Final Project

Group members:

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Packages:

```r
#install.packages("RMySQL")

#install.packages("ggplot2")

#install.packages("xts")

#install.packages("DBI")

#install.packages("RMySQL")

#install.packages("dplyr")

#install.packages("plotly")

#install.packages("purrr")

#install.packages("quantmod")

#install.packages("treemapify")

#install.packages("ggpubr")

#install.packages("Tushare")

#install.packages("rmarkdown")

library(RMySQL)

library(ggplot2)

library(xts)

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library(plotly)

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library(quantmod)

library(treemapify)

library(ggpubr)

library(Tushare)

library(rmarkdown)
```

Get SSE50 Index Data from Tushare

```r
today = format(Sys.Date(),"%Y%m%d")

tushare <- Tushare::pro_api(token = "a060f5bc02599c4f873ae86e6f9197d83e27469834e3a07be4716df5")

SSE_Index <- tushare(api_name = "index_daily", ts_code = "000001.SH", start_date = '20180101', end_date = today,
                    fields='trade_date,open,high,low,close')

head(SSE_Index)
```

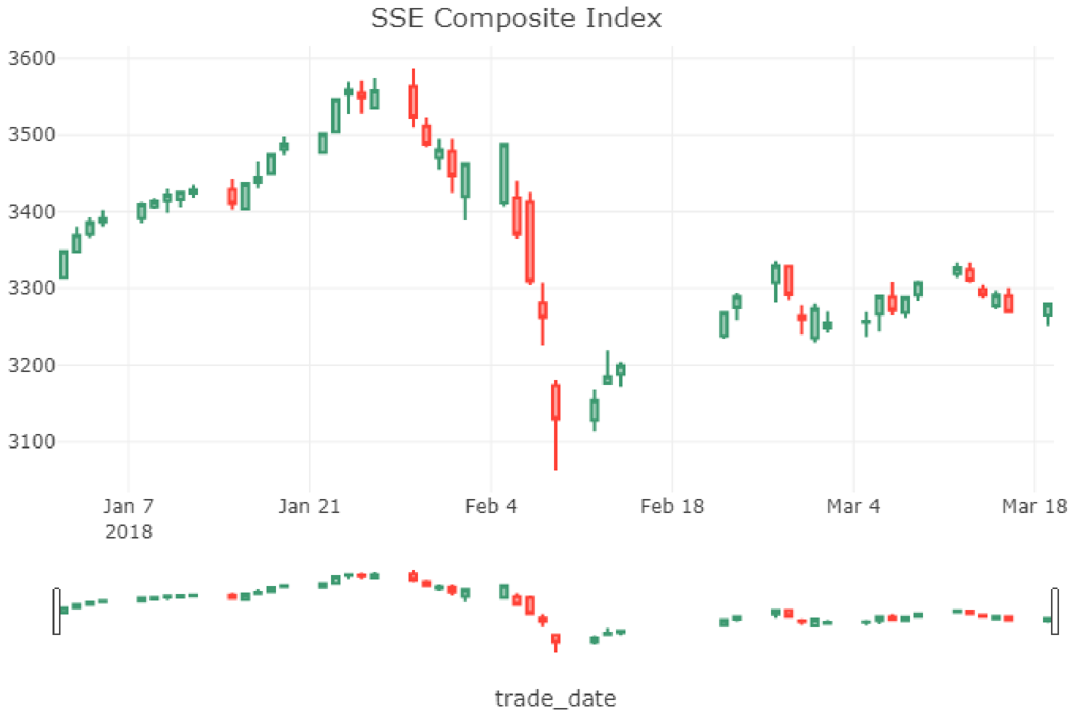
```
##     ts_code trade_date    close     open     high      low pre_close
## 1 000001.SH   20191226 3007.355 2981.249 3007.355 2980.397  2981.881
## 2 000001.SH   20191225 2981.881 2980.428 2988.292 2970.657  2982.681
## 3 000001.SH   20191224 2982.681 2965.826 2983.819 2960.684  2962.751
## 4 000001.SH   20191223 2962.751 2999.036 3009.338 2960.435  3004.938
## 5 000001.SH   20191220 3004.938 3019.640 3027.483 3002.260  3017.066
## 6 000001.SH   20191219 3017.066 3017.153 3021.418 3007.992  3017.044
##     change pct_chg       vol    amount
## 1  25.4741  0.8543 182440426 195586079
## 2  -0.8001 -0.0268 175654028 189608563
## 3  19.9293  0.6727 163030250 167366667
## 4 -42.1863 -1.4039 205716617 218484273
## 5 -12.1282 -0.4020 215075755 223305036
## 6   0.0214  0.0007 208624264 220688292
```

```r
SSE_Index$trade_date<-as.Date(SSE_Index$trade_date,"%Y%m%d")

#Get trade dates

trade_date<-tushare(api_name = "trade_cal", start_date = '20191001', end_date = today)

trade_date <- trade_date[trade_date$is_open == 1,]

return_cal_dates <- trade_date$cal_date[(nrow(trade_date)-1):nrow(trade_date)]

#300 Industry indices

ind_returns <- data.frame()

ind_indices_code <-paste0(c('000908','000909','000910','000912','000913','000914','000915','000916','000917'),".SH")

for (code in ind_indices_code){

  ind_index <- tushare(api_name = "index_daily", ts_code = code, start_date = '20180830', end_date = '20180831')
  ind_returns[code,"returns"] <- ind_index$close[2]/ind_index$close[1] - 1
}
row.names(ind_returns)<- c("CSI 300 Energy","CSI 300 Materials","CSI 300 Industrials","CSI 300 Cons Staples",
     "CSI 300 Health Care","CSI 300 Financials","CSI 300 Info Tech","CSI 300 Telecom Svc","CSI 300 Utilities")
#SSE 50 Constituents
SSE50_constituents <- read.csv("C:/Users/Administrator/Desktop/R_final_project-master/000016closeweight.csv")
SSE50_codes <- paste0(SSE50_constituents$Constituent.Code,".SH")
SSE50_names <- SSE50_constituents$Constituent.Name
SSE50_basics <- data.frame()
SSE50 <- data.frame()
for (code in SSE50_codes){
  stk <- tushare(api_name = "daily", ts_code = code, trade_date = return_cal_dates[1])
  stk_mv <- tushare(api_name = "daily_basic", ts_code = code,  trade_date = return_cal_dates[1])
  SSE50[code,"returns"] <- stk$close/stk$pre_close -1
  SSE50[code,"vol"] <- stk$vol
  SSE50[code,"mv"] <- stk_mv$total_mv
  SSE50_basics <- rbind(SSE50_basics,stk_mv)
}
SSE50$names <- paste0(SSE50_names,'\n',round(SSE50$returns*100,2),'%')
SSE50_basics_new <- data.frame(row.names = 1:50)
SSE50_basics_new$Code <- SSE50_codes
SSE50_basics_new$Company <- SSE50_names
SSE50_basics_new$Exchange <- SSE50_constituents$Exchange
SSE50_basics_new["Market Cap"] <- SSE50_basics$total_mv
SSE50_basics_new["P/E"] <- SSE50_basics$pe
SSE50_basics_new$Price <- SSE50_basics$close
SSE50_basics_new$Change <- paste0(round(SSE50$returns*100,2),"%")
SSE50_basics_new$Volume <- SSE50$vol
```

Draw figures

Plot candlestick

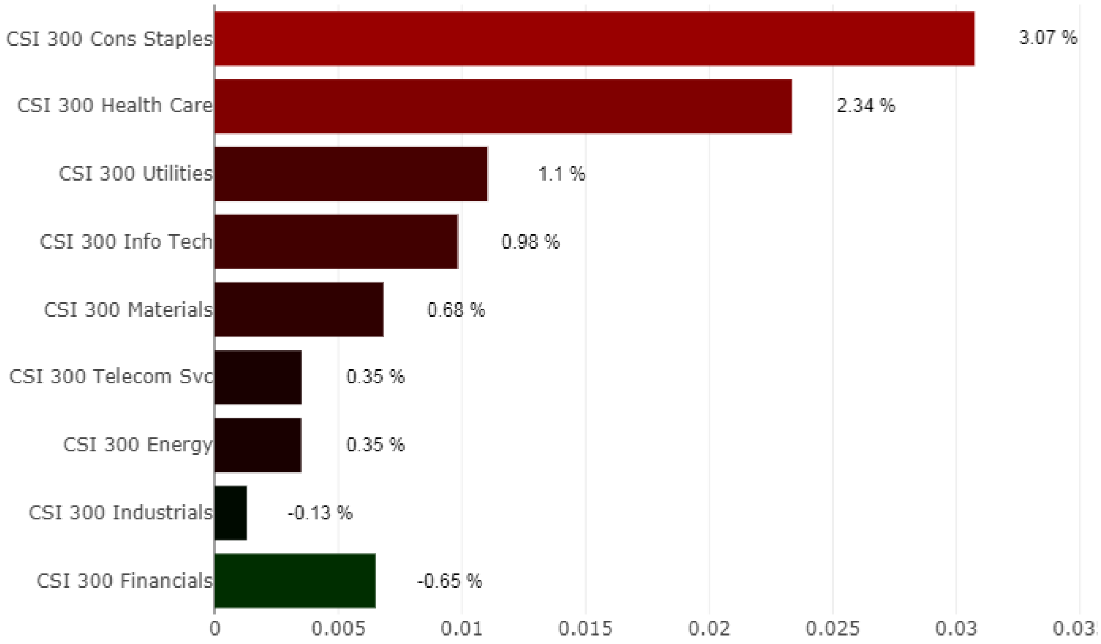
```
SSE_Index <- tail(SSE_Index,50)
SSE_candlestick <- SSE_Index %>%
  plot_ly(x = ~trade_date, type="candlestick",
          open = ~open, close = ~close,
          high = ~high, low = ~low) %>%
  layout(title = "SSE Composite Index")
SSE_candlestick
```



Plot industry indices barchart

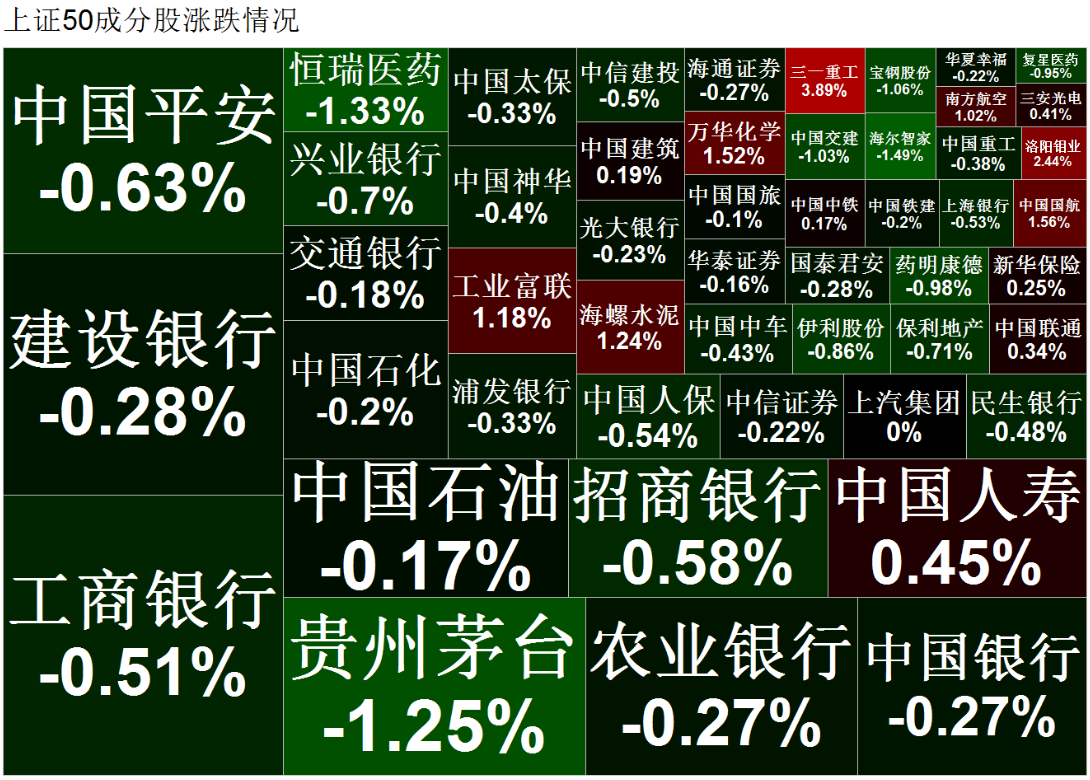
```
to_color <- function (x){
  if (x > 0){
    return(sprintf("rgb(%d,0,0)",floor(255*(1-exp(-x*30)))));
  }
  else if (x<=0){
    return(sprintf("rgb(0,%d,0)",ceiling(255*(1-exp(x*30)))));
  }
}
ind_returns["color"] = map_chr(ind_returns$returns, to_color)
```

```
ind_indices_barchart <- plot_ly(y = reorder(row.names(ind_returns), ind_returns$returns),
                             x = abs(ind_returns$returns),
                             marker =list(color = ind_returns$color),
                             type = 'bar',orientation = 'h') %>%
  add_annotations(xref = 'x1', yref = 'y',
                x = abs(ind_returns$returns)+0.003 ,  y = row.names(ind_returns),
                text = paste(round(ind_returns$returns*100, 2), '%'),
                font = list(family = 'Arial', size = 12, color = 'rgb(0, 0, 0)'),
                showarrow = FALSE)

ind_indices_barchart
```



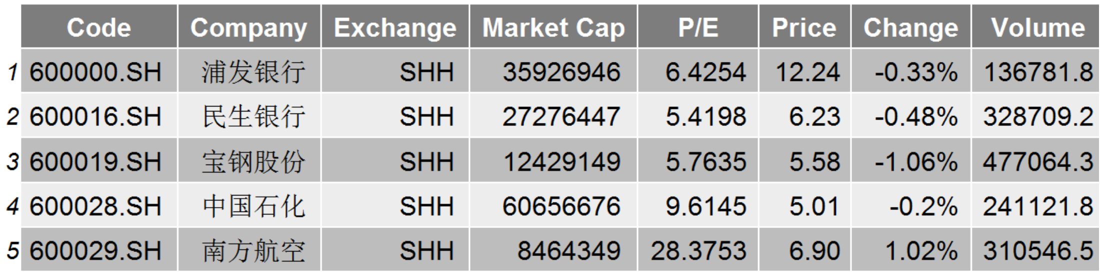
Plot SSE50 constituents maps

```
rgb2hex <- function(rgb){
  rgb <- strsplit(substr(rgb,5,nchar(rgb)-1),',')[[1]]
  rgb <- as.integer(rgb)
  rgb <- as.character(as.hexmode(rgb))
  hex <- "#"
  for (i in rgb){
    if (nchar(i) == 1){i <- paste0('0',i)}
    hex <- paste0(hex, i)
  }
  return(hex)
}


SSE50["color"] = map_chr(SSE50$returns, to_color) %>% map_chr(rgb2hex)
ggplot(SSE50, aes(area = mv, label = names)) +
  geom_treemap(fill = SSE50$color) +
  geom_treemap_text(fontface = "bold", colour = "white", place = "centre",
                    grow = TRUE) +
  ggtitle("上证 50 成分股涨跌情况")
```



Generate the screener overview

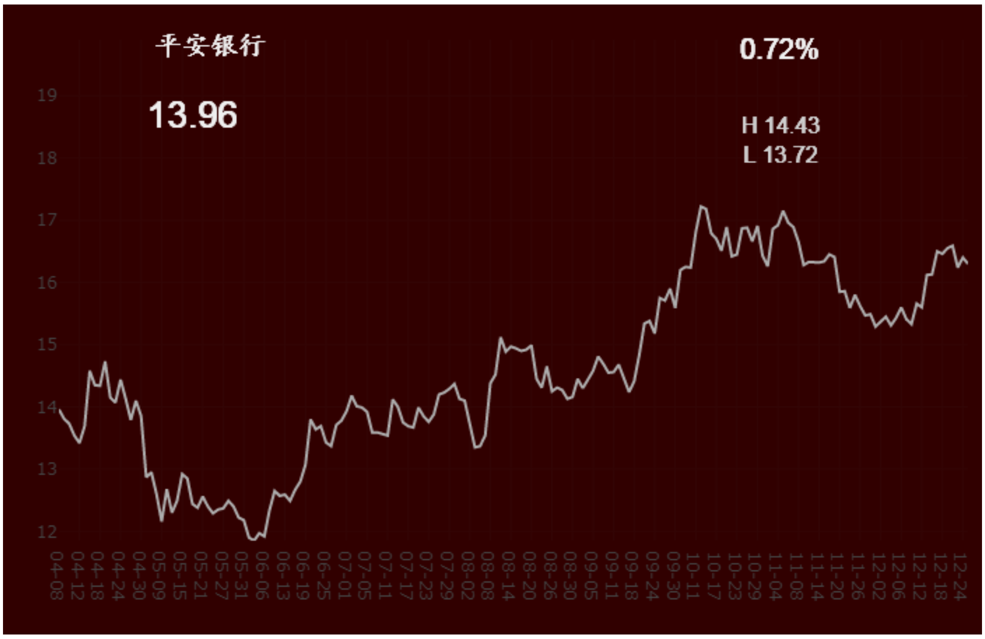
```
SSE50_basics_new <- head(SSE50_basics_new,5)

tbody.style = tbody_style(color = "black",

                          fill = c("#bdbdbd","#ededed"), hjust=1, x=0.9)

ggtexttable(SSE50_basics_new,

           theme = ttheme(

             colnames.style = colnames_style(color = "white", fill = "#7d7d7d"),

             tbody.style = tbody.style

           ))
```

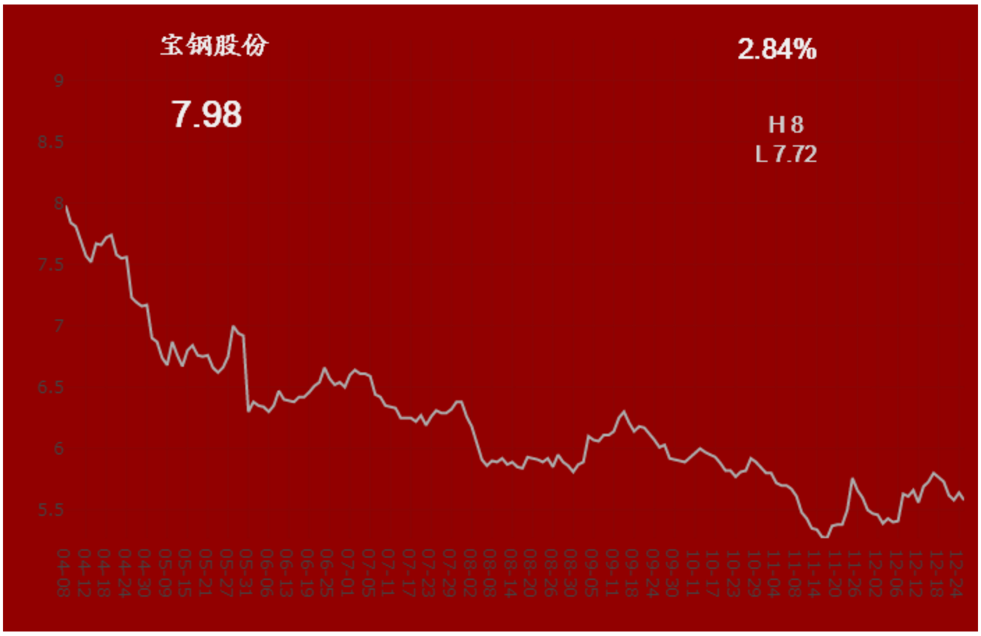


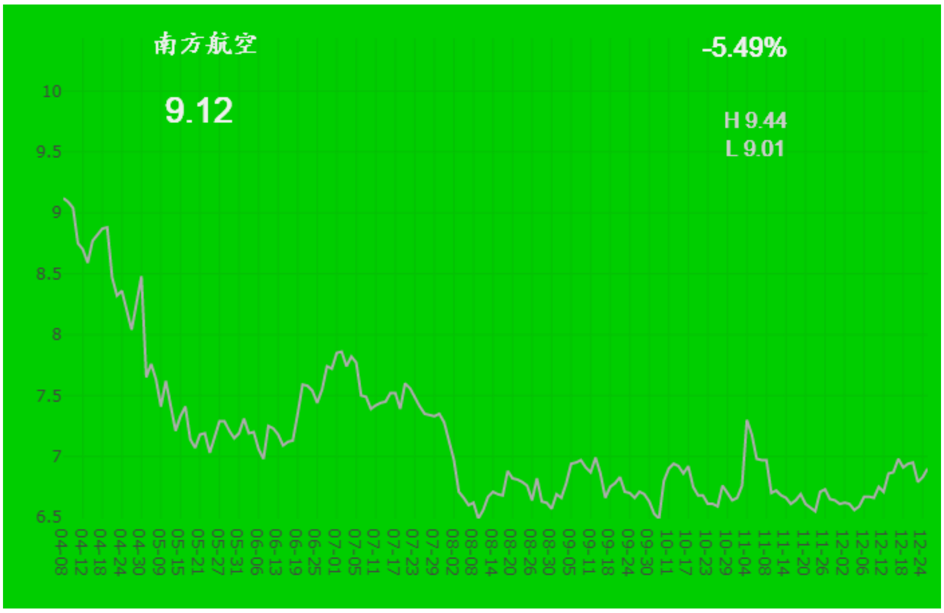
	Code	Company	Exchange	Market Cap	P/E	Price	Change	Volume
1	600000.SH	浦发银行	SHH	35926946	6.4254	12.24	-0.33%	136781.8
2	600016.SH	民生银行	SHH	27276447	5.4198	6.23	-0.48%	328709.2
3	600019.SH	宝钢股份	SHH	12429149	5.7635	5.58	-1.06%	477064.3
4	600028.SH	中国石化	SHH	60656676	9.6145	5.01	-0.2%	241121.8
5	600029.SH	南方航空	SHH	8464349	28.3753	6.90	1.02%	310546.5

Generate the line graph of individual stock
The background color will change according to the daily return of the stock.

```
PingAn <- tushare(api_name = "daily", ts_code = '000001.SZ', start_date = '20190405', end_date = return_cal_dates[1])
PingAn_return = PingAn$close[nrow(PingAn)]/PingAn$pre_close[nrow(PingAn)] - 1


PingAn_name <- list(
         xref = 'paper',
         yref = 'paper',
         x = 0.23,
         y = 0.99,
         xanchor = 'right',
         yanchor = 'middle',
         text = '平安银行\n',
         font = list(family = '楷体',
                    size = 20,
                    color = '#efefef'),
         showarrow = FALSE)
PingAn_price <- list(
  xref = 'paper',
  yref = 'paper',
  x = 0.20,
  y = 0.85,
  xanchor = 'right',
  yanchor = 'middle',
  text = ~as.character(PingAn$close[nrow(PingAn)]),
  font = list(family = 'Arial',
             size = 26,
             color = '#efefef'),
  showarrow = FALSE)


PingAn_change <- list(
       xref = 'paper',
       yref = 'paper',
       x = 0.84,
        y = 0.98,
        xanchor = 'right',
        yanchor = 'middle',
        text = ~paste0(round(PingAn_return*100,2),'%'),
        font = list(family = 'Arial',
                    size = 20,
                    color = '#efefef'),
        showarrow = FALSE)

PingAn_HL <- list(
  xref = 'paper',
  yref = 'paper',
  x = 0.84,
  y = 0.80,
  xanchor = 'right',
  yanchor = 'middle',
  text = ~paste0("H ",PingAn$high[nrow(PingAn)],"\nL ",PingAn$low[nrow(PingAn)]),
  font = list(family = 'Arial',
              size = 16,
              color = '#cfcfcf'),
  showarrow = FALSE)

PingAn_plot <- plot_ly(PingAn, y=~close,x=~paste0(substr(trade_date,5,6),'-',substr(trade_date,7,8)),
                       type = 'scatter', mode = 'lines',
                       line = list(color = '#adadad')) %>%
              layout(paper_bgcolor=to_color(PingAn_return), plot_bgcolor=to_color(PingAn_return),
                     xaxis = list(title = ""),
                     yaxis = list(title = "", range=c(min(PingAn$close),max(PingAn$close)*1.5 - 0.5*min(PingAn$close))),
                     margin =list(autoexpand = TRUE, r=10,l=10))%>%
              layout(annotations = PingAn_name)%>%
              layout(annotations = PingAn_price)%>%
              layout(annotations = PingAn_change)%>%
              layout(annotations = PingAn_HL)

PingAn_plot
```






南方航空
9.12
-5.49%
H 9.44
L 9.01
10
9.5
9
8.5
8
7.5
7
6.5
04-08
04-12
04-18
04-24
04-30
05-09
05-15
05-21
05-27
05-31
06-06
06-13
06-19
06-25
07-01
07-05
07-11
07-17
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10-29
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11-20
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12-02
12-06
12-12
12-18
12-24