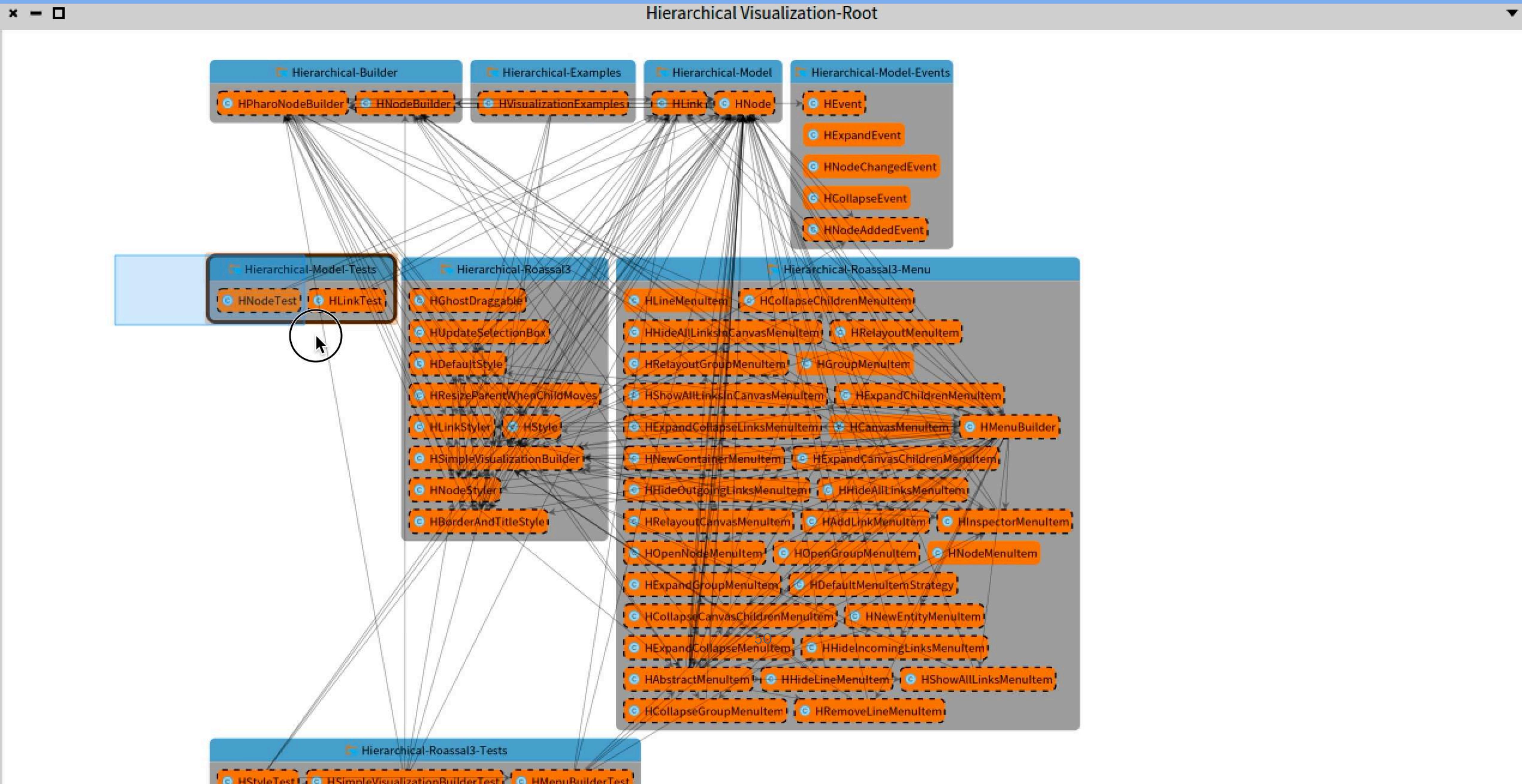
Central Point
nil

The visualization displays a circular arrangement of nodes. A central point at the bottom is connected to numerous nodes arranged in concentric circles around it. The nodes are colored in various shades of blue, green, red, and orange. Some nodes have small numerical labels near them, such as '48' at the bottom left. The background features a grid of faint lines radiating from the center, creating a sunburst effect.

Open Street Maps(OSM)



Selection in Roassal



Roassal + Bloc

The screenshot shows the Pharo IDE interface with a playground window open. The window title is "Playground". The menu bar includes "Pharo", "Browse", "Debug", "Sources", "System", "Library", "Windows", and "Help". The toolbar contains icons for "Do it", "Publish", "Bindings", "Versions", and "Pages". The code in the playground is as follows:

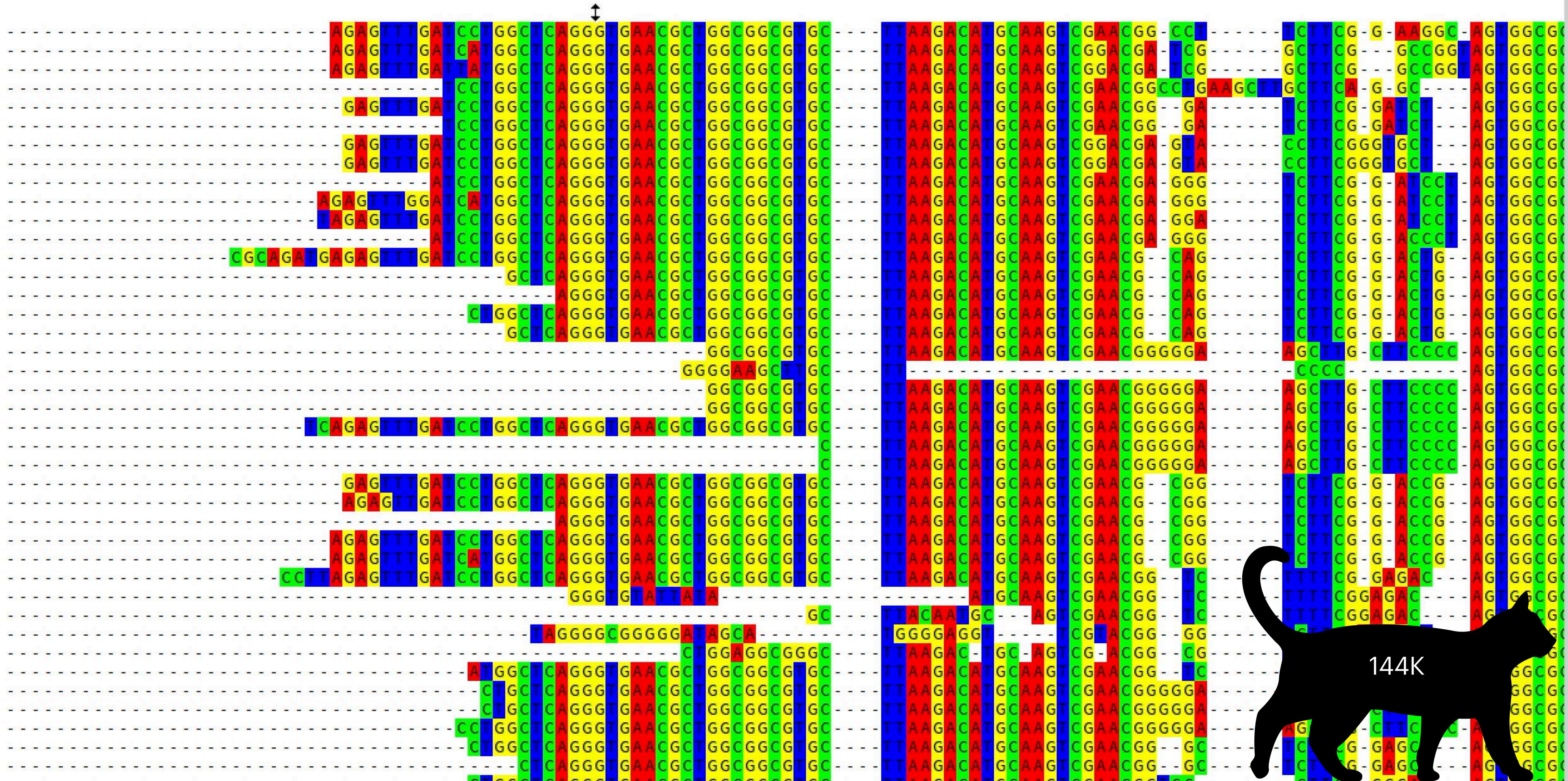
```
1 chart p1 p2 p3 y1 y2 y3
2
3 y1 := { { 1. 2. 3. 4. 5. } .
4     { 5. 6. 7. 5. 10. } .
5     { 12. 12. 13. 14. 15. 24. } }.
6
7 y2 := { { 1. 2. 2. 2. 3. 4. 3. 5. 12. } .
8     { 1. 12. 7. 10. 11. 11. 15. 10. } .
9     { 12. 12. 13. 15. 18. 20. 21. 24. } }.
10
11 y3 := { { 1. 2. 3. 3. 5. 3. 5. 5. 7. 8. 5. 6. 10. 11. } .
12     { 12. 7. 10. 11. 11. 13. 10. 11. 12. 11. 15. 16. } .
13     { 12. 12. 13. 15. 18. 20. 21. 24. 25. 24. 25. 26. 24. 23. 23. 25. 25. } }.
14
15 p1 := RSViolinPlot data: y1. "blue"
16 p2 := RSViolinPlot data: y2. "sky blue"
17 p3 := RSViolinPlot data: y3. "orange"
18 chart := p1 + p2 + p3.
19 chart xTickLabels: { 'Day 1'. 'Day 2'. 'Day 3' }.
20 chart container useBlocHost.
21 ^ chart open
22 extent: 1280@720
```

The code defines three sets of data points (y1, y2, y3) and creates three RSViolinPlot objects (p1, p2, p3) with specific colors. These plots are then combined into a single chart, which is opened with a specific extent.

Escalation problem

The Problem

Roassal



The Problem

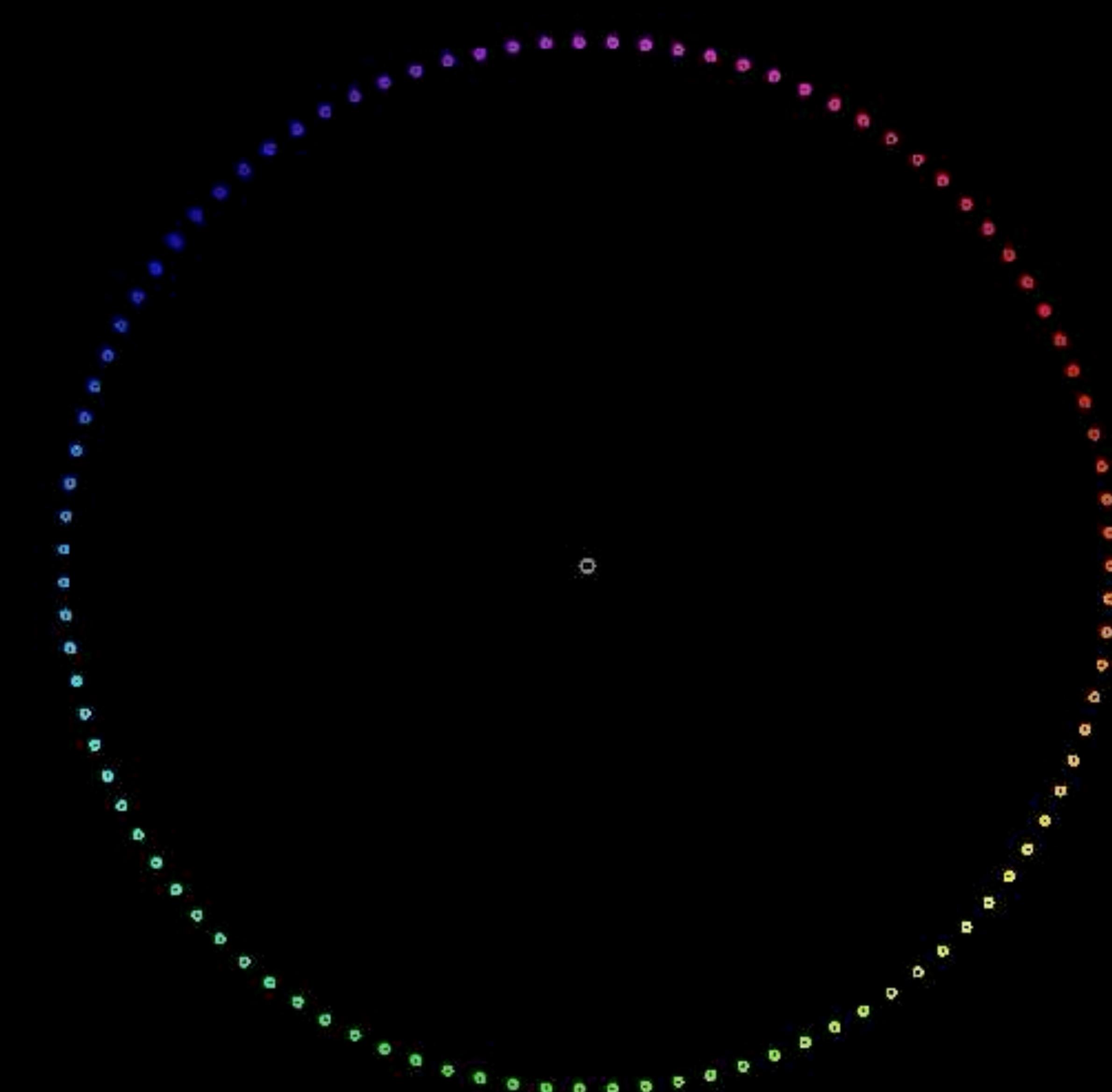


Why?



**Since I was a kid, my
biggest dream has been to
have more FPS in Roassal**

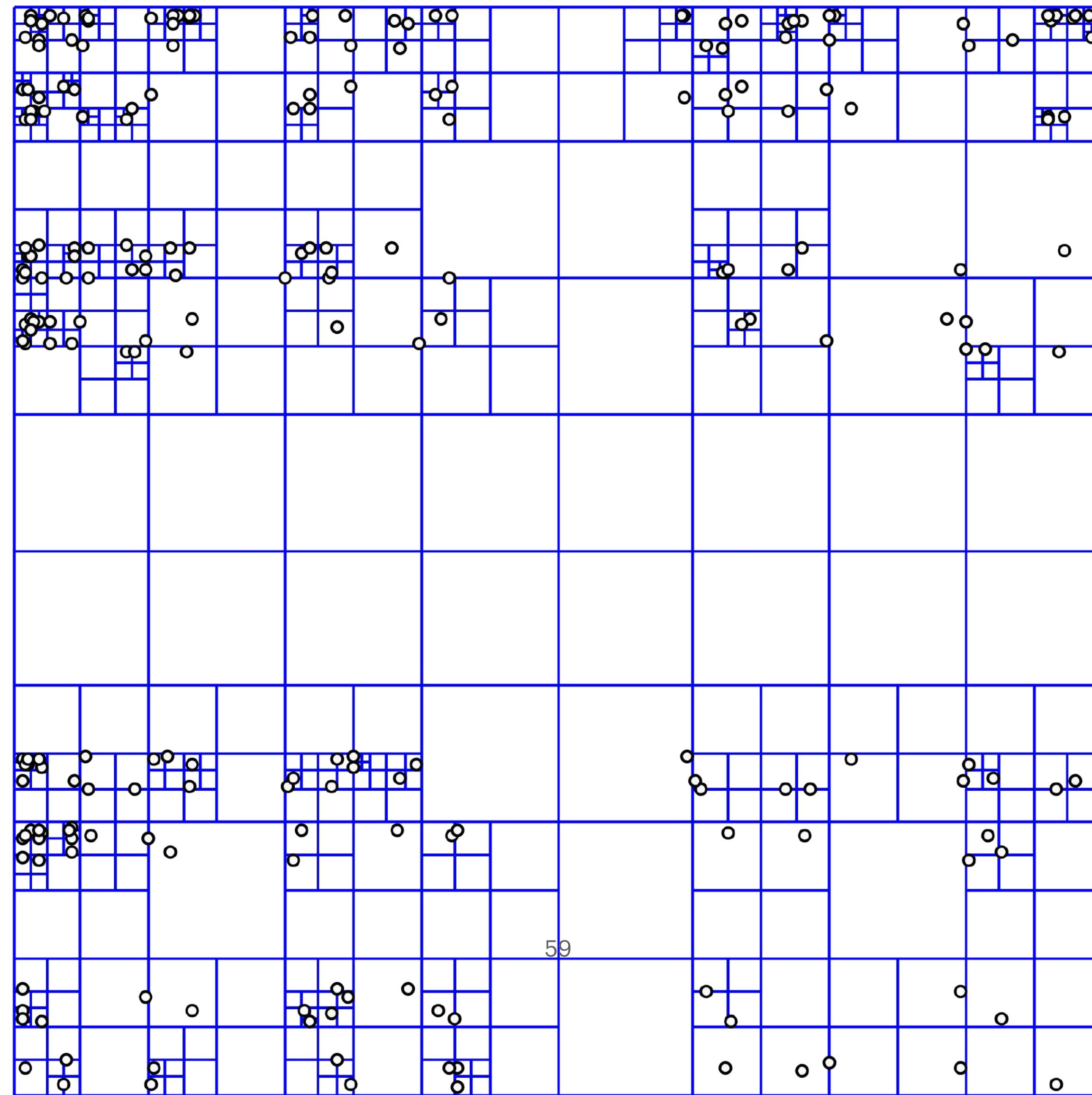
So I put some **RGB** in Roassal



Trees



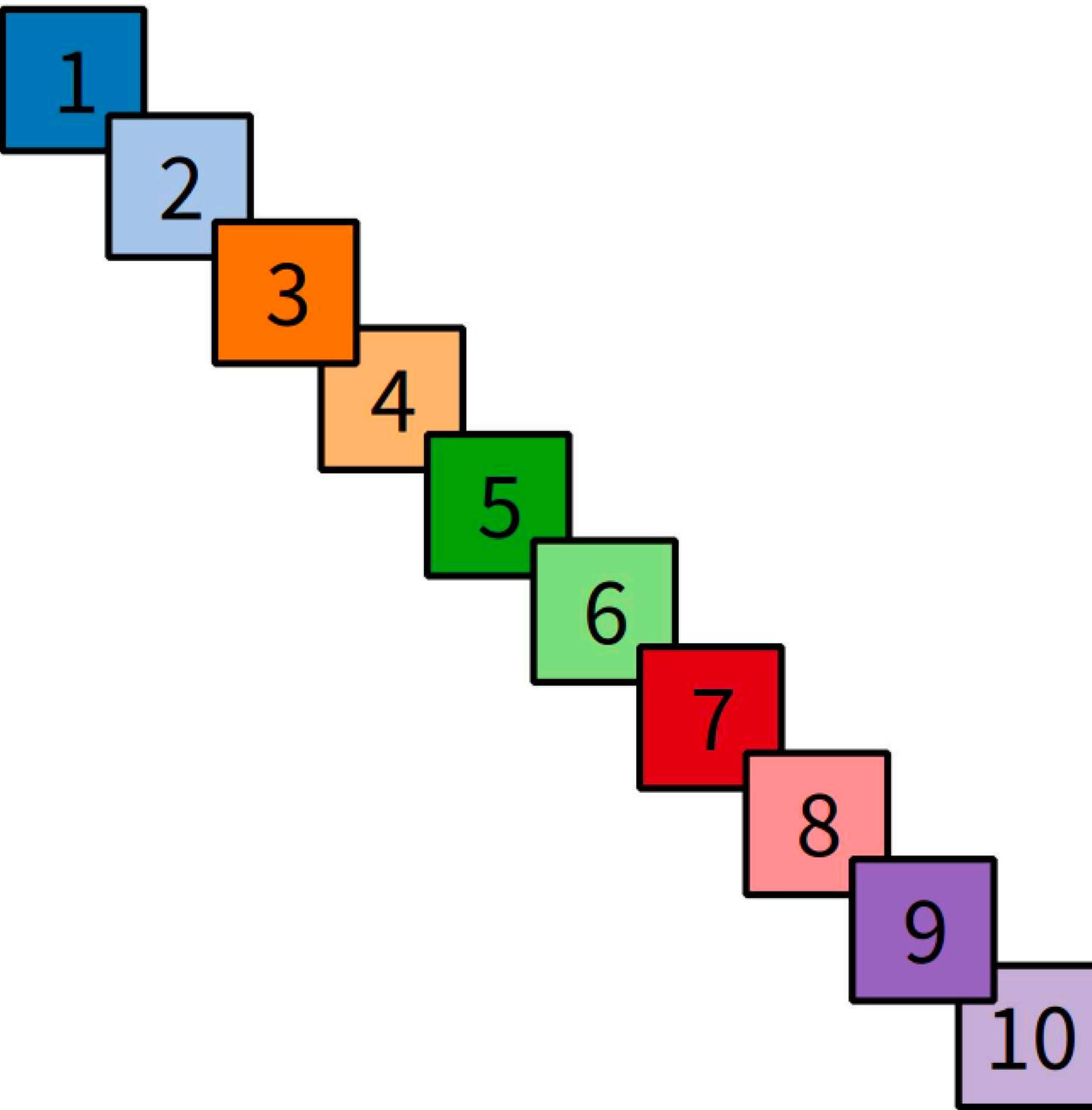
Quad Tree



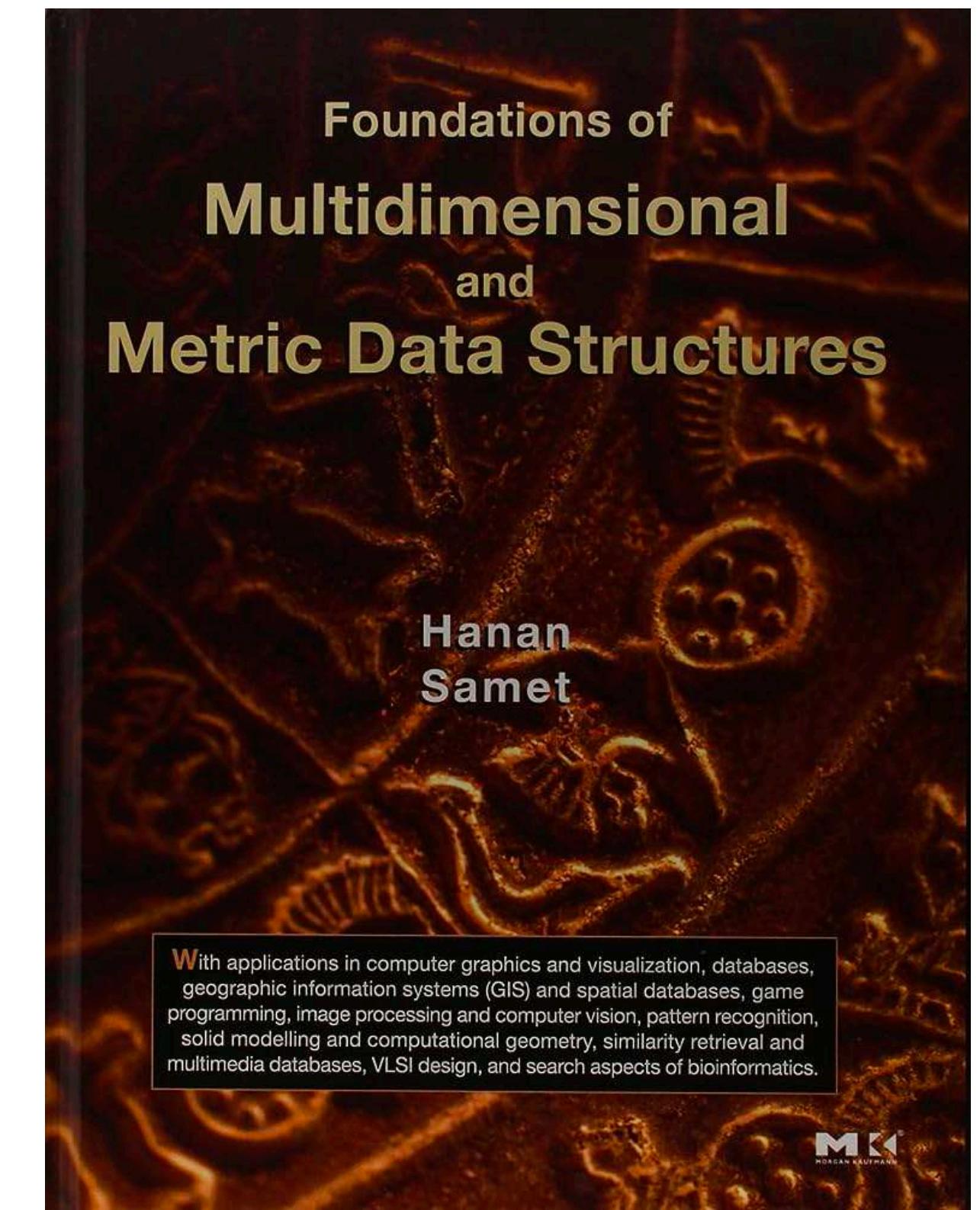
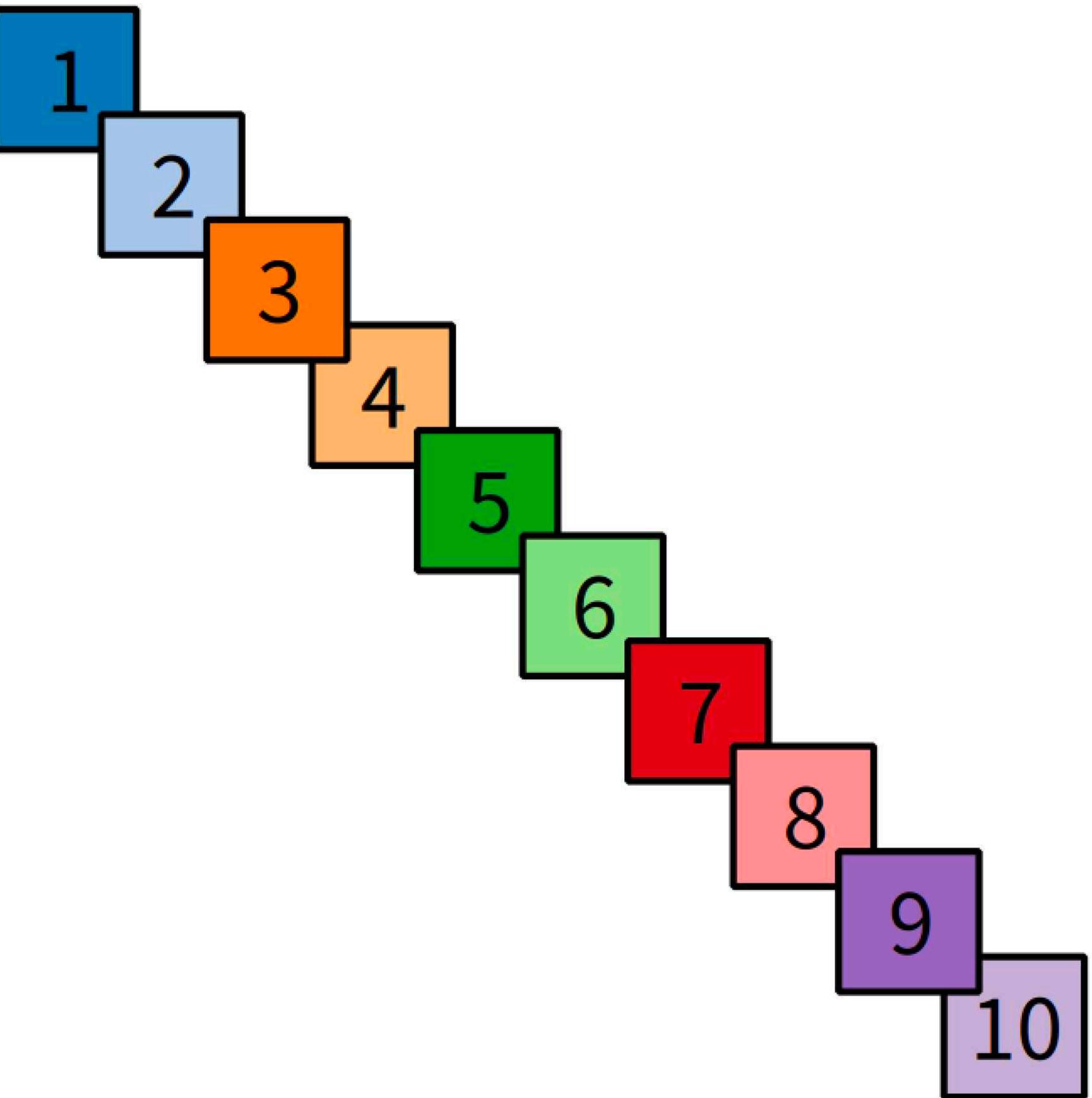
Quad Tree



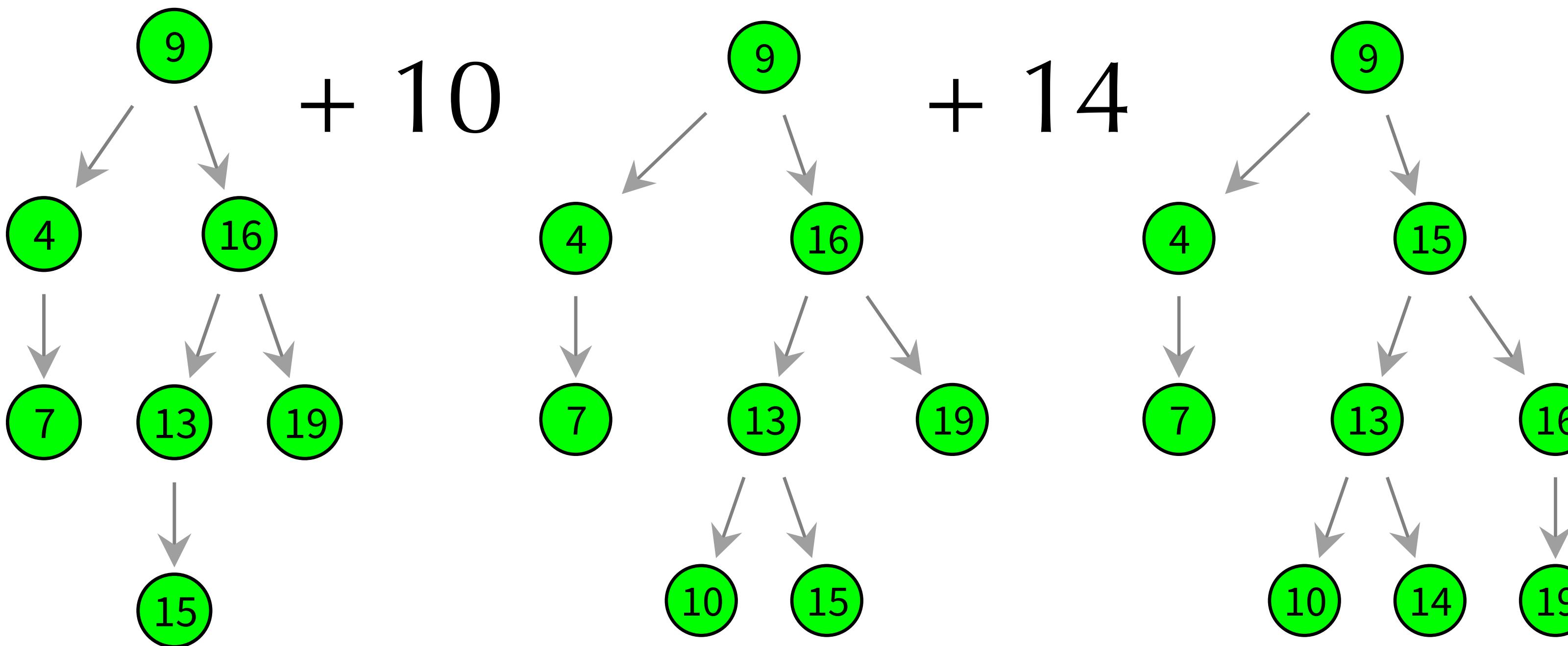
The Problem: Overlapping



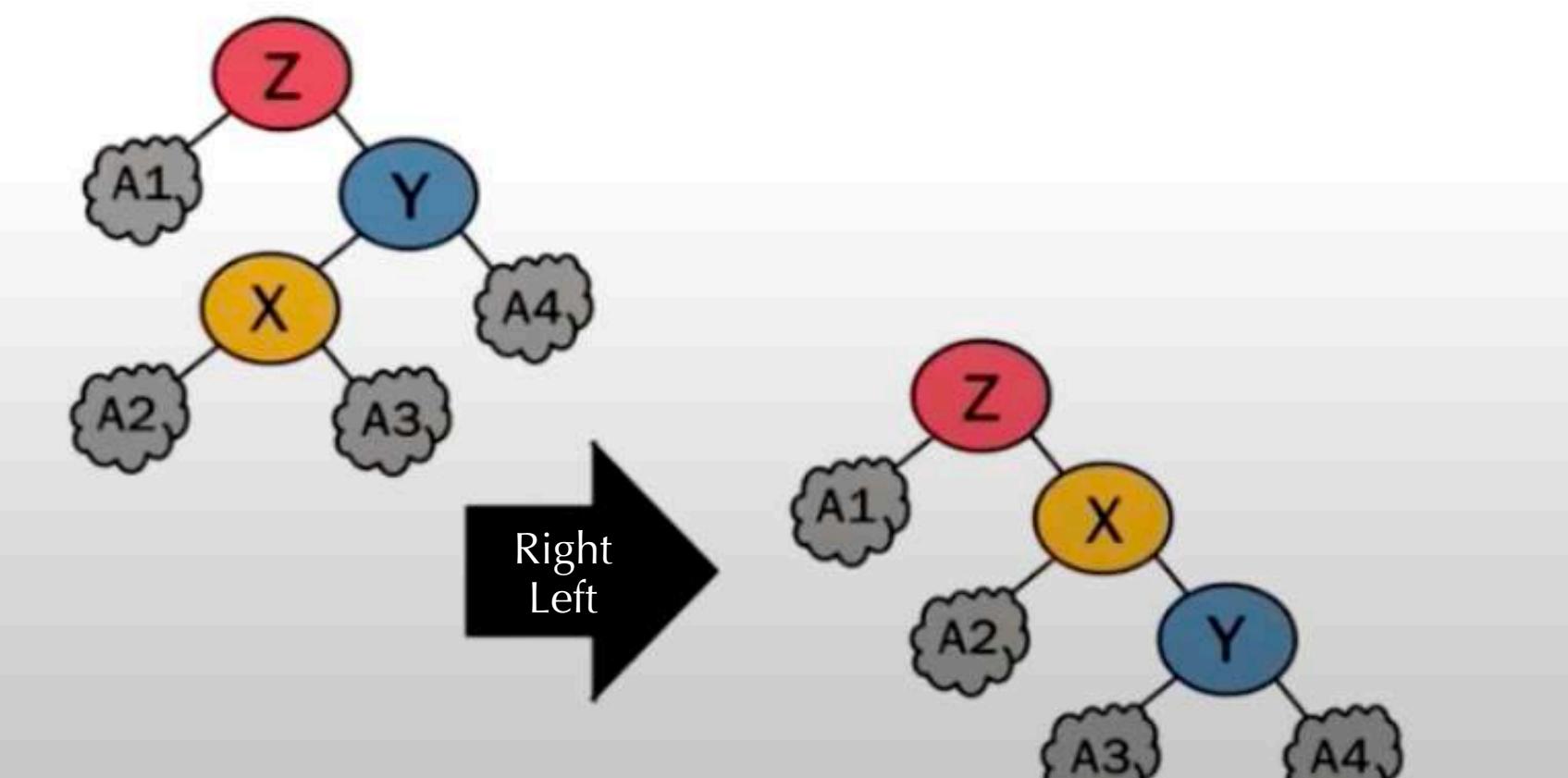
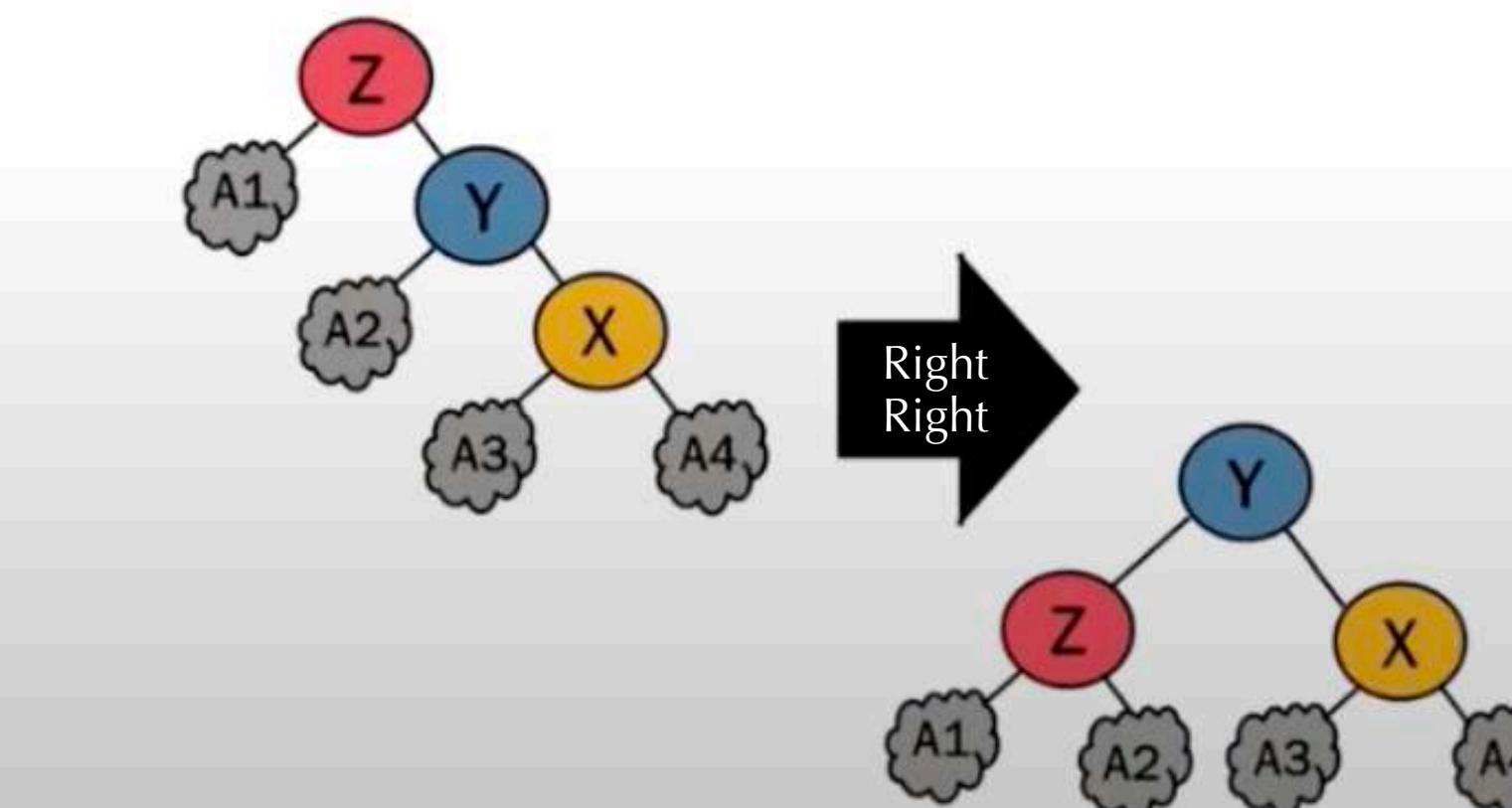
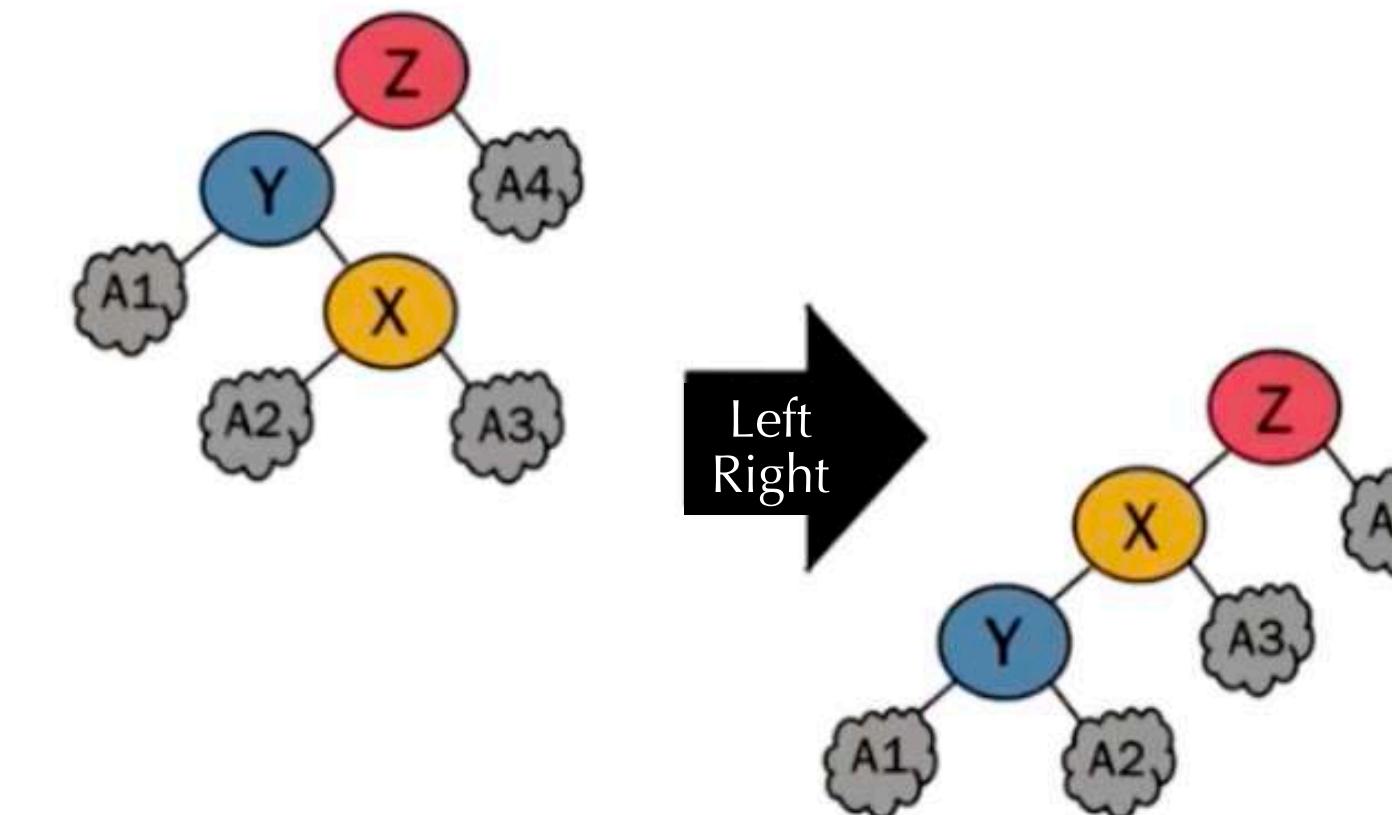
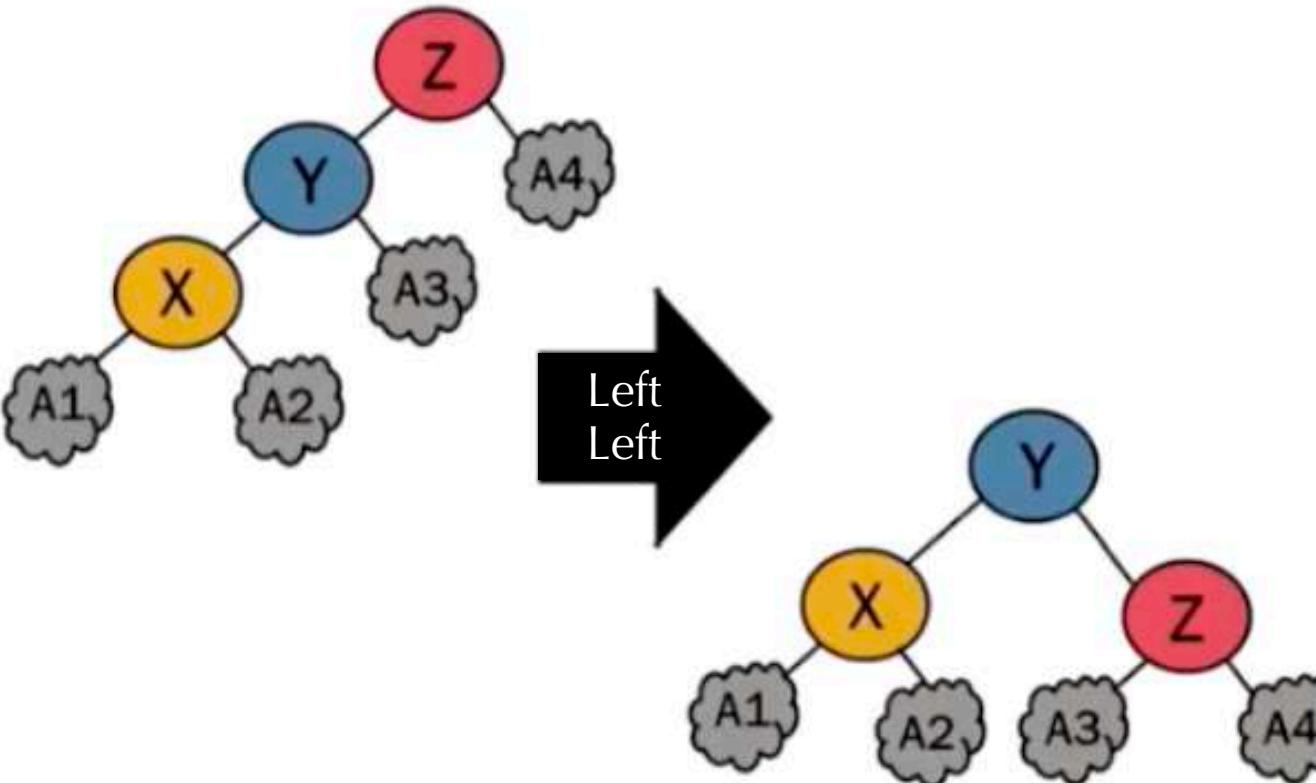
The Problem: Overlapping



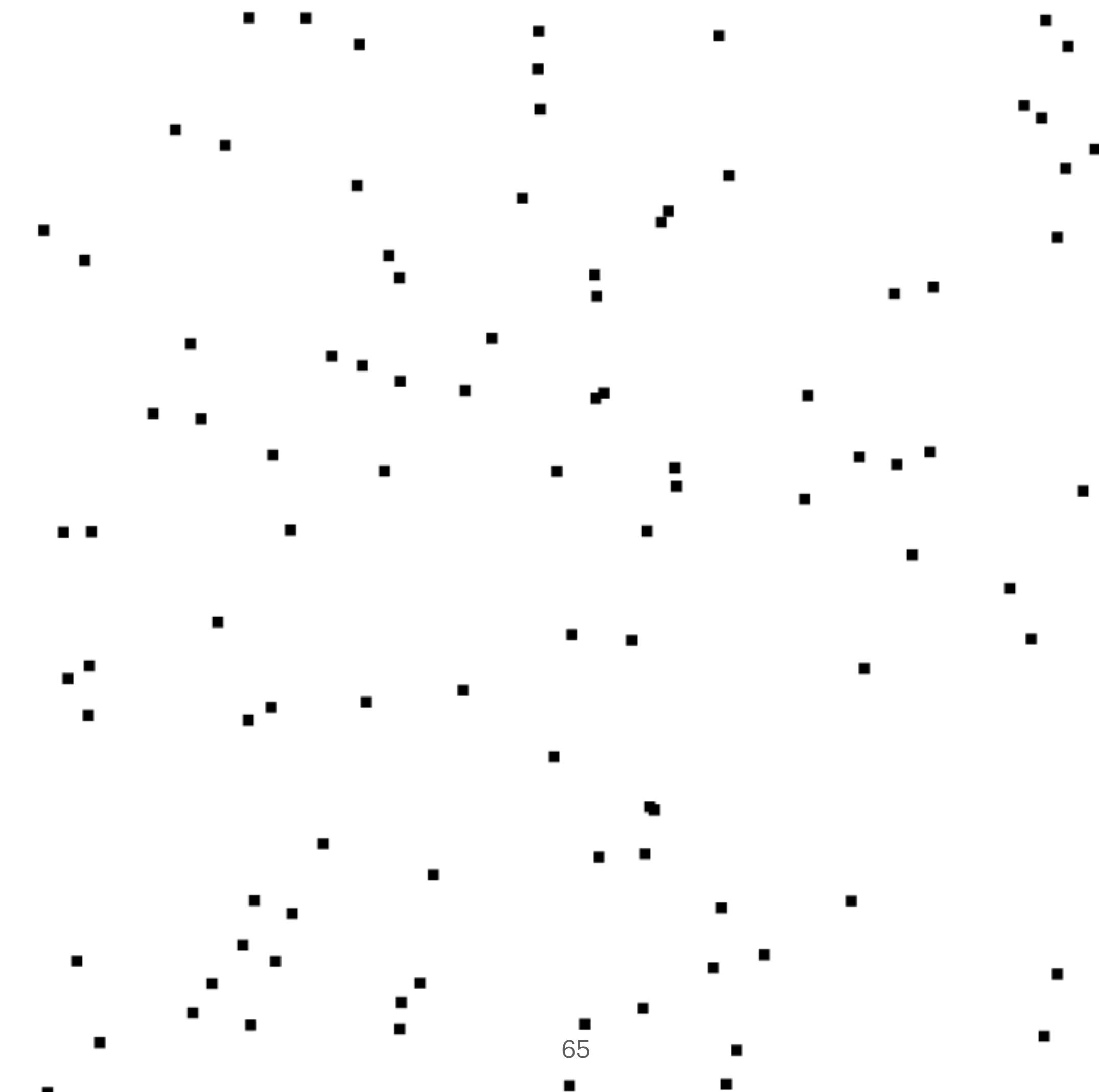
AVL



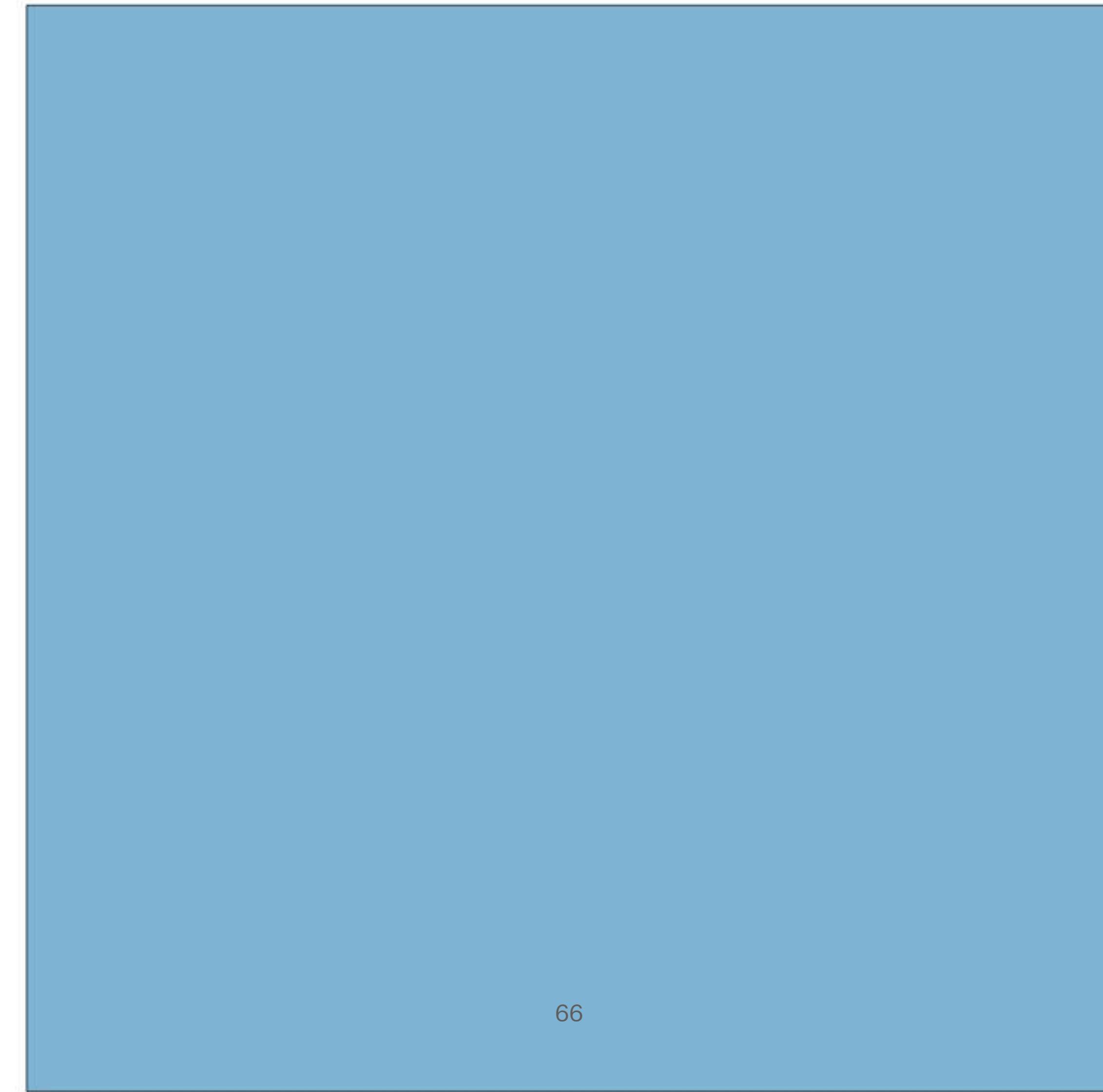
Rotations



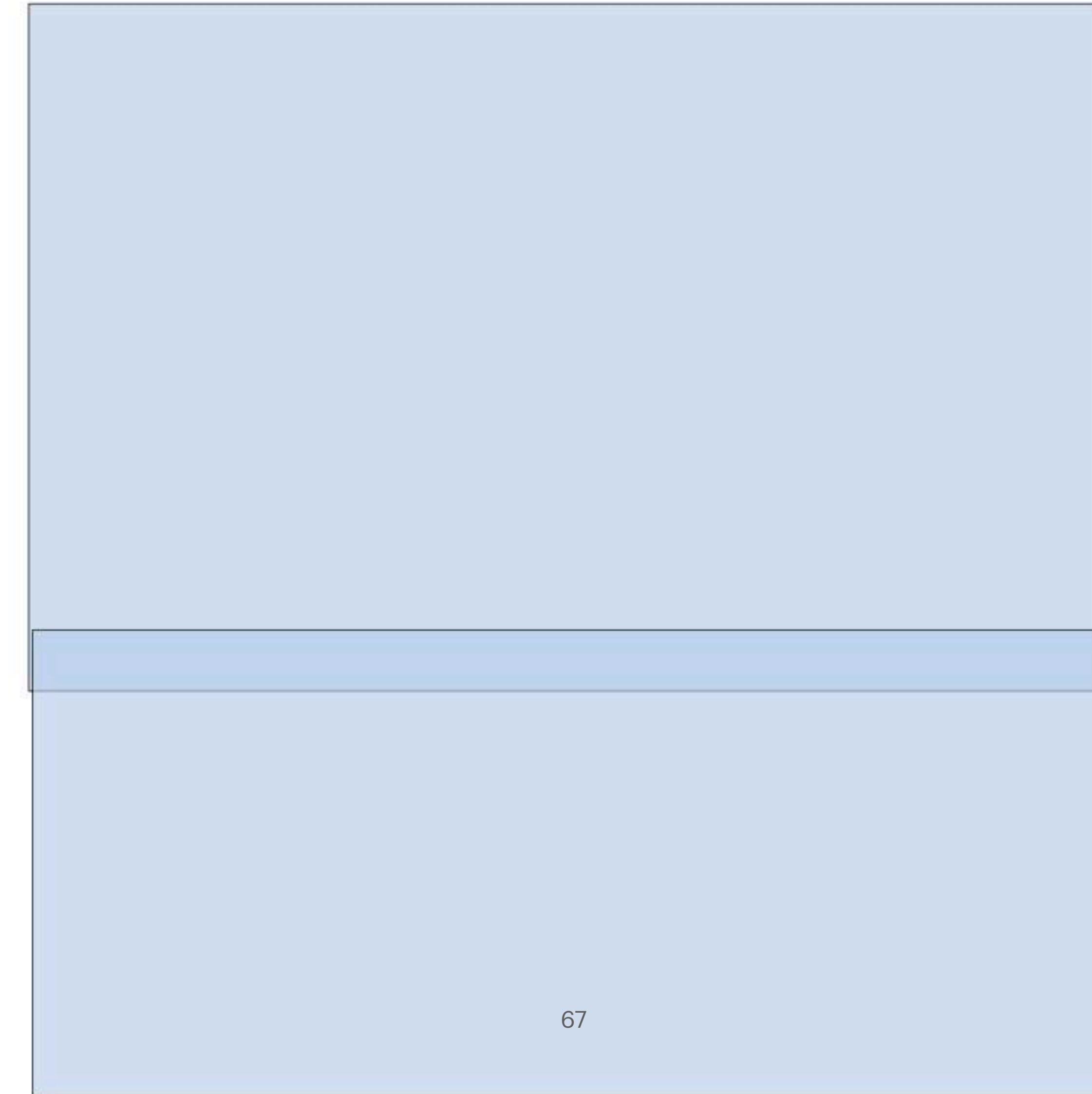
RTree in Roassal



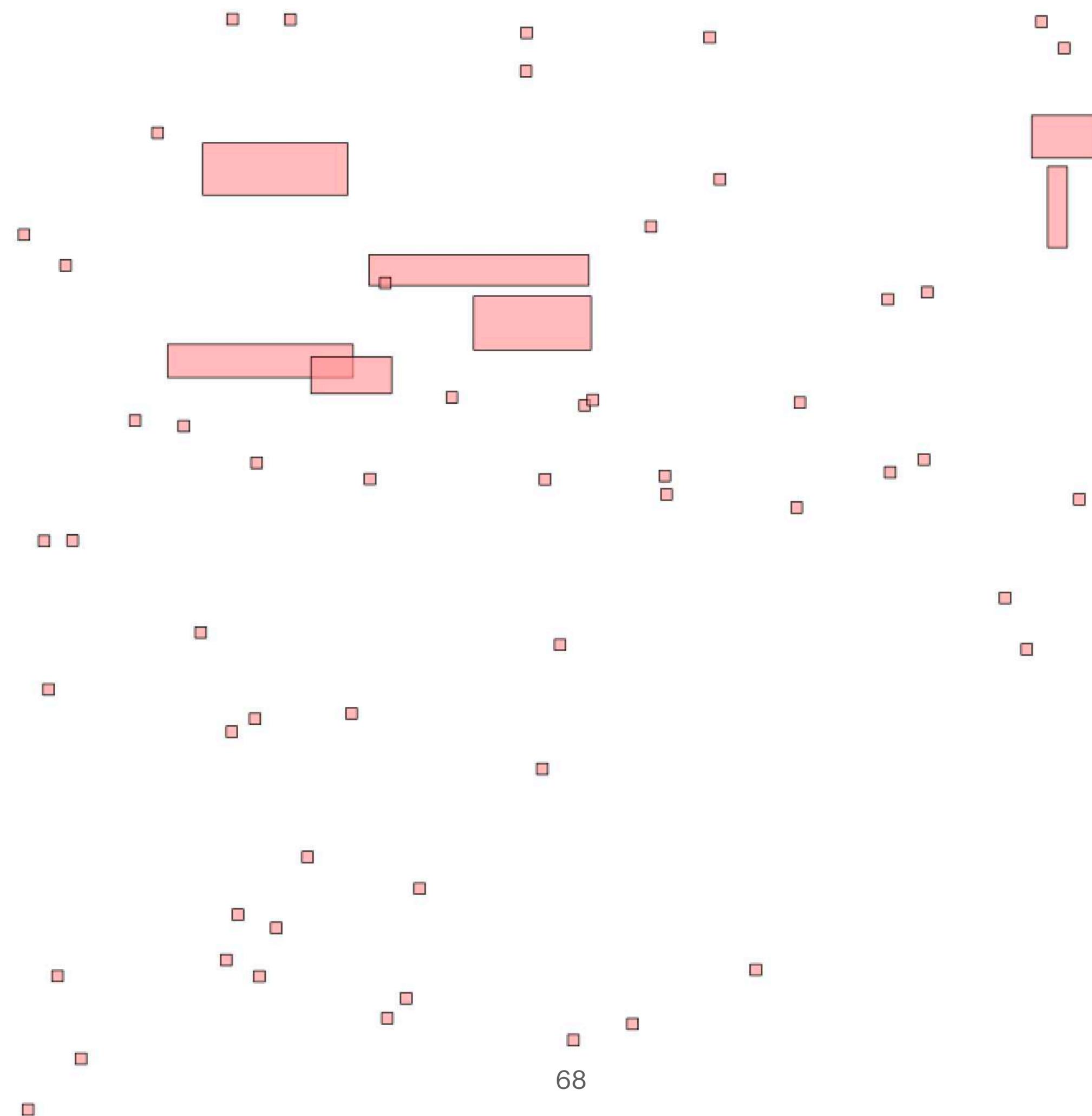
RTree in Roassal



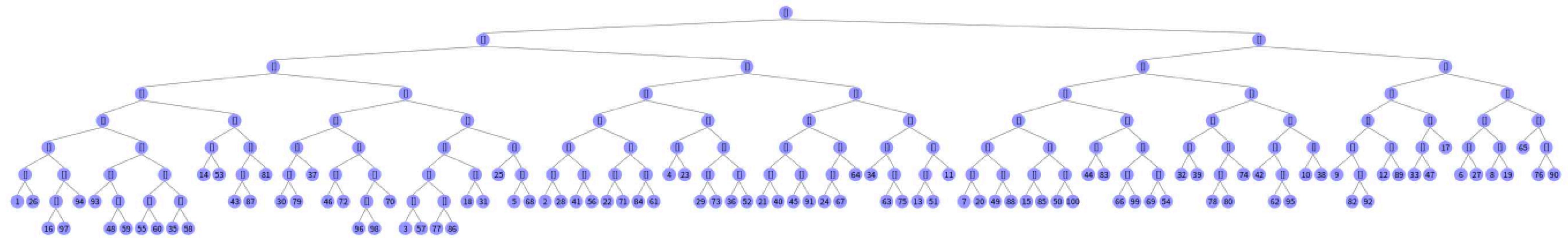
RTree in Roassal



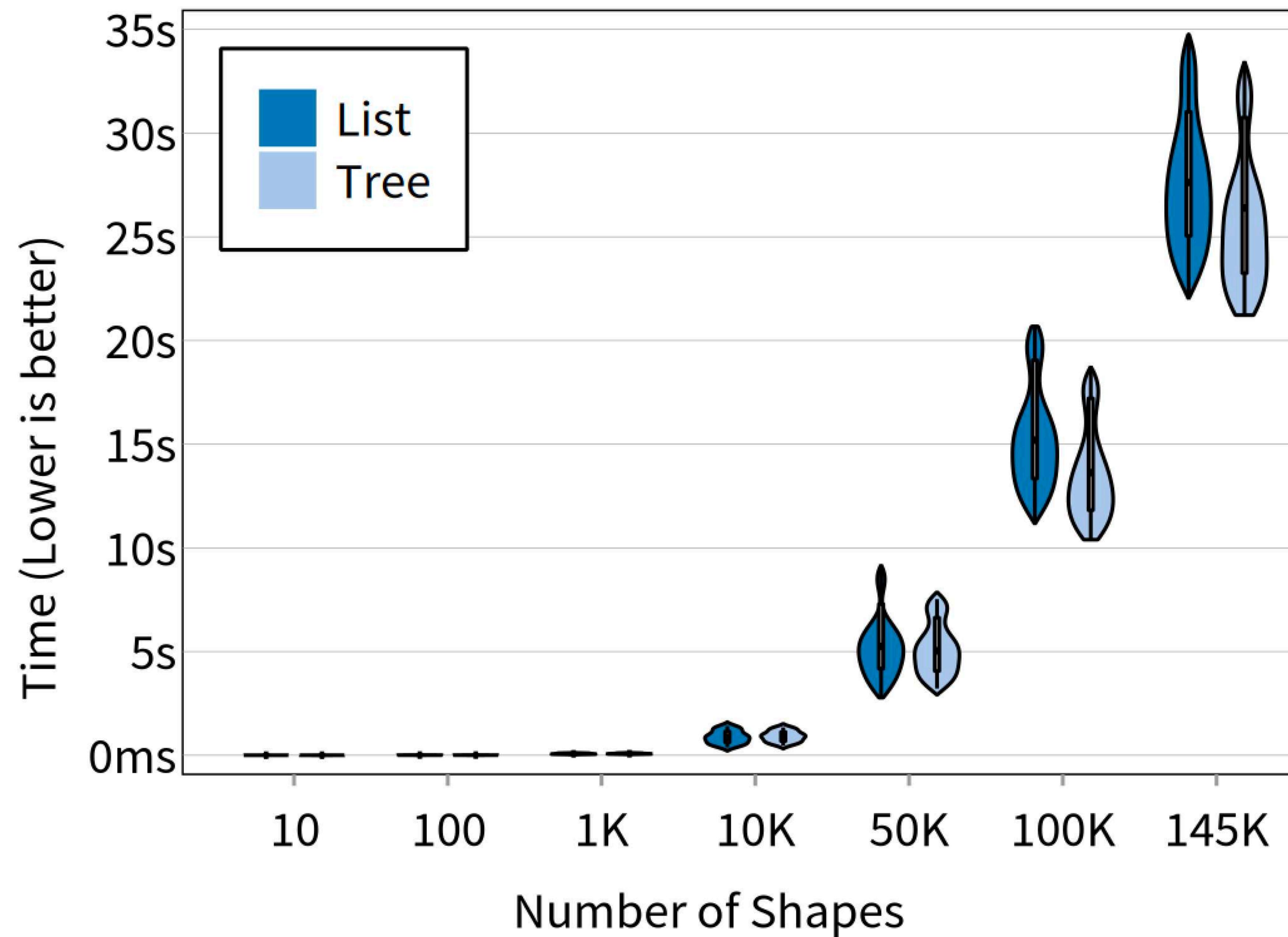
RTree in Roassal



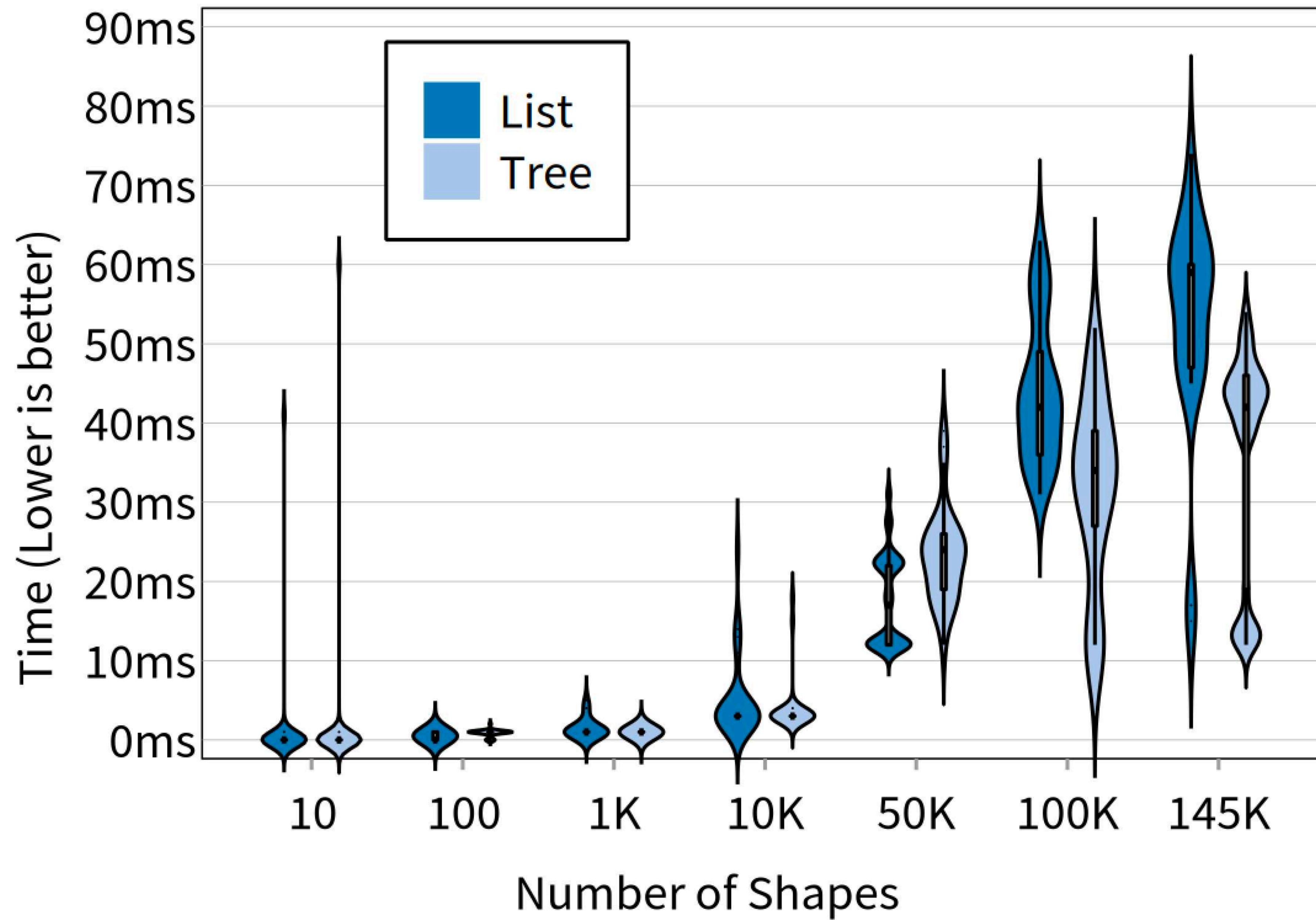
RTree in Roassal



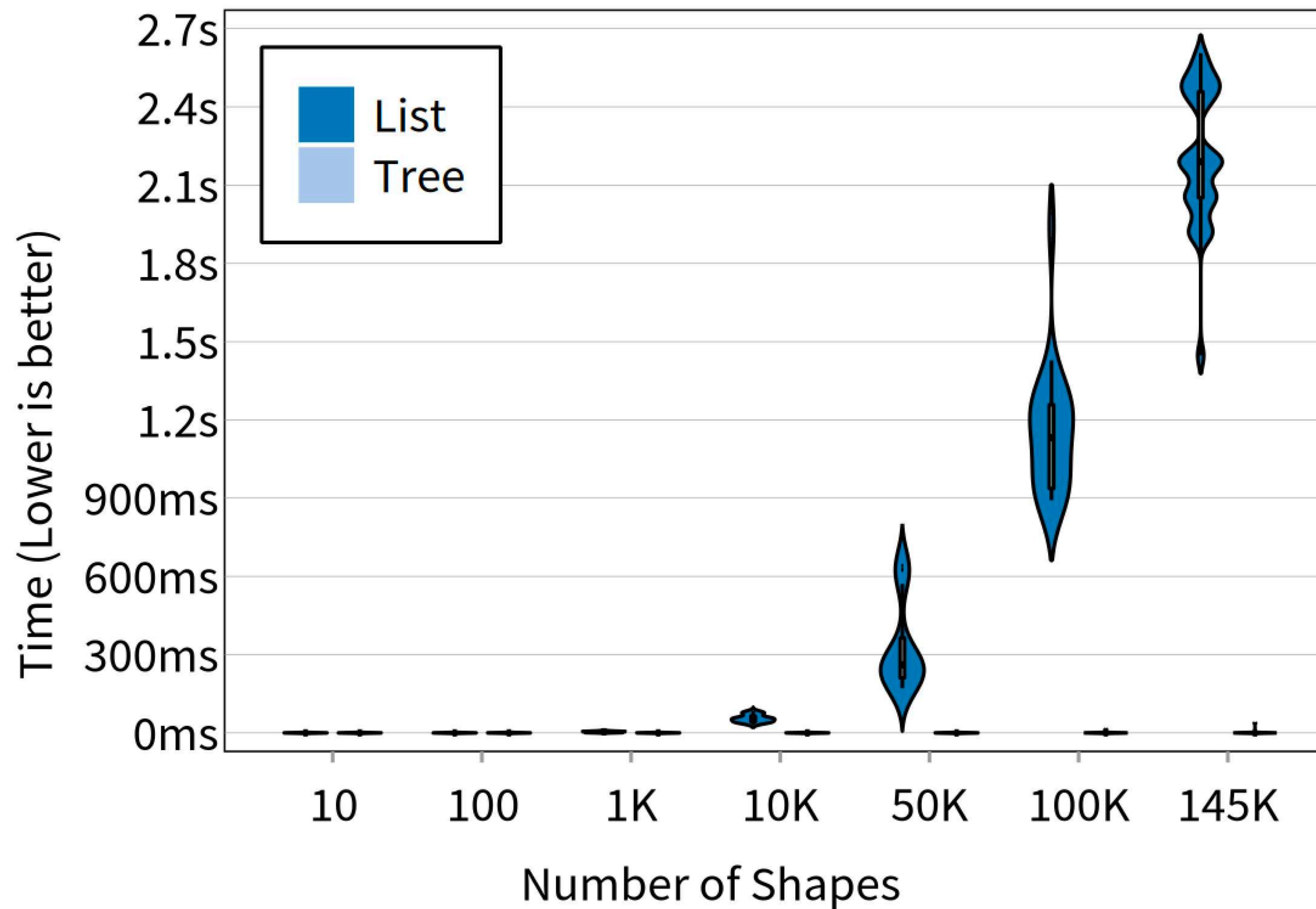
When adding Shapes: Tree vs List



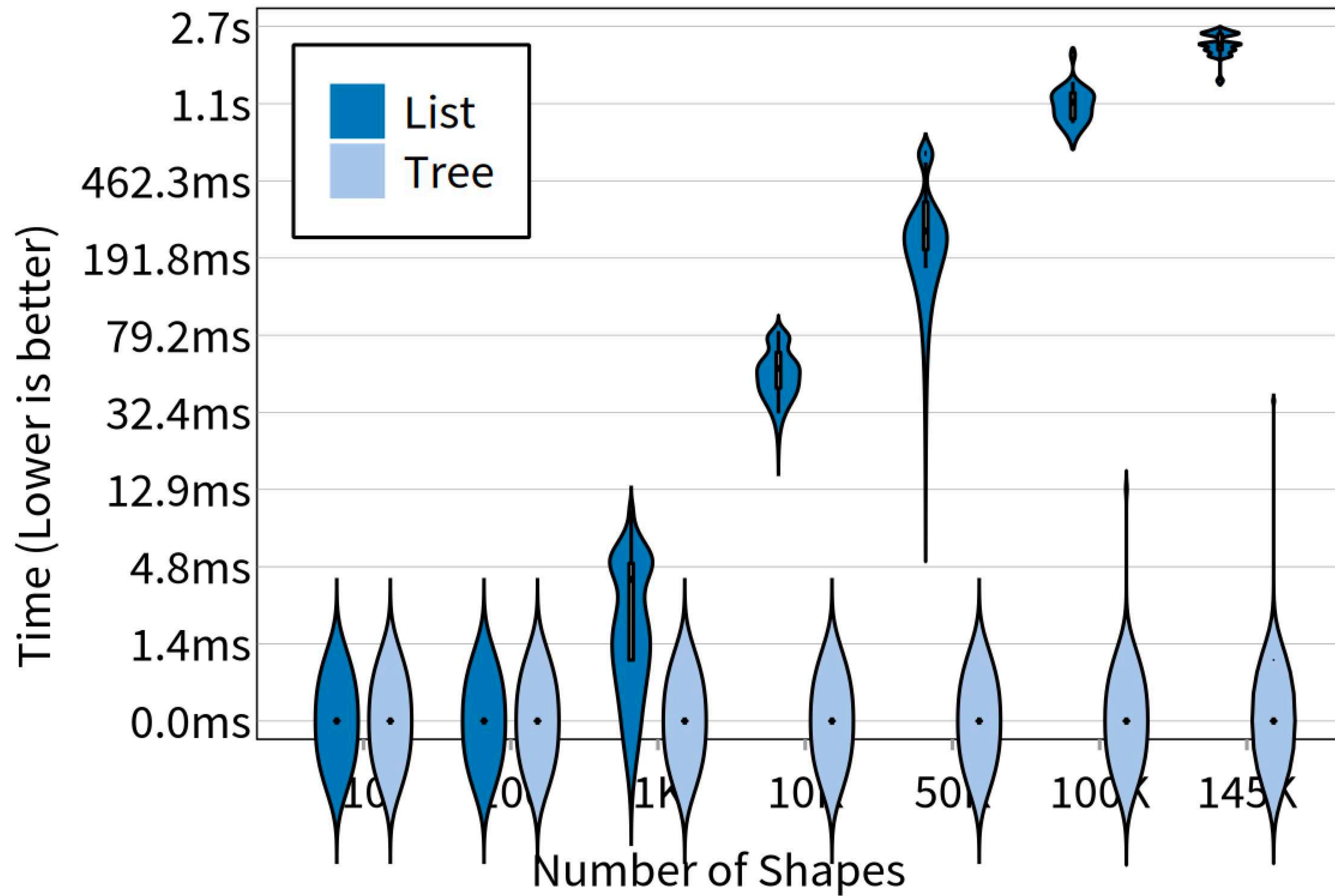
Drawing one Frame: Tree vs List



Mouse move: Tree vs List



Mouse move: Tree vs List



Final result

TODO



- Charts.
- Dirty areas.
- More FPS (GPU, Cores, Caches)
- Roassal + Bloc
- Close roassal issues
- Prepare Roassal for next engineer

Name: Milton Mamani Torres

Country: Bolivia

Occupation: Software Engineer in
Rmod team, Inria
for 2 years, so contact(contract) me.
Do it now!

Github: [https://github.com/akevalion/
MyAnimations](https://github.com/akevalion/MyAnimations)
Email: akevalion@gmail.com

