Information Visualization Homework 1

Andrei Sacuiu (955067), Johann Lutterodt (878253)

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Excercise 3

Create 10 random values in the range of 0 and 10.

```
r <- runif(10,0,10)
r
```

```
##  [1] 1.386695 1.159658 4.626294 2.386298 3.551162 4.050507 1.657180
##  [8] 7.802511 6.063940 2.672469
```

Excercise 4

Name and explain briefly in your own words the three goals of visualizations. Make sure the differences between the goals are clearly described.

1) Presentation

Gather facts and the data to prove it, chose a template that make the data easy to understand and create a presentation that proves the stated facts.

2) Confirmatory analysis

Start from a hypothesis, examine the hypothesis, and visualize the data in order to confirm or reject the hypothesis

3) Explanatory Analysis

When having no hypothesis, a person can deduce a hypothesis by interactively analyzing the data and searching for trends and patterns within the visualizations.

Excercise 5

a) Even though visualization is possible without a computer, today most visualizations are computer generated and some of them would be impossible to do without a computer. It helps as a computer science course as it has many applications in computer science as well, for example bench-marking performance of programs, viewing statistical data about network security, visualizing big data, etc.

b) It makes sense to visualize the data as it makes it much easier to understand, find patterns, and reach conclusions this way than to look only at numbers.

Excercise 6

a) Create a vector containing values from 0 to 50 with a distance of 0.5.

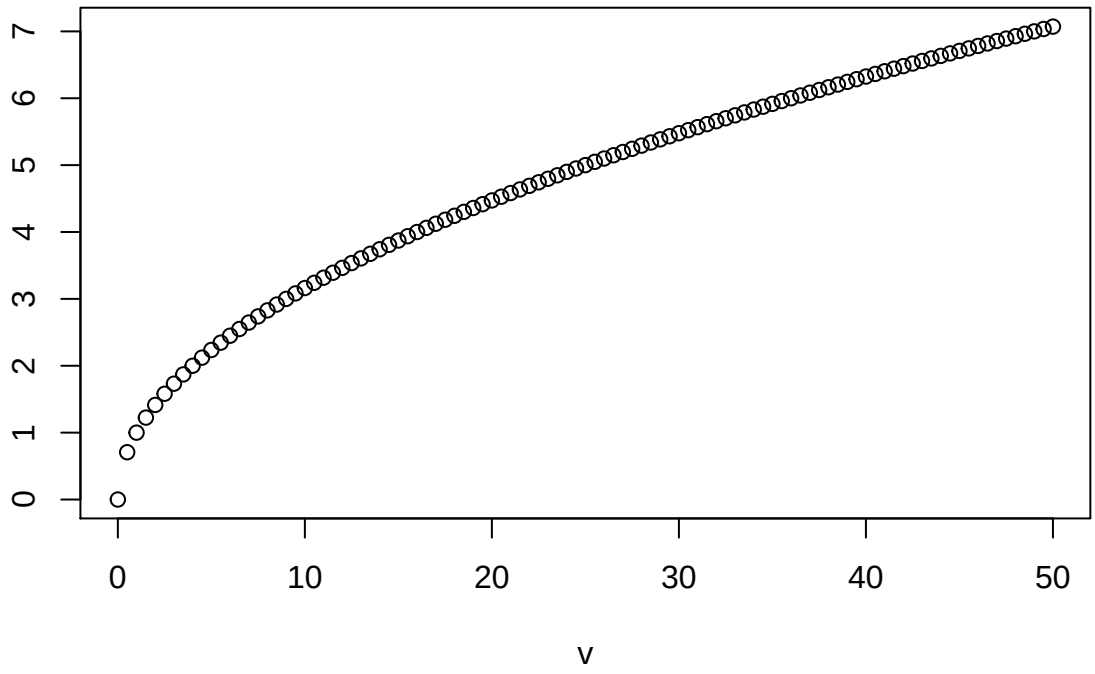
```
v <- seq(0,50,0.5)
```

b) Calculate the square root for each of these values and add this vector to the other vector as a second column.

```
v2 <- cbind(v,sqrt(v))
```

c) Visualize the result with the plot() function.

```
plot(v2)
```

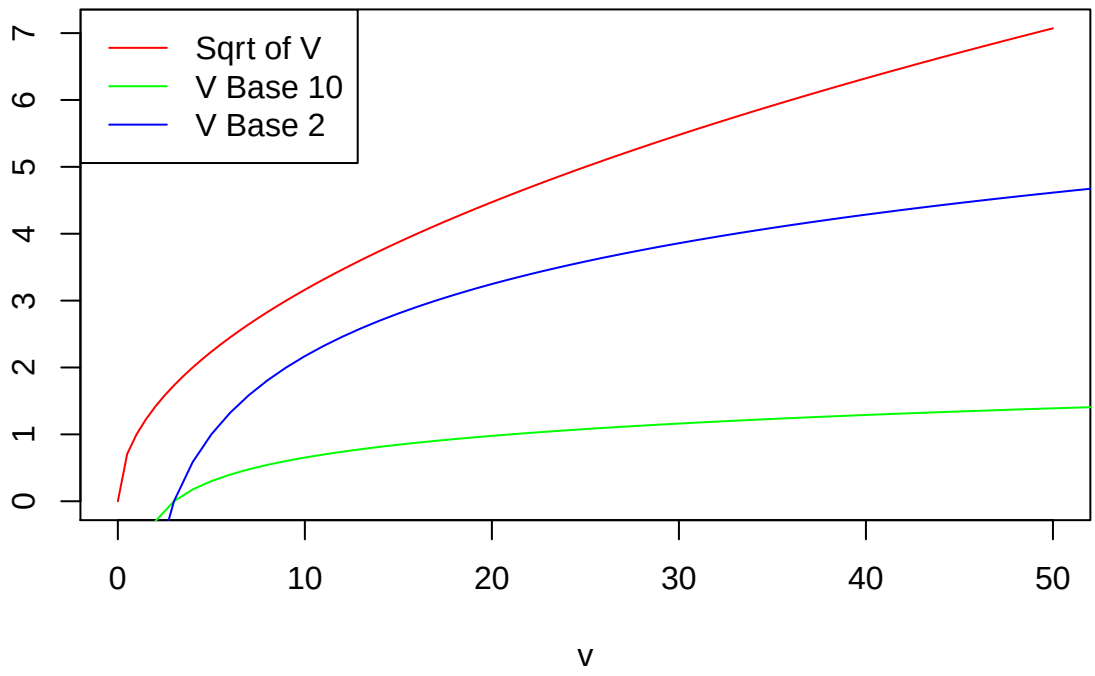


d) Calculate the logarithm (base 2 and 10) for each of the values calculated in a).

```
v_log2 <- log2(v)
v_log10 <- log10(v)
```

e) Add the two logarithmic curves to your plot visualized in c). Use different colors for the curves.

```
plot(v2,type="l",col="red")
lines(v_log10,col="green")
lines(v_log2, col="blue")
legend("topleft", legend=c("Sqrt of V","V Base 10", "V Base 2"),col=c("red","green", "blue"), lty=1)
```



Excercise 7

a) Create the following vector vec: 2^n with n ∈ N{1,2,3,...,50}

```
v_2_n <- 2^seq(1:50)
```

b) Create the following vector vec: n^2 with n ∈ N{1,2,3,...,50}

```
v_n_2 <- seq(1:50)^2
```

c.a) Print the values

```
v_2_n[v_2_n==v_n_2]
```

```
## [1]  4 16
```

c.b) Print the index positions

```
index_position <- which(v_2_n==v_n_2)
index_position
```

```
## [1] 2 4
```

c.c) Count the number of identical index positions

```
length(index_position)
```

```
## [1] 2
```