

```
In [1]: boat_sales <- read.csv("C:\\Users\\franc\\Downloads\\boat_data.csv", stringsAsFactors
```

```
In [2]: boat_sales
```

Price	Boat.Type	Manufacturer	Type	Year.Built	Length	Width	
CHF 3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.00	1.90	
EUR 3490	Center console boat	Terhi power boats	new boat from stock	2020	4.00	1.50	T
CHF 3770	Sport Boat	Marine power boats	new boat from stock	0	3.69	1.42	
DKK 25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.00	1.00	
EUR 3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.55	1.46	
CHF 3650	Sport Boat	Linder power boats	new boat from stock	0	4.03	1.56	
CHF 3600	Catamaran		Used boat,Unleaded	1999	6.20	2.38	
DKK 24800	Sport Boat		Used boat	0	3.00	NA	
EUR 3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.64	1.37	
EUR 3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.35	1.73	
CHF 3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.35	1.75	
CHF 3480	Fishing Boat	Marine power boats	new boat from stock	0	4.13	1.41	
EUR 3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.70	2.00	
CHF 4600	Runabout	Kimple power boats	new boat from stock	2020	4.40	1.65	
CHF 4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.72	1.33	
CHF 4400	Deck Boat	Buster power boats	new boat from stock,Unleaded	0	3.88	1.49	
CHF 4380	Sport Boat	Linder power boats	new boat from stock	0	4.31	1.64	
DKK 30000	Sport Boat		Used boat	1985	4.00	1.00	
EUR 4000	Pilothouse	BÃfÂ©nÃfÂ©teau power boats	Used boat,Diesel	1981	8.00	2.84	
EUR 4000	Cabin Boat		Used boat,Unleaded	2011	6.37	2.31	
EUR 3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.55	1.46	

Price	Boat.Type	Manufacturer	Type	Year.Built	Length	Width	
CHF 4267	Fishing Boat	Quicksilver (Brunswick Marine) power boats	new boat from stock,Unleaded	0	3.78	1.71	
EUR 3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.31	1.64	
EUR 3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.60	2.10	
EUR 3900	Cabin Boat		Used boat	1985	6.53	2.47	
CHF 4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.70	1.55	
CHF 4200	Fishing Boat	MÃfÂndli power boats	Used boat,Unleaded	0	4.00	1.50	
CHF 4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.55	1.46	
CHF 4000	Fishing Boat		Used boat,Unleaded	1994	5.60	1.58	
CHF 3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.01	1.50	T
...	
EUR 5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.90	1.98	
EUR 5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.20	1.95	
EUR 5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.50	1.55	
EUR 5000	Center console boat,Sport Boat		Elan power boats	Used boat	1992	5.20	NA
EUR 4999	Pilothouse		Used boat,Diesel	1955	9.00	3.00	
EUR 4990	Cabin Boat		Unleaded	1987	6.50	2.50	
EUR 4990	Sport Boat		Used boat,Unleaded	0	4.60	1.80	
CHF 5390	Working Boat	Cipax AS power boats	new boat on order,Unleaded	0	4.00	1.80	
DKK 36500	Sport Boat		Used boat	1985	4.00	1.00	
DKK 36500	Fishing Boat	Hunter power boats	Used boat	2000	5.00	1.00	
EUR 4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.40	2.32	

Price	Boat.Type	Manufacturer	Type	Year.Built	Length	Width
EUR 4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.20	2.10
CHF 5250	Sport Boat	Marine power boats	new boat from stock	0	4.40	1.51
CHF 5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.38	1.70
EUR 4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.10	2.16
EUR 4799	Working Boat		new boat from stock,Electric	2019	3.64	1.37
EUR 4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.55	1.46
EUR 4790	Classic		Used boat	1962	4.10	1.50
CHF 5000	Pilothouse	Lambro power boats	Used boat,Unleaded	0	6.50	2.45
CHF 5000	Cabin Boat	Princess power boats	Used boat	1974	7.20	2.70
CHF 4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.00	2.10
CHF 4990	Sport Boat	Pioner power boats	new boat on order	0	4.11	1.73
CHF 4980	Sport Boat	Linder power boats	new boat from stock	0	4.01	1.64
CHF 4950	Sport Boat	Marine power boats	new boat from stock	0	3.99	1.52
CHF 4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.00	1.62
CHF 4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.30	2.44
EUR 4516	Sport Boat		new boat from stock	0	4.17	1.68
EUR 4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.40	1.80
EUR 4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.37	1.89
CHF 3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.60	1.60



```
In [3]: library(dplyr)
library(tidyr)
library(ggplot2)
```

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

filter, lag

The following objects are masked from 'package:base':

intersect, setdiff, setequal, union

Registered S3 methods overwritten by 'ggplot2':

```
method      from  
[.quosures  rlang  
c.quosures  rlang  
print.quosures rlang
```

In [4]: `head(boat_sales)`

Price	Boat.Type	Manufacturer	Type	Year.Built	Length	Width	Material	Location	Number
CHF 3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.00	1.90		Switzerland	
EUR 3490	Center console boat	Terhi power boats	new boat from stock	2020	4.00	1.50	Thermoplastic	Germany	
CHF 3770	Sport Boat	Marine power boats	new boat from stock	0	3.69	1.42	Aluminium	Switzerland	
DKK 25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.00	1.00		Denmark	
EUR 3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.55	1.46	Aluminium	Germany	
CHF 3650	Sport Boat	Linder power boats	new boat from stock	0	4.03	1.56	Aluminium	Switzerland	

In [5]: `str(boat_sales)`

```

'data.frame':  9888 obs. of  10 variables:
 $ Price                : chr  "CHF 3337" "EUR 3490" "CHF 3770" "DKK 25900" ...
 $ Boat.Type            : chr  "Motor Yacht" "Center console boat" "Sport Boat"
 "Sport Boat" ...
 $ Manufacturer         : chr  "Rigiflex power boats" "Terhi power boats" "Mari
 ne power boats" "Pioner power boats" ...
 $ Type                 : chr  "new boat from stock" "new boat from stock" "new
 boat from stock" "new boat from stock" ...
 $ Year.Built           : int   2017 2020 0 2020 2019 0 1999 0 2019 2018 ...
 $ Length               : num   4 4 3.69 3 3.55 4.03 6.2 3 3.64 4.35 ...
 $ Width                : num   1.9 1.5 1.42 1 1.46 1.56 2.38 NA 1.37 1.73 ...
 $ Material             : chr   "" "Thermoplastic" "Aluminium" "" ...
 $ Location             : chr  "Switzerland" "Germany" "Switzerland" "Denmark"
 ...
 $ Number.of.views.last.7.days: int   226 75 124 64 58 132 474 134 45 180 ...

```

```

In [6]: boat_sales <- boat_sales %>%
        separate(Price, into = c('Currency', 'o_price'), sep = " ")

```

```

In [7]: boat_sales

```

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.0
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.0
CHF	3770	Sport Boat	Marine power boats	new boat from stock	0	3.6
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.0
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.5
CHF	3650	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.2
DKK	24800	Sport Boat		Used boat	0	3.0
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.6
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.3
CHF	3480	Fishing Boat	Marine power boats	new boat from stock	0	4.1
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.7
CHF	4600	Runabout	Kimble power boats	new boat from stock	2020	4.4
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.7
CHF	4400	Deck Boat	Buster power boats	new boat from stock,Unleaded	0	3.8
CHF	4380	Sport Boat	Linder power boats	new boat from stock	0	4.3
DKK	30000	Sport Boat		Used boat	1985	4.0
EUR	4000	Pilothouse	BÃ©nÃ©teau power boats	Used boat,Diesel	1981	8.0
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.3
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.5

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length	
CHF	4267	Fishing Boat	Quicksilver (Brunswick Marine) power boats	new boat from stock,Unleaded	0	3.7	
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.3	
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.6	
EUR	3900	Cabin Boat		Used boat	1985	6.5	
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.7	
CHF	4200	Fishing Boat	MÃfÂndli power boats	Used boat,Unleaded	0	4.0	
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.5	
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.6	
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.0	
...	
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.9	
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.2	
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.5	
EUR	5000	Center console boat,Sport Boat		Elan power boats	Used boat	1992	5.2
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.0	
EUR	4990	Cabin Boat		Unleaded	1987	6.5	
EUR	4990	Sport Boat		Used boat,Unleaded	0	4.6	
CHF	5390	Working Boat	Cipax AS power boats	new boat on order,Unleaded	0	4.0	
DKK	36500	Sport Boat		Used boat	1985	4.0	
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.0	
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.4	
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.2	
CHF	5250	Sport Boat	Marine power boats	new boat from stock	0	4.4	

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.3
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.1
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.6
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.5
EUR	4790	Classic		Used boat	1962	4.1
CHF	5000	Pilothouse	Lambro power boats	Used boat,Unleaded	0	6.5
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.2
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.0
CHF	4990	Sport Boat	Pioner power boats	new boat on order	0	4.1
CHF	4980	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	4950	Sport Boat	Marine power boats	new boat from stock	0	3.9
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.0
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.3
EUR	4516	Sport Boat		new boat from stock	0	4.1
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.4
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.6



In [8]: `boat_sales %>%
distinct(Currency)`

Currency

CHF

EUR

DKK

Å,£

```
In [9]: class(boat_sales$o_price)
```

'character'

```
In [10]: boat_sales <- transform(boat_sales, o_price = as.numeric(o_price))
```

```
In [11]: class(boat_sales$o_price)
```

'numeric'

```
In [12]: boat_sales <- boat_sales %>%  
mutate(id = row_number())
```

```
In [13]: boat_sales_CHF <- boat_sales %>%  
filter(Currency == 'CHF') %>%  
mutate(Price_USD = o_price * 1.05)
```

```
In [14]: boat_sales_EUR <- boat_sales %>%  
filter(Currency == 'EUR') %>%  
mutate(Price_USD = o_price * 1.02)
```

```
In [15]: boat_sales_DKK <- boat_sales %>%  
filter(Currency == 'DKK') %>%  
mutate(Price_USD = o_price * 0.14)
```

```
In [16]: boat_sales_AAE <- boat_sales %>%  
filter(Currency == 'Å,£') %>%  
mutate(Price_USD = o_price * 1.21)
```

```
In [17]: boat_sales_join <- bind_rows(boat_sales_CHF, boat_sales_EUR, boat_sales_DKK, boat_sales_AAE)
```

```
In [18]: boat_sales <- boat_sales_join %>%  
arrange(id)
```

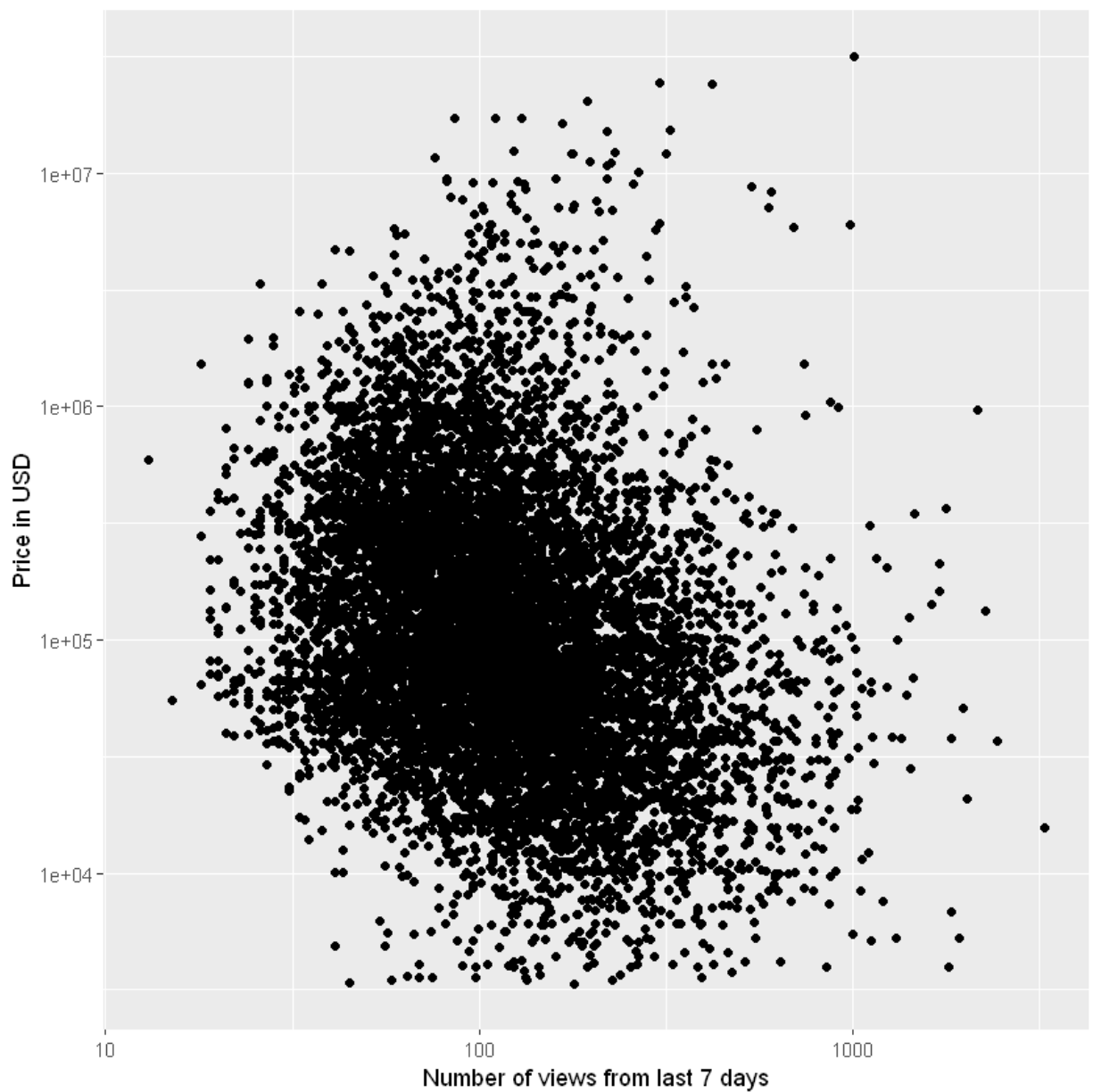
```
In [19]: boat_sales
```

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.0
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.0
CHF	3770	Sport Boat	Marine power boats	new boat from stock	0	3.6
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.0
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.5
CHF	3650	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.2
DKK	24800	Sport Boat		Used boat	0	3.0
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.6
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.3
CHF	3480	Fishing Boat	Marine power boats	new boat from stock	0	4.1
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.7
CHF	4600	Runabout	Kimble power boats	new boat from stock	2020	4.4
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.7
CHF	4400	Deck Boat	Buster power boats	new boat from stock,Unleaded	0	3.8
CHF	4380	Sport Boat	Linder power boats	new boat from stock	0	4.3
DKK	30000	Sport Boat		Used boat	1985	4.0
EUR	4000	Pilothouse	BÃ©nÃ©teau power boats	Used boat,Diesel	1981	8.0
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.3
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.5

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length	
CHF	4267	Fishing Boat	Quicksilver (Brunswick Marine) power boats	new boat from stock,Unleaded	0	3.7	
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.3	
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.6	
EUR	3900	Cabin Boat		Used boat	1985	6.5	
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.7	
CHF	4200	Fishing Boat	MÃƒÂndli power boats	Used boat,Unleaded	0	4.0	
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.5	
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.6	
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.0	
...	
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.9	
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.2	
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.5	
EUR	5000	Center console boat,Sport Boat		Elan power boats	Used boat	1992	5.2
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.0	
EUR	4990	Cabin Boat		Unleaded	1987	6.5	
EUR	4990	Sport Boat		Used boat,Unleaded	0	4.6	
CHF	5390	Working Boat	Cipax AS power boats	new boat on order,Unleaded	0	4.0	
DKK	36500	Sport Boat		Used boat	1985	4.0	
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.0	
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.4	
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.2	
CHF	5250	Sport Boat	Marine power boats	new boat from stock	0	4.4	

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.3
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.1
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.6
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.5
EUR	4790	Classic		Used boat	1962	4.1
CHF	5000	Pilothouse	Lambro power boats	Used boat,Unleaded	0	6.5
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.2
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.0
CHF	4990	Sport Boat	Pioner power boats	new boat on order	0	4.1
CHF	4980	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	4950	Sport Boat	Marine power boats	new boat from stock	0	3.9
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.0
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.3
EUR	4516	Sport Boat		new boat from stock	0	4.1
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.4
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.6

```
In [20]: ggplot(boat_sales, aes(x = Number.of.views.last.7.days, y = Price_USD)) +
  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  labs(x = 'Number of views from last 7 days', y = 'Price in USD')
#Need further cleaning
```



```
In [21]: boat_sales %>%  
distinct(Manufacturer)  
#There are way too many manufacturers  
#It may be better to analyze this data by looking at other variables
```

Manufacturer
Rigiflex power boats
Terhi power boats
Marine power boats
Pioner power boats
Linder power boats
Crescent power boats
Whaly power boats
GS Nautica power boats
Kimple power boats
Italmarine power boats
Buster power boats
BÃfÂ©nÃfÂ©teau power boats
Quicksilver (Brunswick Marine) power boats
Kammin power boats
Bucher power boats
MÃfÂ¤ndli power boats
Draco power boats
Hensa power boats
Ibis power boats
Rio power boats
Jouandoudet power boats
Corsiva power boats
Saver power boats
Ilver power boats
Skibsplast power boats
Allegra power boats
Viking power boats
Staempfli power boats
Fiberline power boats
...
Ranger power boats
Seacode power boats
Nussbaumer power boats

Manufacturer
Nireus power boats
Meier power boats
J2J Service power boats
Bombard power boats
BLULINE (IT) power boats
Stalder power boats
Zodiac power boats
UMS-Boat power boats
Marieholm power boats
Sealver power boats
Marine Pro power boats
Verus power boats
Joda power boats
Reinell power boats
Selco power boats
Poca power boats
Webbcraft power boats
Ockelbo power boats
Interster power boats
Ernst Riss power boats
Motocraft power boats
Steiner power boats
Baha power boats
Aquaviva power boats
Hatecke power boats
Cipax AS power boats
Hunter power boats

```
In [22]: boat_sales %>%
distinct(Boat.Type)
#There are way too many boat types
#It may be better to analyze this data by looking at other variables
```


Boat.Type
Motor Yacht
Center console boat
Sport Boat
Fishing Boat
Catamaran
Pontoon Boat
Runabout
Deck Boat
Pilothouse
Cabin Boat
Working Boat
Classic
Bowrider
Sport Boat,Working Boat
Cabin Boat,Classic
Deck Boat,Pilothouse,Sport Boat
Trawler
Launch
Cabin Boat,Trawler
Bowrider,Classic
Motor Yacht,Sport Boat
Classic,Runabout,Sport Boat
Cabin Boat,Motor Yacht
Classic,Launch
Cabin Boat,Sport Boat
Flybridge
Water ski
Hardtop
Classic,Runabout
Offshore Boat
...
Fishing Boat,Flybridge,Trawler
Motor Yacht,Sport Boat,Water ski

Boat.Type
Cabin Boat,Hardtop,Sport Boat
Fishing Boat,Sport Boat
Classic,Hardtop,Motor Yacht
Center console boat,Deck Boat,Working Boat
Center console boat,Sport Boat,Water ski
Fishing Boat,Pilothouse
Bowrider,Wakeboard/Wakesurf
House Boat,Sport Boat,Trawler
Cabin Boat,House Boat,Trawler
Cabin Boat,Fishing Boat
Bowrider,Center console boat,Sport Boat
Cabin Boat,Pilothouse,Sport Boat
Cabin Boat,Classic,Passenger boat
Classic,Sport Boat,Trawler
Fishing Boat,Passenger boat,Sport Boat
Classic,Fishing Boat,Working Boat
Center console boat,Deck Boat,Sport Boat
Cabin Boat,Classic,Flybridge
Fishing Boat,Hardtop,Pilothouse
Cabin Boat,Fishing Boat,House Boat
Cabin Boat,Sport Boat,Water ski
Bowrider,Deck Boat,Water ski
RIB
Deck Boat,Water ski
Classic,Fishing Boat
Hardtop,Sport Boat
Cabin Boat,Fishing Boat,Sport Boat
Classic,Runabout,Trawler

```
In [23]: boat_sales %>%
distinct(Type)
```

Type
new boat from stock
Used boat,Unleaded
Used boat
Used boat,Electric
new boat from stock,Unleaded
Used boat,Diesel
new boat on order
Unleaded
new boat on order,Unleaded
new boat from stock,Gas
Diesel
Display Model,Unleaded
Display Model
Used boat,Gas
new boat from stock,Diesel
new boat from stock,Electric
new boat on order,Diesel
new boat from stock,Hybrid
Display Model,Diesel
Used boat,Hybrid
Display Model,Gas
Display Model,Electric
Electric
Used boat,Propane

```
In [24]: boat_sales %>%
distinct(Material)
#This variable is clean enough besides the NULLs
```

Material
Thermoplastic
Aluminium
GRP
PVC
Plastic
Wood
Steel
Hypalon
Carbon Fiber
Reinforced concrete
Rubber

```
In [25]: boat_sales %>%
distinct(Location) %>%
arrange(Location) %>%
filter(substr(Location, 1, 1) == "Z")
#You could filter your data to only include locations listed as a country
#I filtered the locations to look for specific countries by making a list of countries
```

Location
ZÃfÃ¼richse,
Zevenbergen

```
In [26]: countries <- c('Australia', 'Austria', 'Belgium', 'Bulgaria', 'Croatia', 'Cyprus', 'Cz
'Greece', 'Hungary', 'Ireland', 'Italy', 'Latvia', 'Lebanon', 'Lithuani
'Philippines', 'Poland', 'Portugal', 'Romania', 'Russia', 'Serbia', 'SI
'Turkey', 'Ukraine', 'United', 'Venezuela')

boat_sales <- boat_sales %>%
filter(Location %in% countries)
```

```
In [27]: boat_sales
```

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.0
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.0
CHF	3770	Sport Boat	Marine power boats	new boat from stock	0	3.6
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.0
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.5
CHF	3650	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.2
DKK	24800	Sport Boat		Used boat	0	3.0
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.6
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.3
CHF	3480	Fishing Boat	Marine power boats	new boat from stock	0	4.1
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.7
CHF	4600	Runabout	Kimple power boats	new boat from stock	2020	4.4
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.7
CHF	4400	Deck Boat	Buster power boats	new boat from stock,Unleaded	0	3.8
CHF	4380	Sport Boat	Linder power boats	new boat from stock	0	4.3
DKK	30000	Sport Boat		Used boat	1985	4.0
EUR	4000	Pilothouse	BÃ©nÃ©teau power boats	Used boat,Diesel	1981	8.0
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.3
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.5

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length	
CHF	4267	Fishing Boat	Quicksilver (Brunswick Marine) power boats	new boat from stock,Unleaded	0	3.7	
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.3	
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.6	
EUR	3900	Cabin Boat		Used boat	1985	6.5	
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.7	
CHF	4200	Fishing Boat	MÃfÂndli power boats	Used boat,Unleaded	0	4.0	
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.5	
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.6	
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.0	
...	
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.9	
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.2	
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.5	
EUR	5000	Center console boat,Sport Boat		Elan power boats	Used boat	1992	5.2
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.0	
EUR	4990	Cabin Boat		Unleaded	1987	6.5	
EUR	4990	Sport Boat		Used boat,Unleaded	0	4.6	
CHF	5390	Working Boat	Cipax AS power boats	new boat on order,Unleaded	0	4.0	
DKK	36500	Sport Boat		Used boat	1985	4.0	
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.0	
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.4	
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.2	
CHF	5250	Sport Boat	Marine power boats	new boat from stock	0	4.4	

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.3
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.1
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.6
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.5
EUR	4790	Classic		Used boat	1962	4.1
CHF	5000	Pilothouse	Lambro power boats	Used boat,Unleaded	0	6.5
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.2
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.0
CHF	4990	Sport Boat	Pioner power boats	new boat on order	0	4.1
CHF	4980	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	4950	Sport Boat	Marine power boats	new boat from stock	0	3.9
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.0
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.3
EUR	4516	Sport Boat		new boat from stock	0	4.1
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.4
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.6

```
In [28]: boat_sales %>%
distinct(Year.Built) %>%
arrange(Year.Built)
```

Year.Built

0
1885
1889
1895
1897
1898
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1917
1919
1920
1922
1923
1924
1925
1926
...
1992
1993

Year.Built

1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021

```
In [29]: boat_sales %>%  
count(Year.Built < 1900)
```

Year.Built < 1900	n
FALSE	9107
TRUE	552

```
In [30]: Eighteen_eighties <- c(1885, 1886, 1887, 1888, 1889)
Eighteen_nineties <- c(1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899)
Nineteen_hundreds <- c(1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909)
Nineteen_tens <- c(1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919)
Nineteen_twenties <- c(1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929)
Nineteen_thirties <- c(1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939)
Nineteen_forties <- c(1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949)
Nineteen_fifties <- c(1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959)
Nineteen_sixties <- c(1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969)
Nineteen_seventies <- c(1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979)
Nineteen_eighties <- c(1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989)
Nineteen_nineties <- c(1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999)
Two_thousands <- c(2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009)
Two_thousand_tens <- c(2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019)
Two_thousand_twenties <- c(2020, 2021)

boat_sales_1880s <- boat_sales %>%
  filter(Year.Built %in% Eighteen_eighties) %>%
  mutate(Decade.Built = '1880s')

boat_sales_1890s <- boat_sales %>%
  filter(Year.Built %in% Eighteen_nineties) %>%
  mutate(Decade.Built = '1890s')

boat_sales_1900s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_hundreds) %>%
  mutate(Decade.Built = '1900s')

boat_sales_1910s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_tens) %>%
  mutate(Decade.Built = '1910s')

boat_sales_1920s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_twenties) %>%
  mutate(Decade.Built = '1920s')

boat_sales_1930s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_thirties) %>%
  mutate(Decade.Built = '1930s')

boat_sales_1940s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_forties) %>%
  mutate(Decade.Built = '1940s')

boat_sales_1950s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_fifties) %>%
  mutate(Decade.Built = '1950s')

boat_sales_1960s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_sixties) %>%
  mutate(Decade.Built = '1960s')

boat_sales_1970s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_seventies) %>%
  mutate(Decade.Built = '1970s')

boat_sales_1980s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_eighties) %>%
  mutate(Decade.Built = '1980s')
```

```

boat_sales_1990s <- boat_sales %>%
  filter(Year.Built %in% Nineteen_nineties) %>%
  mutate(Decade.Built = '1990s')

boat_sales_2000s <- boat_sales %>%
  filter(Year.Built %in% Two_thousands) %>%
  mutate(Decade.Built = '2000s')

boat_sales_2010s <- boat_sales %>%
  filter(Year.Built %in% Two_thousand_tens) %>%
  mutate(Decade.Built = '2010s')

boat_sales_2020s <- boat_sales %>%
  filter(Year.Built %in% Two_thousand_twenties) %>%
  mutate(Decade.Built = '2020s')

boat_sales_join2 <- bind_rows(boat_sales_2020s, boat_sales_2010s, boat_sales_2000s, boat_sales_1970s, boat_sales_1960s, boat_sales_1950s, boat_sales_1920s, boat_sales_1910s, boat_sales_1900s, boat_sales_1880s,
  id = NULL)

```

In [31]: boat_sales_1880s

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length	Width	Material	Location
EUR	148000	House Boat		Used boat,Diesel	1885	28.00	5.60	Steel	Netherlands
EUR	99000	House Boat		Used boat,Diesel	1889	18.66	4.16	Steel	Netherlands

In [32]: boat_sales <- boat_sales_join2 %>%
arrange(id)

In [33]: boat_sales

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.00
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.00
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.00
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.50
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.20
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.60
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.30
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.30
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.70
CHF	4600	Runabout	Kimple power boats	new boat from stock	2020	4.40
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.70
DKK	30000	Sport Boat		Used boat	1985	4.00
EUR	4000	Pilothouse	BÃfÂ©nÃfÂ©teau power boats	Used boat,Diesel	1981	8.00
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.30
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.50
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.30
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.60
EUR	3900	Cabin Boat		Used boat	1985	6.50
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.70
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.50
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.60
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.00

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3950	Sport Boat	MÃfÂndli power boats	Used boat	1996	4.80
CHF	3900	Sport Boat		Used boat,Unleaded	1972	5.00
CHF	3800	Fishing Boat	Quicksilver (Brunswick Marine) power boats	Used boat,Unleaded	1996	4.40
CHF	3800	Cabin Boat	Draco power boats	Used boat,Unleaded	1980	6.20
CHF	3800	Fishing Boat	Hensa power boats	Used boat,Unleaded	1974	5.40
EUR	3500	Center console boat	Ibis power boats	Used boat,Unleaded	1983	4.40
EUR	3500	Sport Boat	Rio power boats	Used boat,Unleaded	1991	4.00
EUR	3500	Cabin Boat	Jouandoudet power boats	Used boat,Unleaded	1992	4.30
...
EUR	5990	Trawler		Unleaded	1987	7.50
EUR	5950	Pontoon Boat	Whaly power boats	new boat from stock	2018	5.00
EUR	5950	Fishing Boat	Atlantis power boats	Used boat	2020	4.90
EUR	5950	Classic	Glastron power boats	Used boat,Unleaded	1974	5.20
EUR	5900	Cabin Boat		new boat from stock,Unleaded	1988	5.00
EUR	5900	Motor Yacht	Gobbi power boats	Used boat,Unleaded	1990	5.70
EUR	5900	Sport Boat	Hille power boats	Used boat,Unleaded	1997	4.30
EUR	5900	Fishing Boat	Hatecke power boats	Used boat,Unleaded	1985	4.80
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.90
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.20
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.50
EUR	5000	Center console boat,Sport Boat	Elan power boats	Used boat	1992	5.20
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.00

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
EUR	4990	Cabin Boat		Unleaded	1987	6.50
DKK	36500	Sport Boat		Used boat	1985	4.00
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.00
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.40
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.20
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.30
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.10
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.60
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.50
EUR	4790	Classic		Used boat	1962	4.10
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.20
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.00
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.00
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.30
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.40
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.30
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.60

```
In [34]: boat_sales <- boat_sales %>%
mutate(Floor.Area = Length * Width)
```

```
In [35]: boat_sales
```

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.00
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.00
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.00
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.50
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.20
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.60
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.30
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.30
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.70
CHF	4600	Runabout	Kimple power boats	new boat from stock	2020	4.40
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.70
DKK	30000	Sport Boat		Used boat	1985	4.00
EUR	4000	Pilothouse	BÃ¶nÃ©teau power boats	Used boat,Diesel	1981	8.00
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.30
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.50
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.30
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.60
EUR	3900	Cabin Boat		Used boat	1985	6.50
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.70
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.50
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.60
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.00

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3950	Sport Boat	MÃfÂndli power boats	Used boat	1996	4.80
CHF	3900	Sport Boat		Used boat,Unleaded	1972	5.00
CHF	3800	Fishing Boat	Quicksilver (Brunswick Marine) power boats	Used boat,Unleaded	1996	4.40
CHF	3800	Cabin Boat	Draco power boats	Used boat,Unleaded	1980	6.20
CHF	3800	Fishing Boat	Hensa power boats	Used boat,Unleaded	1974	5.40
EUR	3500	Center console boat	Ibis power boats	Used boat,Unleaded	1983	4.40
EUR	3500	Sport Boat	Rio power boats	Used boat,Unleaded	1991	4.00
EUR	3500	Cabin Boat	Jouandoudet power boats	Used boat,Unleaded	1992	4.30
...
EUR	5990	Trawler		Unleaded	1987	7.50
EUR	5950	Pontoon Boat	Whaly power boats	new boat from stock	2018	5.00
EUR	5950	Fishing Boat	Atlantis power boats	Used boat	2020	4.90
EUR	5950	Classic	Glastron power boats	Used boat,Unleaded	1974	5.20
EUR	5900	Cabin Boat		new boat from stock,Unleaded	1988	5.00
EUR	5900	Motor Yacht	Gobbi power boats	Used boat,Unleaded	1990	5.70
EUR	5900	Sport Boat	Hille power boats	Used boat,Unleaded	1997	4.30
EUR	5900	Fishing Boat	Hatecke power boats	Used boat,Unleaded	1985	4.80
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.90
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.20
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.50
EUR	5000	Center console boat,Sport Boat	Elan power boats	Used boat	1992	5.20
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.00

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
EUR	4990	Cabin Boat		Unleaded	1987	6.50
DKK	36500	Sport Boat		Used boat	1985	4.00
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.00
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.40
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.20
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.30
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.10
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.60
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.50
EUR	4790	Classic		Used boat	1962	4.10
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.20
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.00
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.00
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.30
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.40
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.30
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.60

```
In [36]: boat_sales <- boat_sales %>%
  mutate(Boat.Status = case_when(
    substr(Type, 1, 3) == "new" ~ "New",
    substr(Type, 1, 4) == "Used" ~ "Used"
  ))
```

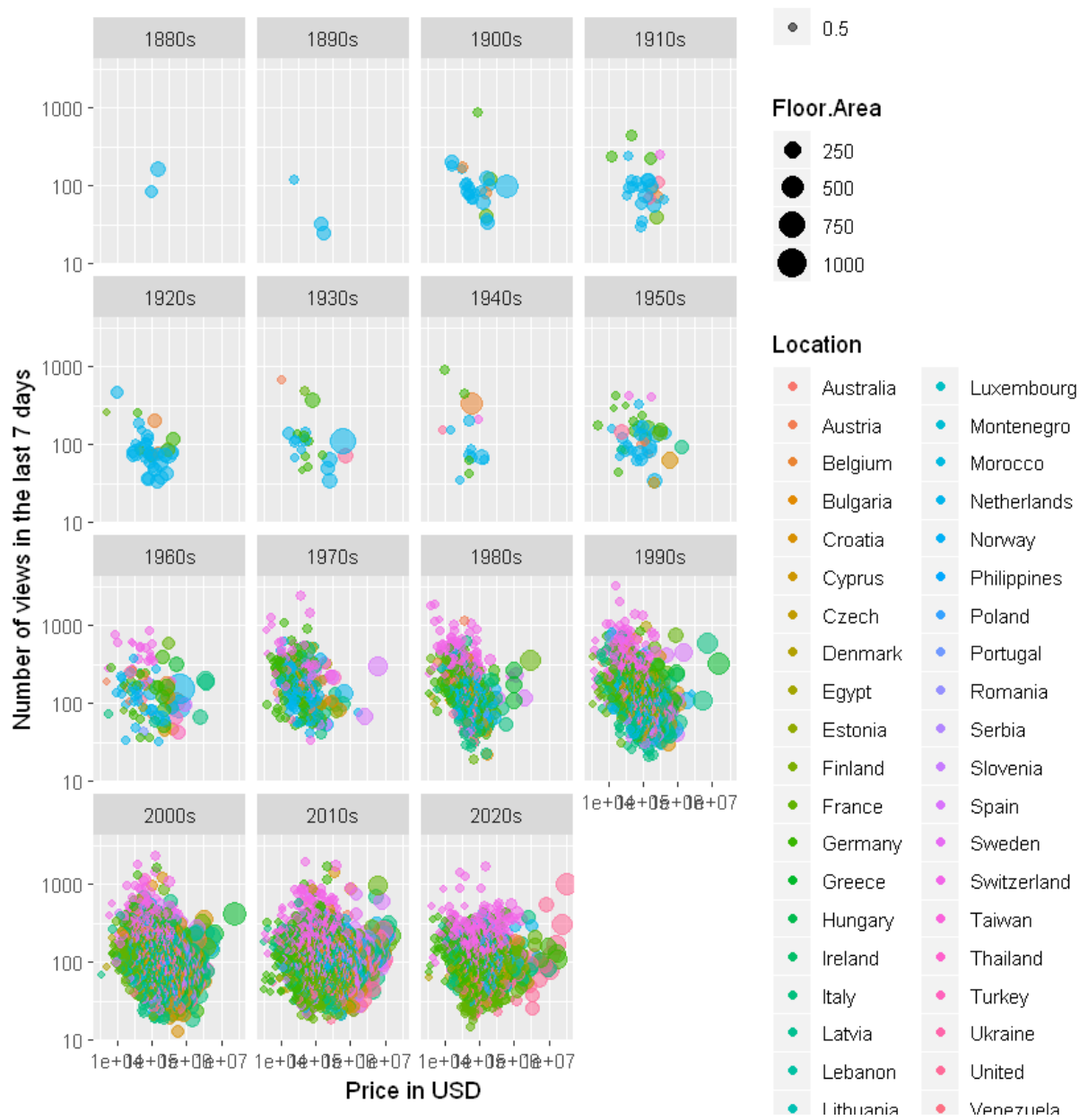
```
In [37]: boat_sales_clean <- boat_sales %>%
  select(id, Price_USD, Number.of.views.last.7.days, Decade.Built, Location, Floor.Area,
    Boat.Status, Material)
```

In [38]: `head(boat_sales_clean)`

id	Price_USD	Number.of.views.last.7.days	Decade.Built	Location	Floor.Area	Boat.Status	Ma
1	3503.85	226	2010s	Switzerland	7.6000	New	
2	3559.80	75	2020s	Germany	6.0000	New	Thermop
4	3626.00	64	2020s	Denmark	3.0000	New	
5	3466.98	58	2010s	Germany	5.1830	New	Alum
7	3780.00	474	1990s	Switzerland	14.7560	Used	Alum
9	3399.66	45	2010s	Germany	4.9868	New	

In [39]: `ggplot(boat_sales_clean, aes(x = Price_USD, y = Number.of.views.last.7.days, color = Location)) +
 geom_point() +
 scale_x_log10() +
 scale_y_log10() +
 facet_wrap(~Decade.Built) +
 labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
#To make the graph more clear, you can make 4 graphs each containing 10 countries`

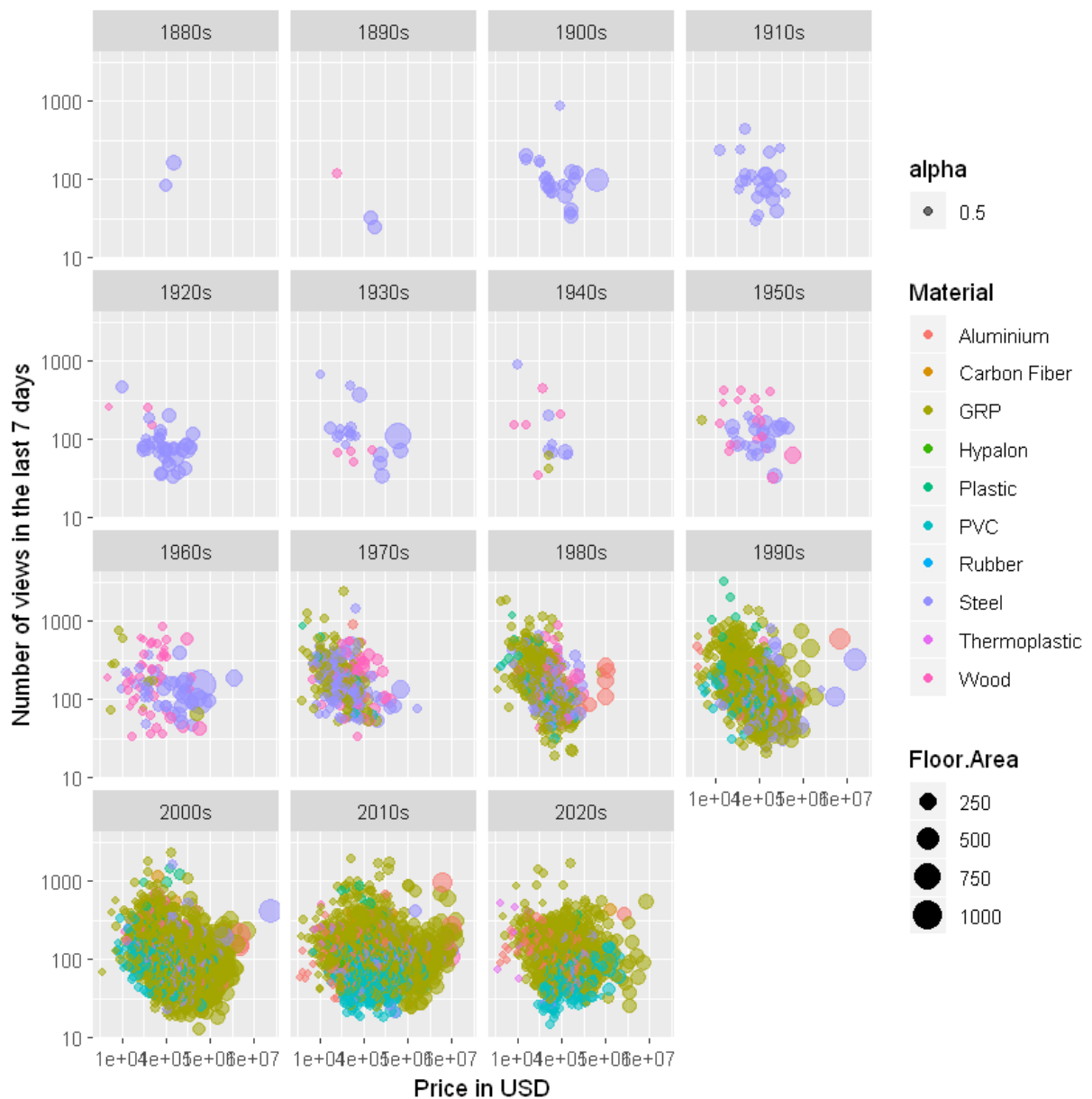
Warning message:
"Removed 51 rows containing missing values (geom_point)."



```
In [40]: boat_sales_clean_M <- boat_sales_clean %>%
  filter(Material %in% c('Thermoplastic', 'Aluminium', 'GRP', 'PVC', 'Plastic', 'Wood',
    'Reinforced', 'concrete', 'Rubber'))

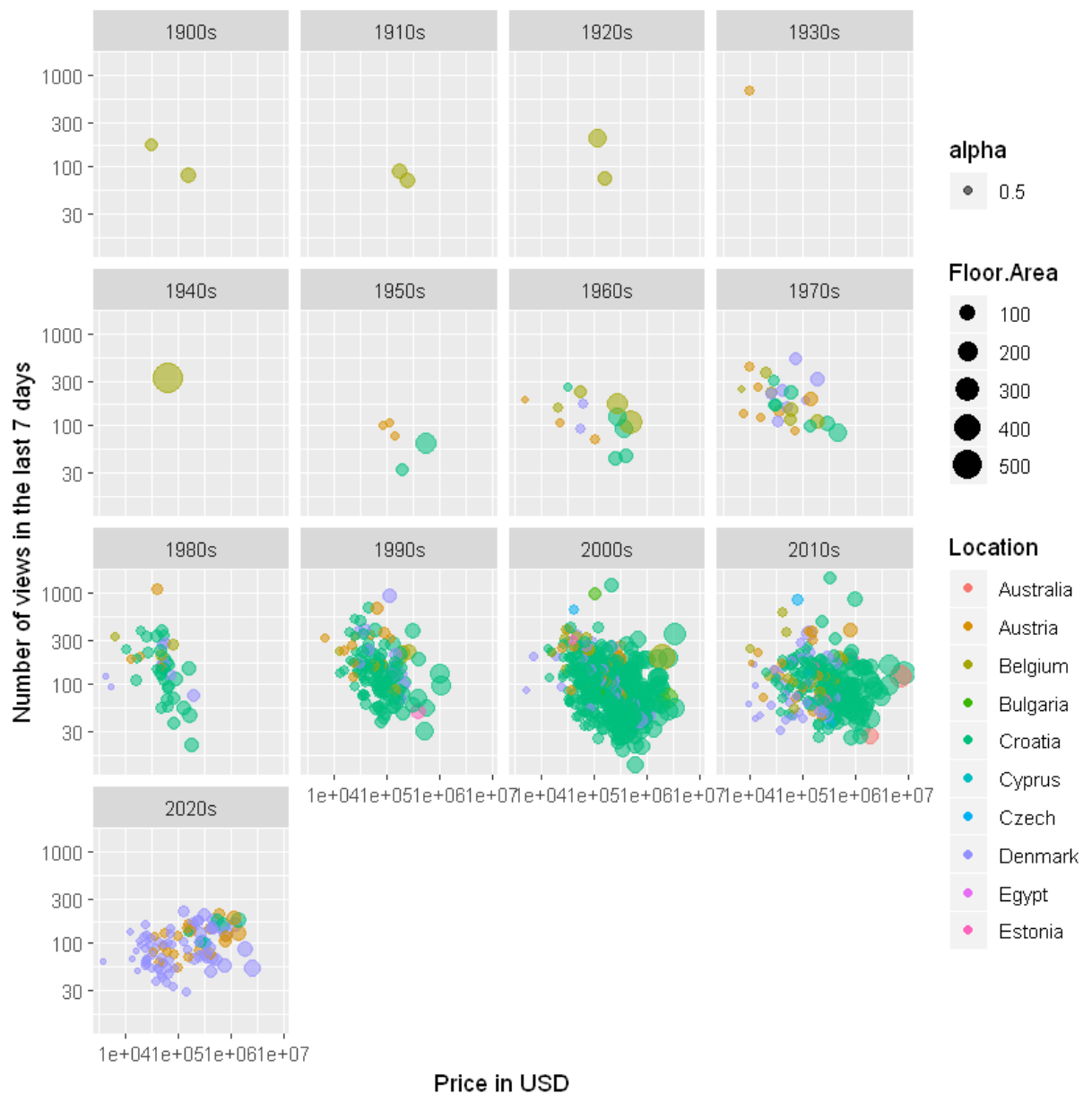
ggplot(boat_sales_clean_M, aes(x = Price_USD, y = Number.of.views.last.7.days, color = Location,
  size = Floor.Area, alpha = 0.5)) +
  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  facet_wrap(~Decade.Built) +
  labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
```

Warning message:
"Removed 20 rows containing missing values (geom_point)."



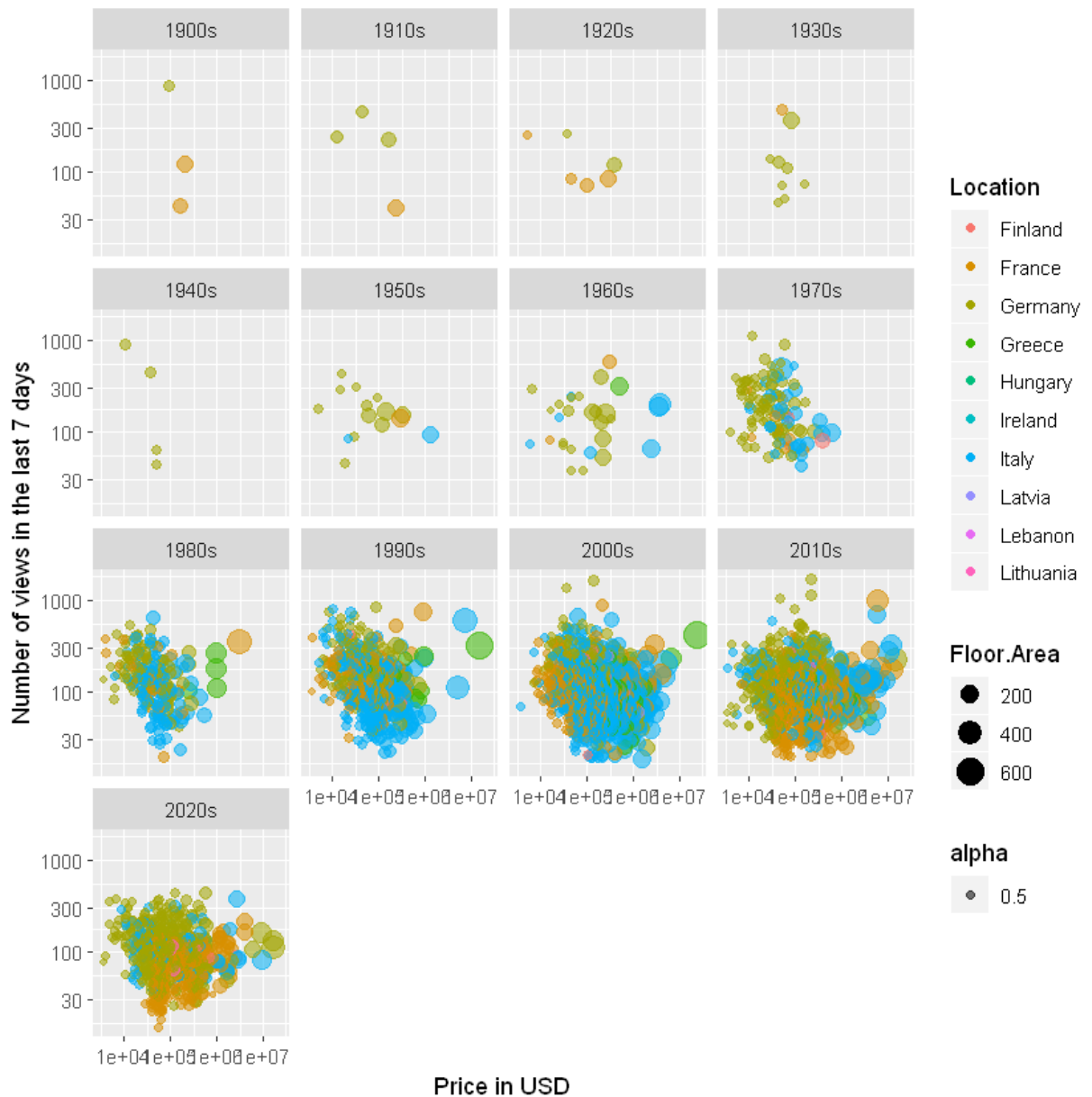
```
In [41]: boat_sales_clean_C1 <- boat_sales_clean %>%
  filter(Location %in% c('Australia', 'Austria', 'Belgium', 'Bulgaria', 'Croatia', '
  ggplot(boat_sales_clean_C1, aes(x = Price_USD, y = Number.of.views.last.7.days, color
    size = Floor.Area, alpha = 0.5)) +
  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  facet_wrap(~Decade.Built) +
  labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
```

Warning message:
 "Removed 13 rows containing missing values (geom_point)."



```
In [42]: boat_sales_clean_C2 <- boat_sales_clean %>%
  filter(Location %in% c('Finland', 'France', 'Germany', 'Greece', 'Hungary', 'Ireland', 'Italy', 'Japan', 'Korea', 'Netherlands', 'Norway', 'Poland', 'Portugal', 'Romania', 'Russia', 'Sweden', 'Switzerland', 'Taiwan', 'Thailand', 'Turkey', 'United Kingdom', 'United States', 'Vietnam'))
ggplot(boat_sales_clean_C2, aes(x = Price_USD, y = Number.of.views.last.7.days, color = Location, size = Floor.Area, alpha = 0.5)) +
  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  facet_wrap(~Decade.Built) +
  labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
```

Warning message:
"Removed 25 rows containing missing values (geom_point)."

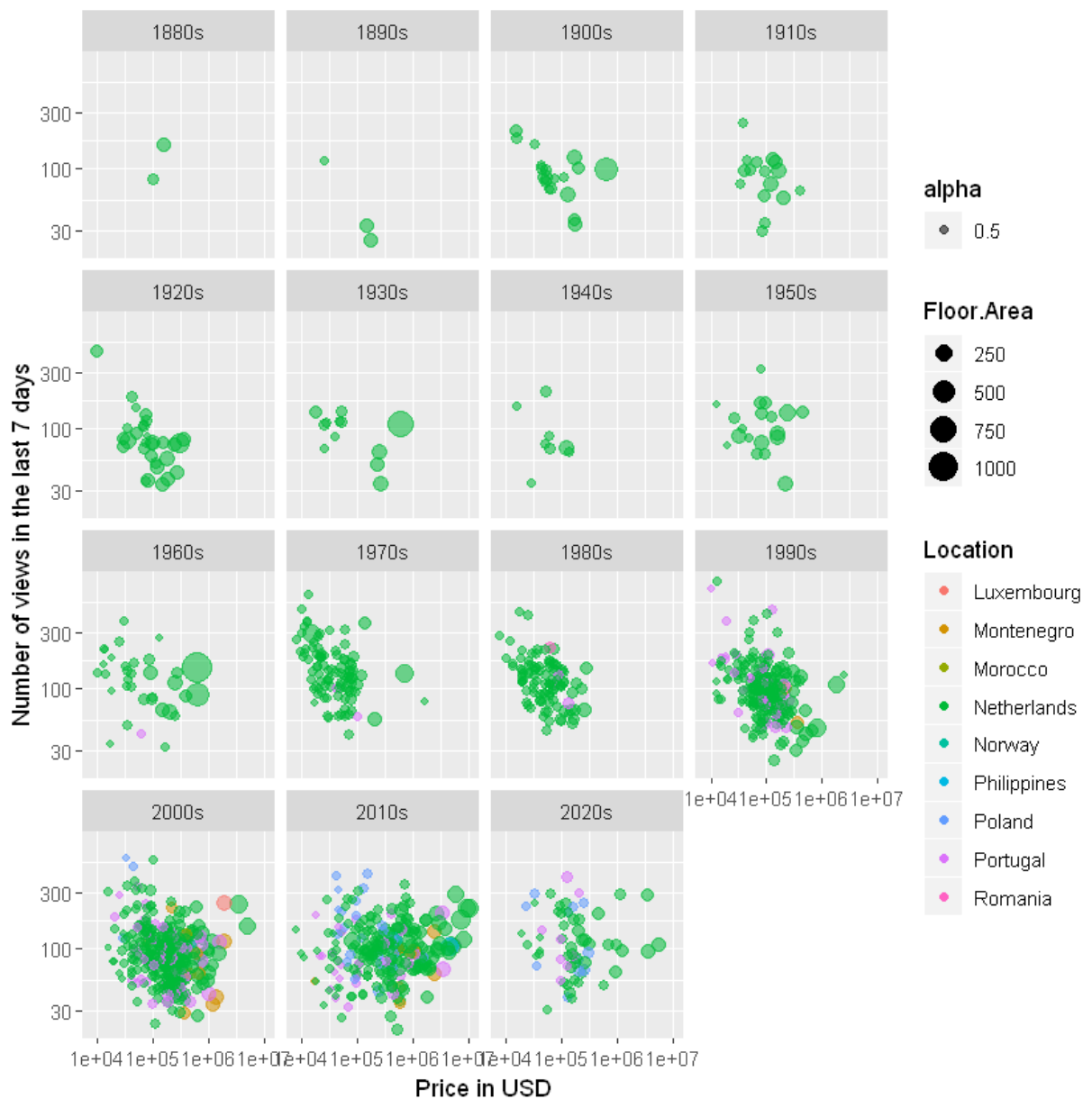


```
In [43]: boat_sales_clean_C3 <- boat_sales_clean %>%
  filter(Location %in% c('Luxembourg', 'Montenegro', 'Morocco', 'Netherlands', 'Norv

ggplot(boat_sales_clean_C3, aes(x = Price_USD, y = Number.of.views.last.7.days, color
  size = Floor.Area, alpha = 0.5)) +

  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  facet_wrap(~Decade.Built) +
  labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
```

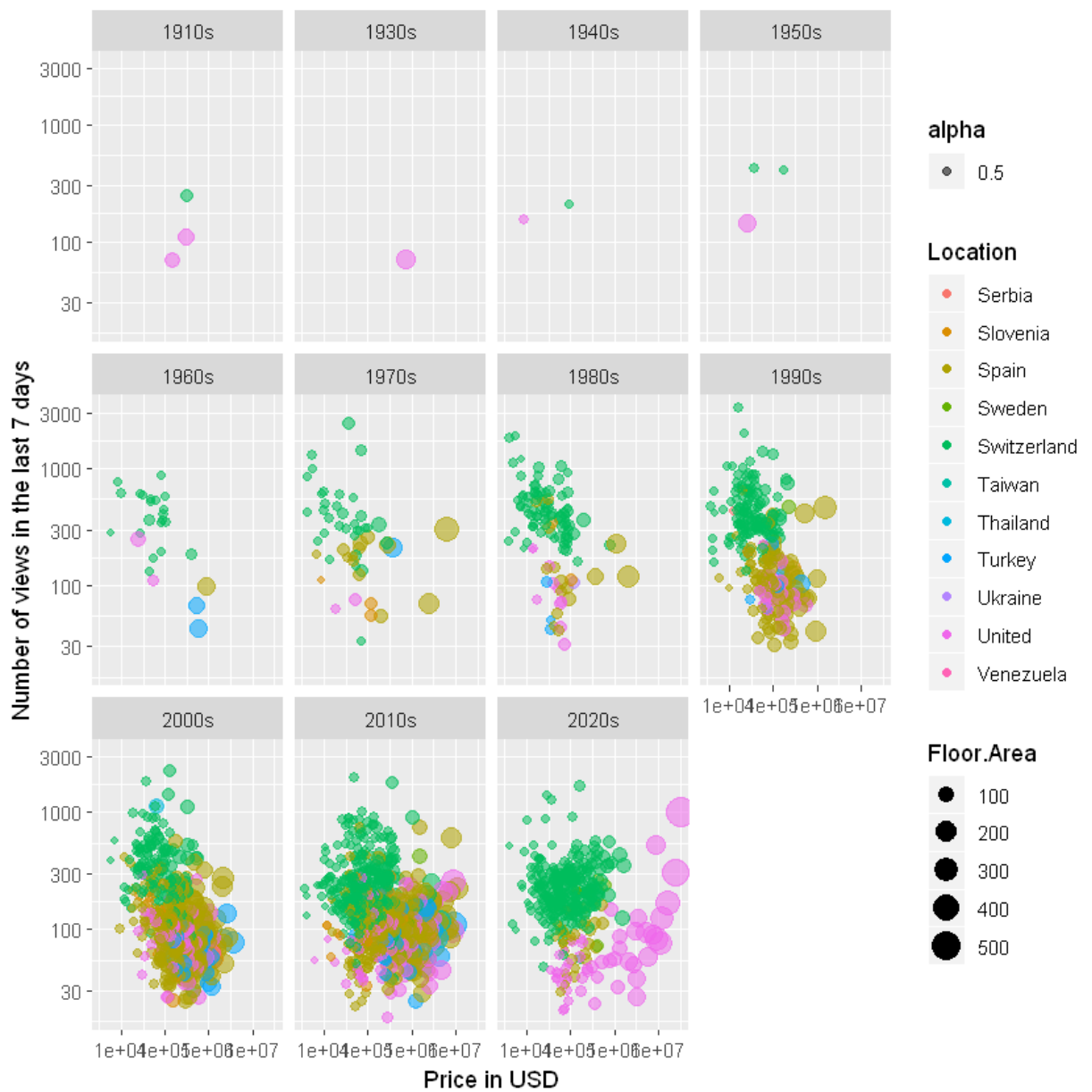
Warning message:
 "Removed 7 rows containing missing values (geom_point)."



```
In [44]: boat_sales_clean_C4 <- boat_sales_clean %>%
  filter(Location %in% c('Serbia', 'Slovenia', 'Spain', 'Sweden', 'Switzerland', 'Ta
    'Turkey', 'Ukraine', 'United', 'Venezuela'))

ggplot(boat_sales_clean_C4, aes(x = Price_USD, y = Number.of.views.last.7.days, color
  size = Floor.Area, alpha = 0.5)) +
  geom_point() +
  scale_x_log10() +
  scale_y_log10() +
  facet_wrap(~Decade.Built) +
  labs(x = 'Price in USD', y = 'Number of views in the last 7 days')
```

Warning message:
 "Removed 6 rows containing missing values (geom_point)."

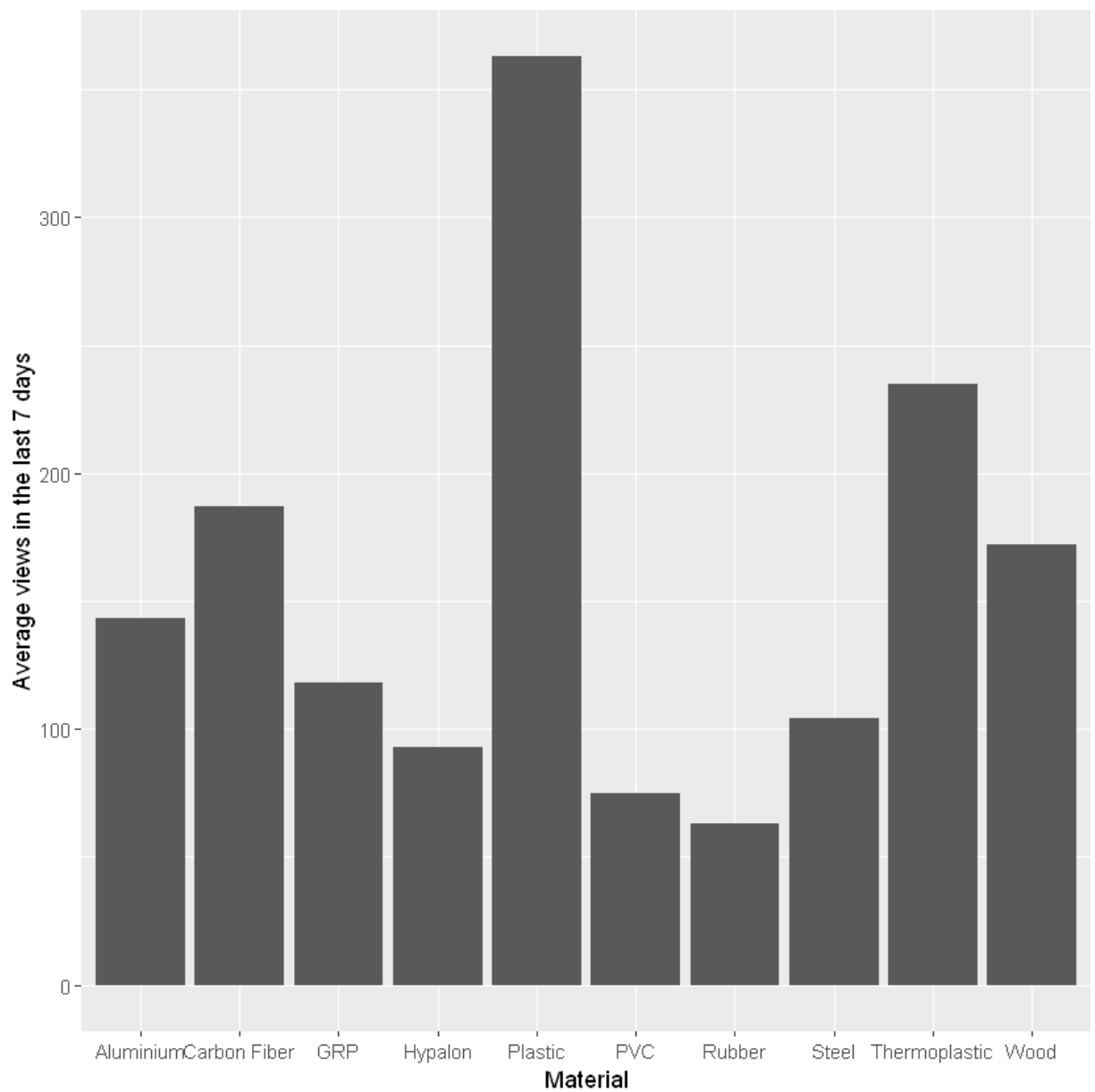


```
In [45]: boat_sales_clean_M_avg_v <- boat_sales_clean_M %>%
  group_by(Material) %>%
  summarize(avg_views = mean(round(Number.of.views.last.7.days), 1), avg_price_usd =
  arrange(desc(avg_views))

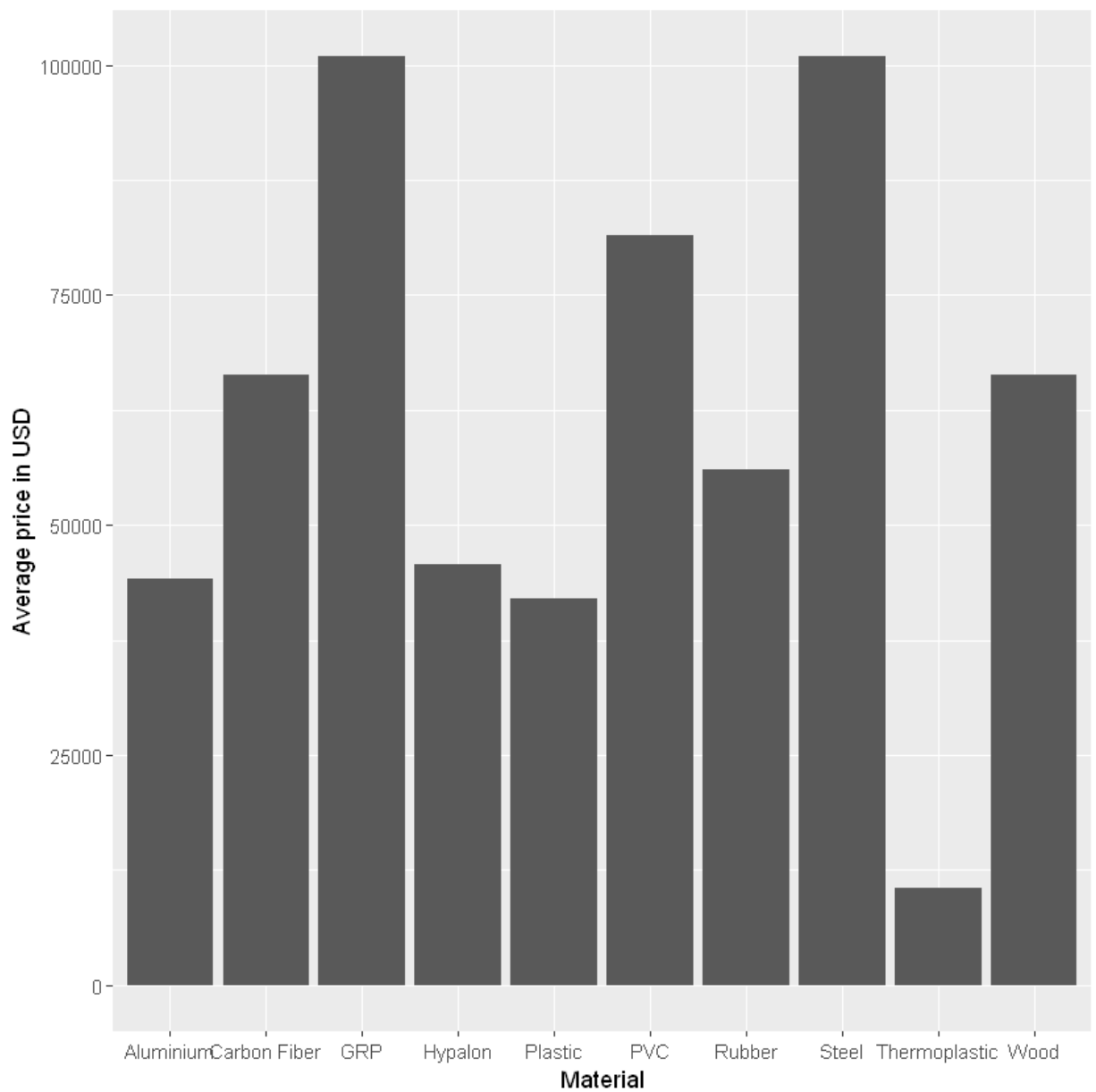
boat_sales_clean_M_avg_v
```


Material	avg_views	avg_price_usd
Plastic	363.0	42000
Thermoplastic	235.0	10588
Carbon Fiber	187.0	66300
Wood	172.0	66300
Aluminium	143.5	44134
GRP	118.0	100980
Steel	104.0	100980
Hypalon	93.0	45675
PVC	75.0	81498
Rubber	63.0	56100

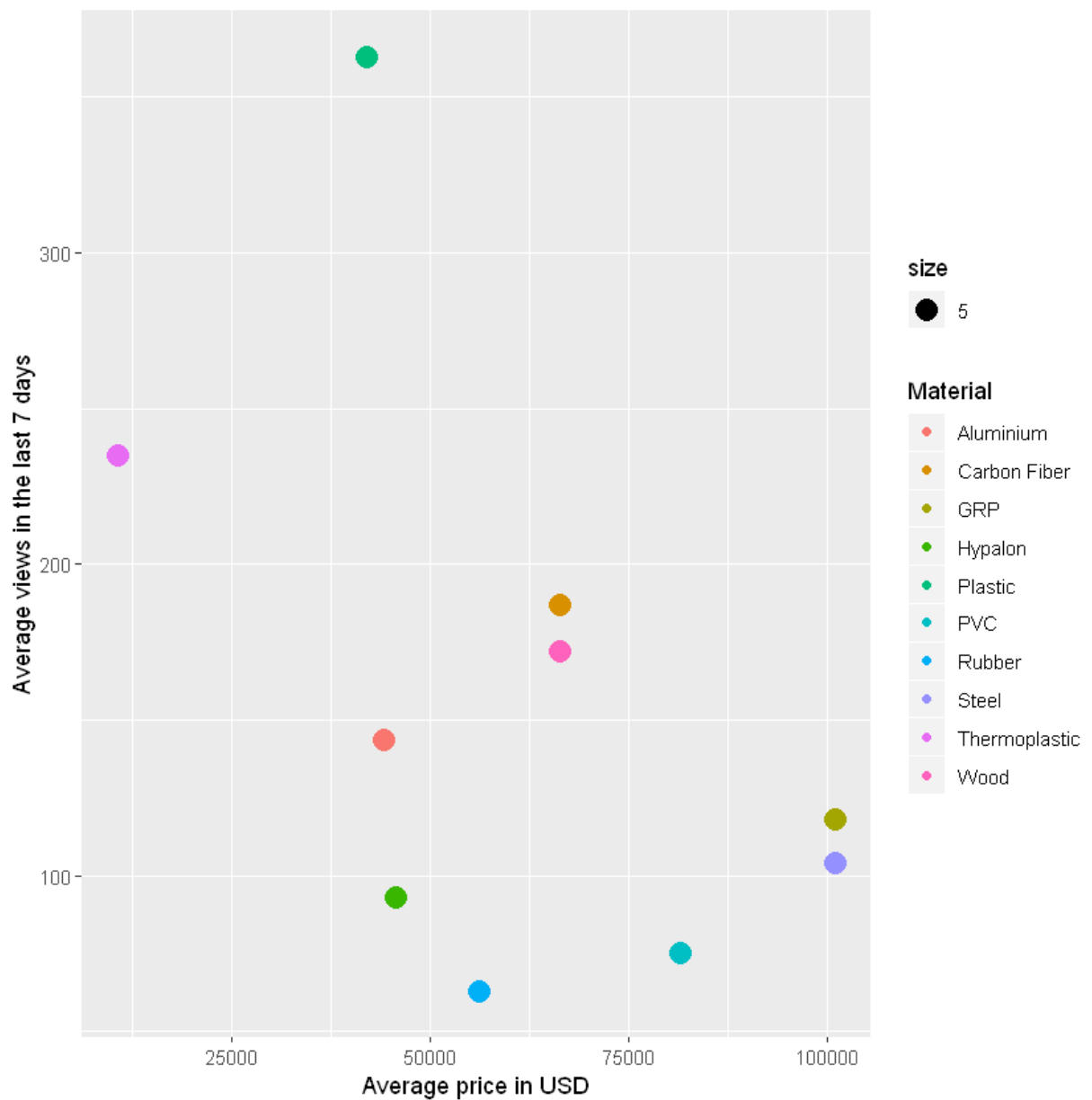
```
In [46]: ggplot(boat_sales_clean_M_avg_v, aes(Material, avg_views)) +
geom_col() +
labs(y = 'Average views in the last 7 days')
```



```
In [47]: ggplot(boat_sales_clean_M_avg_v, aes(Material, avg_price_usd)) +  
  geom_col() +  
  labs(y = 'Average price in USD')
```



```
In [48]: ggplot(boat_sales_clean_M_avg_v, aes(x = avg_price_usd, y = avg_views, color = Material)) +  
  geom_point() +  
  labs(x = 'Average price in USD', y = 'Average views in the last 7 days')
```



```
In [49]: boat_sales_clean_Y_avg <- boat_sales_clean %>%
  group_by(Decade.Built) %>%
  summarize(avg_views = mean(round(Number.of.views.last.7.days), 1), avg_price_usd =
    arrange(desc(avg_views))

boat_sales_clean_Y_avg
```

Decade.Built	avg_views	avg_price_usd
1970s	167.0	36750
1960s	157.0	62475
1980s	145.0	42840
1990s	127.0	70380
1950s	125.5	81090
1880s	121.5	125970
2020s	110.0	72410
1930s	109.0	50490
2010s	102.0	142290
1910s	96.0	119850
2000s	95.0	153000
1900s	91.0	69870
1940s	87.0	50490
1920s	78.0	79815
1890s	33.0	142290

```
In [50]: boat_sales_clean_L_avg <- boat_sales_clean %>%
  group_by(Location) %>%
  summarize(avg_views = mean(round(Number.of.views.last.7.days), 1), avg_price_usd =
  arrange(desc(avg_views))

head(boat_sales_clean_L_avg, 10)
```

Location	avg_views	avg_price_usd
Serbia	442.0	12240.0
Czech	401.5	100980.0
Switzerland	273.0	57592.5
Luxembourg	243.0	1938000.0
Romania	225.0	59670.0
Sweden	212.0	302440.0
Belgium	177.0	73134.0
Latvia	150.5	698700.0
Austria	141.0	88230.0
Hungary	141.0	62118.0

```
In [51]: boat_sales_clean_status <- boat_sales_clean %>%
  group_by(Boat.Status) %>%
  summarize(avg_views = mean(round(Number.of.views.last.7.days), 1), avg_price_usd = mea
```

```
boat_sales_clean_status
```

Boat.Status	avg_views	avg_price_usd
NA	145	69870.0
New	105	66118.5
Used	107	111180.0

```
In [52]: test_result_1 <- t.test(Number.of.views.last.7.days ~ Boat.Status, data = boat_sales_c
test_result_1
```

Welch Two Sample t-test

```
data: Number.of.views.last.7.days by Boat.Status
t = -6.7269, df = 4287.6, p-value = 1.962e-11
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -27.20443 -14.92575
sample estimates:
 mean in group New mean in group Used
    130.9777         152.0428
```

```
In [53]: test_result_2 <- t.test(Price_USD ~ Boat.Status, data = boat_sales_clean)
test_result_2
```

Welch Two Sample t-test

```
data: Price_USD by Boat.Status
t = 0.25259, df = 2204.7, p-value = 0.8006
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -57661.50  74711.63
sample estimates:
 mean in group New mean in group Used
    313223.9         304698.9
```

```
In [54]: cor(boat_sales_clean$Price_USD, boat_sales_clean$Number.of.views.last.7.days)
```

-0.00506324463573833

```
In [55]: cor(boat_sales_clean_M_avg_v$avg_views, boat_sales_clean_M_avg_v$avg_price_usd)
#The correlation between average views and price is a stronger negative correlation wh
```

-0.492681607960198

```
In [56]: #I would like to see how this would change if we exclude plastic and thermoplastic, wh
```

```
#Going back to the original data, I will take a look at manufacturer and boat type.
```

```
library(dplyr)
library(tidyr)
library(ggplot2)
```

```
boat_sales <- read.csv("C:\\Users\\franc\\Downloads\\boat_data.csv", stringsAsFactors
top_manufacturer <- boat_sales %>%
select(Manufacturer, Number.of.views.last.7.days) %>%
group_by(Manufacturer) %>%
```

```
count(Manufacturer) %>%
  arrange(desc(n))

head(top_manufacturer, 10)
```

Manufacturer	n
	1338
BÃfÂ©nÃfÂ©teau power boats	631
Jeanneau power boats	537
Sunseeker power boats	383
Princess power boats	241
Sea Ray power boats	239
Cranchi power boats	219
Azimut power boats	215
Bavaria power boats	185
Fairline power boats	172

```
In [57]: boat_sales <- boat_sales %>%
  separate(Price, into = c('Currency', 'o_price'), sep = " ")

boat_sales <- transform(boat_sales, o_price = as.numeric(o_price))

boat_sales <- boat_sales %>%
  mutate(id = row_number())

boat_sales_CHF <- boat_sales %>%
  filter(Currency == 'CHF') %>%
  mutate(Price_USD = o_price * 1.05)

boat_sales_EUR <- boat_sales %>%
  filter(Currency == 'EUR') %>%
  mutate(Price_USD = o_price * 1.02)

boat_sales_DKK <- boat_sales %>%
  filter(Currency == 'DKK') %>%
  mutate(Price_USD = o_price * 0.14)

boat_sales_AAE <- boat_sales %>%
  filter(Currency == 'Ã,Ã£') %>%
  mutate(Price_USD = o_price * 1.21)

boat_sales_join <- bind_rows(boat_sales_CHF, boat_sales_EUR, boat_sales_DKK, boat_sales_AAE)

boat_sales <- boat_sales_join %>%
  arrange(id)

boat_sales
```

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	3337	Motor Yacht	Rigiflex power boats	new boat from stock	2017	4.0
EUR	3490	Center console boat	Terhi power boats	new boat from stock	2020	4.0
CHF	3770	Sport Boat	Marine power boats	new boat from stock	0	3.6
DKK	25900	Sport Boat	Pioner power boats	new boat from stock	2020	3.0
EUR	3399	Fishing Boat	Linder power boats	new boat from stock	2019	3.5
CHF	3650	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	3600	Catamaran		Used boat,Unleaded	1999	6.2
DKK	24800	Sport Boat		Used boat	0	3.0
EUR	3333	Fishing Boat	Crescent power boats	new boat from stock	2019	3.6
EUR	3300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3500	Fishing Boat	Terhi power boats	Used boat,Electric	1987	4.3
CHF	3480	Fishing Boat	Marine power boats	new boat from stock	0	4.1
EUR	3500	Sport Boat	GS Nautica power boats	Used boat	2004	4.7
CHF	4600	Runabout	Kimple power boats	new boat from stock	2020	4.4
CHF	4500	Fishing Boat	Italmarine power boats	Used boat,Unleaded	1997	3.7
CHF	4400	Deck Boat	Buster power boats	new boat from stock,Unleaded	0	3.8
CHF	4380	Sport Boat	Linder power boats	new boat from stock	0	4.3
DKK	30000	Sport Boat		Used boat	1985	4.0
EUR	4000	Pilothouse	BÃ©nÃ©teau power boats	Used boat,Diesel	1981	8.0
EUR	4000	Cabin Boat		Used boat,Unleaded	2011	6.3
EUR	3999	Fishing Boat	Linder power boats	new boat from stock	2019	3.5

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length	
CHF	4267	Fishing Boat	Quicksilver (Brunswick Marine) power boats	new boat from stock,Unleaded	0	3.7	
EUR	3930	Sport Boat	Linder power boats	new boat from stock,Unleaded	2020	4.3	
EUR	3900	Sport Boat	Kammin power boats	Used boat,Unleaded	1979	5.6	
EUR	3900	Cabin Boat		Used boat	1985	6.5	
CHF	4200	Fishing Boat	Bucher power boats	Used boat,Unleaded	1998	5.7	
CHF	4200	Fishing Boat	MÃfÂndli power boats	Used boat,Unleaded	0	4.0	
CHF	4030	Fishing Boat	Linder power boats	new boat from stock	2018	3.5	
CHF	4000	Fishing Boat		Used boat,Unleaded	1994	5.6	
CHF	3975	Fishing Boat	Terhi power boats	new boat from stock	2020	4.0	
...	
EUR	5900	Sport Boat	Kelt power boats	Used boat,Unleaded	1996	4.9	
EUR	5000	Cabin Boat	Dufour power boats	Used boat,Unleaded	1990	4.2	
EUR	5000	Classic,Runabout,Trawler		Used boat,Unleaded	1920	6.5	
EUR	5000	Center console boat,Sport Boat		Elan power boats	Used boat	1992	5.2
EUR	4999	Pilothouse		Used boat,Diesel	1955	9.0	
EUR	4990	Cabin Boat		Unleaded	1987	6.5	
EUR	4990	Sport Boat		Used boat,Unleaded	0	4.6	
CHF	5390	Working Boat	Cipax AS power boats	new boat on order,Unleaded	0	4.0	
DKK	36500	Sport Boat		Used boat	1985	4.0	
DKK	36500	Fishing Boat	Hunter power boats	Used boat	2000	5.0	
EUR	4900	Sport Boat	Rio Iberica power boats	Used boat,Unleaded	1995	6.4	
EUR	4900	Bowrider	Glastron power boats	Used boat,Unleaded	1974	5.2	
CHF	5250	Sport Boat	Marine power boats	new boat from stock	0	4.4	

Currency	o_price	Boat.Type	Manufacturer	Type	Year.Built	Length
CHF	5250	Sport Boat	Fletcher power boats	Used boat,Unleaded	1975	4.3
EUR	4799	Sport Boat	BlueCraft power boats	new boat from stock	2020	5.1
EUR	4799	Working Boat		new boat from stock,Electric	2019	3.6
EUR	4790	Fishing Boat	Linder power boats	new boat from stock,Unleaded	2019	3.5
EUR	4790	Classic		Used boat	1962	4.1
CHF	5000	Pilothouse	Lambro power boats	Used boat,Unleaded	0	6.5
CHF	5000	Cabin Boat	Princess power boats	Used boat	1974	7.2
CHF	4999	Sport Boat,Wakeboard/Wakesurf,Water ski	Tullio Abbate power boats	Used boat,Unleaded	1980	6.0
CHF	4990	Sport Boat	Pioner power boats	new boat on order	0	4.1
CHF	4980	Sport Boat	Linder power boats	new boat from stock	0	4.0
CHF	4950	Sport Boat	Marine power boats	new boat from stock	0	3.9
CHF	4950	Fishing Boat	Staempfli power boats	Used boat,Unleaded	1984	6.0
CHF	4900	Sport Boat	Sea Ray power boats	Used boat,Unleaded	1987	6.3
EUR	4516	Sport Boat		new boat from stock	0	4.1
EUR	4499	Sport Boat	BlueCraft power boats	new boat from stock,Unleaded	2020	4.4
EUR	4300	Pontoon Boat	Whaly power boats	new boat from stock	2018	4.3
CHF	3780	Fishing Boat	DarekCo power boats	new boat from stock	2019	3.6

```
In [58]: top_10_manufacturers <- c("BÃfÃnÃfÃteau power boats", "Jeanneau power boats", "Sunset
      "Princess power boats", "Sea Ray power boats", "Cranchi power boats",
      "Azimut power boats", "Bavaria power boats", "Fairline power boats")

Manufacturer_views_price <- boat_sales %>%
select(Manufacturer, Number.of.views.last.7.days, Price_USD) %>%
group_by(Manufacturer) %>%
filter(Manufacturer %in% top_10_manufacturers) %>%
summarize(avg_views = mean(Number.of.views.last.7.days), avg_prive_usd = mean(Price_USD))
```

```
arrange(desc(avg_views))
```

```
Manufacturer_views_price
```

Manufacturer	avg_views	avg_prive_usd
Bavaria power boats	192.26486	170125.6
Sea Ray power boats	189.90377	85483.5
Princess power boats	162.03734	613476.3
Cranchi power boats	148.13699	280029.0
Fairline power boats	141.13953	370853.9
Sunseeker power boats	133.44648	1101672.3
Azimut power boats	113.20465	530308.4
Jeanneau power boats	95.10242	144917.3
BÃfÂ©nÃfÂ©teau power boats	89.08241	150703.6

```
In [58]: top_boat_type <- boat_sales %>%
select(Boat.Type, Number.of.views.last.7.days) %>%
group_by(Boat.Type) %>%
count(Boat.Type) %>%
arrange(desc(n))

head(top_boat_type, 10)
```

Boat.Type	n
Motor Yacht	2720
Sport Boat	1407
Flybridge	1194
Trawler	679
Pilothouse	613
Cabin Boat	585
Hardtop	507
Center console boat	369
Bowrider	301
Deck Boat	283

```
In [59]: top_10_boat_types <- c("Motor Yacht", "Sport Boat", "Flybridge", "Trawler", "Pilothouse",
"Cabin Boat", "Hardtop", "Center console boat", "Bowrider", "Deck Boat")

Boat_type_views_price <- boat_sales %>%
select(Boat.Type, Number.of.views.last.7.days, Price_USD) %>%
group_by(Boat.Type) %>%
filter(Boat.Type %in% top_10_boat_types) %>%
summarize(avg_views = mean(Number.of.views.last.7.days), avg_prive_usd = mean(Price_USD))
arrange(desc(avg_views))
```

Boat_type_views_price

Boat.Type	avg_views	avg_prive_usd
Cabin Boat	225.1282	65750.65
Sport Boat	178.6908	79897.17
Bowrider	156.7542	57906.58
Motor Yacht	129.2864	416603.71
Hardtop	128.8817	364082.16
Pilothouse	121.9086	69430.40
Trawler	111.1281	194763.63
Flybridge	106.8124	496752.72
Deck Boat	104.9399	50337.89
Center console boat	100.3117	81239.17

In []: