**Check points Questions**

1. **True or False: R is case sensitive?**

True

**2. What are some naming conventions in R?**

Underscore is allowed.

We cannot start with numbers.

**R Studio**

install.packages("tidyverse")  
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:  
  
https://cran.rstudio.com/bin/windows/Rtools/  
Installing package into ‘C:/Users/YAW/AppData/Local/R/win-library/4.3’  
(as ‘lib’ is unspecified)  
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/tidyverse\_2.0.0.zip'  
Content type 'application/zip' length 430809 bytes (420 KB)  
downloaded 420 KB  
  
package ‘tidyverse’ successfully unpacked and MD5 sums checked  
  
The downloaded binary packages are in  
 C:\Users\YAW\AppData\Local\Temp\RtmpktXTXs\downloaded\_packages  
> library(ggplot2)

> #Display dataframe  
> data(df)  
Warning message:  
In data(df) : data set ‘df’ not found  
>   
> #size   
> dim(df)  
NULL  
>   
> #check datatypes  
> str(df)  
function (x, df1, df2, ncp, log = FALSE)   
>   
> #size   
> dim(df)  
NULL  
> #check datatypes  
> str(df)  
function (x, df1, df2, ncp, log = FALSE)   
> #check for missing values  
> ColSums(is.na(df))  
Error in ColSums(is.na(df)) : could not find function "ColSums"  
> #drop null values  
> df<- na.omit(df) #it will delete all rows  
> F <- read.csv("F:/Just IT Bootcamp Data Techician/Week 11 Data Technician Bootcamp/Technical Training/Data Set- Inc5000 Company List-2014 (1).csv")  
> #drop null values method-1  
> drops <- c("x\_input") #c=contact  
> df <-df[,!(names(df)%in% c("x\_input"))]  
Error in df[, !(names(df) %in% c("x\_input"))] :   
 object of type 'closure' is not subsettable  
> read.csv("F:/Just IT Bootcamp Data Techician/Week 11 Data Technician Bootcamp/Technical Training/Data Set- Inc5000 Company List-2014 (1).csv")  
 X\_input X\_num X\_widgetName  
1 NA 1 Inc5000 Company List  
2 NA 2 Inc5000 Company List  
3 NA 3 Inc5000 Company List  
4 NA 4 Inc5000 Company List  
5 NA 5 Inc5000 Company List  
6 NA 6 Inc5000 Company List  
7 NA 7 Inc5000 Company List  
8 NA 8 Inc5000 Company List  
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10 NA 10 Inc5000 Company List  
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51 NA 51 Inc5000 Company List  
52 NA 52 Inc5000 Company List  
 X\_source X\_resultNumber  
1 Inc5000 Company List 1  
2 Inc5000 Company List 2  
3 Inc5000 Company List 3  
4 Inc5000 Company List 4  
5 Inc5000 Company List 5  
6 Inc5000 Company List 6  
7 Inc5000 Company List 7  
8 Inc5000 Company List 8  
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46 Inc5000 Company List 46  
47 Inc5000 Company List 47  
48 Inc5000 Company List 48  
49 Inc5000 Company List 49  
50 Inc5000 Company List 50  
51 Inc5000 Company List 51  
52 Inc5000 Company List 52  
 X\_pageUrl  
1 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
2 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
3 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
4 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
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48 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
49 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
50 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
51 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
52 http://www.inc.com/inc5000list/json/inc5000\_2014.json  
 id rank workers  
1 22890 1 227  
2 25747 2 191  
3 25643 3 145  
4 26098 4 62  
5 26182 5 92  
6 22913 6 50  
7 22937 7 129  
8 25413 8 130  
9 26079 9 264  
10 25861 10 11  
11 25231 11 113  
12 26450 12 135  
13 22892 13 153  
14 26223 14 313  
15 25021 15 159  
16 26535 16 34  
17 24632 17 436  
18 26246 18 42  
19 22962 19 27  
20 25398 20 44  
21 25290 21 12  
22 24803 22 790  
23 25925 23 17  
24 25323 24 102  
25 25679 25 102  
26 25524 26 90  
27 25360 27 27  
28 25764 28 10  
29 25317 29 8  
30 26342 30 200  
31 24949 31 33  
32 25188 32 176  
33 25240 33 24  
34 25357 34 140  
35 25522 35 55  
36 22949 36 61  
37 25527 37 53  
38 25755 38 25  
39 25634 39 1  
40 25306 40 4  
41 26117 41 24  
42 26490 42 96  
43 25659 43 48  
44 26179 44 147  
45 25965 45 20  
46 25677 46 379  
47 25385 47 40  
48 25931 48 17  
49 25654 49 30  
50 26146 50 35  
51 26092 51 32  
52 25699 52 50  
 company  
1 Fuhu  
2 Quest Nutrition  
3 Reliant Asset Management  
4 Superfish  
5 Acacia Communications  
6 Provider Power  
7 Crescendo Bioscience  
8 Plexus Worldwide  
9 Vacasa  
10 Go Energies  
11 Minute Key  
12 Sainstore  
13 The HCI Group  
14 Dynamic Dental Partners Group  
15 Aseptia  
16 Asentra Health  
17 American Solar Direct  
18 Prescient Edge  
19 BlueSquare Resolutions  
20 BES Design/Build  
21 Simpler Trading  
22 sweetFrog Premium Frozen Yogurt  
23 Base Commerce  
24 CPSG Partners  
25 MedHOK  
26 Showroom Logic  
27 WeVeel  
28 PackIt  
29 American Retirement Advisors  
30 HighPoint Global  
31 AdKarma  
32 Axtria  
33 Dolls Kill  
34 Centric Digital  
35 Retail Capital  
36 Restore Health  
37 OpenRoad Lending  
38 Pontchartrain Partners  
39 Team Extreme Marketing International  
40 Choice Energy  
41 ReviMedia  
42 SmartZip Analytics  
43 Thompson Gray  
44 MCSG Technologies  
45 Innovative Surveillance Solutions  
46 Nordic  
47 Michigan Realty Solutions  
48 Ohio Investments  
49 Adore Me  
50 IQ Formulations  
51 MAX Digital  
52 MaxHome  
 url  
1 fuhu  
2 quest-nutrition  
3 reliant-asset-management  
4 superfish  
5 acacia-communications  
6 provider-power  
7 crescendo-bioscience  
8 plexus-worldwide  
9 vacasa  
10 go-energies  
11 minute-key  
12 sainstore  
13 the-hci-group  
14 dynamic-dental-partners-group  
15 aseptia  
16 asentra-health  
17 american-solar-direct  
18 prescient-edge  
19 bluesquare-resolutions  
20 bes-designbuild  
21 simpler-trading  
22 sweetfrog-premium-frozen-yogurt  
23 base-commerce  
24 cpsg-partners  
25 medhok  
26 showroom-logic  
27 weveel  
28 packit  
29 american-retirement-advisors  
30 highpoint-global  
31 adkarma  
32 axtria  
33 dolls-kill  
34 centric-digital  
35 retail-capital  
36 restore-health  
37 openroad-lending  
38 pontchartrain-partners  
39 team-extreme-marketing-international  
40 choice-energy  
41 revimedia  
42 smartzip-analytics  
43 thompson-gray  
44 mcsg-technologies  
45 innovative-surveillance-solutions  
46 nordic  
47 michigan-realty-solutions  
48 ohio-investments  
49 adore-me  
50 iq-formulations  
51 max-digital  
52 maxhome  
 state\_l state\_s  
1 California CA  
2 California CA  
3 Virginia VA  
4 California CA  
5 Massachusetts MA  
6 Maine ME  
7 California CA  
8 Arizona AZ  
9 Oregon OR  
10 North Carolina NC  
11 Colorado CO  
12 Kansas KS  
13 Florida FL  
14 Florida FL  
15 North Carolina NC  
16 Hawaii HI  
17 California CA  
18 Virginia VA  
19 Arizona AZ  
20 Alabama AL  
21 Texas TX  
22 Virginia VA  
23 Arizona AZ  
24 Texas TX  
25 Florida FL  
26 Florida FL  
27 Pennsylvania PA  
28 California CA  
29 Arizona AZ  
30 Indiana IN  
31 Missouri MO  
32 New Jersey NJ  
33 California CA  
34 New York NY  
35 Michigan MI  
36 Wisconsin WI  
37 Texas TX  
38 Louisiana LA  
39 Maryland MD  
40 Iowa IA  
41 New York NY  
42 California CA  
43 Alabama AL  
44 Oklahoma OK  
45 Texas TX  
46 Wisconsin WI  
47 Michigan MI  
48 Ohio OH  
49 New York NY  
50 Florida FL  
51 Illinois IL  
52 Louisiana LA  
 city  
1 El Segundo  
2 El Segundo  
3 Arlington  
4 Palo Alto  
5 Maynard  
6 Auburn  
7 South San Francisco  
8 Scottsdale  
9 Portland  
10 Wilmington  
11 Boulder  
12 Lenexa  
13 Jacksonville  
14 Palmetto  
15 Raleigh  
16 Honolulu  
17 Los Angeles  
18 McLean  
19 Scottsdale  
20 Fairhope  
21 Austin  
22 Richmond  
23 Tempe  
24 Dallas  
25 Tampa  
26 Miami  
27 Morrisville  
28 Westlake Village  
29 Scottsdale  
30 Indianapolis  
31 Columbia  
32 Berkeley Heights  
33 San Francisco  
34 New York  
35 Troy  
36 Madison  
37 North Richland Hills  
38 New Orleans  
39 Chevy Chase  
40 Des Moines  
41 New York  
42 Pleasanton  
43 Huntsville  
44 Norman  
45 Tyler  
46 Madison  
47 Richmond  
48 Enon  
49 New York  
50 Sunrise  
51 Chicago  
52 New Orleans  
 metro  
1 Los Angeles  
2 Los Angeles  
3 Washington DC  
4 San Jose  
5 Boston  
6 Lewiston-Auburn ME  
7 San Francisco  
8 Phoenix  
9 Portland OR  
10 Wilmington NC  
11 Boulder CO  
12 Waterloo-Cedar Falls IA  
13 Jacksonville FL  
14 Sarasota-Bradenton-Venice FL  
15 Raleigh-Cary NC  
16 Honolulu HI  
17 Los Angeles  
18 Washington DC  
19 Phoenix  
20 Daphne-Fairhope-Foley AL  
21 Austin  
22 Richmond VA  
23 Phoenix  
24 Dallas  
25 Tampa  
26 Miami  
27 Dallas  
28 Los Angeles  
29 Phoenix  
30 Indianapolis IN  
31 Columbia MO  
32 New York City  
33 San Francisco  
34 New York City  
35 Detroit  
36 Madison WI  
37 Dallas  
38 New Orleans-Metairie-Kenner LA  
39 Washington DC  
40 Des Moines-West Des Moines IA  
41 New York City  
42 San Francisco  
43 Huntsville AL  
44 Oklahoma City OK  
45 Tyler TX  
46 Madison WI  
47 Detroit  
48 Springfield OH  
49 New York City  
50 Miami  
51 Chicago  
52 New Orleans-Metairie-Kenner LA  
 growth revenue  
1 158956.911 195640000  
2 57347.925 82640563  
3 55460.165 85076502  
4 26042.963 35293000  
5 20690.458 77652360  
6 19876.517 137977203  
7 18375.069 27308000  
8 16457.653 159897088  
9 16192.061 26263454  
10 16006.801 32851754  
11 14588.345 15782039  
12 14086.513 19243863  
13 13230.947 34583142  
14 12895.587 19802935  
15 12427.423 13887650  
16 12127.913 20445071  
17 11560.354 52086567  
18 11497.772 12315210  
19 11488.600 46400872  
20 11374.914 11819161  
21 10522.641 11260000  
22 10371.799 34382478  
23 10186.259 12479598  
24 9531.637 17095000  
25 9109.189 17037000  
26 8448.578 13443409  
27 8239.815 9007000  
28 7877.954 11874148  
29 7758.159 13876488  
30 7638.541 95810719  
31 7635.240 13326503  
32 7351.296 8963909  
33 7055.660 7585000  
34 6898.417 18045419  
35 6861.358 7013359  
36 6663.177 6821205  
37 6603.372 8853881  
38 6535.054 10545091  
39 6369.192 6772856  
40 6020.955 20894369  
41 5817.129 5963105  
42 5811.357 11396150  
43 5752.525 14104761  
44 5715.286 7686703  
45 5604.783 10247444  
46 5593.014 81410104  
47 5530.806 6178120  
48 5507.453 23809245  
49 5505.550 5637838  
50 5486.212 8269660  
51 5483.130 6577541  
52 5438.967 5792929  
 industry  
1 Consumer Products & Services  
2 Food & Beverage  
3 Business Products & Services  
4 Software  
5 Telecommunications  
6 Energy  
7 Health  
8 Health  
9 Travel & Hospitality  
10 Energy  
11 Consumer Products & Services  
12 Business Products & Services  
13 Health  
14 Health  
15 Food & Beverage  
16 Health  
17 Energy  
18 Government Services  
19 Financial Services  
20 Engineering  
21 Financial Services  
22 Food & Beverage  
23 Financial Services  
24 IT Services  
25 Health  
26 Advertising & Marketing  
27 Consumer Products & Services  
28 Consumer Products & Services  
29 Financial Services  
30 Business Products & Services  
31 Advertising & Marketing  
32 IT Services  
33 Retail  
34 Business Products & Services  
35 Financial Services  
36 Health  
37 Financial Services  
38 Government Services  
39 Consumer Products & Services  
40 Energy  
41 Advertising & Marketing  
42 Software  
43 Government Services  
44 IT Services  
45 Security  
46 Health  
47 Real Estate  
48 Real Estate  
49 Retail  
50 Health  
51 Software  
52 Construction  
 yrs\_on\_list  
1 2  
2 1  
3 1  
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41 1  
42 1  
43 1  
44 1  
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47 1  
48 1  
49 1  
50 1  
51 1  
52 1  
 [ reached 'max' / getOption("max.print") -- omitted 4948 rows ]  
> #drop null values method- 2   
> drops <- c("x\_input") #c-contact  
> names(df)  
NULL  
>   
> df<- df [,!(names(df) %in% drops)] #re create dataframe but exclude x.   
Error in df[, !(names(df) %in% drops)] :   
 object of type 'closure' is not subsettable  
> view(df)  
Error in view(df) : could not find function "view"  
> #drop null values method-3   
> F <- read.csv("F:/Just IT Bootcamp Data Techician/Week 11 Data Technician Bootcamp/Technical Training/Data Set- Inc5000 Company List-2014 (1).csv")  
> df <- df[,!(names(df) %in% c("x\_input"))]  
Error in df[, !(names(df) %in% c("x\_input"))] :   
 object of type 'closure' is not subsettable  
> #check duplicates  
> df<-df[!duplicated(df$id),]  
Error in df$id : object of type 'closure' is not subsettable  
> #round of to 2 decimal places   
> df$growth <- round(df$growth,digit=2)   
Error in df$growth : object of type 'closure' is not subsettable  
> install.packages("tidyverse")  
WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:  
  
https://cran.rstudio.com/bin/windows/Rtools/  
Installing package into ‘C:/Users/YAW/AppData/Local/R/win-library/4.3’  
(as ‘lib’ is unspecified)  
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.3/tidyverse\_2.0.0.zip'  
Content type 'application/zip' length 430809 bytes (420 KB)  
downloaded 420 KB  
  
package ‘tidyverse’ successfully unpacked and MD5 sums checked  
  
The downloaded binary packages are in  
 C:\Users\YAW\AppData\Local\Temp\RtmpktXTXs\downloaded\_packages  
> library(ggplot2)  
> ggplot(df,aes(x=revenue, y=growth)) + geom\_boxplot(outlier.colour="red", outlier.shape=1)+  
+ ggplot(df,aes(x=revenue, y=growth)) +   
+ geom\_boxplot(outlier.colour="red", outlier.shape=1)+  
+ scale\_x\_continuous(labels=scales::comma)+coord\_cartesian (ylim =(0, 1000)   
Error: unexpected ',' in:  
" geom\_boxplot(outlier.colour="red", outlier.shape=1)+  
 scale\_x\_continuous(labels=scales::comma)+coord\_cartesian (ylim =(0,"  
> ggplot(df, aes(x=revenue, y=growth))+  
+ geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `ggplot()`:**  
**!** `data` cannot be a function.  
ℹ Have you misspelled the `data`  
 argument in `ggplot()`  
Run `rlang::last\_trace()` to see where the error occurred.  
> rlang::last\_trace()  
<error/rlang\_error>  
Error **in `ggplot()`:**  
**!** `data` cannot be a function.  
ℹ Have you misspelled the `data`  
 argument in `ggplot()`  
---  
Backtrace:  
 ▆  
 1. ├─ggplot2::ggplot(df, aes(x = revenue, y = growth))  
 2. └─**ggplot2:::ggplot.function(**df, aes(x = revenue, y = growth)**)**  
**Run** rlang::last\_trace(drop = FALSE) to see 2 hidden frames.  
> rlang::last\_trace()  
<error/rlang\_error>  
Error **in `ggplot()`:**  
**!** `data` cannot be a function.  
ℹ Have you misspelled the `data`  
 argument in `ggplot()`  
---  
Backtrace:  
 ▆  
 1. ├─ggplot2::ggplot(df, aes(x = revenue, y = growth))  
 2. └─**ggplot2:::ggplot.function(**df, aes(x = revenue, y = growth)**)**  
**Run** rlang::last\_trace(drop = FALSE) to see 2 hidden frames.  
> scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
Run `rlang::last\_trace()` to see where the error occurred.  
> geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ rlang::last\_trace()  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
Run `rlang::last\_trace()` to see where the error occurred.  
> ggplot(df, aes(x=growth, y=revenue))+  
+ geom\_boxplot(outlier.colour="red", outlier.shape= 1))+  
Error: unexpected ')' in:  
"ggplot(df, aes(x=growth, y=revenue))+  
 geom\_boxplot(outlier.colour="red", outlier.shape= 1))"  
> geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
Run `rlang::last\_trace()` to see where the error occurred.  
> geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
Run `rlang::last\_trace()` to see where the error occurred.  
> rlang::last\_trace()  
<error/rlang\_error>  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
---  
Backtrace:  
 ▆  
 1. └─**ggplot2:::`+.gg`(**geom\_boxplot(outlier.colour = "red", outlier.shape = 1), scale\_x\_continuous(labels = scales::comma)**)**  
**Run** rlang::last\_trace(drop = FALSE) to see 2 hidden frames.  
> rlang::last\_trace()  
<error/rlang\_error>  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
---  
Backtrace:  
 ▆  
 1. └─**ggplot2:::`+.gg`(**geom\_boxplot(outlier.colour = "red", outlier.shape = 1), scale\_x\_continuous(labels = scales::comma)**)**  
**Run** rlang::last\_trace(drop = FALSE) to see 2 hidden frames.  
> scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
Run `rlang::last\_trace()` to see where the error occurred.  
> rlang::last\_trace(drop = FALSE)  
<error/rlang\_error>  
Error **in `+.gg`:**  
**!** Cannot add <ggproto> objects  
 together  
ℹ Did you forget to add this object to  
 a <ggplot> object?  
---  
Backtrace:  
 ▆  
 1. └─**ggplot2:::`+.gg`(**...**)**  
 **2.**  └─**cli**::cli\_abort(...)  
 3. └─**rlang**::abort(...)  
> #calculating IQR  
> q1\_growth <- quantile(df$growth,0.25)  
Error in df$growth : object of type 'closure' is not subsettable  
> ggplot(df,aes(x=growth, y=revenue))+  
+ geom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error **in `ggplot()`:**  
**!** `data` cannot be a function.  
ℹ Have you misspelled the `data`  
 argument in `ggplot()`  
Run `rlang::last\_trace()` to see where the error occurred.  
> eom\_boxplot(outlier.colour="red", outlier.shape= 1)+  
+ scale\_x\_continuous(labels=scales:: comma)+coord\_cartesian(c(0,1000))  
Error in eom\_boxplot(outlier.colour = "red", outlier.shape = 1) :   
 could not find function "eom\_boxplot"  
> #calculating IQR  
> q1\_growth <- quantile(df$growth,0.25)  
Error in df$growth : object of type 'closure' is not subsettable  
> #calculate IQR for revenue column   
> q1\_revenue<- quantile(df$revenue, 0.25)  
Error in df$revenue : object of type 'closure' is not subsettable  
> no\_outliers <- subset(no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))   
Error: unexpected ')' in "no\_outliers <- subset(no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))"  
> #removing outliers   
> no\_outliers <- subset(no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))  
Error: unexpected ')' in "no\_outliers <- subset(no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))"  
> no\_outliers <- subset (df,$growth>no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))  
Error: unexpected '$' in "no\_outliers <- subset (df,$"  
> #removing outliers   
> no\_outliers <- subset (df,$growth>no\_outliers$revenue> (q1\_revenue - 1.5\*IQR\_revenue)& df$growth< q3\_growth+ 1.5\*IQR\_growth))  
Error: unexpected '$' in "no\_outliers <- subset (df,$"  
> no\_outliers <- subset (no\_outliers, no\_outliers$revenue> (q1\_revenue -1.5\* IQR\_revenue)