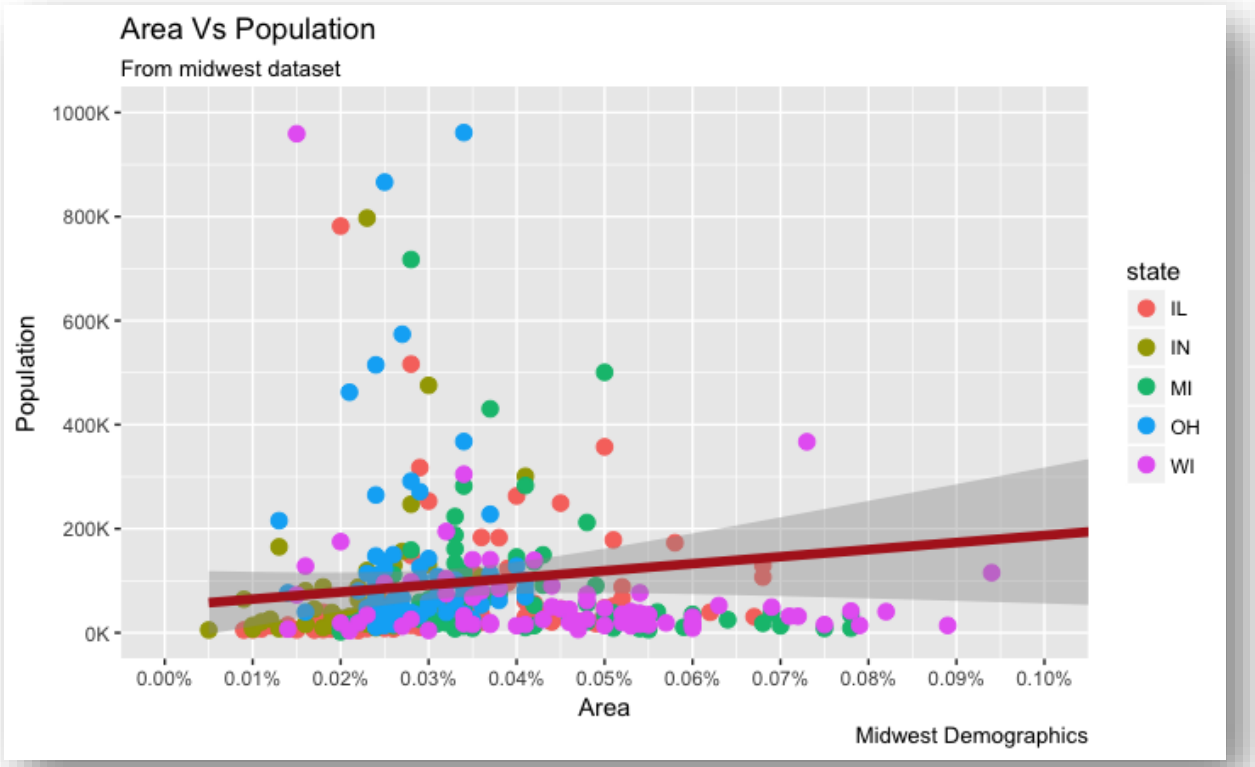
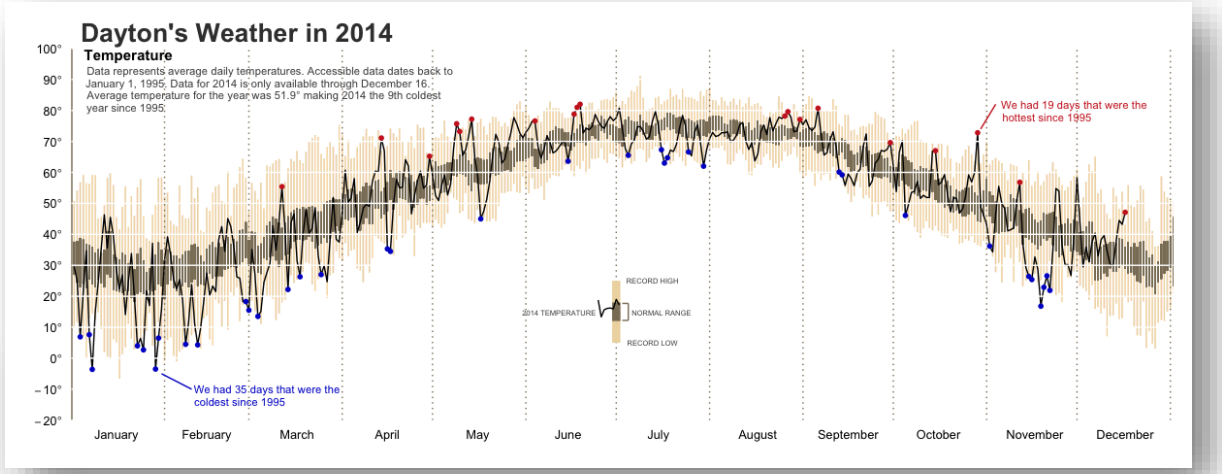
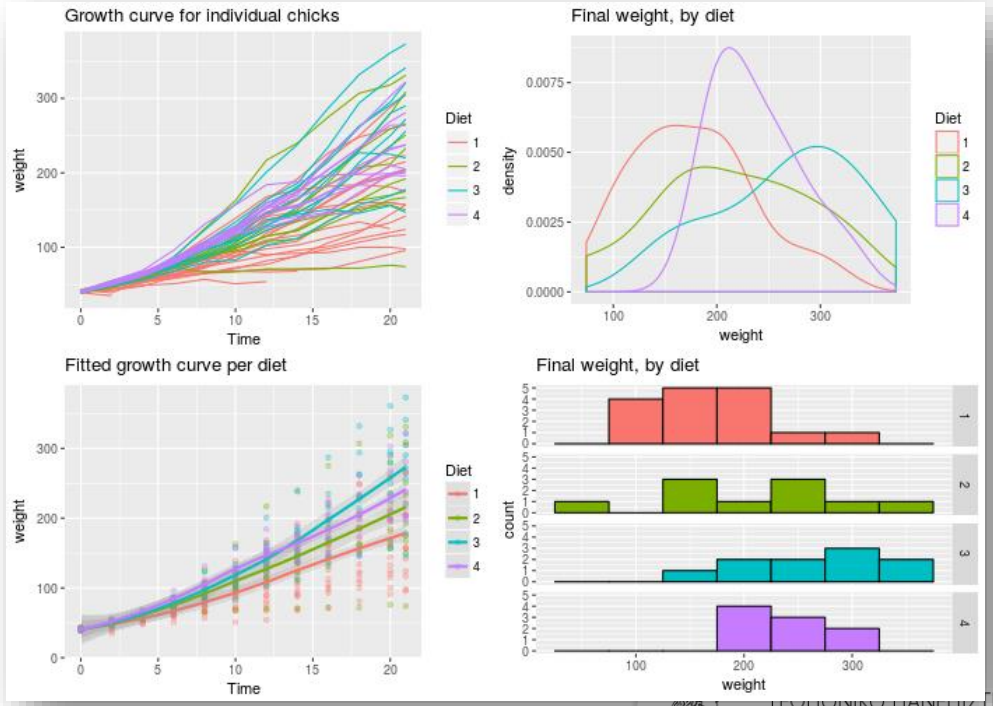
ggplot2 Basics

1. Τι είναι το ggplot
2. Βασικά στοιχεία της γραμματικής του
3. Τα πρώτα γραφήματα







https://goo.gl/9ooihB
https://goo.gl/inRmpd

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ggplot2 Basics

Γιατί ggplot (grammar of graphics);

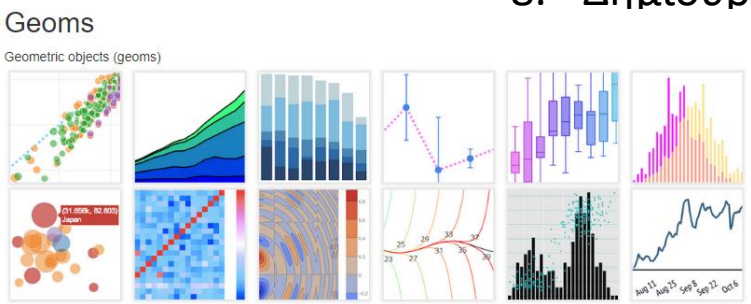
- Είναι εξαιρετικά ευέλικτο
- Λειτουργεί με θεματικά γραφικά (themes)
- Είναι ώριμο και πλήρες σύστημα γραφικών
- Πάρα πολλοί χρήστες = πάρα πολύ βοήθεια

https://goo.gl/h86R2D

Από τί αποτελείται η γραμματική του;

-η βασική ιδέα είναι ότι το τελικό γράφημα αποτελείται από αυτόνομα στοιχεία του γραφήματος που το καθένα έχει διαφορετική διαχείριση

- Τα στοιχεία αυτά είναι:
  1. Δεδομένα (data)
  2. Αισθητική χαρτογράφηση (aesthetic mapping)
  3. Γεωμετρικά στοιχεία (geometric objects)
  4. Στατιστικοί μετασχηματισμοί (statistical transformations)
  5. Κλίμακες (scales)
  6. Συντεταγμένες (coordinate system)
  7. Διευθετήσεις θέσεις (position adjustments)
  8. Δημιουργία πολλών όψεων (faceting)



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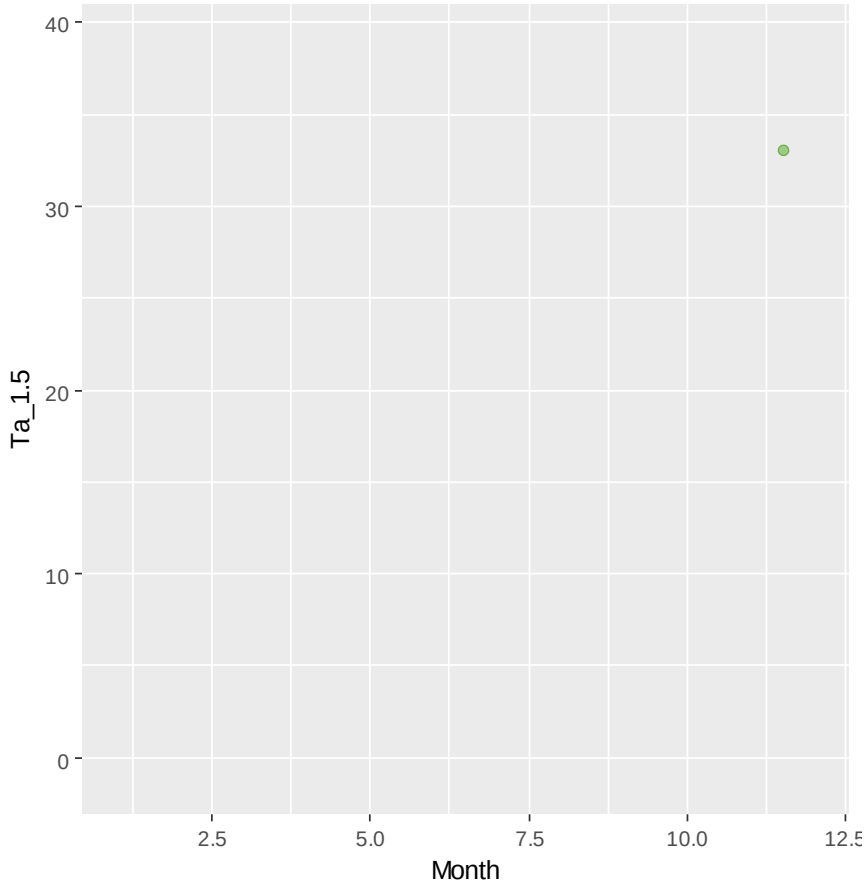
ggplot2 Basics

Τα δεδομένα μου

Τι θα δείξω από αυτά

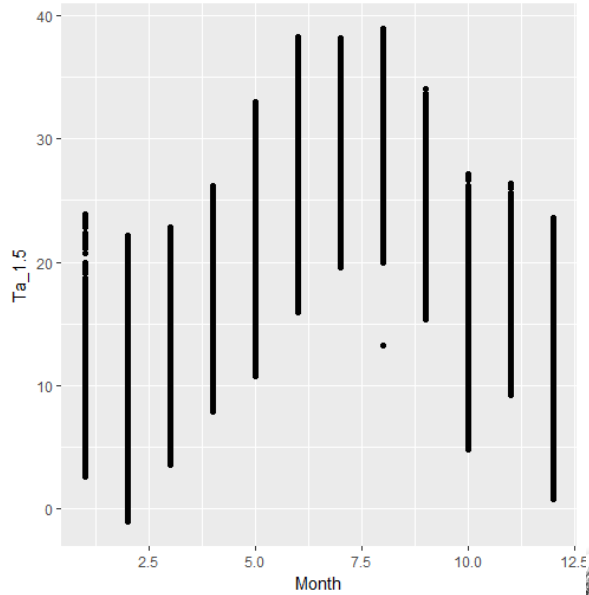
```
ggplot(my.data, aes(x=Month, y=Ta_1.5))
```

Παραμένει **κενό** γιατί δεν είπα πως θα το παρουσιάσει



Του λέω εμφάνισε τα ως σημεία

```
ggplot(my.data,aes(x=Month, y=Ta_1.5))
+geom_point()
```



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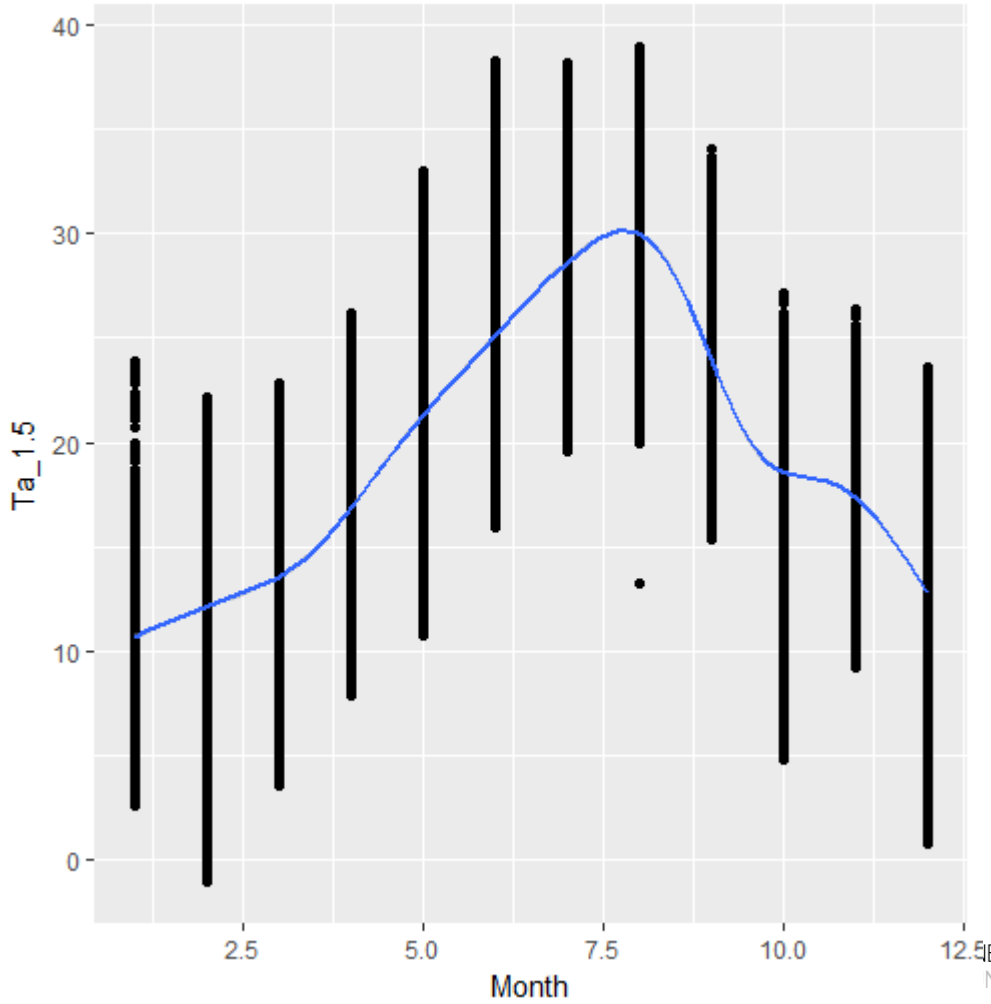
ggplot2 Basics

```
ggplot(my.data, aes(x = Month, y = Ta_1.5))
+ geom_point()
+ geom_smooth()
```

Του λέω εμφάνισε και μια γραμμή μέσου όρου

Τα layers μπαίνουν το ένα πάνω από το άλλο ως ξεχωριστά

```
ggplot(my.data, aes(x = Month, y = Ta_1.5))
+ geom_smooth()
```



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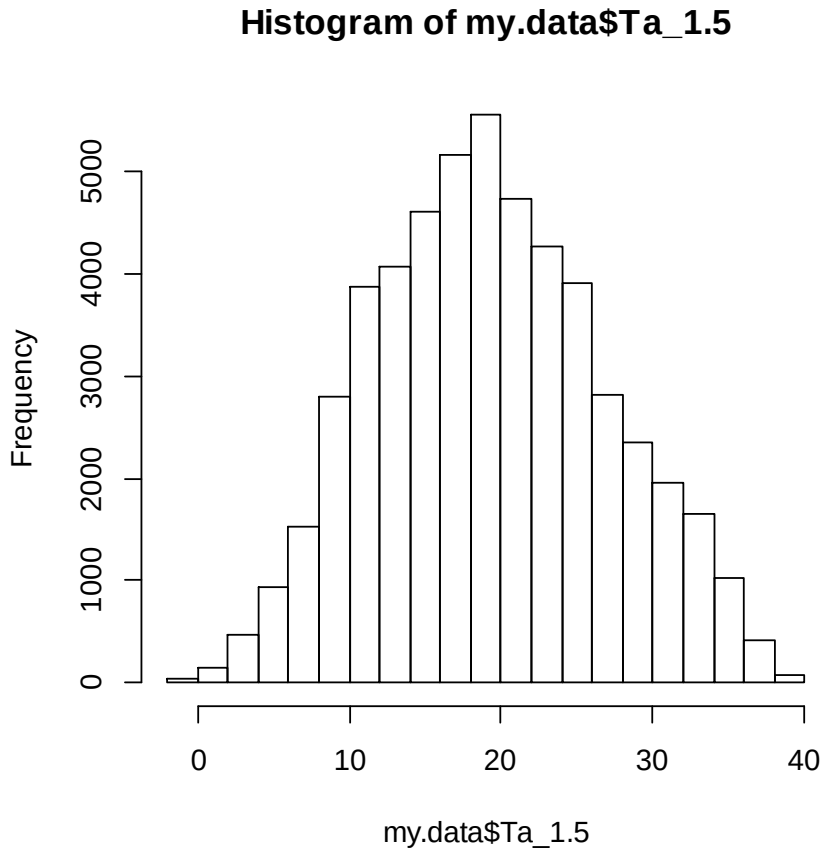
ggplot2 Basics

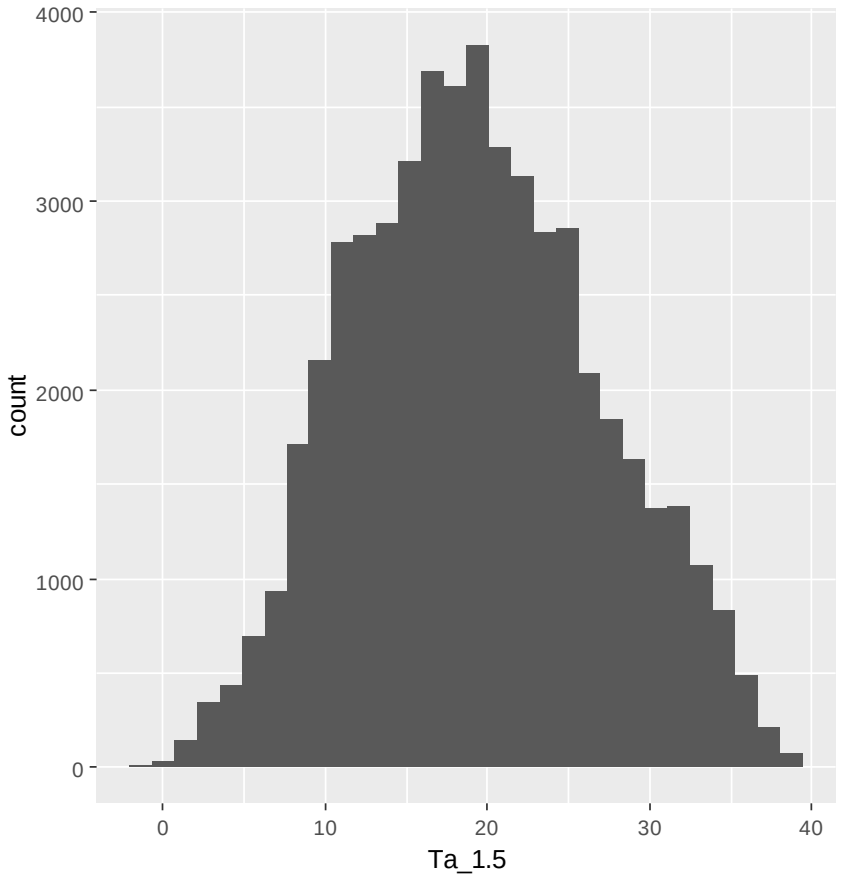
```
## Base graphics histogram

hist(my.data$Ta_1.5)
```




```
## ggplot histogram

hist1 <- ggplot(my.data, aes(x = Ta_1.5)) +
 geom_histogram()
plot(hist1)
```



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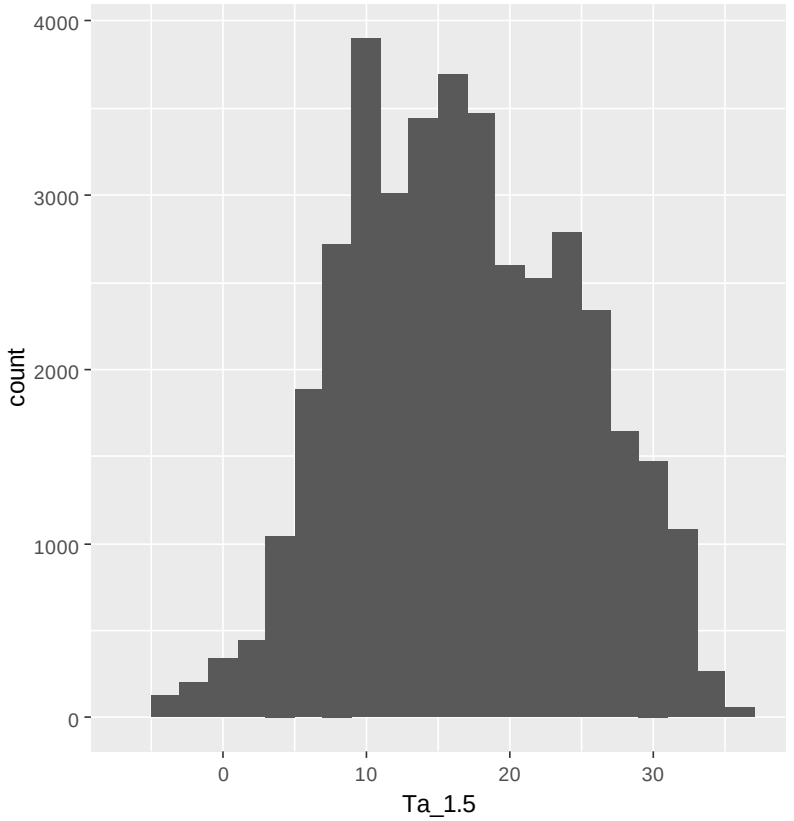
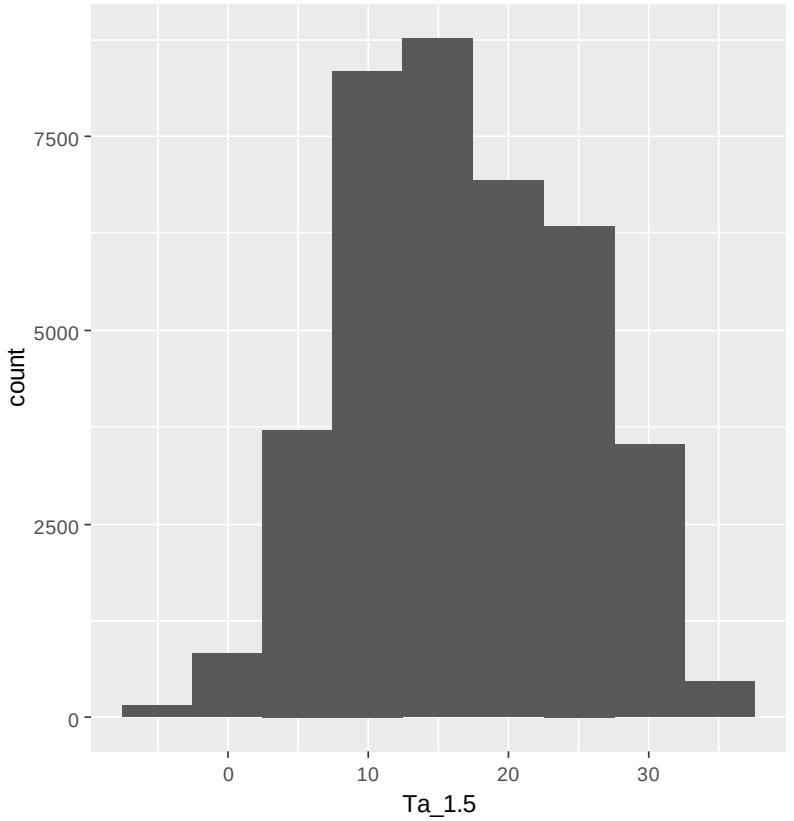
ggplot2 Basics

```
### ggplot histogram / define binwidth
hist2 <- ggplot(data = my.data, mapping
= aes(x = Ta_1.5)) +
  geom_histogram(binwidth = 2) # the
width of the bar

plot(hist2)



hist3 <- ggplot(data = my.data, mapping
= aes(x = Ta_1.5)) +
  geom_histogram(binwidth = 5)

plot(hist3)
```





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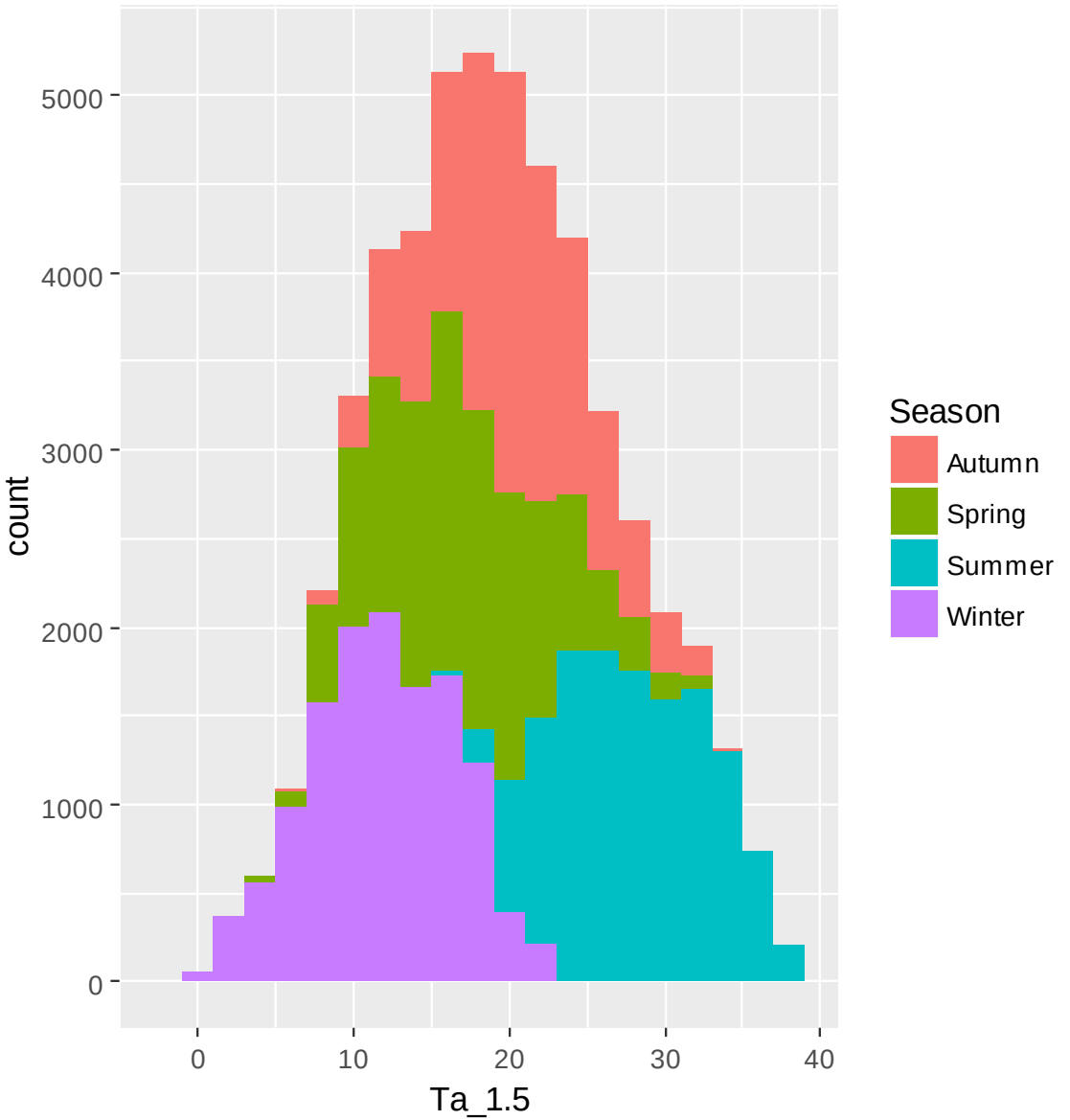
ggplot2 Basics

```
hist4 <- ggplot(data = my.data, mapping = aes(x = Ta_1.5,
fill=Season)) +
  geom_histogram(binwidth = 2)

plot(hist4)
```



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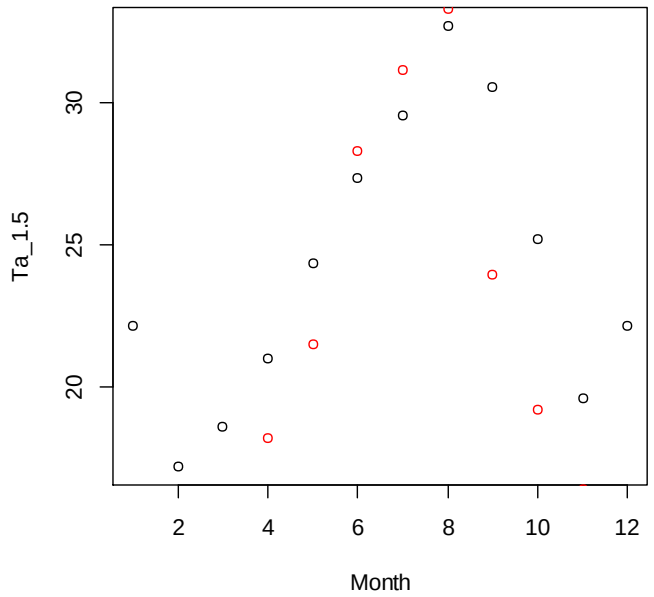
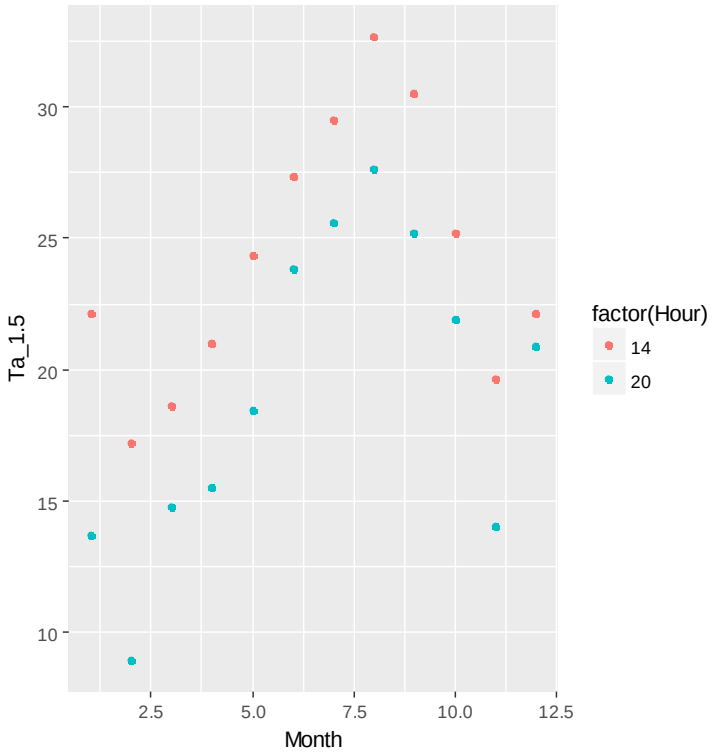
ggplot2 Basics

```
plot(Ta_1.5 ~ Month,
    data = subset(my.data, Minute== 10 & Day == 1 &
Hour==14))
points(Ta_1.5 ~ Month,
      col = "red",
      data = subset(my.data,Minute== 10 & Day == 15 &
Hour==20))
```

```
## ggplot
ggplot(subset(my.data,Hour %in% c("14", "20") &Minute == 10
& Day == 1  ),
       aes(x = Month,
           y = Ta_1.5,
           color = factor(Hour))) +
  geom_point()
```





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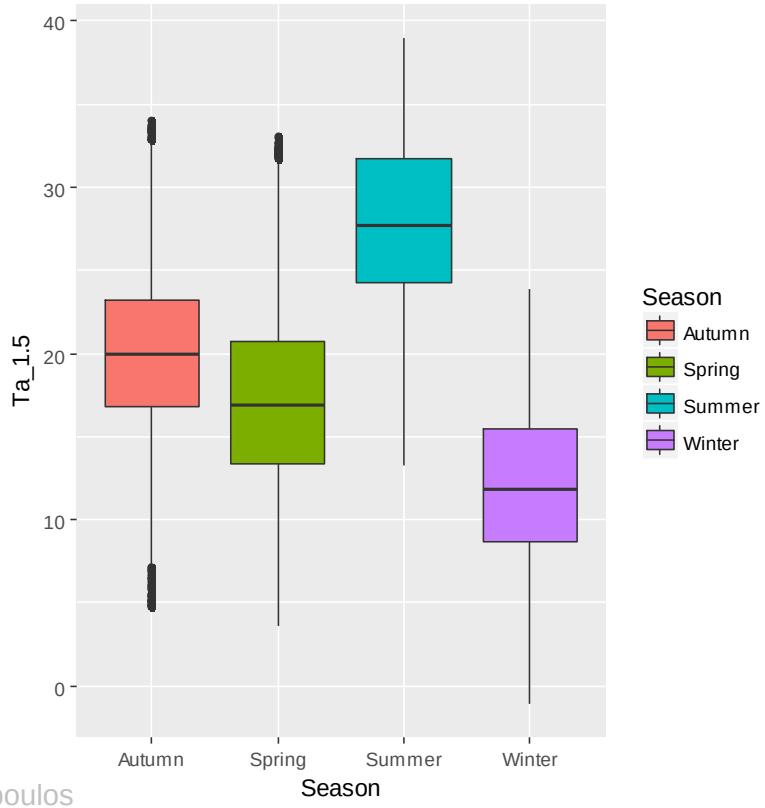
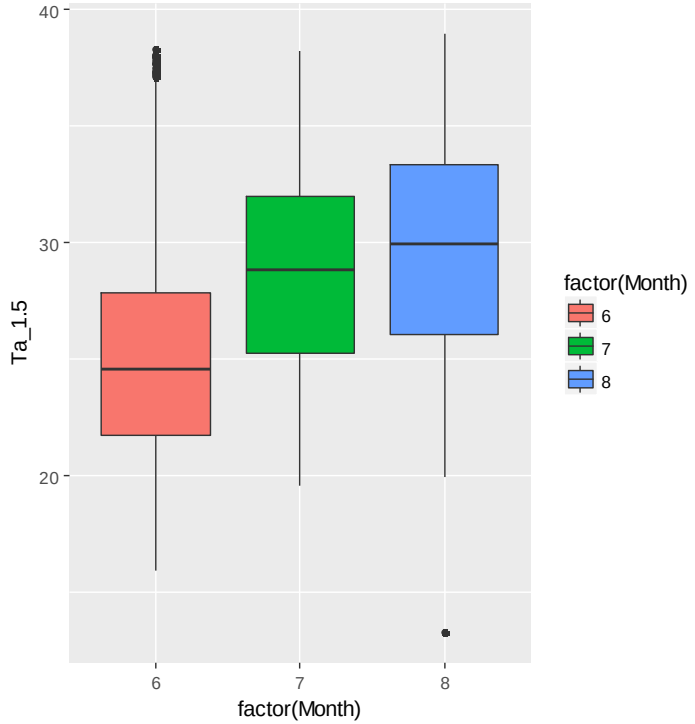
ggplot2 Basics

```
box1 <-
  ggplot(data = my.data, mapping = aes(x = Season,y=Ta_1.5))
+  geom_boxplot(aes(fill = Season))

plot(box1)
```




```
summer.data <- subset(my.data, Month == 6 | Month == 7 |
Month == 8)
box2 <-  ggplot(data = summer.data, mapping = aes(x =
factor(Month), y = Ta_1.5)) +
geom_boxplot(aes(fill=factor(Month)))

plot(box2)
```

Προσοχή!! Ότι ομαδοποιεί πρέπει να είναι **factor**



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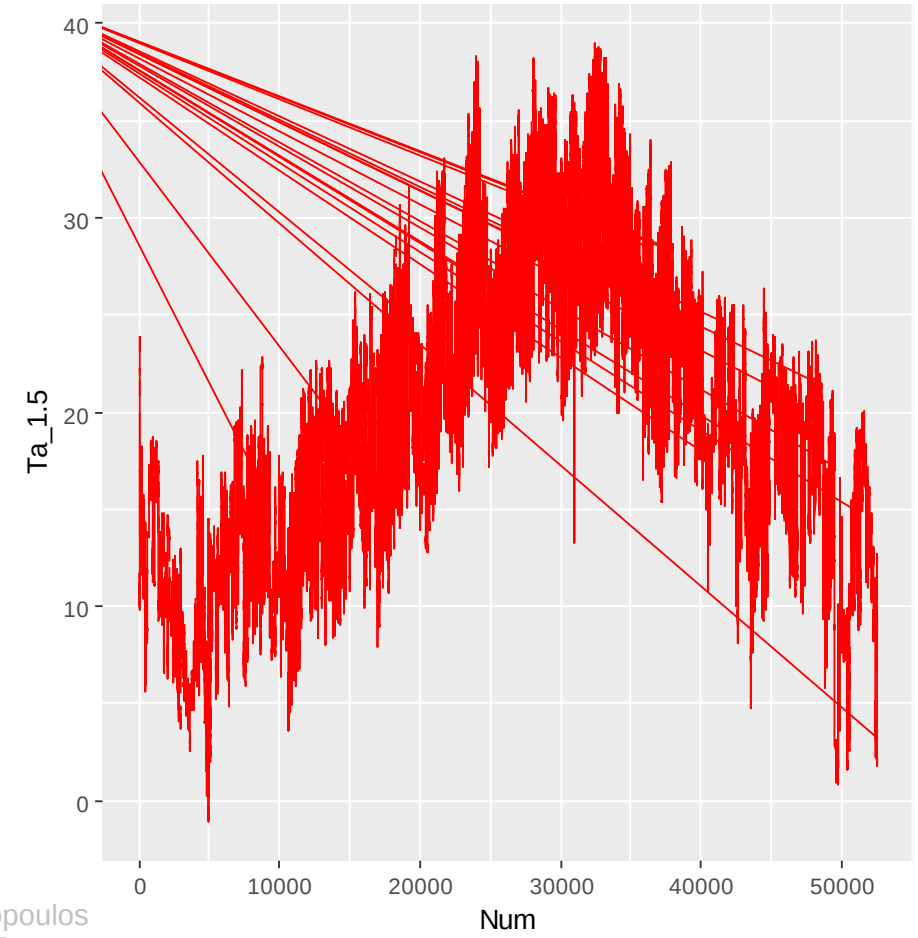
ggplot2 Basics

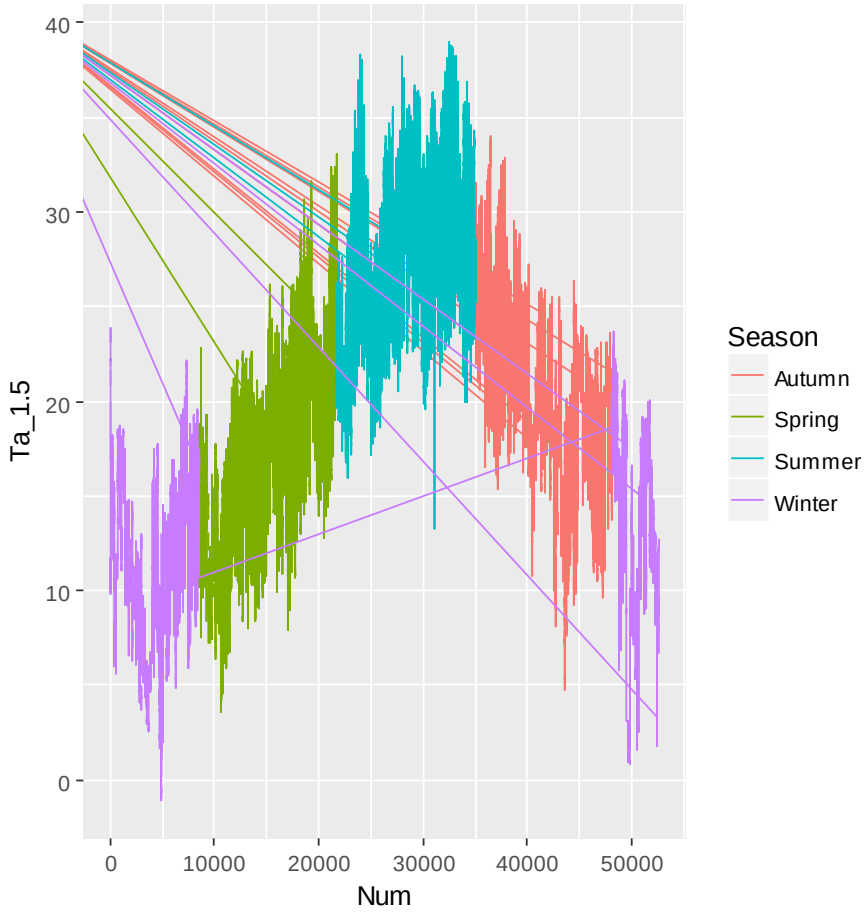
```
line1 <- ggplot(data = my.data, mapping = aes(x = Num, y = Ta_1.5)) +  geom_line(colour="red")

plot(line1)
```




```
line2 <- ggplot(data=my.data,mapping = aes(x=Num, y=Ta_1.5,col=Season))+  geom_line()

plot(line2)
```



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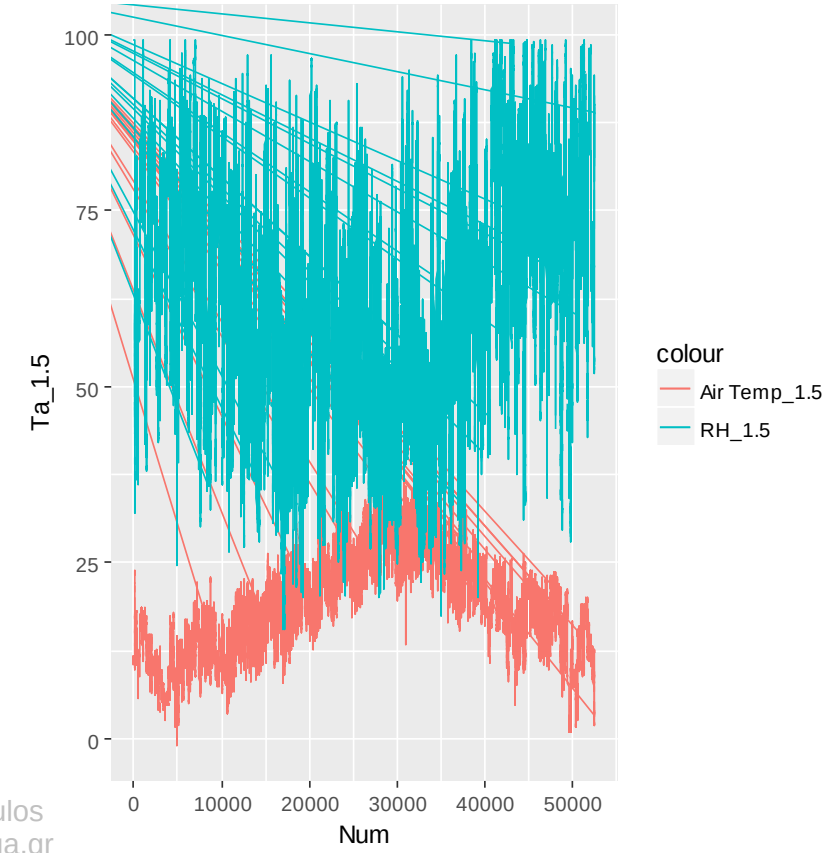
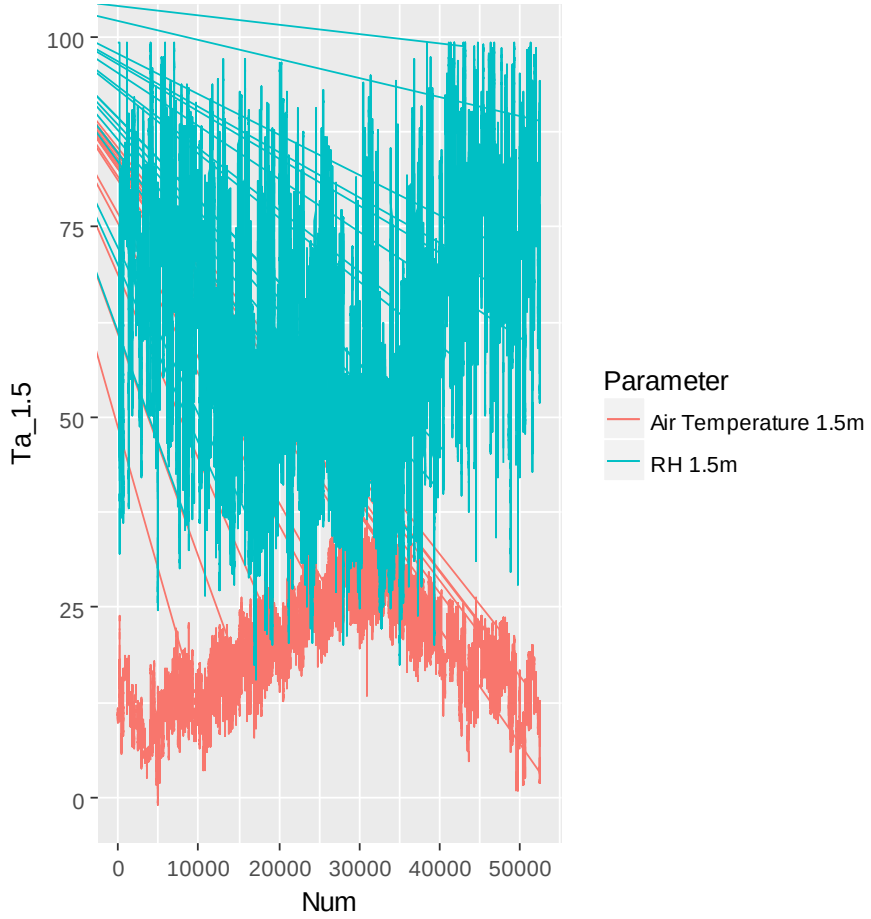
ggplot2 Basics

```
line3 <- ggplot(my.data, aes(Num)) +
  geom_line(aes(y = Ta_1.5, colour = "Air Temp_1.5")) +
  geom_line(aes(y = RH_1.5, colour = "RH_1.5"))

plot(line3)
```




```
line4 <- line3 + scale_color_discrete(name = "Parameter",
                                      labels = c("Air Temperature 1.5m", "RH
1.5m"))
plot(line4)
```



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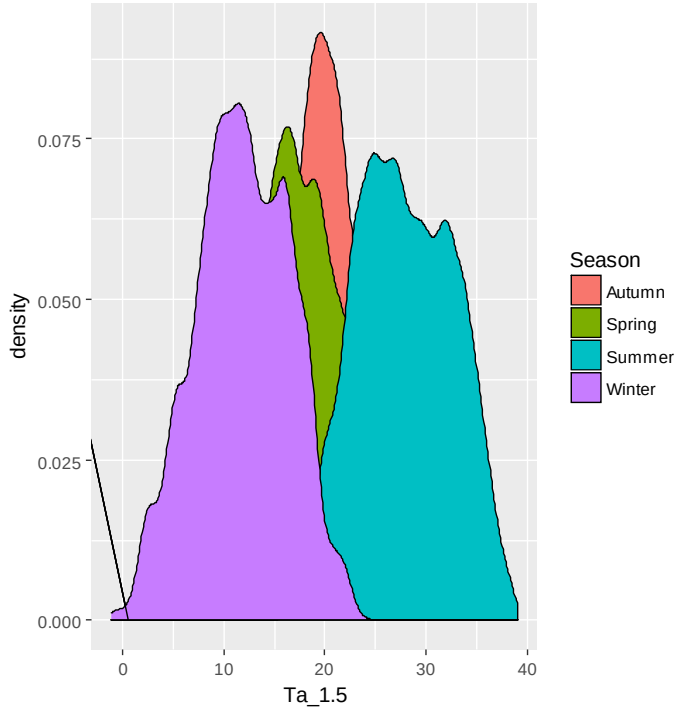
ggplot2 Basics

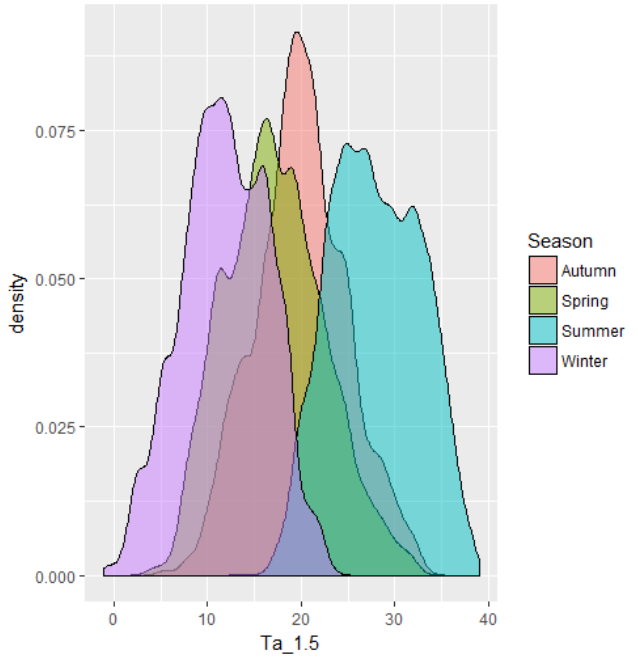
```
dens1 <-  ggplot(data = my.data, mapping = aes(x = Ta_1.5, fill = Season)) + geom_density()

plot(dens1)
```

```
dens2 <-  ggplot(data = my.data, mapping = aes(x = Ta_1.5, fill = Season)) +  geom_density(alpha=0.5)

plot(dens2)
```





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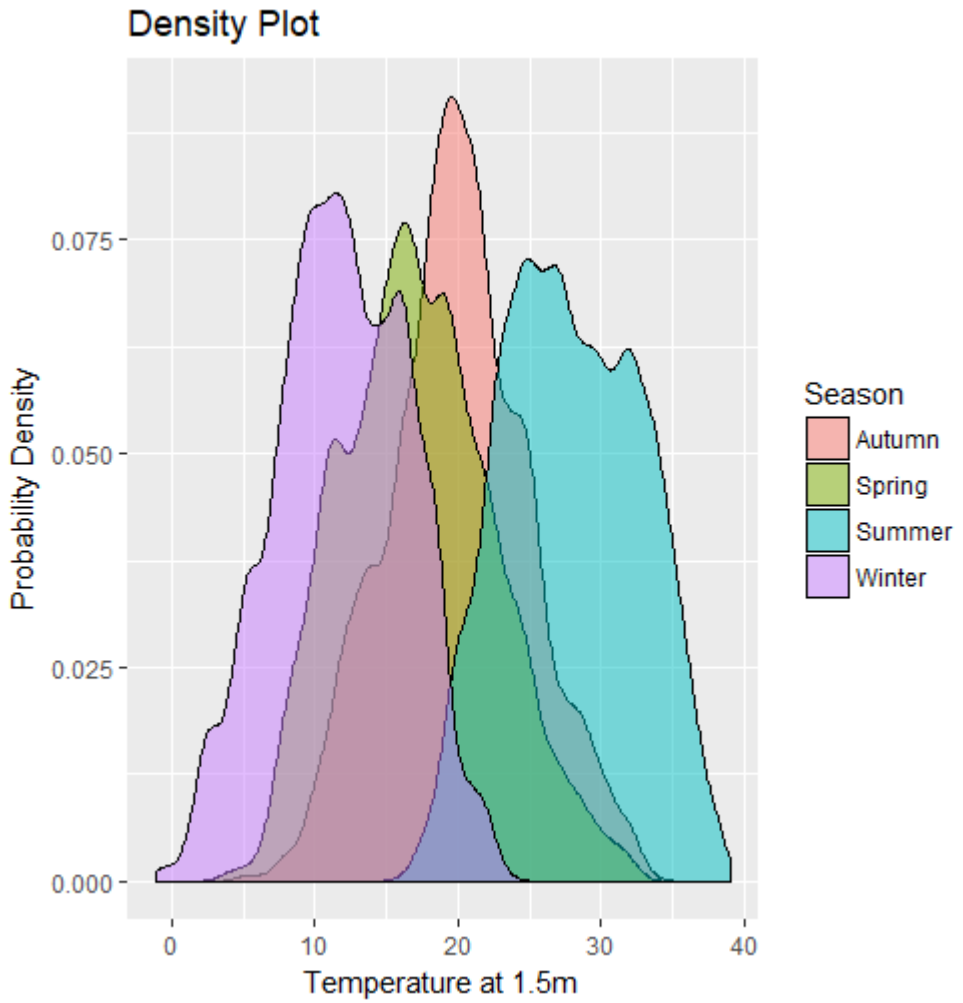
ggplot2 Basics

Labels

```
dens3 <-
  ggplot(data = my.data, mapping = aes(x = Ta_1.5, fill = Season)) +
  geom_density(alpha = 0.5) +
  labs(title = "Density Plot", x = "Temperature at 1.5m", y =
"Probability Density")

plot(dens3)
```



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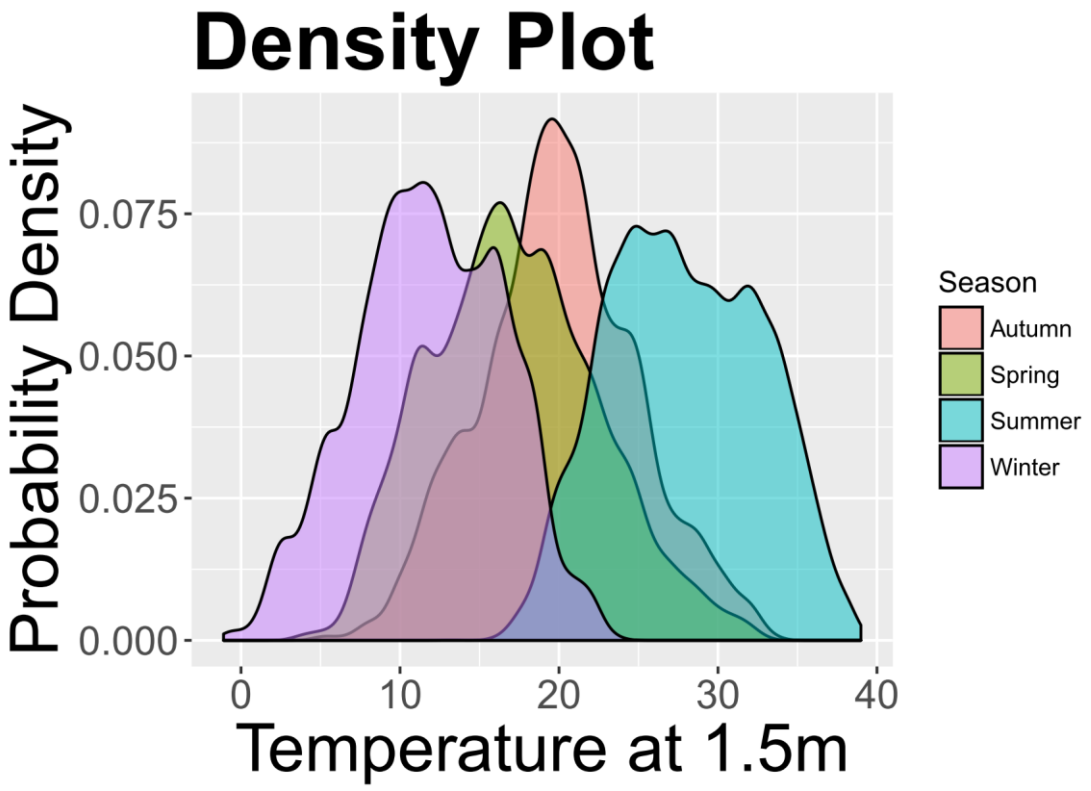
ggplot2 Basics

Theme

Χρησιμοποιώ προηγούμενο γραφικό στοιχείο και προσθέτω στοιχεία για τους τίτλους και τους αριθμούς των αξόνων

```
dens4 <- dens3 +
  theme(
    plot.title = element_text(size = 30, face = "bold"),
    axis.text.x = element_text(size = 15),
    axis.text.y = element_text(size = 15),
    axis.title.x = element_text(size = 25),
    axis.title.y = element_text(size = 25)
  )

plot(dens4)
```



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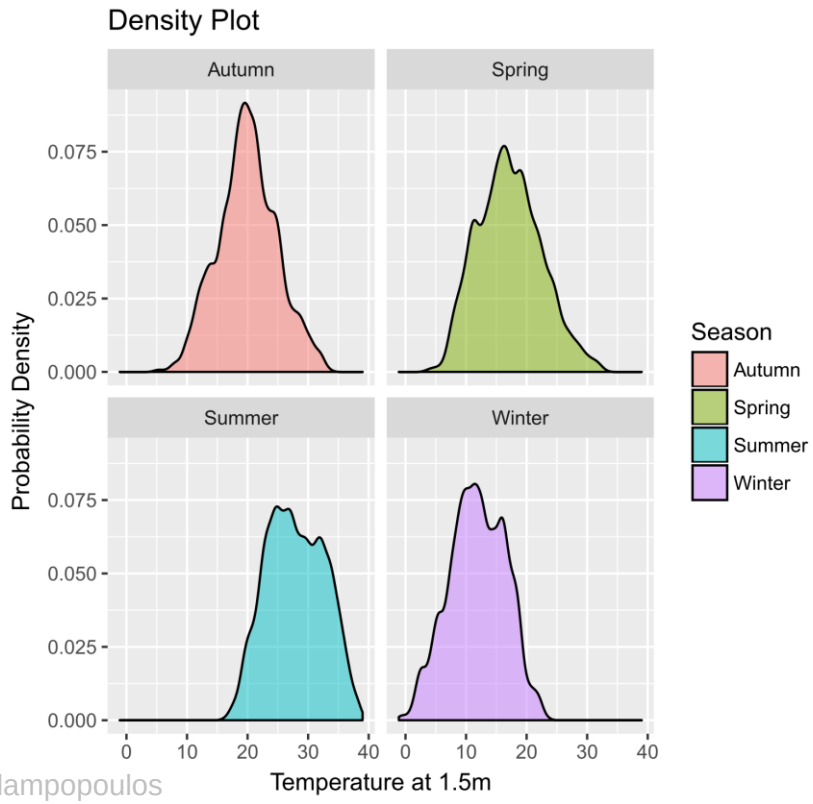
ggplot2 Basics

Facets

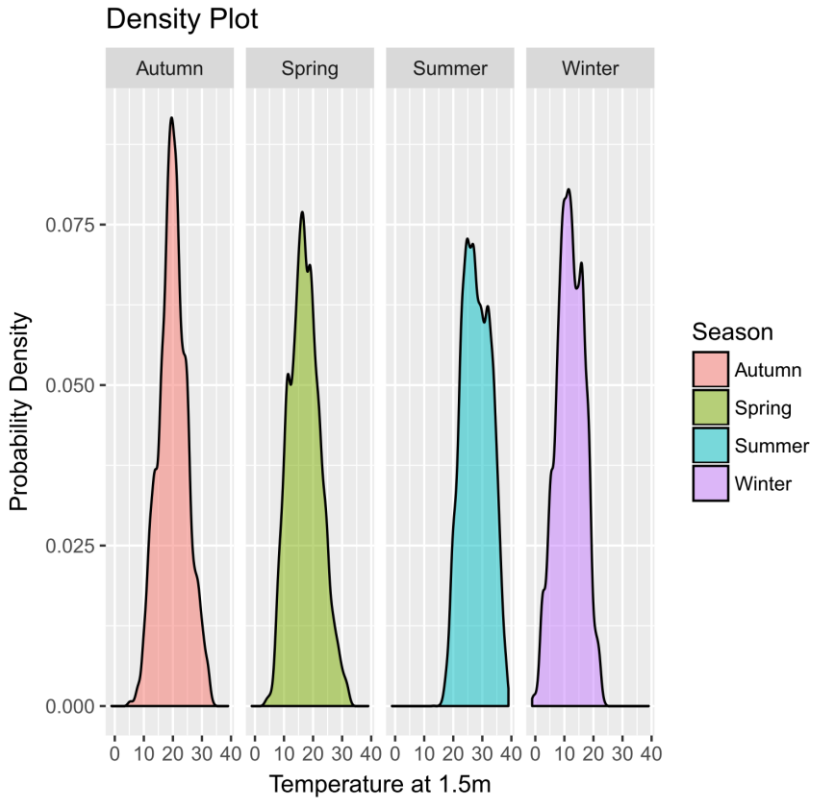
```
f_dens1 <- dens3+
facet_wrap(~Season)

plot(f_dens1)
```




```
f_dens2 <- dens3+
facet_wrap(~Season,ncol=4)

plot(f_dens2)
```



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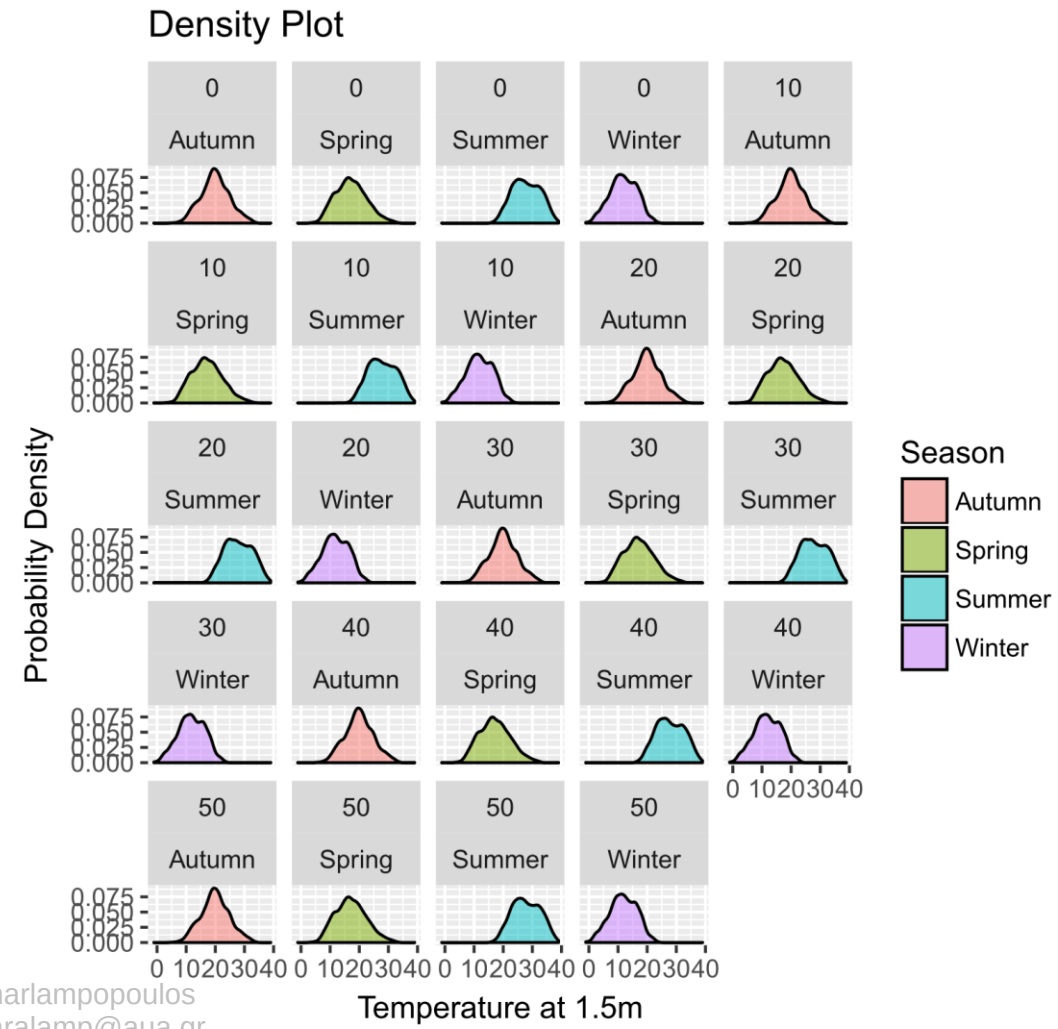
ggplot2 Basics

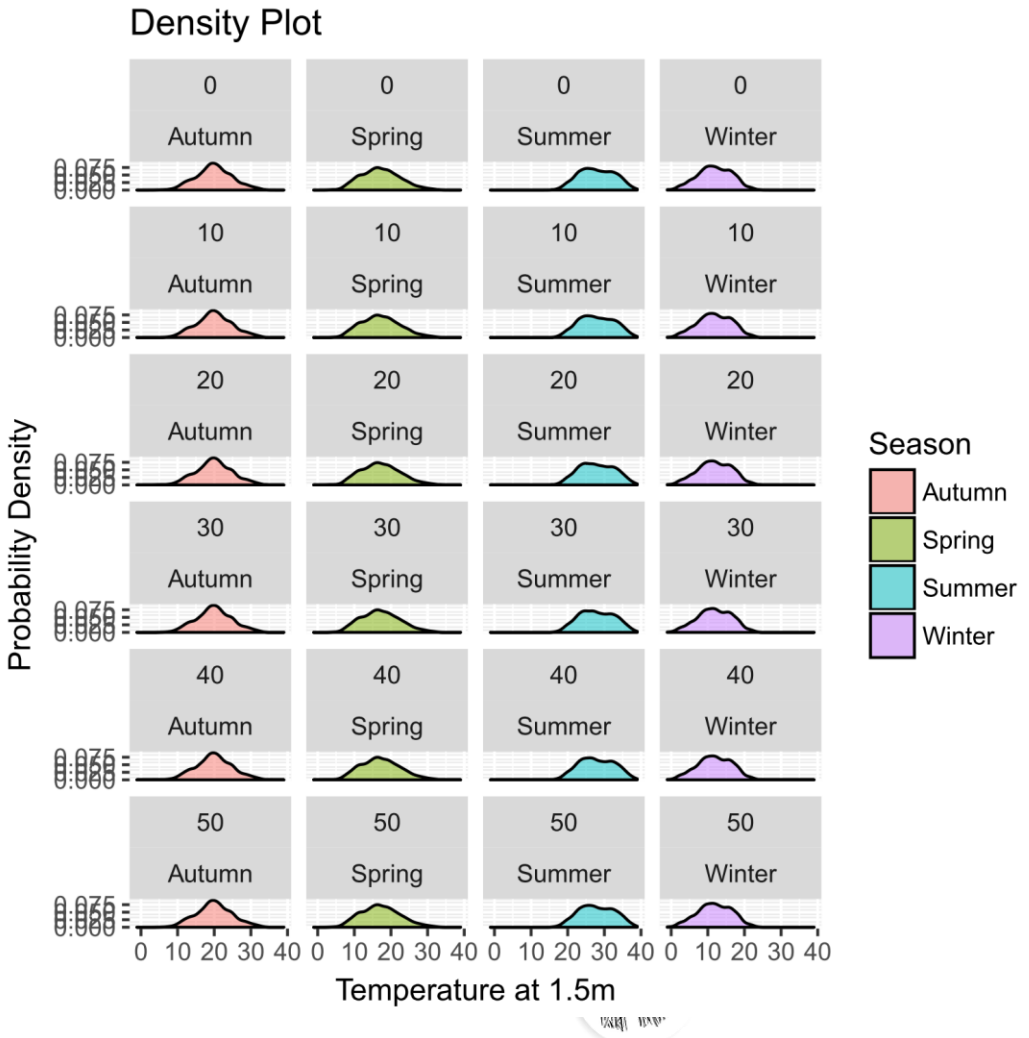
```
f_dens3 <- dens3+facet_wrap(Minute~Season)

plot(f_dens3)
```




```
f_dens4 <- dens3+facet_wrap(Minute~Season, ncol=4)

plot(f_dens4)
```



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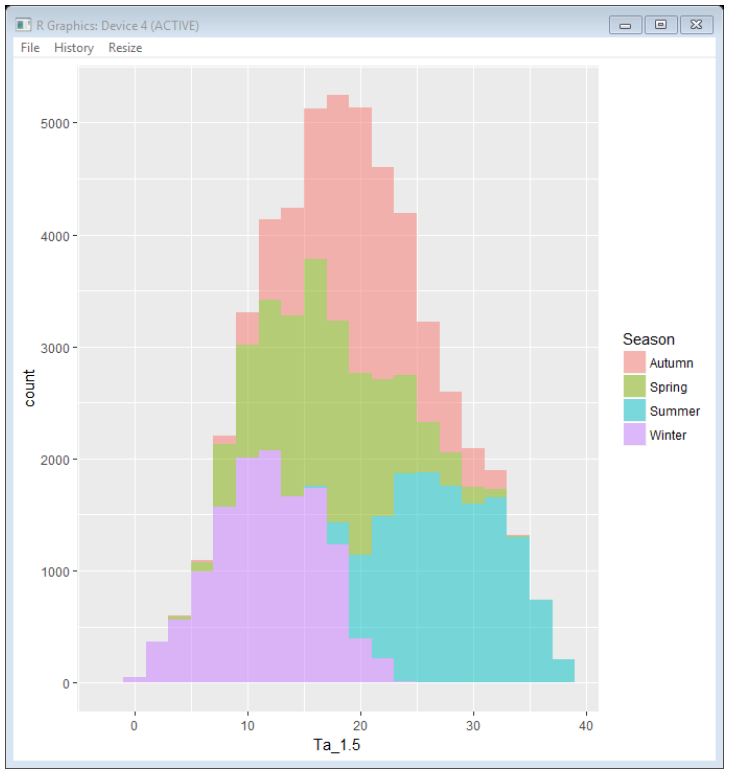
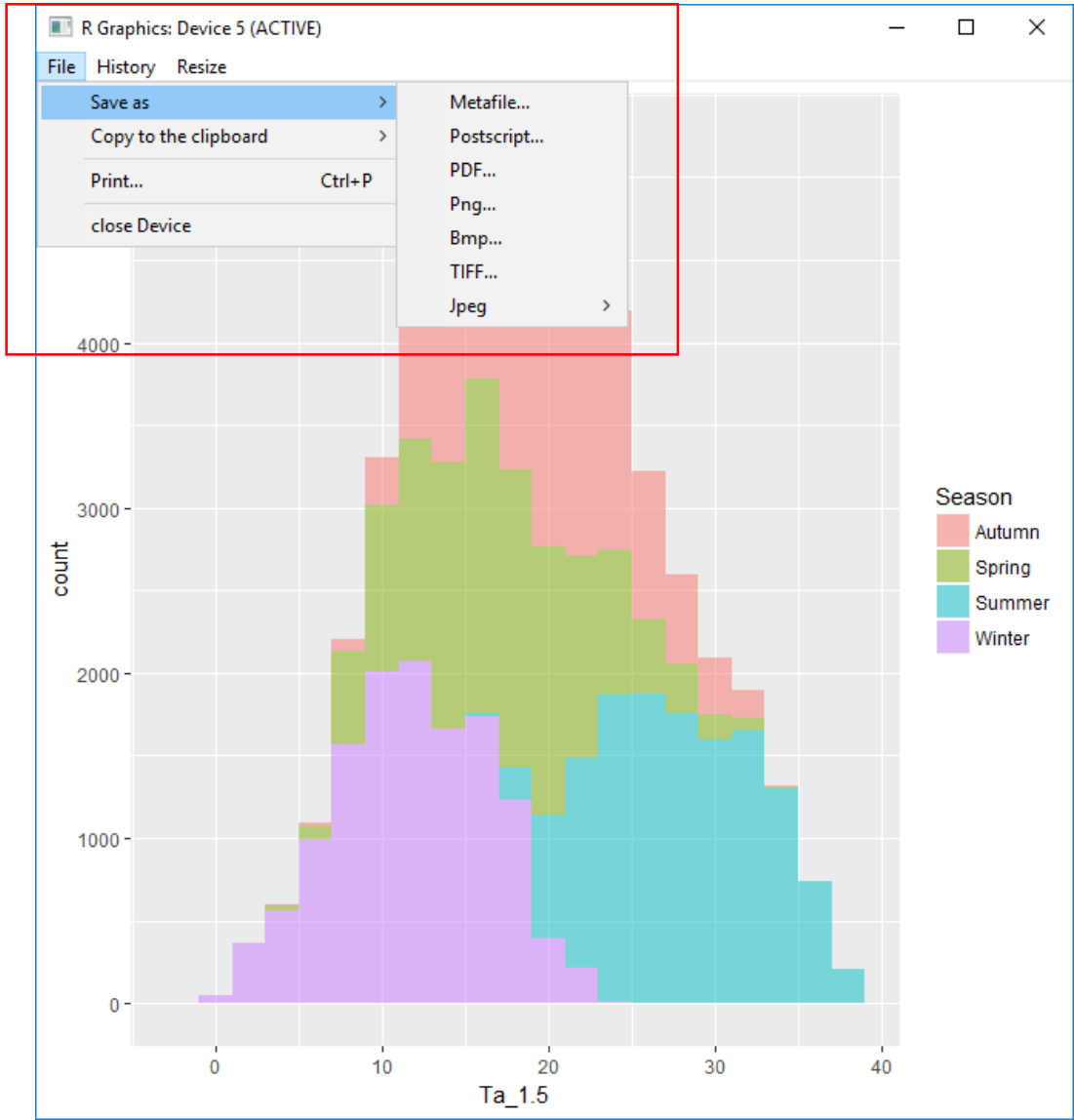
ggplot2 Basics

```
windows()# graphics device
hist6 <-
  ggplot(data = my.data, mapping = aes(x = Ta_1.5, fill = Season)) +
  geom_histogram(binwidth = 2, alpha = 0.5) # transparency of the
the graph

plot(hist6)
```





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