```
## this code reads a dataset on two variables X and Y
## computes the value of Spearman's rank correlation coefficient r_S
## does NOT compute p value for test of association

## this code asumes there are no ties in X values as well as in Y values
## if this assumption is not true, this code will produce incorrect value of
 r_S

## read the data file that includes observations from two variables in
 two-column format

dataset = as.matrix(read.table("folderpath/filename.extension", header = T or
 F))

## Name the first column as X, 2nd column as Y

X = dataset[,1]
Y = dataset[,2]

## calculate sample size

n = length(X)
print(paste("Sample size = n = ",n,sep=""))

## Now sort the data according to values of X ONLY from smallest to largest
dataset_sorted_using_X_only =  dataset[order(X), ]

## now rank the y observations in the sorted pairs
Y_ranks = rank(dataset_sorted_using_X_only[ ,2])

## since X values are already arranged in sorted manner, ranking X values is
 easy
X_ranks = c(1:n)

## Compute the differences between ranks of Y values and ranks of X values
D = Y_ranks - X_ranks

## construct the 1st column of the table with (X,Y) pairs sorted based only on
 X values
Pairs_sorted_using_X = array(0,n)
for (i in 1:n)
{
 Pairs_sorted_using_X[i] = paste("(",dataset_sorted_using_X_only[i,1], ",",
  dataset_sorted_using_X_only[i,2],")",sep="")
}

## combine the columns
output = data.frame( Pairs_sorted_using_X = noquote(Pairs_sorted_using_X),
 Y_ranks = Y_ranks, X_ranks = X_ranks, Rank_difference = D )

## print it
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print("------------------------------------------------------")
print(output,row.names=F)
print("------------------------------------------------------")

## Accuracy check
print(paste("Sum of rank differences = ", sum(D),sep=""))

## compute the value of Spearman's rank correlation coefficient

r_S = 1 - 6*sum(D^2)/(n*(n^2-1))

print(paste("Spearman's rank correlation coefficient = ", round(r_S,4),
 sep=""))

## Now use this value of r_S to calculate
## test statistic and find p value as mentioned in classnote
```