CECS 282 Lab 1
Team 6
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SOURCE CODE

```
/**
   CECS 282 LAB 1.3: Displays data of rainfall from rainfall.txt
   of a binary string
   @authors Danny Nguyen, Nathan Lai
   @file Lab1.3.cpp
   @version 5.11 8/27/20
*/
#include<iostream>
#include<fstream>
#include<iomanip>
#include<cmath>

using namespace std;

const int NUM_MONTHS = 12;
const double RAIN_RATE = 0.20;//20% more rain than average
const double DRY_RATE = 0.25; //25% less rain than average

void inputRainFall(int [], int);
int calculateAverageRainFall(int [], int );
void classifyAndDisplayRainfall(int [],int);


/**
   Opens a file to store in an array, then closes it
   @param rainFall [] - array that tracks the amount of rainfall
   for each month
   @param size - the number of months of rainfall recorded
*/
void inputRainFall(int rainFall [], int size) {
        ifstream inputFile;
        inputFile.open("rainfall.txt");

        //Initialize month counter
        int month = 0; //first month

        //Read the monthly rainfall in the file line by line through for loop
```

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```
	for(; month < size; month++) {
		inputFile >> rainFall[month];
	}
	inputFile.close();
}

/**
   Calculates and returns the average rainfall of a given array
   @param rainFall [] - array that tracks the amount of rainfall
   for each month
	@param size - the number of months of rainfall recorded
*/
int calculateAverageRainFall(int rainFall [], int size) {
	double sum = 0;

	// Adds up the ammount of rainfalls recorded
	for(int i = 0; i < size; i++){
		sum += rainFall[i];
	}
	return round(sum / size);
}

/**
   Gives classifications to monthly rainfalls and prints it in a table
   @param rainFall [] - array that tracks the amount of rainfall
   for each month
	@param months - the number of months of rainfall recorded
*/
void classifyAndDisplayRainfall(int rainFall[], int months) {
	string  month[] = {"January", "February", "March", "April",
	"May", "June", "July", "August", "September", "October",
	"November", "December"};
	double averageRain = calculateAverageRainFall(rainFall,NUM_MONTHS);

	cout << "The year's average monthly rainfall was " <<
	 averageRain << " mm." << endl;

	// Set the indexes for the highest and lowest months of rainfall
	int maxIndex = 0;
	int minIndex = 0;
```

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```
        /* Compares all the values in the table to determine the index
         of the lowest and highest months of rainfall */
        for(int i = 0; i < months; i++) {
                if(rainFall[i] > rainFall[maxIndex]) {
                        maxIndex = i;
                }
                if(rainFall[i] < rainFall[minIndex]) {
                        minIndex = i;
                }
        }

        //Displays the highest and lowest months of rainfall
        cout << month[maxIndex] << " has the highest rainfall (" <<
          rainFall[maxIndex] << " mm)." << endl;
        cout << month[minIndex] << " has the lowest rainfall (" <<
          rainFall[minIndex] << " mm)." << endl;

        /* Classify months as Dry, Average, or Rainy and display
         the result */
        cout << endl << "   Month      Rainfall(mm)   Classification"<< endl;
        cout << "___________    ____________   _____________"<<endl;

        //For loop that classifies and prints each month of rainfall
        for(int i = 0; i < months; i++) {
                /* Classifies each month by comparing to established
                   rates of rainy and dry classifications */
                string classification = "Average";
                if(rainFall[i] > (1 + RAIN_RATE) * averageRain) {
                        classification = "Rainy ";
                }
                else if(rainFall[i] < (1 - DRY_RATE) * averageRain) {
                        classification = "Dry  ";
                }

                // Prints each row of the table once classification is done
                cout << setw(6) << (i + 1) << setw(16) << rainFall[i] <<
                   setw(18) << classification << endl;
  }
}
```

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```
// Controls operation of the program
int main() {
	int rainFall[NUM_MONTHS];

	// Read rainfall from the the file and the fill them in the array
	inputRainFall(rainFall, NUM_MONTHS);

	// Classify months as Dry, Average, or Rainy and display the result
	classifyAndDisplayRainfall(rainFall, NUM_MONTHS);

	return 0;
}
```

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RUNTIME OUTPUT