Assignment 4

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# Assignment 4

First, you have to download the data from the following link:

Data: [link](https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2FStormData.csv.bz2)

There is also documentation on the data that you can find below:

National Weather Service Storm Data Documentation [link](https://d396qusza40orc.cloudfront.net/repdata%2Fpeer2_doc%2Fpd01016005curr.pdf)

National Climatic Data Center Storm Events FAQ [link](https://d396qusza40orc.cloudfront.net/repdata%2Fpeer2_doc%2FNCDC%20Storm%20Events-FAQ%20Page.pdf)

After downloading the unzip file and get the file repdata\_data\_StormData.csv

data <- read.csv('repdata\_data\_StormData.csv', header = TRUE)  
head(data)

## STATE\_\_ BGN\_DATE BGN\_TIME TIME\_ZONE COUNTY COUNTYNAME STATE EVTYPE  
## 1 1 4/18/1950 0:00:00 0130 CST 97 MOBILE AL TORNADO  
## 2 1 4/18/1950 0:00:00 0145 CST 3 BALDWIN AL TORNADO  
## 3 1 2/20/1951 0:00:00 1600 CST 57 FAYETTE AL TORNADO  
## 4 1 6/8/1951 0:00:00 0900 CST 89 MADISON AL TORNADO  
## 5 1 11/15/1951 0:00:00 1500 CST 43 CULLMAN AL TORNADO  
## 6 1 11/15/1951 0:00:00 2000 CST 77 LAUDERDALE AL TORNADO  
## BGN\_RANGE BGN\_AZI BGN\_LOCATI END\_DATE END\_TIME COUNTY\_END COUNTYENDN  
## 1 0 0 NA  
## 2 0 0 NA  
## 3 0 0 NA  
## 4 0 0 NA  
## 5 0 0 NA  
## 6 0 0 NA  
## END\_RANGE END\_AZI END\_LOCATI LENGTH WIDTH F MAG FATALITIES INJURIES PROPDMG  
## 1 0 14.0 100 3 0 0 15 25.0  
## 2 0 2.0 150 2 0 0 0 2.5  
## 3 0 0.1 123 2 0 0 2 25.0  
## 4 0 0.0 100 2 0 0 2 2.5  
## 5 0 0.0 150 2 0 0 2 2.5  
## 6 0 1.5 177 2 0 0 6 2.5  
## PROPDMGEXP CROPDMG CROPDMGEXP WFO STATEOFFIC ZONENAMES LATITUDE LONGITUDE  
## 1 K 0 3040 8812  
## 2 K 0 3042 8755  
## 3 K 0 3340 8742  
## 4 K 0 3458 8626  
## 5 K 0 3412 8642  
## 6 K 0 3450 8748  
## LATITUDE\_E LONGITUDE\_ REMARKS REFNUM  
## 1 3051 8806 1  
## 2 0 0 2  
## 3 0 0 3  
## 4 0 0 4  
## 5 0 0 5  
## 6 0 0 6

tail(data)

## STATE\_\_ BGN\_DATE BGN\_TIME TIME\_ZONE COUNTY  
## 902292 47 11/28/2011 0:00:00 03:00:00 PM CST 21  
## 902293 56 11/30/2011 0:00:00 10:30:00 PM MST 7  
## 902294 30 11/10/2011 0:00:00 02:48:00 PM MST 9  
## 902295 2 11/8/2011 0:00:00 02:58:00 PM AKS 213  
## 902296 2 11/9/2011 0:00:00 10:21:00 AM AKS 202  
## 902297 1 11/28/2011 0:00:00 08:00:00 PM CST 6  
## COUNTYNAME STATE EVTYPE BGN\_RANGE  
## 902292 TNZ001>004 - 019>021 - 048>055 - 088 TN WINTER WEATHER 0  
## 902293 WYZ007 - 017 WY HIGH WIND 0  
## 902294 MTZ009 - 010 MT HIGH WIND 0  
## 902295 AKZ213 AK HIGH WIND 0  
## 902296 AKZ202 AK BLIZZARD 0  
## 902297 ALZ006 AL HEAVY SNOW 0  
## BGN\_AZI BGN\_LOCATI END\_DATE END\_TIME COUNTY\_END COUNTYENDN  
## 902292 11/29/2011 0:00:00 12:00:00 PM 0 NA  
## 902293 11/30/2011 0:00:00 10:30:00 PM 0 NA  
## 902294 11/10/2011 0:00:00 02:48:00 PM 0 NA  
## 902295 11/9/2011 0:00:00 01:15:00 PM 0 NA  
## 902296 11/9/2011 0:00:00 05:00:00 PM 0 NA  
## 902297 11/29/2011 0:00:00 04:00:00 AM 0 NA  
## END\_RANGE END\_AZI END\_LOCATI LENGTH WIDTH F MAG FATALITIES INJURIES  
## 902292 0 0 0 NA 0 0 0  
## 902293 0 0 0 NA 66 0 0  
## 902294 0 0 0 NA 52 0 0  
## 902295 0 0 0 NA 81 0 0  
## 902296 0 0 0 NA 0 0 0  
## 902297 0 0 0 NA 0 0 0  
## PROPDMG PROPDMGEXP CROPDMG CROPDMGEXP WFO STATEOFFIC  
## 902292 0 K 0 K MEG TENNESSEE, West  
## 902293 0 K 0 K RIW WYOMING, Central and West  
## 902294 0 K 0 K TFX MONTANA, Central  
## 902295 0 K 0 K AFG ALASKA, Northern  
## 902296 0 K 0 K AFG ALASKA, Northern  
## 902297 0 K 0 K HUN ALABAMA, North  
## ZONENAMES  
## 902292 LAKE - LAKE - OBION - WEAKLEY - HENRY - DYER - GIBSON - CARROLL - LAUDERDALE - TIPTON - HAYWOOD - CROCKETT - MADISON - CHESTER - HENDERSON - DECATUR - SHELBY  
## 902293 OWL CREEK & BRIDGER MOUNTAINS - OWL CREEK & BRIDGER MOUNTAINS - WIND RIVER BASIN  
## 902294 NORTH ROCKY MOUNTAIN FRONT - NORTH ROCKY MOUNTAIN FRONT - EASTERN GLACIER  
## 902295 ST LAWRENCE IS. BERING STRAIT - ST LAWRENCE IS. BERING STRAIT  
## 902296 NORTHERN ARCTIC COAST - NORTHERN ARCTIC COAST  
## 902297 MADISON - MADISON  
## LATITUDE LONGITUDE LATITUDE\_E LONGITUDE\_  
## 902292 0 0 0 0  
## 902293 0 0 0 0  
## 902294 0 0 0 0  
## 902295 0 0 0 0  
## 902296 0 0 0 0  
## 902297 0 0 0 0  
## REMARKS  
## 902292 EPISODE NARRATIVE: A powerful upper level low pressure system brought snow to portions of Northeast Arkansas, the Missouri Bootheel, West Tennessee and extreme north Mississippi. Most areas picked up between 1 and 3 inches of with areas of Northeast Arkansas and the Missouri Bootheel receiving between 4 and 6 inches of snow.EVENT NARRATIVE: Around 1 inch of snow fell in Carroll County.  
## 902293 EPISODE NARRATIVE: A strong cold front moved south through north central Wyoming bringing high wind to the Meeteetse area and along the south slopes of the western Owl Creek Range. Wind gusts to 76 mph were recorded at Madden Reservoir.EVENT NARRATIVE:   
## 902294 EPISODE NARRATIVE: A strong westerly flow aloft produced gusty winds at the surface along the Rocky Mountain front and over the plains of Central Montana. Wind gusts in excess of 60 mph were reported.EVENT NARRATIVE: A wind gust to 60 mph was reported at East Glacier Park 1ENE (the Two Medicine DOT site).  
## 902295 EPISODE NARRATIVE: A 960 mb low over the southern Aleutians at 0300AKST on the 8th intensified to 945 mb near the Gulf of Anadyr by 2100AKST on the 8th. The low crossed the Chukotsk Peninsula as a 956 mb low at 0900AKST on the 9th, and moved into the southern Chukchi Sea as a 958 mb low by 2100AKST on the 9th. The low then tracked to the northwest and weakened to 975 mb about 150 miles north of Wrangel Island by 1500AKST on the 10th. The storm was one of the strongest storms to impact the west coast of Alaska since November 1974. \n\nZone 201: Blizzard conditions were observed at Wainwright from approximately 1153AKST through 1611AKST on the 9th. The visibility was frequently reduced to one quarter mile in snow and blowing snow. There was a peak wind gust to 43kt (50 mph) at the Wainwright ASOS. During this event, there was also a peak wind gust to \n68 kt (78 mph) at the Cape Lisburne AWOS. \n\nZone 202: Blizzard conditions were observed at Barrow from approximately 1021AKST through 1700AKST on the 9th. The visibility was frequently reduced to one quarter mile or less in blowing snow. There was a peak wind gust to 46 kt (53 mph) at the Barrow ASOS. \n\nZone 207: Blizzard conditions were observed at Kivalina from approximately 0400AKST through 1230AKST on the 9th. The visibility was frequently reduced to one quarter of a mile in snow and blowing snow. There was a peak wind gust to 61 kt (70 mph) at the Kivalina ASOS. The doors to the village transportation shed were blown out to sea. Many homes lost portions of their tin roofing, and satellite dishes were ripped off of roofs. One home had its door blown off. At Point Hope, severe blizzard conditions were observed. There was a peak wind gust of 68 kt (78 mph) at the Point Hope AWOS before power was lost to the AWOS. It was estimated that the wind gusted as high as 85 mph in the village during the height of the storm during the morning and early afternoon hours on the 9th. Five power poles were knocked down in the storm EVENT NARRATIVE:   
## 902296 EPISODE NARRATIVE: A 960 mb low over the southern Aleutians at 0300AKST on the 8th intensified to 945 mb near the Gulf of Anadyr by 2100AKST on the 8th. The low crossed the Chukotsk Peninsula as a 956 mb low at 0900AKST on the 9th, and moved into the southern Chukchi Sea as a 958 mb low by 2100AKST on the 9th. The low then tracked to the northwest and weakened to 975 mb about 150 miles north of Wrangel Island by 1500AKST on the 10th. The storm was one of the strongest storms to impact the west coast of Alaska since November 1974. \n\nZone 201: Blizzard conditions were observed at Wainwright from approximately 1153AKST through 1611AKST on the 9th. The visibility was frequently reduced to one quarter mile in snow and blowing snow. There was a peak wind gust to 43kt (50 mph) at the Wainwright ASOS. During this event, there was also a peak wind gust to \n68 kt (78 mph) at the Cape Lisburne AWOS. \n\nZone 202: Blizzard conditions were observed at Barrow from approximately 1021AKST through 1700AKST on the 9th. The visibility was frequently reduced to one quarter mile or less in blowing snow. There was a peak wind gust to 46 kt (53 mph) at the Barrow ASOS. \n\nZone 207: Blizzard conditions were observed at Kivalina from approximately 0400AKST through 1230AKST on the 9th. The visibility was frequently reduced to one quarter of a mile in snow and blowing snow. There was a peak wind gust to 61 kt (70 mph) at the Kivalina ASOS. The doors to the village transportation shed were blown out to sea. Many homes lost portions of their tin roofing, and satellite dishes were ripped off of roofs. One home had its door blown off. At Point Hope, severe blizzard conditions were observed. There was a peak wind gust of 68 kt (78 mph) at the Point Hope AWOS before power was lost to the AWOS. It was estimated that the wind gusted as high as 85 mph in the village during the height of the storm during the morning and early afternoon hours on the 9th. Five power poles were knocked down in the storm EVENT NARRATIVE:   
## 902297 EPISODE NARRATIVE: An intense upper level low developed on the 28th at the base of a highly amplified upper trough across the Great Lakes and Mississippi Valley. The upper low closed off over the mid South and tracked northeast across the Tennessee Valley during the morning of the 29th. A warm conveyor belt of heavy rainfall developed in advance of the low which dumped from around 2 to over 5 inches of rain across the eastern two thirds of north Alabama and middle Tennessee. The highest rain amounts were recorded in Jackson and DeKalb Counties with 3 to 5 inches. The rain fell over 24 to 36 hour period, with rainfall remaining light to moderate during most its duration. The rainfall resulted in minor river flooding along the Little River, Big Wills Creek and Paint Rock. A landslide occurred on Highway 35 just north of Section in Jackson County. A driver was trapped in his vehicle, but was rescued unharmed. Trees, boulders and debris blocked 100 to 250 yards of Highway 35.\n\nThe rain mixed with and changed to snow across north Alabama during the afternoon and evening hours of the 28th, and lasted into the 29th. The heaviest bursts of snow occurred in northwest Alabama during the afternoon and evening hours, and in north central and northeast Alabama during the overnight and morning hours. Since ground temperatures were in the 50s, and air temperatures in valley areas only dropped into the mid 30s, most of the snowfall melted on impact with mostly trace amounts reported in valley locations. However, above 1500 foot elevation, snow accumulations of 1 to 2 inches were reported. The heaviest amount was 2.3 inches on Monte Sano Mountain, about 5 miles northeast of Huntsville.EVENT NARRATIVE: Snowfall accumulations of up to 2.3 inches were reported on the higher elevations of eastern Madison County. A snow accumulation of 1.5 inches was reported 2.7 miles south of Gurley, while 2.3 inches was reported 3 miles east of Huntsville atop Monte Sano Mountain.  
## REFNUM  
## 902292 902292  
## 902293 902293  
## 902294 902294  
## 902295 902295  
## 902296 902296  
## 902297 902297

summary(data)

## STATE\_\_ BGN\_DATE BGN\_TIME   
## Min. : 1.0 5/25/2011 0:00:00: 1202 12:00:00 AM: 10163   
## 1st Qu.:19.0 4/27/2011 0:00:00: 1193 06:00:00 PM: 7350   
## Median :30.0 6/9/2011 0:00:00 : 1030 04:00:00 PM: 7261   
## Mean :31.2 5/30/2004 0:00:00: 1016 05:00:00 PM: 6891   
## 3rd Qu.:45.0 4/4/2011 0:00:00 : 1009 12:00:00 PM: 6703   
## Max. :95.0 4/2/2006 0:00:00 : 981 03:00:00 PM: 6700   
## (Other) :895866 (Other) :857229   
## TIME\_ZONE COUNTY COUNTYNAME STATE   
## CST :547493 Min. : 0.0 JEFFERSON : 7840 TX : 83728   
## EST :245558 1st Qu.: 31.0 WASHINGTON: 7603 KS : 53440   
## MST : 68390 Median : 75.0 JACKSON : 6660 OK : 46802   
## PST : 28302 Mean :100.6 FRANKLIN : 6256 MO : 35648   
## AST : 6360 3rd Qu.:131.0 LINCOLN : 5937 IA : 31069   
## HST : 2563 Max. :873.0 MADISON : 5632 NE : 30271   
## (Other): 3631 (Other) :862369 (Other):621339   
## EVTYPE BGN\_RANGE BGN\_AZI   
## HAIL :288661 Min. : 0.000 :547332   
## TSTM WIND :219940 1st Qu.: 0.000 N : 86752   
## THUNDERSTORM WIND: 82563 Median : 0.000 W : 38446   
## TORNADO : 60652 Mean : 1.484 S : 37558   
## FLASH FLOOD : 54277 3rd Qu.: 1.000 E : 33178   
## FLOOD : 25326 Max. :3749.000 NW : 24041   
## (Other) :170878 (Other):134990   
## BGN\_LOCATI END\_DATE END\_TIME   
## :287743 :243411 :238978   
## COUNTYWIDE : 19680 4/27/2011 0:00:00: 1214 06:00:00 PM: 9802   
## Countywide : 993 5/25/2011 0:00:00: 1196 05:00:00 PM: 8314   
## SPRINGFIELD : 843 6/9/2011 0:00:00 : 1021 04:00:00 PM: 8104   
## SOUTH PORTION: 810 4/4/2011 0:00:00 : 1007 12:00:00 PM: 7483   
## NORTH PORTION: 784 5/30/2004 0:00:00: 998 11:59:00 PM: 7184   
## (Other) :591444 (Other) :653450 (Other) :622432   
## COUNTY\_END COUNTYENDN END\_RANGE END\_AZI   
## Min. :0 Mode:logical Min. : 0.0000 :724837   
## 1st Qu.:0 NA's:902297 1st Qu.: 0.0000 N : 28082   
## Median :0 Median : 0.0000 S : 22510   
## Mean :0 Mean : 0.9862 W : 20119   
## 3rd Qu.:0 3rd Qu.: 0.0000 E : 20047   
## Max. :0 Max. :925.0000 NE : 14606   
## (Other): 72096   
## END\_LOCATI LENGTH WIDTH   
## :499225 Min. : 0.0000 Min. : 0.000   
## COUNTYWIDE : 19731 1st Qu.: 0.0000 1st Qu.: 0.000   
## SOUTH PORTION : 833 Median : 0.0000 Median : 0.000   
## NORTH PORTION : 780 Mean : 0.2301 Mean : 7.503   
## CENTRAL PORTION: 617 3rd Qu.: 0.0000 3rd Qu.: 0.000   
## SPRINGFIELD : 575 Max. :2315.0000 Max. :4400.000   
## (Other) :380536   
## F MAG FATALITIES INJURIES   
## Min. :0.0 Min. : 0.0 Min. : 0.0000 Min. : 0.0000   
## 1st Qu.:0.0 1st Qu.: 0.0 1st Qu.: 0.0000 1st Qu.: 0.0000   
## Median :1.0 Median : 50.0 Median : 0.0000 Median : 0.0000   
## Mean :0.9 Mean : 46.9 Mean : 0.0168 Mean : 0.1557   
## 3rd Qu.:1.0 3rd Qu.: 75.0 3rd Qu.: 0.0000 3rd Qu.: 0.0000   
## Max. :5.0 Max. :22000.0 Max. :583.0000 Max. :1700.0000   
## NA's :843563   
## PROPDMG PROPDMGEXP CROPDMG CROPDMGEXP   
## Min. : 0.00 :465934 Min. : 0.000 :618413   
## 1st Qu.: 0.00 K :424665 1st Qu.: 0.000 K :281832   
## Median : 0.00 M : 11330 Median : 0.000 M : 1994   
## Mean : 12.06 0 : 216 Mean : 1.527 k : 21   
## 3rd Qu.: 0.50 B : 40 3rd Qu.: 0.000 0 : 19   
## Max. :5000.00 5 : 28 Max. :990.000 B : 9   
## (Other): 84 (Other): 9   
## WFO STATEOFFIC   
## :142069 :248769   
## OUN : 17393 TEXAS, North : 12193   
## JAN : 13889 ARKANSAS, Central and North Central: 11738   
## LWX : 13174 IOWA, Central : 11345   
## PHI : 12551 KANSAS, Southwest : 11212   
## TSA : 12483 GEORGIA, North and Central : 11120   
## (Other):690738 (Other) :595920   
## ZONENAMES   
## :594029   
## :205988   
## GREATER RENO / CARSON CITY / M - GREATER RENO / CARSON CITY / M : 639   
## GREATER LAKE TAHOE AREA - GREATER LAKE TAHOE AREA : 592   
## JEFFERSON - JEFFERSON : 303   
## MADISON - MADISON : 302   
## (Other) :100444   
## LATITUDE LONGITUDE LATITUDE\_E LONGITUDE\_   
## Min. : 0 Min. :-14451 Min. : 0 Min. :-14455   
## 1st Qu.:2802 1st Qu.: 7247 1st Qu.: 0 1st Qu.: 0   
## Median :3540 Median : 8707 Median : 0 Median : 0   
## Mean :2875 Mean : 6940 Mean :1452 Mean : 3509   
## 3rd Qu.:4019 3rd Qu.: 9605 3rd Qu.:3549 3rd Qu.: 8735   
## Max. :9706 Max. : 17124 Max. :9706 Max. :106220   
## NA's :47 NA's :40   
## REMARKS REFNUM   
## :287433 Min. : 1   
## : 24013 1st Qu.:225575   
## Trees down.\n : 1110 Median :451149   
## Several trees were blown down.\n : 569 Mean :451149   
## Trees were downed.\n : 446 3rd Qu.:676723   
## Large trees and power lines were blown down.\n: 432 Max. :902297   
## (Other) :588294