Statsc283-project1

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b.Import the data in R and convert the adjusted close prices into returns. (Use the first 5-year data only!)

```
#Read your csv file:
a <- read.csv("stockData.csv", sep=",", header=TRUE)
#Convert adjusted close prices into returns:
r <- (a[-1,3:ncol(a)]-a[-nrow(a),3:ncol(a)])/a[-nrow(a),3:ncol(a)]
```

c. Compute the means of the 31 assets, the standard deviations, and the variance covariance matrix.

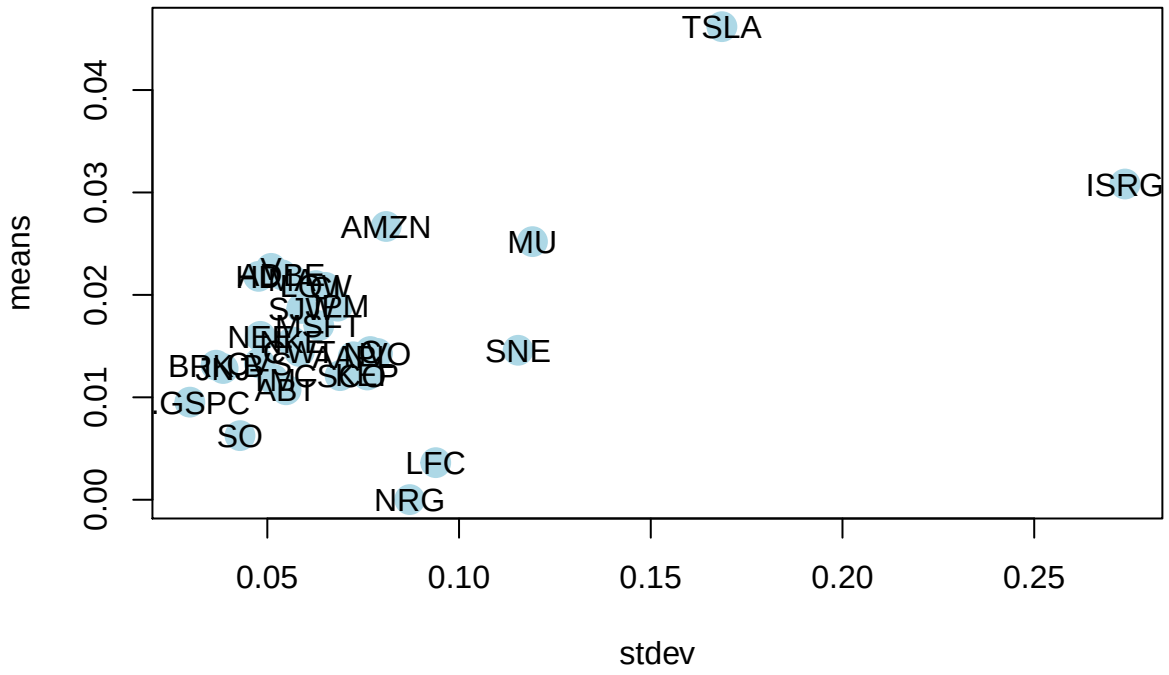
```
#Compute mean vector:
means <- colMeans(r)  #Without ^GSPC

#Compute variance covariance matrix:
covmat <- cov(r)  #Without ^GSPC

#Compute the vector of variances:
variances <- diag(covmat)
#Compute the vector of standard deviations:
stdev <- diag(covmat)^.5
```

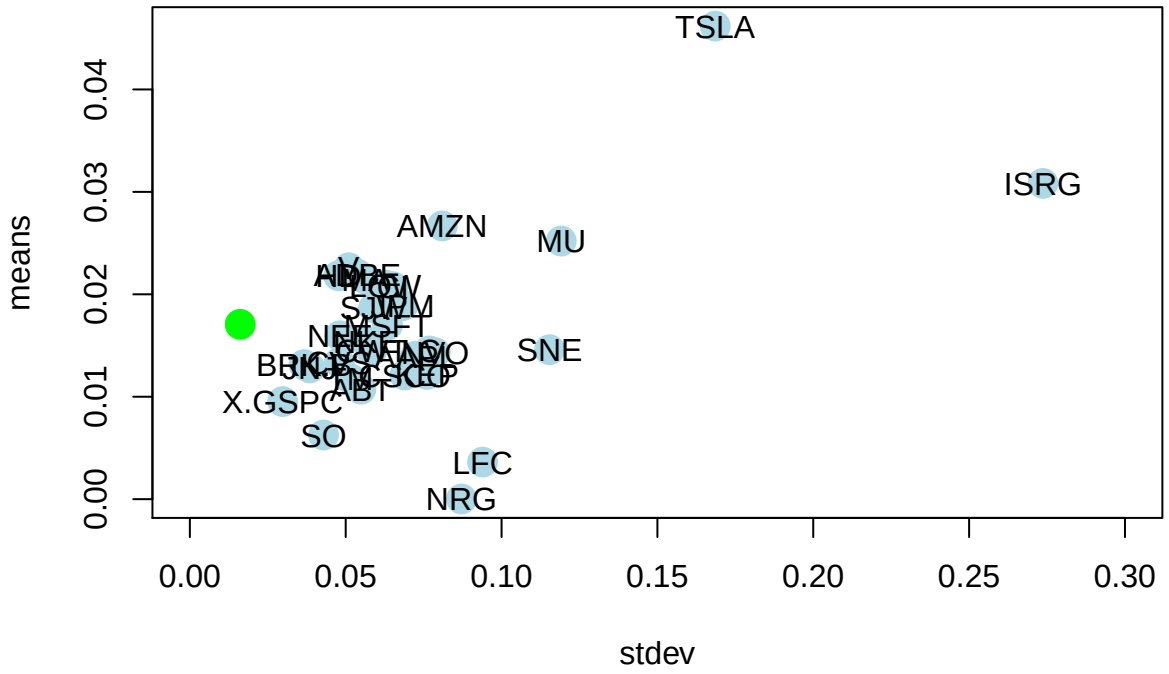
d.Plot the 31 assets on the space expected return against standard deviation.

```
plot(stdev, means, col="lightblue", pch=19, cex=2)
text(stdev, means, labels=names(means))
```



e. Assume equal allocation portfolio using the 30 stocks. Compute the mean and standard deviation of this portfolio and add it on the plot of question (c).

```
equal_portfolio_mean<-sum(means[-1])/30.    # without SGPC
equal_portfolio_sd<-sqrt(sum(variances[-1])/900)
plot(stdev, means, col="lightblue", pch=19, cex=2, xlim=c(0, 0.3))
text(stdev, means, labels=names(means))
points(equal_portfolio_sd, equal_portfolio_mean, col="green", pch=19, cex=2)
```

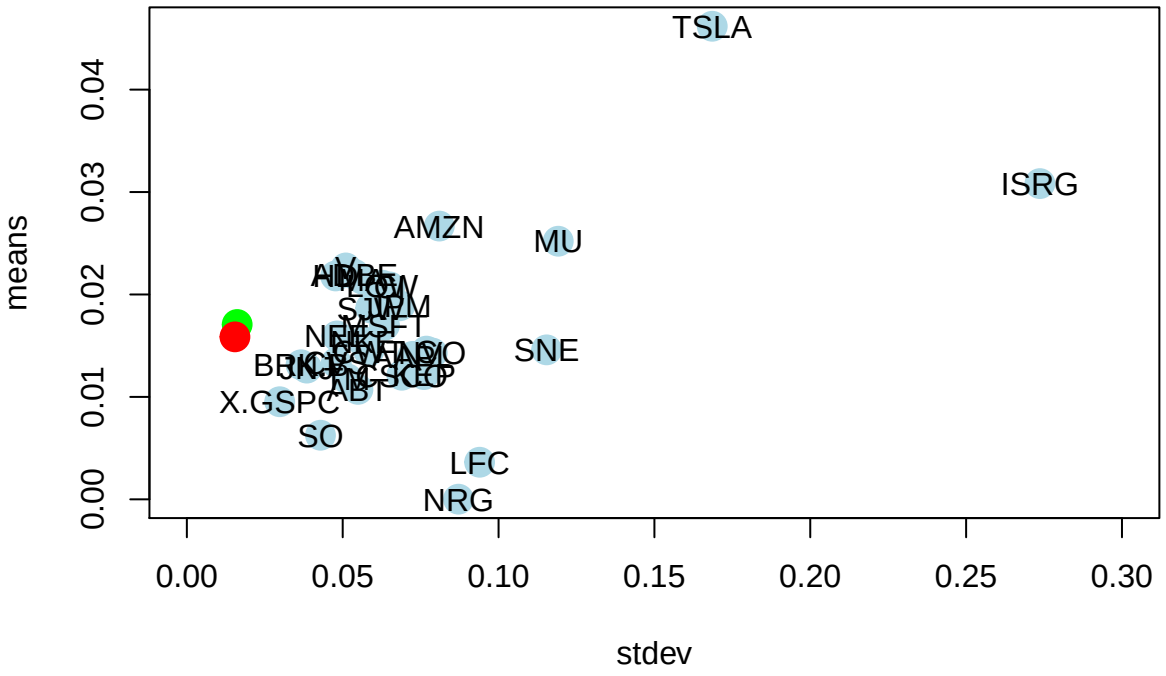


f.Add on the plot the minimum risk portfolio.

```
#Compute mean vector or 30 stocks:
means_30 <- colMeans(r[-1])  #Without ^GSPC

#Compute variance covariance matrix:
covmat_30 <- cov(r[-1])  #Without ^GSPC
ones<-rep(1, 30)

min_sd<- sqrt(1/(t(ones) %*% solve(covmat_30) %*% ones))
expected_return<-  (t(ones) %*% solve(covmat_30) %*% means_30)  /(t(ones) %*% solve(covmat_30) %*% ones)
 plot(stdev, means, col="lightblue", pch=19, cex=2, xlim=c(0, 0.3))
text(stdev, means, labels=names(means))
points(equal_portfolio_sd, equal_portfolio_mean, col="green", pch=19, cex=2)
points(min_sd, expected_return, col="red", pch=19, cex=2)
```



(The red dot represents the minimum risk portfolio)