

ECE 71/191T – Data Structures and Algorithms

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C++ Homework Assignment: Chapter 8

Code Due By: Midnight on Wed, Feb 01

Write-up Due By: Class on Thu, Feb 02

HOMEWORK #15 – Local Election

You need to determine the winner of a local election based upon the number of votes each candidate received.

Specifications:

Write a program that allows the user to enter the last names of five candidates in a local election and the number of votes received by each candidate. The program should then output each candidate's name, the number of votes received, and the percentage of the total received by the candidate. Your program should also output the winner of the election.

Use the following function prototypes:

```
// Reads in the Voting Data
void getVotes(string candidates[N], int votes[N],
              int &totalVotes);

// Calculates the Voting Percentages
void calculatePercentages(const int votes[N],
                          const int totalVotes, double percentages[N]);

// Calculates the Election Winner
void calculateWinner(const int votes[N], int &winnerIndex);

// Prints the Election Results
void printResults(const string candidates[N],
                  const int votes[N], const int totalVotes,
                  const double percentages[N], const int winnerIndex);
```

N should be declared as a global constant expression.

Use the <local> header file and the `cout.imbue()` function to format the numbers.

```
Enter candidate name and number of votes: Johnson 5000
Enter candidate name and number of votes: Miller 4000
Enter candidate name and number of votes: Duffy 6000
Enter candidate name and number of votes: Robinson 12315
Enter candidate name and number of votes: Ashtony 1800
```

Candidate	Votes Received	% of Total Votes
Johnson	5,000	17.17
Miller	4,000	13.74
Duffy	6,000	20.61
Robinson	12,315	42.30
Ashtony	1,800	6.18
Total:	29,115	

The Winner of the Election is Robinson.

Once you verify the operation of your program, submit your source code to the Grader Program.

HOMEWORK #16 – Student Names

Jason, Samantha, Ravi, Sheila, and Ankit are preparing for an upcoming marathon. Each day of the week, they run a certain number of miles and write them into a log file. At the end of the week, they would like to know the number of miles run each day, the total miles for the week, and the average miles run each day.

Specifications:

Write a program to analyze the data. The program must use a 1D array to store the names, a 2D array with 5 rows and 7 columns to store the number of miles run by each runner each day, a 1D array to store the total miles for each runner for the week, and a 1D array to store the average number of miles run each day.

Use the following function prototypes:

```
// Reads the data from the file into the appropriate arrays.
void readData(fstream &inFile, string runners[numRunners],
    double data[numRunners][numDays]);

// Calculates the total miles and average miles run
void calculateData(double data[numRunners][numDays],
    double totalMiles[numRunners],
    double averageMiles[numDays]);

// Prints the data to the screen
void printData(string runners[numRunners],
    double data[numRunners][numDays],
    double totalMiles[numRunners],
    double averageMiles[numDays]);
```

The filename should be determined by the user. If the file cannot be found, print:

```
Data file not found. Program terminating.
```

Assuming the format of the input data file is:

```
Jason 5.0 2.5 3.0 4.0 6.0 0.0 0.0
```

```
...
```

The program would then provide the following output:

Enter the name of the data file log: **RunnerLog.txt**

Name	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total
Jason	5.0	2.5	3.0	4.0	6.0	0.0	0.0	20.5
Samantha	3.0	0.0	4.0	0.0	2.0	5.0	0.0	14.0
Ravi	3.0	3.0	3.0	3.0	3.0	3.0	3.0	21.0
Sheila	4.0	2.0	4.0	2.0	4.0	1.0	1.0	18.0
Ankit	10.0	3.0	12.0	3.0	7.5	0.0	4.5	40.0
Ave Miles	5.0	2.1	5.2	2.4	4.5	1.8	1.7	

Once you verify the operation of your program, submit your source code to the Grader Program.