TP RMD

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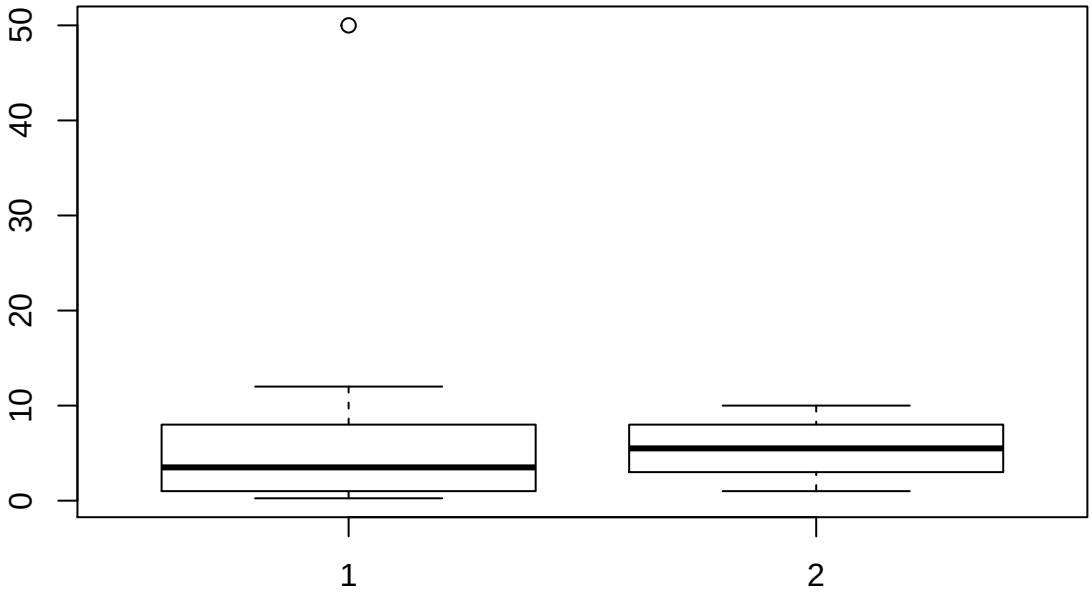
Premier Pas

```
v = c(12, .4, 5, 2, 50, 8, 3, 1, 4, .25)
quantile(v, probs=c(0.9))
```

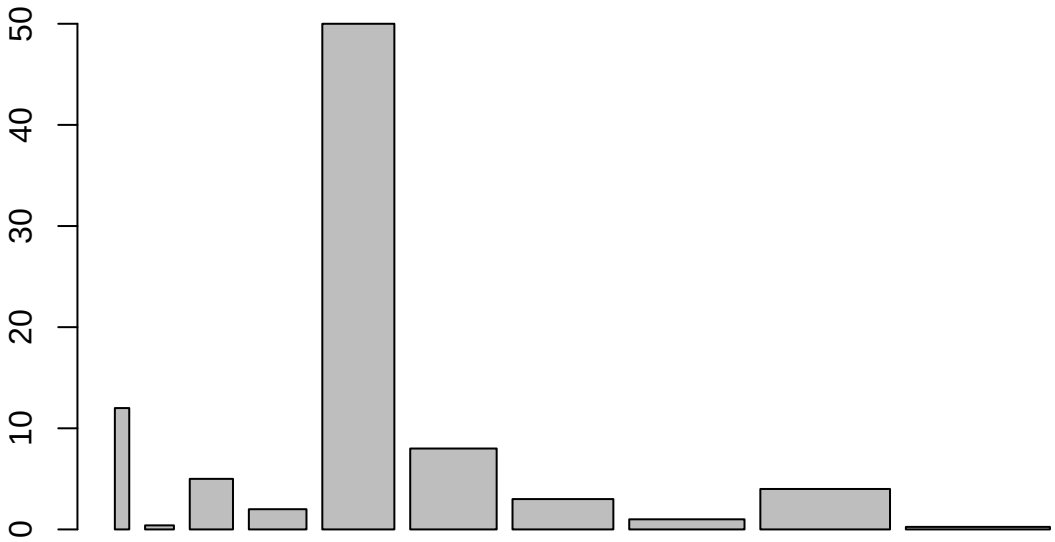
```
##  90%
## 15.8
```

Graphiques

```
v = c(12, .4, 5, 2, 50, 8, 3, 1, 4, .25)
v2 = c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
boxplot(v, v2)
```




```
barplot(v, v2)
```



Importation des données à partir d'un fichiers

```
data = read.table("data.txt", header=TRUE, sep=",")
participant2SurfPad=subset(data,Participant==2 & Technique=="SurfPad")
mean(participant2SurfPad[,"Time"])
```

```
## [1] 1.894566
```

Q3

```
moyTech = function(data, technique) {
  t = subset(data, Technique==technique)
  return(mean(t[,"Time"]))
}
```

Tests de fonctionnement

```
moyTech(data, "SurfPad")
```

```
## [1] 2.031186
```

```
moyTech(data, "SemPoint")
```

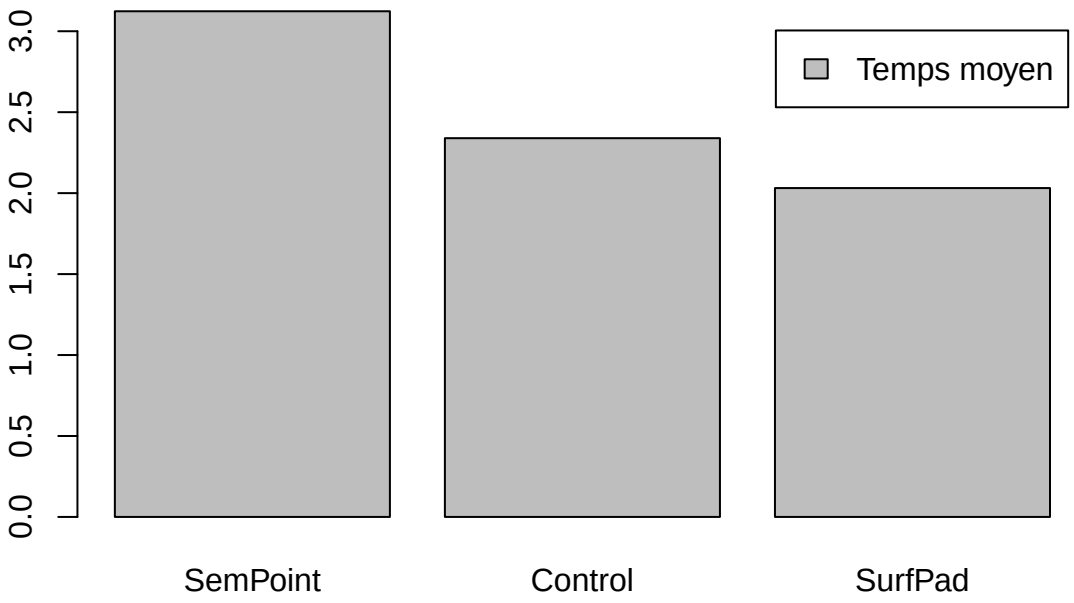
```
## [1] 3.123344
```

Q4

```
techniques=unique(data$Technique)
moyTime = sapply(techniques, function(x)drop(moyTech(data, x)))
```

Q5

```
barplot(moyTime, names.arg = techniques, legend.text="Temps moyen")
```



Q6

```
dataWithoutErr = subset(data, Err!=1)
```

Q7

```
confianceInter = function(data, technique) {
  t = subset(data, Technique==technique)
  return(ci(t[,"Time"]))
}
```

Q8

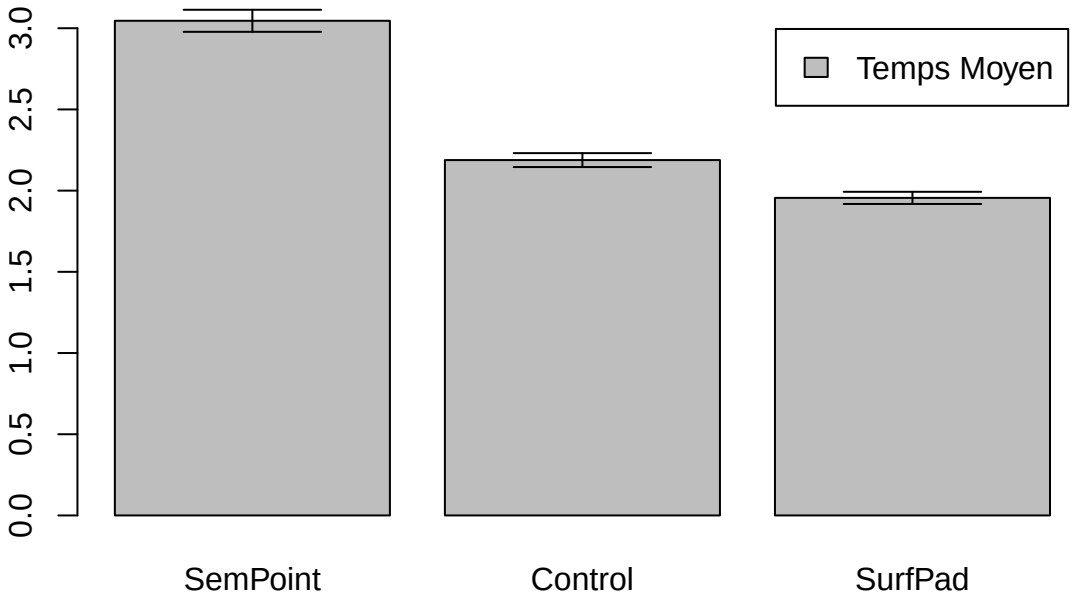
```
moyTime = sapply(techniques, function(x)drop(moyTech(dataWithoutErr, x)))
confiance = sapply(techniques, function(x)drop(confianceInter(dataWithoutErr, x)))
ciLower = confiance["CI lower",]
ciUpper = confiance["CI upper",]
ciLower
```

```
## [1] 2.977805 2.145230 1.917986
```

```
ciUpper
```

```
## [1] 3.113600 2.230927 1.992706
```

```
barplot2(moyTime, names.arg = techniques, legend.text = "Temps Moyen", ci.l = ciLower, ci.u = ciUpper, p
```



ANOVA

Q9

```
# Chargement des donnees
data = read.table("data.txt", header=TRUE, sep=",")

# On ne garde que ce qui nous interesse
filteredData = subset(data, (Err==0), select = c(Participant, Block, Technique,
                      A, W, density, Time))

# Aggregation des donnees pour ne conserver qu'une valeur par condition
attach(filteredData)
aggdata = aggregate(filteredData$Time, by=list(Participant,Block,Technique,W, density),
                    FUN=mean)
detach(filteredData)

# Reecriture des noms de colonnes
colnames(aggdata) = c("Participant","Block","Technique","W", "density", "Time")

# Conversion des donnees au format long
data.long = melt(aggdata, id = c("Participant","Block","Technique","W","density","Time"))

# On specifie les variables independantes
data.long$Block = factor(data.long$Block)
data.long$Technique = factor(data.long$Technique)
data.long$W = factor(data.long$W)
data.long$density = factor(data.long$density)

# L'ANOVA:
print(ezANOVA(data.long, dv=.(Time), wid=.(Participant), within=.(Technique,W,density)))
```

```
## Warning: Converting "Participant" to factor for ANOVA.
```

```
## Warning: Collapsing data to cell means. *IF* the requested effects are a
## subset of the full design, you must use the "within_full" argument, else
## results may be inaccurate.
```

```
## $ANOVA
##                 Effect DFn DFd           F            p p<.05         ges
## 2           Technique   2  22  81.0212328 7.121165e-11     * 0.633639483
## 3                   W   1  11 159.3132475 6.908712e-08     * 0.497577951
## 4             density   5  55 128.1795788 5.041695e-29     * 0.452510669
## 5         Technique:W   2  22   3.9128982 3.516713e-02     * 0.023101336
## 6   Technique:density  10 110 146.0100034 1.083647e-58     * 0.593557688
## 7           W:density   5  55   3.4657930 8.562981e-03     * 0.017143292
## 8 Technique:W:density  10 110   0.7167081 7.071837e-01       0.008555489
##
## $`Mauchly's Test for Sphericity`
##                 Effect            W           p p<.05
## 2           Technique 6.947834e-01 0.161900080
## 4             density 1.339997e-01 0.211325632
## 5         Technique:W 5.063824e-01 0.033296076     *
## 6   Technique:density 1.547992e-04 0.277014236
## 7           W:density 3.162044e-01 0.740069115
## 8 Technique:W:density 4.668132e-06 0.004184906     *
##
## $`Sphericity Corrections`
##                 Effect       GGe        p[GG] p[GG]<.05       HFe
## 2           Technique 0.7661563 8.612122e-09         * 0.8654570
## 4             density 0.6340321 3.548643e-19         * 0.9206299
## 5         Technique:W 0.6695154 5.729007e-02           0.7281034
## 6   Technique:density 0.4524487 9.133005e-28         * 0.8075630
## 7           W:density 0.7243752 1.885117e-02         * 1.1239310
## 8 Technique:W:density 0.3539673 5.696686e-01           0.5425509
##          p[HF] p[HF]<.05
## 2 1.120890e-09         *
## 4 6.844866e-27         *
## 5 5.253180e-02
## 6 7.781843e-48         *
## 7 8.562981e-03         *
## 8 6.242234e-01
```

```
# Analyse post-hoc avec ajustement de Bonferroni
attach(data.long)
print(pairwise.t.test(Time, interaction(Technique), p.adj = "bonf"))
```

```
##
##  Pairwise comparisons using t tests with pooled SD
##
## data:  Time and interaction(Technique)
##
##          Control SemPoint
## SemPoint < 2e-16 -
## SurfPad  8.2e-07 < 2e-16
##
## P value adjustment method: bonferroni
```

```r
print(pairwise.t.test(Time, interaction(Technique, density), p.adj = "bonf"))
```

```
##
##  Pairwise comparisons using t tests with pooled SD
##
## data:  Time and interaction(Technique, density)
##
##             Control.0 SemPoint.0 SurfPad.0 Control.1 SemPoint.1 SurfPad.1
## SemPoint.0  0.30448   -          -         -         -          -
## SurfPad.0   1.00000   1.00000    -         -         -          -
## Control.1   1.00000   1.00000    1.00000   -         -          -
## SemPoint.1  1.00000   1.00000    1.00000   1.00000   -          -
## SurfPad.1   0.11272   1.00000    1.00000   1.00000   1.00000    -
## Control.2   1.00000   0.29140    1.00000   1.00000   1.00000    0.10751
## SemPoint.2  0.05011   4.2e-09    1.1e-05   7.4e-05   0.00077    6.0e-10
## SurfPad.2   0.08112   1.00000    1.00000   1.00000   1.00000    1.00000
## Control.4   1.00000   1.00000    1.00000   1.00000   1.00000    1.00000
## SemPoint.4  1.3e-11   < 2e-16    < 2e-16   < 2e-16   5.5e-15    < 2e-16
## SurfPad.4   0.00111   1.00000    1.00000   0.33794   0.06264    1.00000
## Control.8   1.00000   0.02757    1.00000   1.00000   1.00000    0.00856
## SemPoint.8  < 2e-16   < 2e-16    < 2e-16   < 2e-16   < 2e-16    < 2e-16
## SurfPad.8   1.00000   1.00000    1.00000   1.00000   1.00000    1.00000
## Control.12  1.00000   0.41355    1.00000   1.00000   1.00000    0.15643
## SemPoint.12 < 2e-16   < 2e-16    < 2e-16   < 2e-16   < 2e-16    < 2e-16
## SurfPad.12  0.38168   1.00000    1.00000   1.00000   1.00000    1.00000
##             Control.2 SemPoint.2 SurfPad.2 Control.4 SemPoint.4 SurfPad.4
## SemPoint.0  -         -          -         -         -          -
## SurfPad.0   -         -          -         -         -          -
## Control.1   -         -          -         -         -          -
## SemPoint.1  -         -          -         -         -          -
## SurfPad.1   -         -          -         -         -          -
## Control.2   -         -          -         -         -          -
## SemPoint.2  0.05266   -          -         -         -          -
## SurfPad.2   0.07730   3.4e-10    -         -         -          -
## Control.4   1.00000   1.1e-05    1.00000   -         -          -
## SemPoint.4  1.4e-11   0.01425    < 2e-16   < 2e-16   -          -
## SurfPad.4   0.00105   1.5e-13    1.00000   1.00000   < 2e-16    -
## Control.8   1.00000   0.47405    0.00587   1.00000   1.1e-09    4.2e-05
## SemPoint.8  < 2e-16   < 2e-16    < 2e-16   < 2e-16   < 2e-16    < 2e-16
## SurfPad.8   1.00000   4.6e-07    1.00000   1.00000   < 2e-16    1.00000
## Control.12  1.00000   0.03278    0.11325   1.00000   5.2e-12    0.00168
## SemPoint.12 < 2e-16   < 2e-16    < 2e-16   < 2e-16   < 2e-16    < 2e-16
## SurfPad.12  0.36558   6.5e-09    1.00000   1.00000   < 2e-16    1.00000
##             Control.8 SemPoint.8 SurfPad.8 Control.12 SemPoint.12
## SemPoint.0  -         -          -         -          -
## SurfPad.0   -         -          -         -          -
## Control.1   -         -          -         -          -
## SemPoint.1  -         -          -         -          -
## SurfPad.1   -         -          -         -          -
## Control.2   -         -          -         -          -
## SemPoint.2  -         -          -         -          -
## SurfPad.2   -         -          -         -          -
## Control.4   -         -          -         -          -
## SemPoint.4  -         -          -         -          -
```

```
## SurfPad.4   -         -          -         -          -
## Control.8   -         -          -         -          -
## SemPoint.8  < 2e-16   -          -         -          -
## SurfPad.8   0.39722   < 2e-16    -         -          -
## Control.12  1.00000   < 2e-16    1.00000   -          -
## SemPoint.12 < 2e-16   1.00000    < 2e-16   < 2e-16    -
## SurfPad.12  0.03603   < 2e-16    1.00000   0.51573    < 2e-16
##
## P value adjustment method: bonferroni
```

```
detach(data.long)
```