LAB 8 / CSC1310

RECURSION

WHAT SHOULD THIS PROGRAM DO? (SPECIFICATIONS)

You will implement 5 recursive problems described below and call them from a main function to demonstrate them working.

PROBLEM 1: SUM OF NUMBERS

Write a function that accepts an integer argument and returns the sum of all the integers from 1 up to the number passed as an argument. For example, if 50 is passed as an argument, the function will return the sum of 1, 2, 3, 4, … 50. Use recursion to calculate the sum.

PROBLEM 2: ISMEMBER ARRAY FUNCTION

Write a recursive Boolean function named isMember. The function should accept three arguments: an array, a value, and the size. The function should return true if the value is found in the array, or false if the value is not found in the array.

PROBLEM 3: STRING REVERSER

Write a recursive function that accepts a string object and the length of the string as its argument and prints the string in reverse order.

PROBLEM 4: PALINDROME DETECTOR

A palindrome is any word, phrase, or sentence that reads the same forward and backward. Here are some well-known palindromes:

```
KAYAK
RACECAR
ROTOR
LEVEL
MADAM
MOM
NOON
```

Write a bool function that uses recursion to determine if a string argument is a palindrome. The function should return true if the argument reads the same forward and backward

PROBLEM 5: RECURSIVE MULTIPLICATION

Write a recursive function that accepts two arguments into the parameters x and y. The function should return the value of x times y. Remember multiplication can be performed as repeated addition:
7 * 4 = 4+4+4+4+4+4+4

MAIN FUNCTION

This function is written for you except for the function calls!!!

FILES THAT SHOULD BE INCLUDED IN YOUR SUBMISSION

- **Lab8.cpp** – this file will contain your main function as well as two other functions.

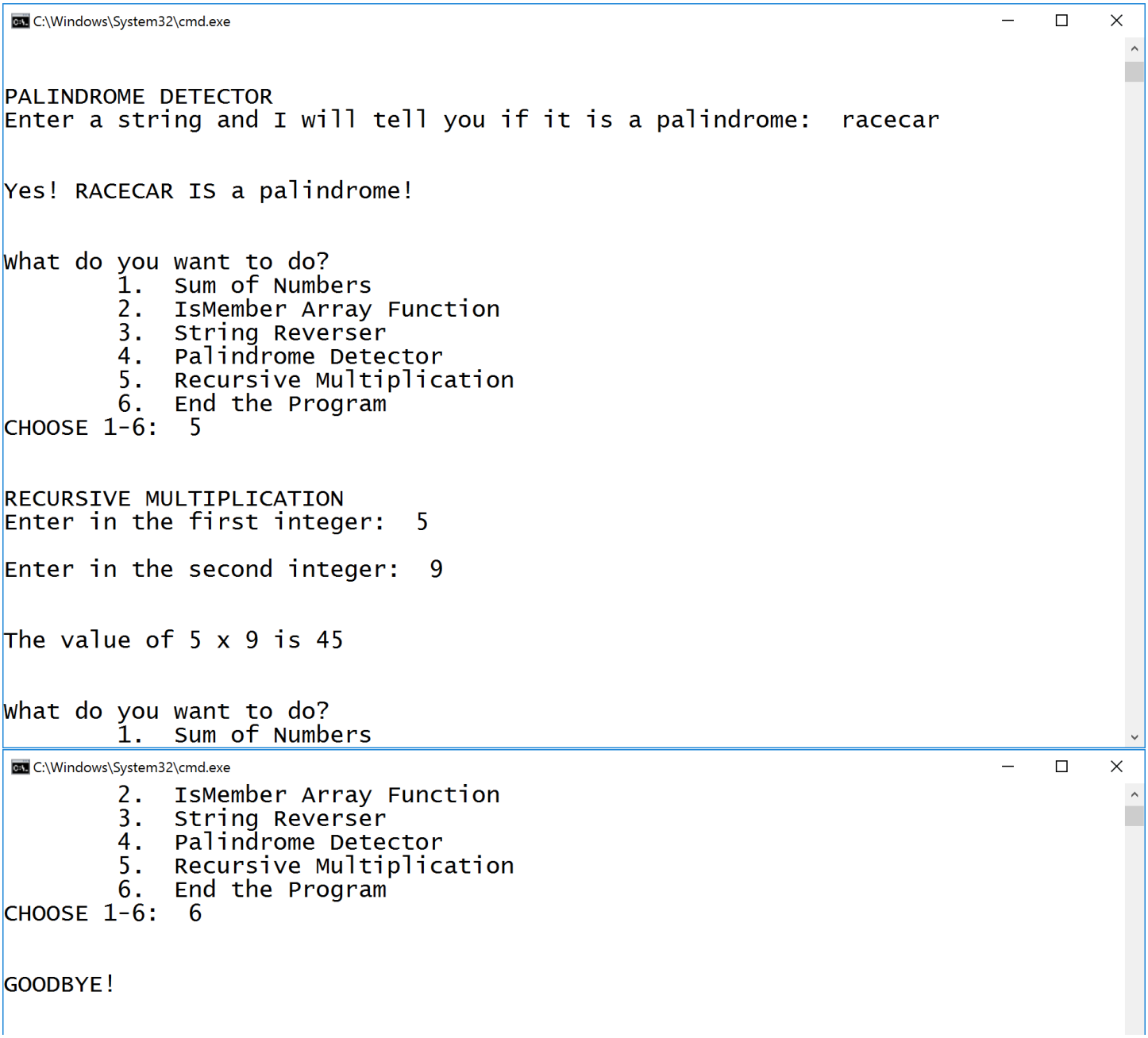
WHAT TO TURN IN

Please put **Lab8.cpp** in a zipped folder and upload to ilearn submission folder.

SAMPLE OUTPUT

```
What do you want to do?
        1.  Sum of Numbers
        2.  IsMember Array Function
        3.  String Reverser
        4.  Palindrome Detector
        5.  Recursive Multiplication
        6.  End the Program
CHOOSE 1-6:  1


SUM OF NUMBERS
Enter an integer:  50

The result is:  1275


What do you want to do?
        1.  Sum of Numbers
        2.  IsMember Array Function
        3.  String Reverser
        4.  Palindrome Detector
        5.  Recursive Multiplication
        6.  End the Program
CHOOSE 1-6:  2
```

```
C:\Windows\System32\cmd.exe
ISMEMBER ARRAY FUNCTION
Enter an integer:  85

Here are the array values:  11 62 81 32 71 70 98 88 52 45

No! 85 is NOT in the array.


What do you want to do?
        1.  Sum of Numbers
        2.  IsMember Array Function
        3.  String Reverser
        4.  Palindrome Detector
        5.  Recursive Multiplication
        6.  End the Program
CHOOSE 1-6:  3


STRING REVERSER
Enter a string and I will reverse it:  April Crockett
 ttekcorC lirpA

What do you want to do?
        1.  Sum of Numbers
        2.  IsMember Array Function
        3.  String Reverser
        4.  Palindrome Detector
        5.  Recursive Multiplication
        6.  End the Program
CHOOSE 1-6:  4
```


C:\Windows\System32\cmd.exe
PALINDROME DETECTOR
Enter a string and I will tell you if it is a palindrome: racecar
Yes! RACECAR IS a palindrome!
What do you want to do?
1. Sum of Numbers
2. IsMember Array Function
3. String Reverser
4. Palindrome Detector
5. Recursive Multiplication
6. End the Program
CHOOSE 1-6: 5
RECURSIVE MULTIPLICATION
Enter in the first integer: 5
Enter in the second integer: 9
The value of 5 x 9 is 45
What do you want to do?
1. Sum of Numbers

C:\Windows\System32\cmd.exe
2. IsMember Array Function
3. String Reverser
4. Palindrome Detector
5. Recursive Multiplication
6. End the Program
CHOOSE 1-6: 6
GOODBYE!