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BP3 Project 2

Project Concept:
The project is about reading and analyzing data from an external file and then outputting results into another external file. The data was provided in a CSV file, which contained five columns: sepal length, sepal width, petal length, petal width and species.

The goal was to write a C program that would read in this data, calculate the mean and variance of each property (sepal length, sepal width, petal length, and petal width), correlation between sepal length and width, petal length and width, sepal and petal length, sepal and petal width, the data's covariance matrix and then export the results to a TXT file.

Execution Steps:
I first had to read in the data from the CSV file. I used the fopen, fscanf, and fclose functions from the stdio.h library to open the file, read the data, and close the file, respectively. I stored the data in an array of structs, with each struct representing a single iris.

Next, I placed all the data in a matrix, and imported the matrix operations library I made in project 1. I used it to perform the required calculations.
I wanted to fprintf with a single string, so I used the strcat function to concatenate the output string and sprintf to convert float values to strings.

Finally, I used the fprintf function with that output string to write the results to a TXT file (named IrisStatistic.txt). I opened the file using the fopen function and passed the "w" mode to indicate that I wanted to write to a new file.

Comment:
Overall, this was a challenging but rewarding project that allowed me to practice my skills in reading and manipulating data in C. I learned a lot about working with files, calculating statistical measures.

Screenshot of the IrisStatistic.txt file

IrisStatistic.txt

```
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Sepal Length Mean = 5.843335
Sepal Width Mean = 3.054000
Petal Length Mean = 3.758667
Petal Width Mean = 1.198667
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Sepal Length Variance = 0.681122
Sepal Width Variance = 0.186751
Petal Length Variance = 3.092424
Petal Width Variance = 0.578532
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Correlation between Sepal Length and Width = -0.109369
Correlation between Petal Length and Width = 0.962757
Correlation between the lengths of sepal and petal = 0.871755
Correlation between the widths of sepal and petal = -0.356544
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
Covariance Matrix of the values:
0.681122    -0.039007   1.265191    0.513458
-0.039007   0.186751    -0.319568   -0.117195
1.265191    -0.319568   3.092424    1.287745
0.513458    -0.117195   1.287745    0.578532
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```