PROGRAM 4 / CSC2100-001

DONUTS

ASSIGNMENT DATE

Wednesday, March 22, 2017

DUE DATE

Friday, April 7, 2017

DESCRIPTION

Donuts are tasty. Write a program that can be used to gather statistical data about the number of donuts college students consume in a month. The program should also gather statistical data on which donut brand is the most popular and also the most popular flavor of donut.

RULES & FUNCTION DESCRIPTIONS

- You must have the following files to implement this program:
  - donut.cpp
  - donut.h
  - functions.cpp
  - arrayFunctions.cpp
  - arrayHeader.h

- You must ask the user for the number of students surveyed and then based on that number, dynamically allocate three arrays:
    - numDonuts – array to keep track of how many donuts each student ate last month
    - typeDonuts – array to keep track of which flavor is each student's favorite flavor
    - location – array to keep track of which location each student prefers to purchase donuts
- You must use pointer notation for all arrays at all times during the program.

MAIN FUNCTION

Your main function should be located in **donut.cpp** and will perform the steps below. You should also create **donut.h** to contain all required include files, namespace, and the **enterData** function prototype.

- Ask how many students surveyed

```
How many students did you survey? 5
```

- Call the **makeArray** function three times to dynamically allocate three arrays
- Call **enterData** function
- Call the **getLargest** function
- Call the **getSmallest** function
- Call the **getTotal** function
- Calculate the average number of donuts eaten by all students
- Call the **getMode** function to find the most popular location
- Call the **getMode** function to find the most popular donut
- Print all results

```
    LARGEST NUMBER OF DONUTS EATEN:              25
   SMALLEST NUMBER OF DONUTS EATEN:               5
      TOTAL NUMBER OF DONUTS EATEN:              75
    AVERAGE NUMBER OF DONUTS EATEN:              15
       MOST POPULAR DONUT LOCATION: Ralph's Donuts
           MOST POPULAR DONUT TYPE:      Blueberry
```

ENTERDATA FUNCTION

The enterData function is the only function that will be defined in functions.cpp. This function should accept a pointer to three different arrays. The function will ask the user for information and then enter all the information into the appropriate array. Please see the screen capture below that shows sample output to see what this will look like. You should have input validation for all input in this function. Do not accept negative numbers for number eaten. The user must choose between 1 and 5 for favorite place and must choose between 1 and 6 for favorite type. USE POINTER NOTATION.

```
STUDENT 1--------------------
NUMBER EATEN:  5

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  5

STUDENT 2--------------------
NUMBER EATEN:  10

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  1

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  1

STUDENT 3--------------------
NUMBER EATEN:  15

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  2

STUDENT 4--------------------
NUMBER EATEN:  20

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  2

STUDENT 5--------------------
NUMBER EATEN:  25

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  4

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  6
```

ARRAY RELATED FUNCTIONS

The following functions are extremely common functions needed for programs that use arrays. So, you are going to define the function definitions in arrayFunctions.cpp and put all the necessary #includes, namespace, and function prototypes in arrayHeader.h.

MAKEARRAY FUNCTION

This function accepts the size of the array as a parameter. The function dynamically allocates an array of integers of that size and then returns a pointer to that array.

GETLARGEST FUNCTION

This function accepts a pointer to an array and the size of the array. The function calculates the largest number in the array and returns this amount. USE POINTER NOTATION.

GETSMALLEST FUNCTION

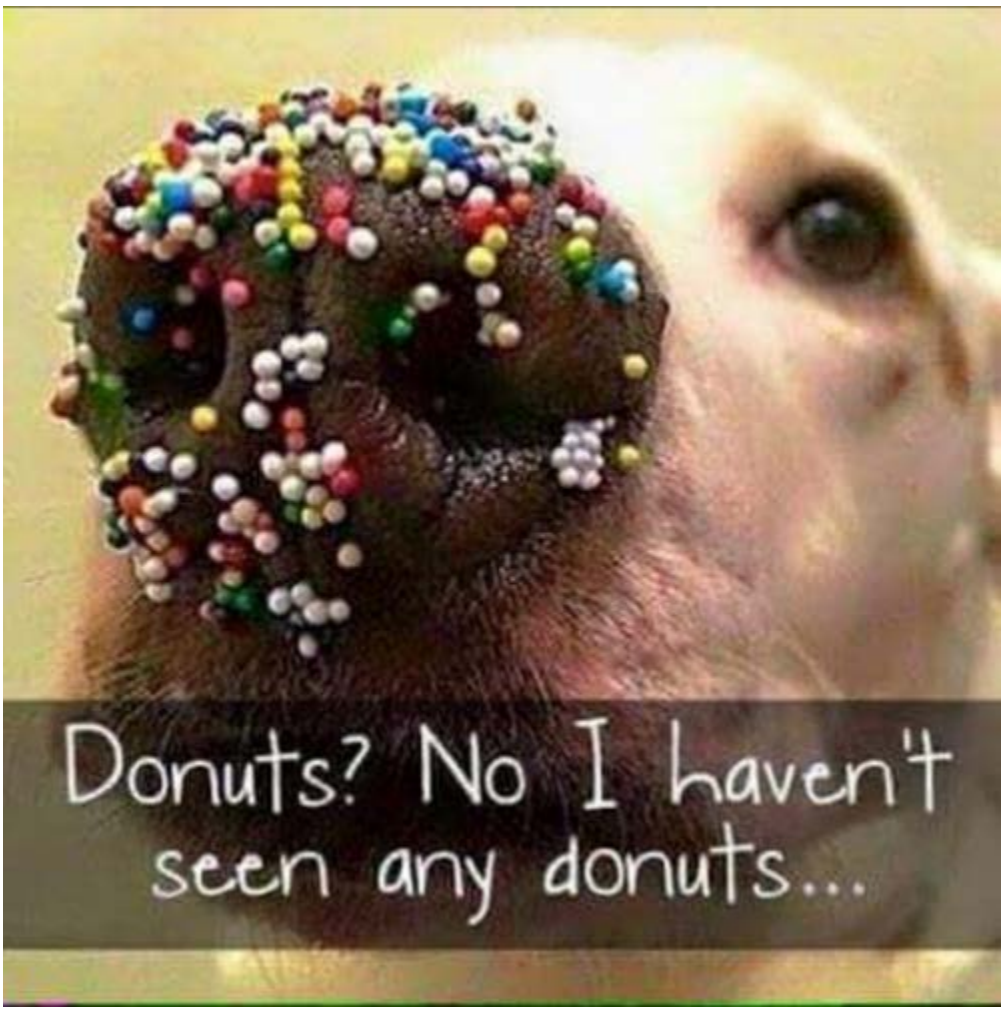
This function accepts a pointer to an array and the size of the array. The function calculates the smallest number in the array and returns this amount. USE POINTER NOTATION.

GETTOTAL FUNCTION

This function accepts a pointer to an array and the size of the array. The function calculates the total of all array elements and then returns this amount. USE POINTER NOTATION.

GETMODE FUNCTION

This function accepts a pointer to an array and the size of the array. The function returns the mode of the array. The mode is the value that appears most often. If no element appears more than once, the function returns -1. USE POINTER NOTATION.



SAMPLE OUTPUT

EXAMPLE ONE

Demonstrating a normal run of the program where the user's input didn't need validated.

```
How many students did you survey?  5

Please enter in the following data about the students surveyed.

For each student enter the number of donuts purchased last month,  favorite place
to purchase donuts, and favorite kind of donut.


STUDENT 1--------------------
NUMBER EATEN:  5

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  5

STUDENT 2--------------------
NUMBER EATEN:  10

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  1

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  1

STUDENT 3--------------------
NUMBER EATEN:  15

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  2

STUDENT 4--------------------
NUMBER EATEN:  20

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  2

STUDENT 5--------------------
NUMBER EATEN:  25

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  4

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  6


         LARGEST NUMBER OF DONUTS EATEN:             25
        SMALLEST NUMBER OF DONUTS EATEN:              5
           TOTAL NUMBER OF DONUTS EATEN:             75
         AVERAGE NUMBER OF DONUTS EATEN:             15
            MOST POPULAR DONUT LOCATION: Ralph's Donuts
                MOST POPULAR DONUT TYPE:      Blueberry
```

EXAMPLE TWO

Example where program demonstrates validating user input for number eaten. The data produced no mode for place or type.

```
C:\Users\acrockett\Desktop\CSC2100 Spring 2017\PROGRAMS\PROGRAM 4>a


How many students did you survey?  4

Please enter in the following data about the students surveyed.

For each student enter the number of donuts purchased last month,  favorite place
to purchase donuts, and favorite kind of donut.


STUDENT 1--------------------
NUMBER EATEN:  -8
Invalid input.  Please enter a positive number.
NUMBER EATEN:  2

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  1

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  6

STUDENT 2--------------------
NUMBER EATEN:  5

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  5

STUDENT 3--------------------
NUMBER EATEN:  4

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  4

STUDENT 4--------------------
NUMBER EATEN:  18

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  4

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  3


         LARGEST NUMBER OF DONUTS EATEN:             18
        SMALLEST NUMBER OF DONUTS EATEN:              2
           TOTAL NUMBER OF DONUTS EATEN:             29
         AVERAGE NUMBER OF DONUTS EATEN:           7.25
            MOST POPULAR DONUT LOCATION: None (no mode)
                MOST POPULAR DONUT TYPE: None (no mode)



C:\Users\acrockett\Desktop\CSC2100 Spring 2017\PROGRAMS\PROGRAM 4>
```

EXAMPLE THREE

Example where program demonstrates validating user input for favorite place & favorite type.

```
How many students did you survey?  6

Please enter in the following data about the students surveyed.

For each student enter the number of donuts purchased last month,  favorite place
to purchase donuts, and favorite kind of donut.


STUDENT 1--------------------
NUMBER EATEN:  3

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  4

STUDENT 2--------------------
NUMBER EATEN:  8

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  3

STUDENT 3--------------------
NUMBER EATEN:  6

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  5

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  6

STUDENT 4--------------------
NUMBER EATEN:  18

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  3

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  2

STUDENT 5--------------------
NUMBER EATEN:  20

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  1

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  3

STUDENT 6--------------------
NUMBER EATEN:  15

FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  8
Invalid input.  Please enter 1,2,3,4 or 5.
FAVORITE PLACE (1=Dunkin, 2=Ralphs, 3=BigOs, 4=KrispyKreme, 5=Other):  2

FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  9
Invalid input.  Please enter 1,2,3,4,5 or 6.
FAVORITE TYPE
(1=glazed, 2=blueberry, 3=chocolate, 4=holes, 5=powdered, 6=filled):  5


         LARGEST NUMBER OF DONUTS EATEN:             20
        SMALLEST NUMBER OF DONUTS EATEN:              3
           TOTAL NUMBER OF DONUTS EATEN:             70
         AVERAGE NUMBER OF DONUTS EATEN:        11.6667
            MOST POPULAR DONUT LOCATION:   Big O Donuts
                MOST POPULAR DONUT TYPE:      Chocolate


C:\Users\acrockett\Desktop\CSC2100 Spring 2017\PROGRAMS\PROGRAM 4>
```