GGPLOT Basics

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(◕‿◕✿)

In [1]:
```
library(knitr)
library(tidyverse)
library(ggplot2)
```

```
── Attaching packages ─────────────────────────────────────── tidyverse
1.3.0 ──

✔ ggplot2 3.3.2     ✔ purrr   0.3.4
✔ tibble  3.0.1     ✔ dplyr   1.0.0
✔ tidyr   1.1.0     ✔ stringr 1.4.0
✔ readr   1.3.1     ✔ forcats 0.5.0

── Conflicts ────────────────────────────────────────── tidyverse_confl
icts() ──
✖ dplyr::filter() masks stats::filter()
✖ dplyr::lag()    masks stats::lag()
```

In [2]:
```
sales_no_cancels <- read_csv('SalesDataNoCancels.csv')
head(sales_no_cancels)
```

```
Parsed with column specification:
cols(
  InvoiceNo = col_double(),
  StockCode = col_character(),
  Description = col_character(),
  Quantity = col_double(),
  InvoiceDate = col_character(),
  UnitPrice = col_double(),
  CustomerID = col_double(),
  Country = col_character(),
  CanceledQty = col_double(),
  Matches = col_logical()
)
```

A tibble: 6 × 10

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country	Canc
<dbl>	<chr>	<chr>	<dbl>	<chr>	<dbl>	<dbl>	<chr>	
563614	23345	DOLLY GIRL BEAKER	200	8/18/2011 8:51	1.08	12415	Australia	
568708	23391	I LOVE LONDON MINI BACKPACK	4	9/28/2011 15:41	4.15	12393	Australia	
556917	22418	10 COLOUR SPACEBOY PEN	48	6/15/2011 13:37	0.85	12415	Australia	
543989	20973	12 PENCIL SMALL TUBE WOODLAND	384	2/15/2011 9:52	0.55	12415	Australia	
547659	20984	12 PENCILS TALL TUBE POSY	12	3/24/2011 13:05	0.85	12434	Australia	
556917	20984	12 PENCILS TALL TUBE POSY	240	6/15/2011 13:37	0.29	12415	Australia	

In [3]:
```
# new columns with total price
sales_no_cancels$Tot_P<-sales_no_cancels$Quantity*sales_no_cancels$UnitPrice

# subset data:
sub_sales<-sales_no_cancels[c('Country','Tot_P')]

# remove UK , because it dwarfs these data:
Wo_uk<-sub_sales[!sub_sales$Country=='United Kingdom',]
```

In [4]:
```
# Aggregated Country Sales:
country_sales_aggr<-aggregate(Wo_uk$Tot_P, by=list(Category=Wo_uk$Countr
y), FUN=sum)
head(country_sales_aggr)
```

A data.frame: 6 × 2

	Category	x
	<chr>	<dbl>
1	Australia	136919.90
2	Austria	10198.68
3	Bahrain	548.40
4	Belgium	40938.69
5	Brazil	1143.60
6	Canada	3666.38

In [5]:
```
# Finding Top 12 Items Sold By Sales:
item_sales<-sales_no_cancels %>%
  group_by(Description) %>%
  summarise(Sales_Tot = sum(Tot_P))

top_twelve_items_sold<-head(item_sales[order(-item_sales$Sales_Tot),],12
)
# top_twelve_items_sold
```

```
`summarise()` ungrouping output (override with `.groups` argument)
```

GGPLOT: background ideas

- If you are coming from using `base R` for graphics, understand that `ggplot` focuses on using dataframes instead of vectors for plotting.
- Layering is also a distinction and advantage for your plots as well

---

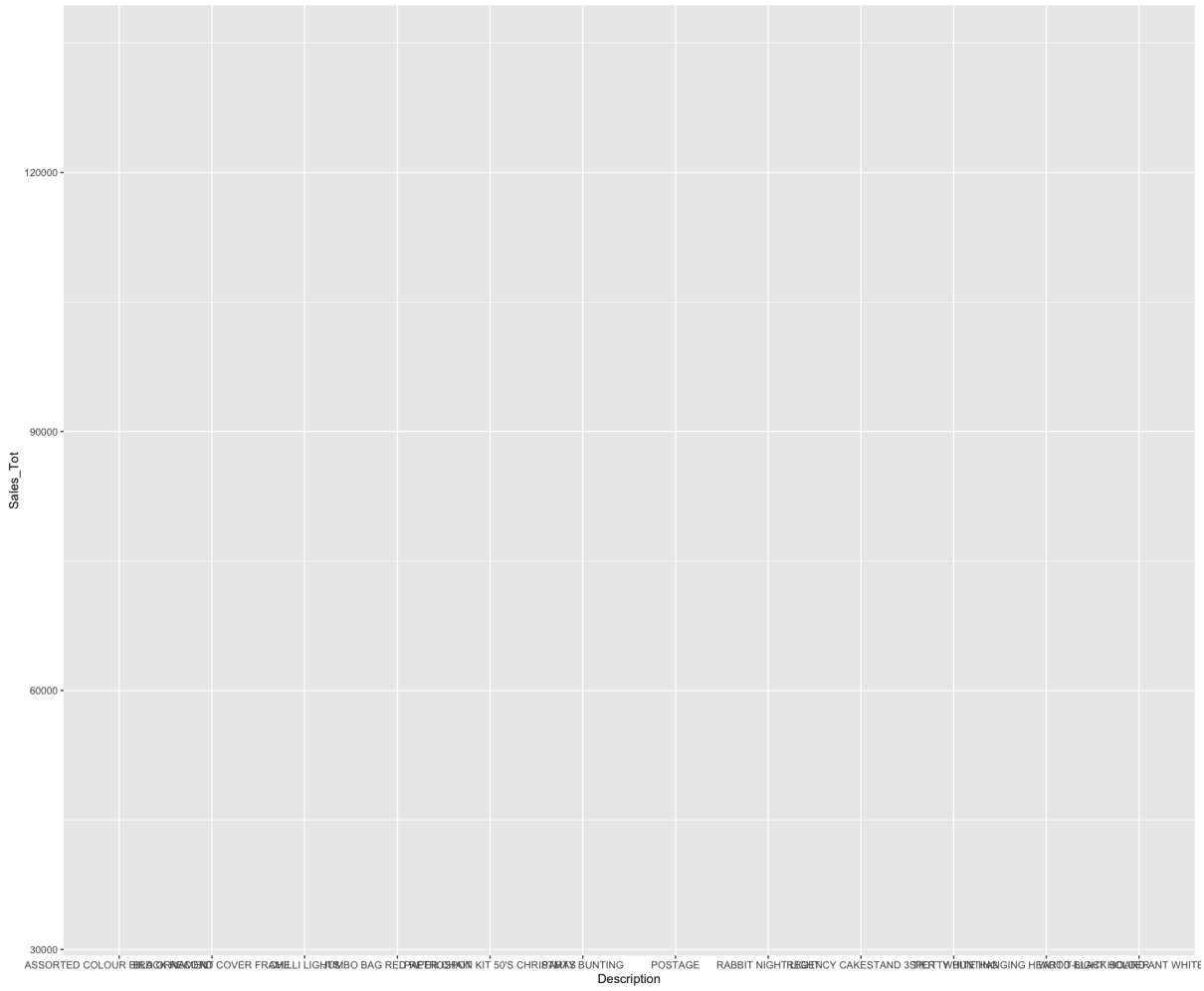
- Using `ggplot()` will initialize your plot
- `aes()` : stands for [*aesthetic*] mapping of your variables
  - `There is a note: ggplot(df, aes(variable)) instead of ggplot(df, aes(df$variable))`
  - `aes()` : can be passed to ggplot or to a give layer; by default it is passed to every layer.

https://ggplot2.tidyverse.org/reference/aes.html (https://ggplot2.tidyverse.org/reference/aes.html)

Why was this blank?

ggplot, cannot interpret what you meant. Each layer is telling it how to react and what to do. It is based on your input

In [86]:
```
ggplot(top_twelve_items_sold, aes(x=Description, y=Sales_Tot))
```

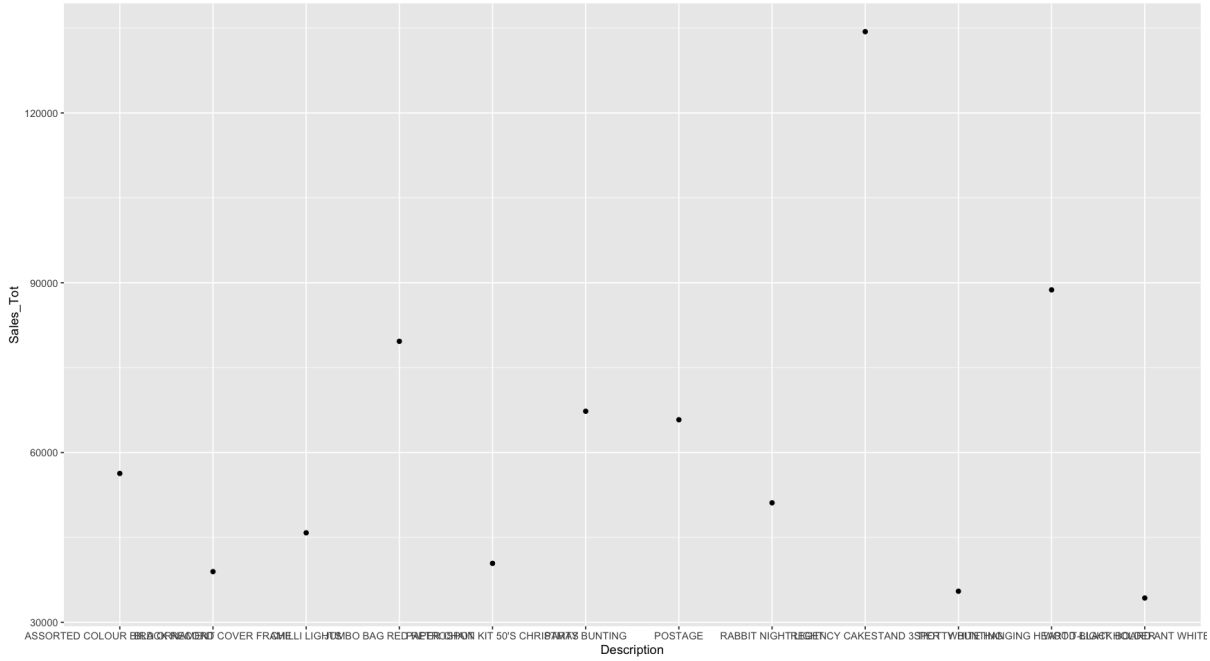


In [ ]:
```
# Lets Get rid of the Scientific notation on the y-axis

options(scipen=999)  # turn off scientific notation i.e 1e+09

ggplot(country_sales_aggr, aes(x=Category, y=x))+ geom_point()
```

Now what?

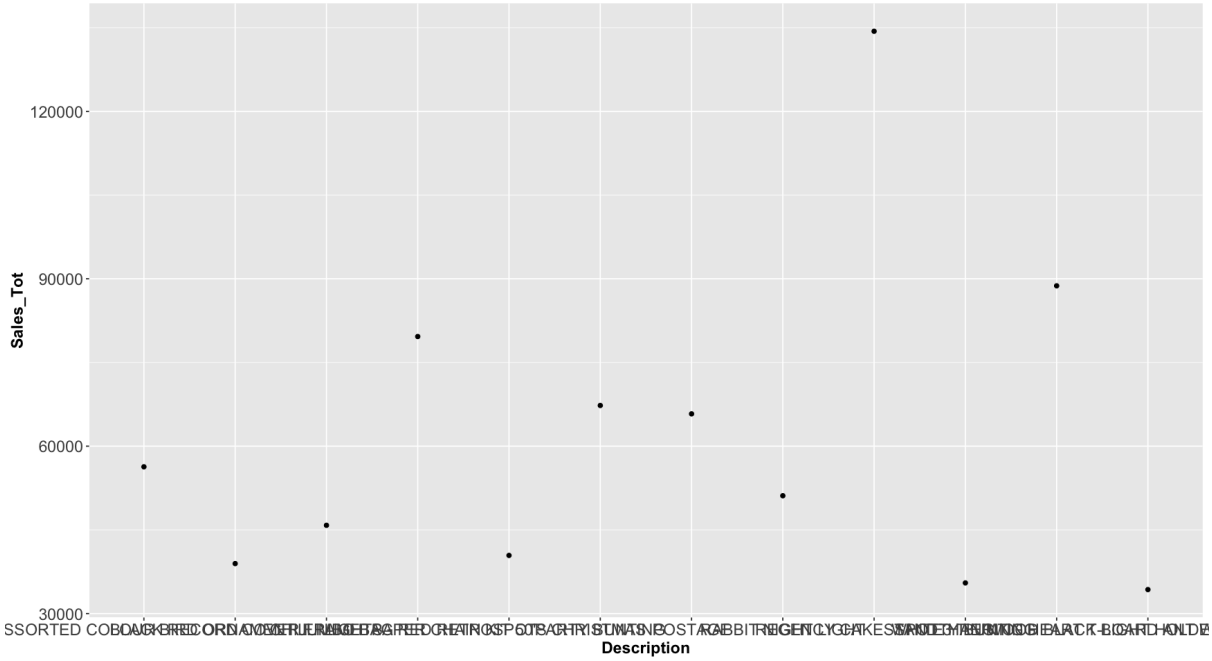
We have our data showing up; but there are a few problems. For simplicity and illustration consider increasing the actual (figure) size.

In [8]:
```
# Add Layer to set plot size:
options(repr.plot.width=14.5, repr.plot.height=8)

ggplot(top_twelve_items_sold, aes(x=Description, y=Sales_Tot)) + geom_po
int()
```



How About `Increasing the Label Sizes` so we don't need magnifying glasses and super powers.

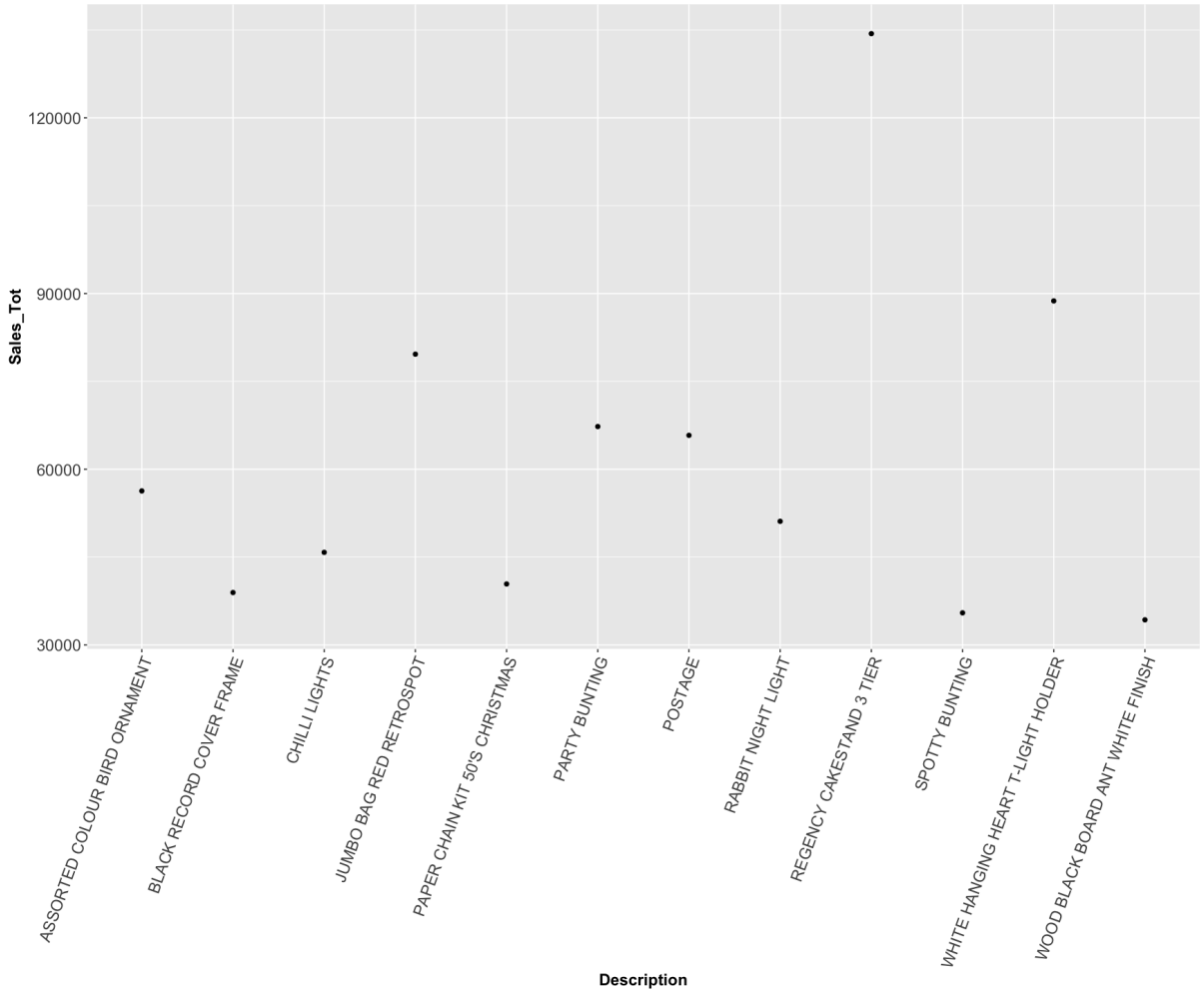
In [12]:
```
# Add Layer to set plot size:
options(repr.plot.width=14.5, repr.plot.height=8)

ggplot(top_twelve_items_sold, aes(x=Description, y=Sales_Tot)) + geom_po
int() +
# Increase the axis text
theme(axis.text=element_text(size=14),
        axis.title=element_text(size=14,face="bold"))
```



We are getting closer but that x-axis is cluttered:

- side note: had to adjust height due to new label formatting

In [28]:
```
options(repr.plot.width=14.5, repr.plot.height=12)

ggplot(top_twelve_items_sold, aes(x=Description, y=Sales_Tot)) + geom_po
int() +
# Increase the axis text
theme(axis.text=element_text(size=14),
        axis.title=element_text(size=14,face="bold"))+
# Change Text angle of x-ticks
theme(axis.text.x = element_text(angle = 70, hjust = 1))
```



Ok, got a scatter plot need a `Title`, but we can change this to a bar chart considering what we are comparing.

- Lets store our current data as a variable and work from there

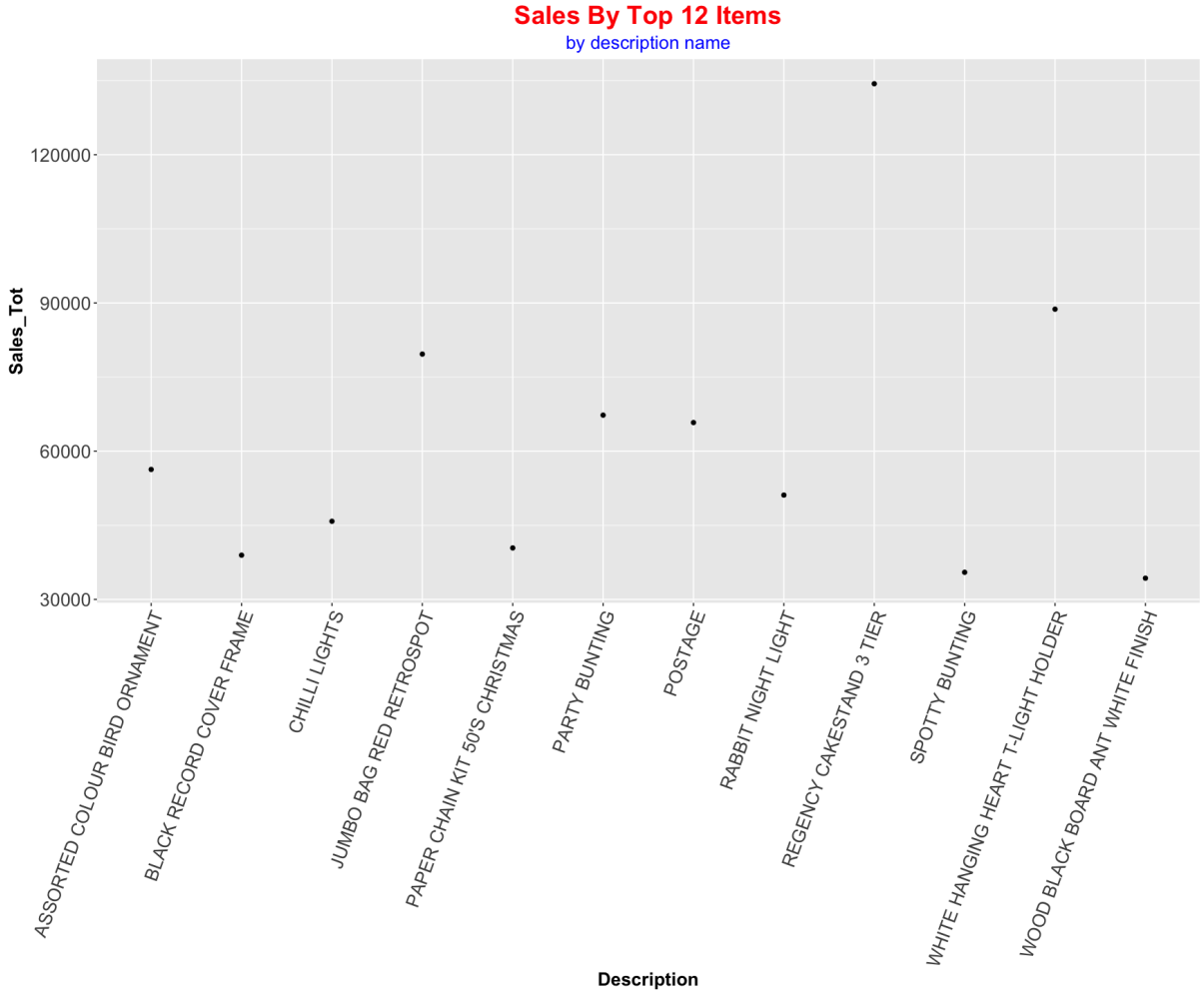
In [53]:
```
options(repr.plot.width=14.5, repr.plot.height=12)

g_scat<-ggplot(top_twelve_items_sold, aes(x=Description, y=Sales_Tot)) +
geom_point() +
# Increase the axis text
theme(axis.text=element_text(size=16),
        axis.title=element_text(size=16,face="bold"))+
# Change Text angle of x-ticks
theme(axis.text.x = element_text(angle = 70, hjust = 1))
```

Setting up the Title:

The `title` and `subtitle` are setup using the `labs()` notations where we use a `theme` to tidy up our hot mess. I decide to show a few things: lets change the color, size and align it properly to the center.

- `hjust` : gives us the ability to shift the labels:
  - `hjust=0` : plot is placed to the **left**
  - `hjust =0.5` : **center**
  - `hjust=1` : **right**

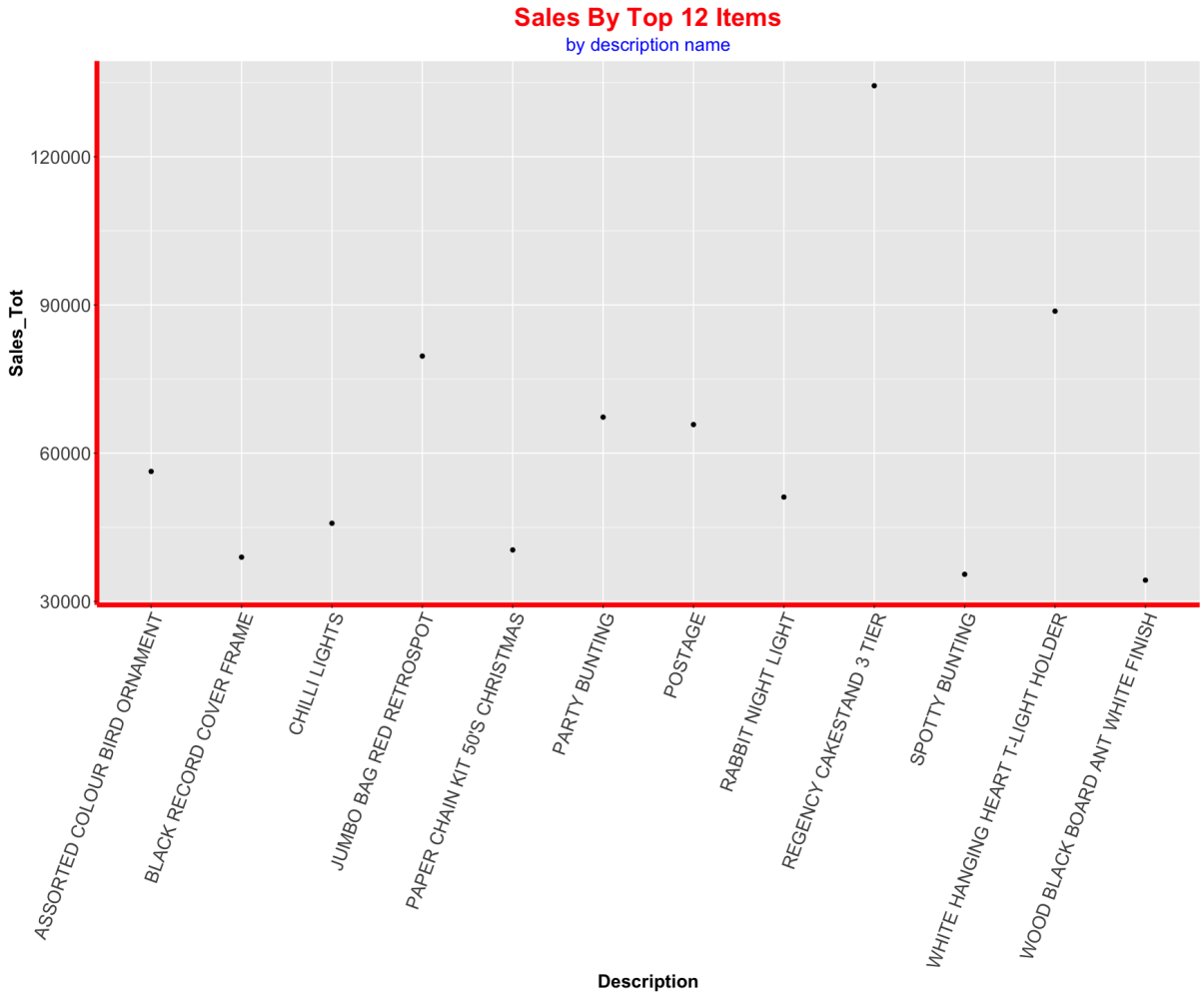
In [54]:
```
g_scat+ labs(title="Sales By Top 12 Items",
             subtitle="by description name")+
theme(
  plot.title = element_text(color = "red", size = 22, face = "bold",hjus
t = .5),
  plot.subtitle = element_text(color = "blue",size=16,hjust=.5))
```



What if you want to add highlighting to the axis?

In [62]:
```
g_almost<-g_scat+ labs(title="Sales By Top 12 Items",
             subtitle="by description name")+
theme(
  plot.title = element_text(color = "red", size = 22, face = "bold",hjus
t = .5),
  plot.subtitle = element_text(color = "blue",size=16,hjust=.5))
```

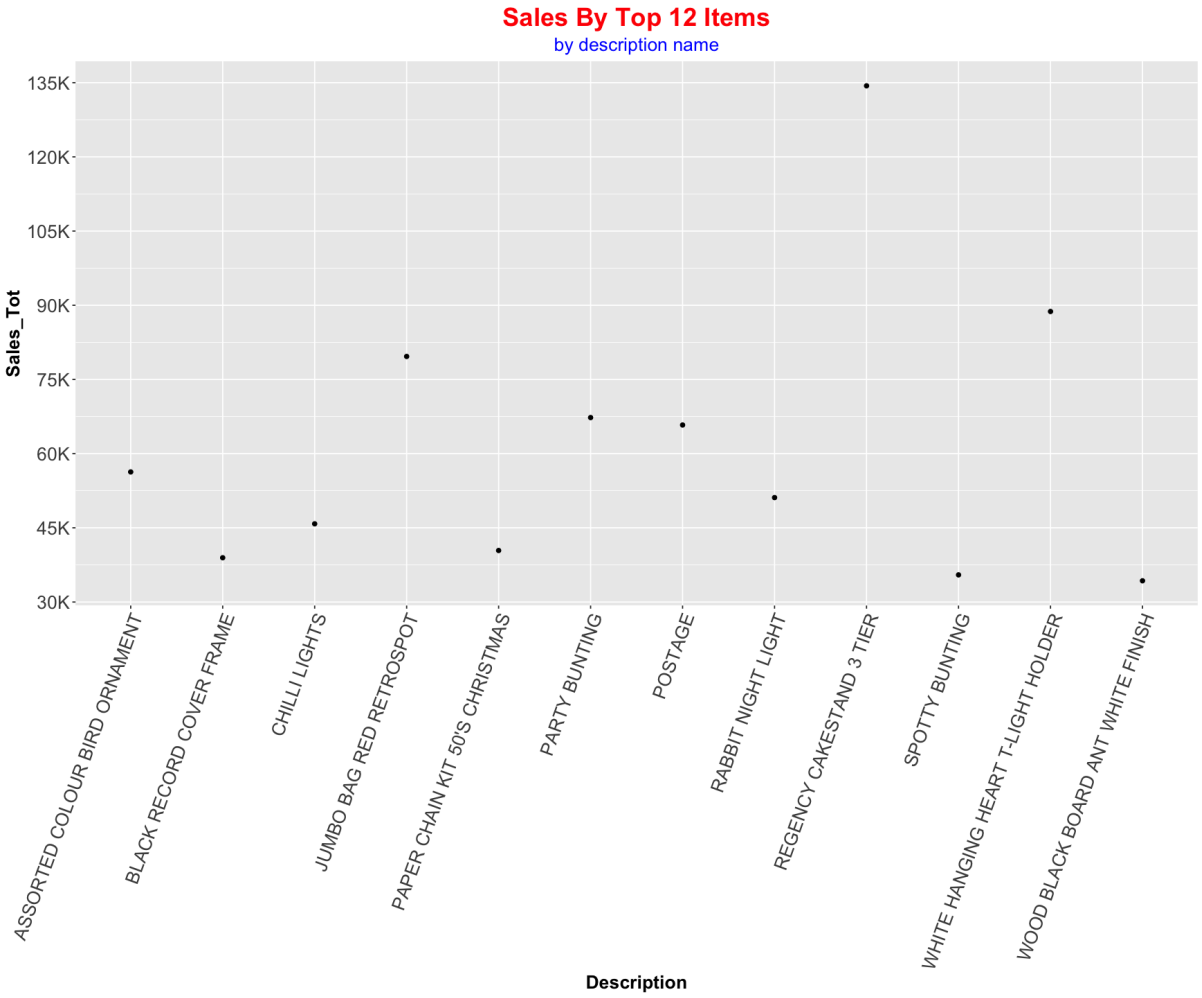
In [63]:
```
g_almost +
# highlighting the axis
theme(axis.line = element_line(colour = 'red', size = 2))
```



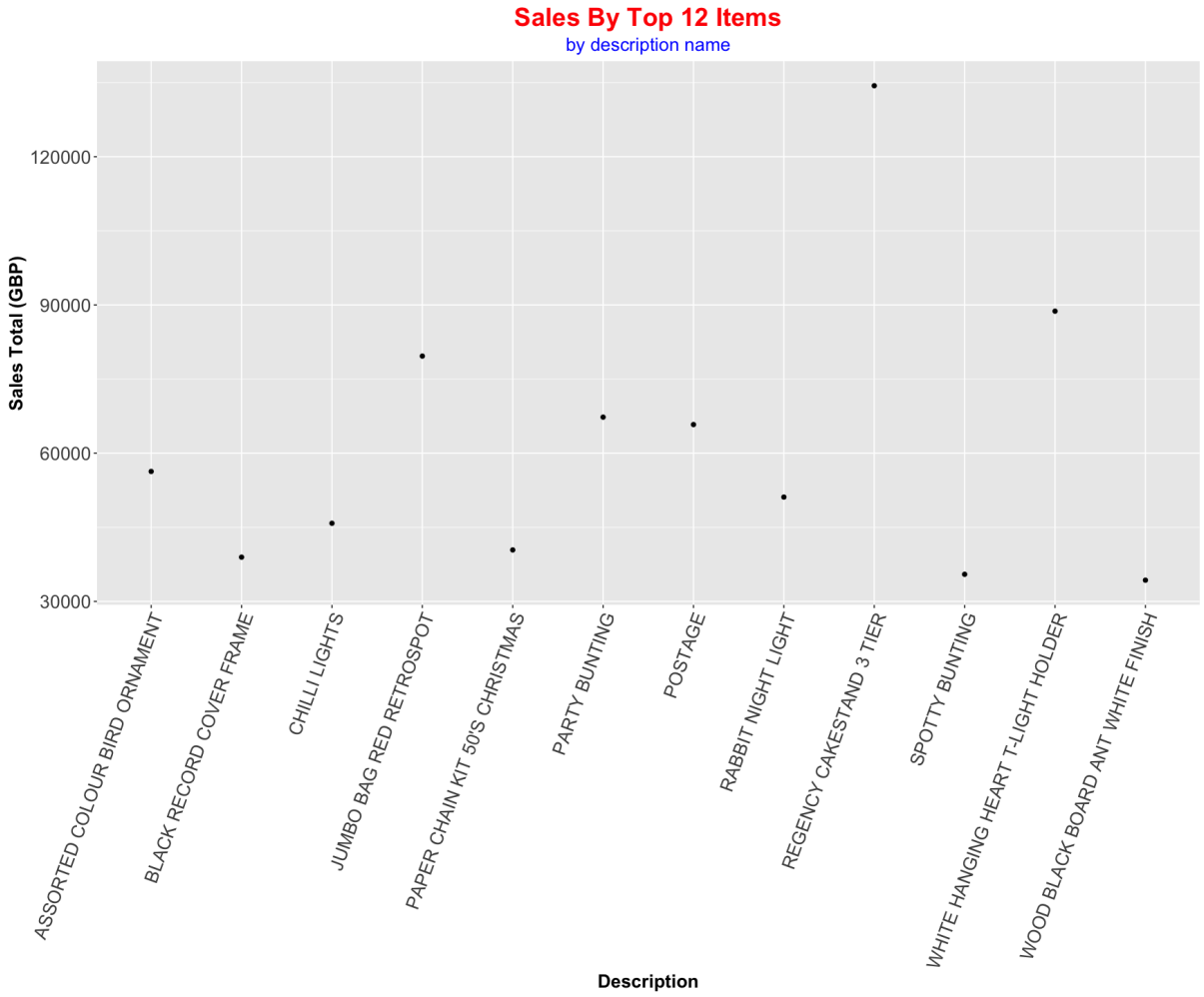
Hmm, what else can we play with?

how about customizing that y-axis label

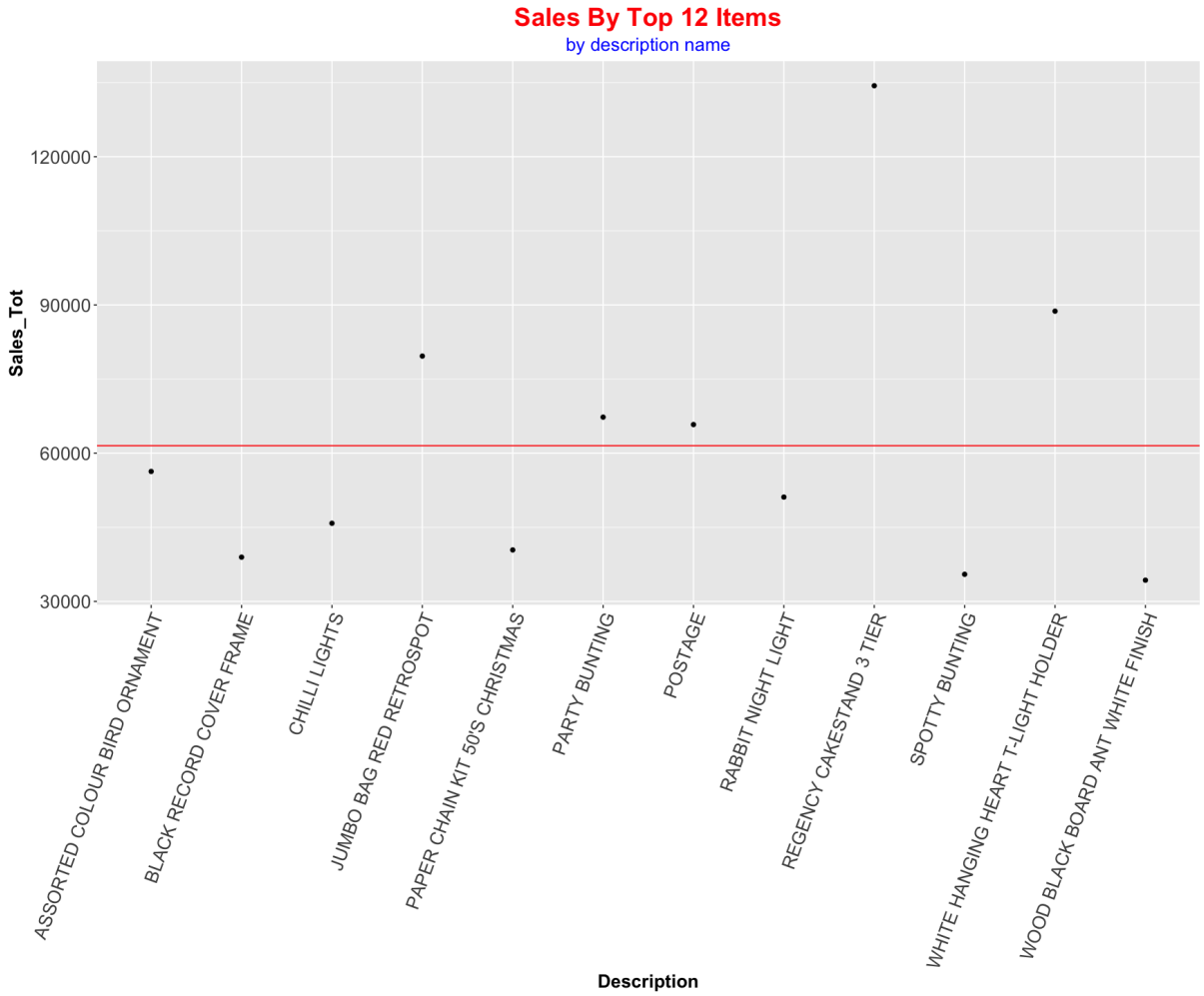
In [68]:
```
g_almost+
scale_y_continuous(breaks=seq(30000, 135000, 15000), labels = function(x
){paste0(x/1000, 'K')})
```



In [73]:
```
# Add a NEW y-axis Label:

g_almost+ ylab("Sales Total (GBP)")
```

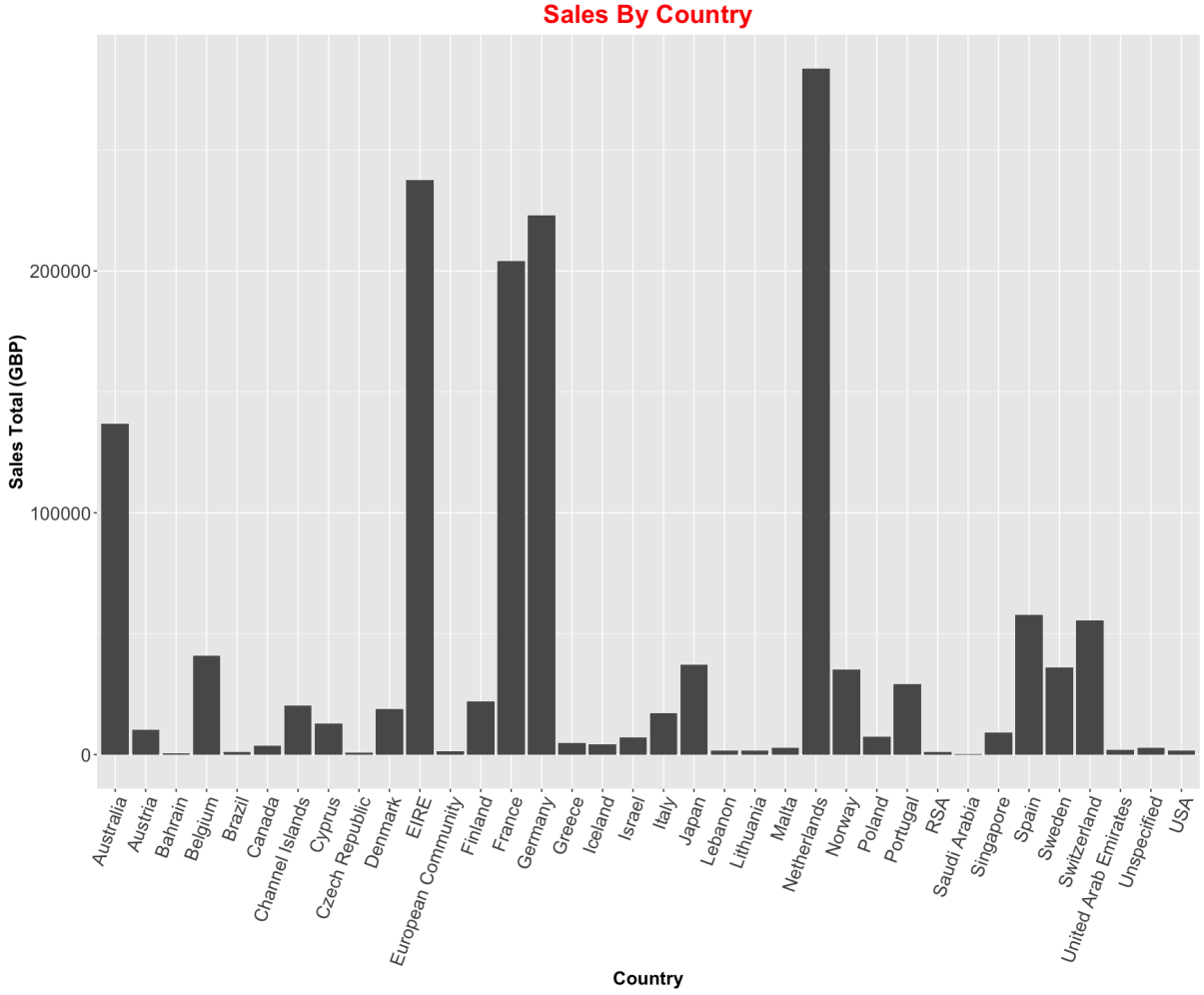


In [76]:
```
# Add a horizontal line for the mean:

g_almost+
geom_hline(yintercept = mean(top_twelve_items_sold$Sales_Tot),color = "red")
```

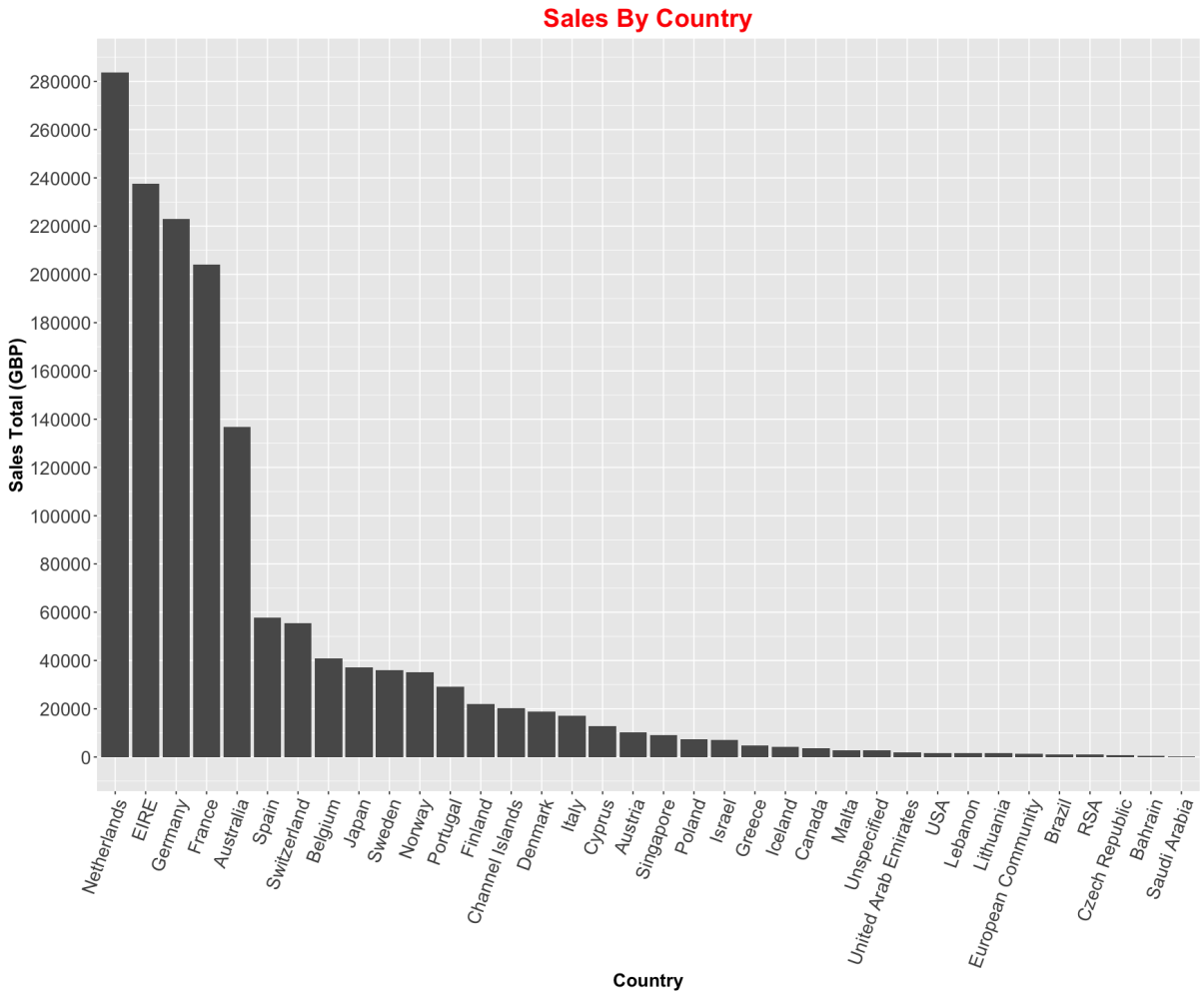


Lets Do a Bar Plot:

In [99]:
```
options(scipen=999)  # turn off scientific notation like 1e+06

#setup initialized plot
ggplot(country_sales_aggr, aes(x=Category, y=x))+

# call bar chart
geom_bar(stat = "identity")+

# create labels for axes
xlab('Country')+ylab('Sales Total (GBP)')+

# title and subtitle with: size, color and centering
labs(title="Sales By Country")+
theme(
  plot.title = element_text(color = "red", size = 22, face = "bold",hjus
t = .5),
  plot.subtitle = element_text(color = "blue",size=16,hjust=.5)) +

# Increase axis label size
theme(axis.text=element_text(size=16),
        axis.title=element_text(size=16,face="bold")) +

# change x-axis tick orientation
theme(axis.text.x = element_text(angle = 70, hjust = 1))
```



In [112]:
```
# How about order the Bar chart: high-low instead of alphabetical order:
ggplot(country_sales_aggr, aes(x = reorder(Category, -x), y = x))+
       geom_bar(stat = "identity") +

# setup bar chart
geom_bar(stat = "identity")+

#Change label names
xlab('Country')+ylab('Sales Total (GBP)')+

# Title
labs(title="Sales By Country")+

# Adjust position, size and color of title and subtitle
theme(
  plot.title = element_text(color = "red", size = 22, face = "bold",hjus
t = .5),
  plot.subtitle = element_text(color = "blue",size=16,hjust=.5)) +

# Increase Axis text size
theme(axis.text=element_text(size=16),
        axis.title=element_text(size=16,face="bold")) +

# Change axis tick angle
theme(axis.text.x = element_text(angle = 70, hjust = 1))  +

#scale y-axis:
scale_y_continuous(breaks=seq(0, 300000, 20000))
```



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https://stackoverflow.com/questions/45473128/r-changing-ggplot-plot-size-in-jupyter (https://stackoverflow.com/questions/45473128/r-changing-ggplot-plot-size-in-jupyter)

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https://sebastiansauer.github.io/ordering-bars/ (https://sebastiansauer.github.io/ordering-bars/)