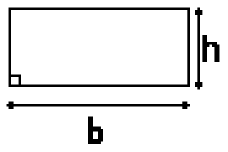
CSCI 1380 **Lab 6: Void and Value-returning functions** **Mr. Alfredo Ramos**

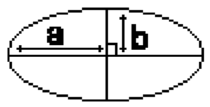
Due date: *On Blackboard*

Problem:

In your own words, analyze and explain the program you implemented below, using just one or two sentences, what it does. Write this explanation as a comment at the top of your program. **This explination is part of your grade (Look at the rubric)**. Do not be too detailed and/or vague (For example, do not write: it opens a file, then declares variables, and then reads from a file…); it should look like the problem descriptions in my previous lab assignments.



$area = b \cdot h$



$area = \pi \cdot a \cdot b$

Note: all images extracted from **http://www.mathsisfun.com/area-calculation-tool.html**

Requirements:

Implement in C++ the algorithm solution (Pseudo-code) shown below:

```
01)  Include your libraries here. Explain the libraries being used with comments.
02)  Declare a global named constant variable(s) named "PI" with the value: 3.141592
03)  Create value-return function prototype areaRectangle().
         Parameter(s): None
04)  Create value-return function prototype areaEllipse().
         Parameter(s): None
05)  Create void function prototype getData().
         Parameter(s): baseA/radiusA, heightA,radiusB
06)  Create void function prototype printData().
         Parameter(s): area of rectangle, area of ellipse, output file stream
07)  Declare variable(s) named "recAreaA" and "elliAreaA" that hold(s) double-precision real number(s).
08)  Declare output file stream variable(s) named "outFileA".
09)  Associate the output file stream variable(s) with the name of the file(s) to be used appropriately.
10)  Check if the output file was properly associated and opened. [i]
         If the file was not opened, then
             01)  Display on the screen: [ii]
                      Error opening the file...

                      Press any key to continue...
             02)  Close the program with integer -1.
11)  Call the value-returning areaRectangle() function.
         Parameter(s): None
12)  Display a new line.
13)  Call the value-returning areaEllipse() function.
         Parameter(s): None
14)  Call the void printData() function.
         Parameter(s): area of rectangle, area of ellipse, output file stream
15)  Display on the screen: [iii]


         Press any ENTER to continue...
```

Note: Pay attention to the new lines above the message.

16) Close the output stream variable.

17) Terminate your program with integer 0.

18) Create value-return function definition for **areaRectangle()**.
    - 01) Declare variable(s) named "**baseA**" and "**heightA**" that hold(s) **double-precision real number(s)**.
    - 02) Display on the screen:
      For the Rectangle
    - 03) Call the **getData() function** and pass(s) the corresponding variables.
      Parameter(s): baseA/radiusA, heightA,radiusB
    - 04) Calculate the area of rectangle and assign it to corresponding variable.
      Formula: base * height [iv]
    - 05) Return the area of the rectangle.

    Parameter(s): None

19) Create value-return function definition for **areaEllipse()**.
    - 01) Declare variable(s) named "**radiusA**" and "**radiusB**" that hold(s) **double-precision real number(s)**.
    - 02) Display on the screen:
      For the Ellipse
    - 03) Call the **getData() function** and pass(s) the corresponding variables.
      Parameter(s): baseA/radiusA, heightA,radiusB
    - 04) Calculate the area of ellipse and assign it to corresponding variable.
      Formula: PI * radiusA * radiusB [v]
    - 05) Return the area of the ellipse.

    Parameter(s): None

20) Create void function definition for **getData()**.
    - 01) Prompt on the screen:
      Please enter two (2) dimensions (Add a space between each):
    - 02) Get the two (2) value(s) from the keyboard and store in appropriate variable(s).

    Parameter(s): baseA/radiusA, heightA,radiusB

21) Create void function definition for **printData()**.
    - 01) Format output in fixed decimal notation displaying one digit(s) after the decimal point.
    - 02) Display on a file: [vi]
      The area of the rectangle is [area of rectangle]

      The area of the ellipse is [area of ellipse]

    Parameter(s): area of rectangle, area of ellipse, output file stream

Note: You must use the tools learned in the class, slides, and book from chapter 7 and below; otherwise, you will receive no credit for the lab!

IMPORTANT:

See examples of void functions in the textbook and on blackboard under examples to get a starting point.

Note: The file must be opened in main() and passed to printData() as an argument. Don't forget to close it at the end of your program. Make sure you **check if the file was opened or not** (if it was not opened display a message and stop the program).

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Example: Console Output Format---File Output Format

```
For the rectangle
Please enter two (2) dimensions (Add a space
between each): 1.23 3.56

For the ellipse
Please enter two (2) dimensions (Add a space
between each): 3.1 5.19
```

```
The area of the rectangle is 4.4

The area of the ellipse is 50.5
```

The program **must compile without errors or warnings.**

Your program must have the following comments at the top. Don't forget to include them because they will count toward the grade of this lab.

```
//*************************************************************************
// Course Number and Section:
// Course Semester:
// Your Name:
// --Only if he helped you with the assignment--
// Teammate Name:
// --------------------------------------------
// Program Description:
//
//*************************************************************************
```

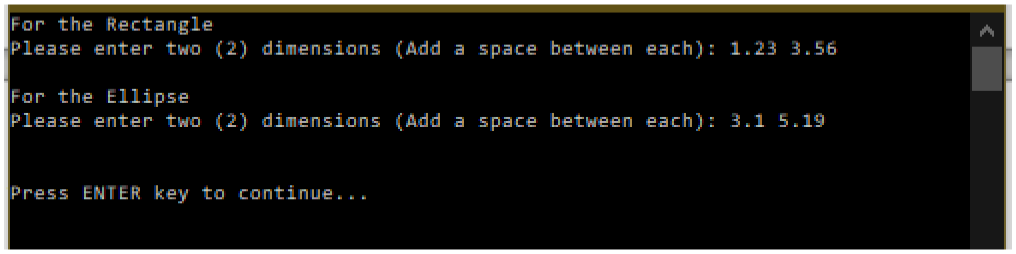
Submission:

Please name your file **lab6TXX** (where **XX is the team/group number**). If you work with a teammate, then make sure to include them on the lab heading.

DO NOT include blank spaces in the name of the file please.

For example: lab01T00.cpp

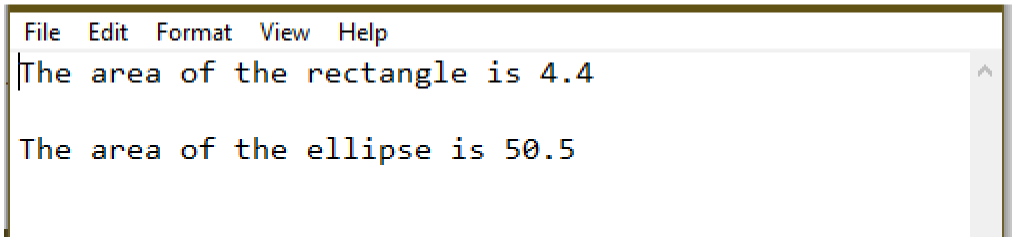
Screenshots:



```
For the Rectangle
Please enter two (2) dimensions (Add a space between each): 1.23 3.56

For the Ellipse
Please enter two (2) dimensions (Add a space between each): 3.1 5.19


Press ENTER key to continue...
```



```
The area of the rectangle is 4.4

The area of the ellipse is 50.5
```

Grading Criteria: vii

	Levels of Achievement			
Criteria	**Exceptional**	**Proficient**	**Satisfactory**	**Unsatisfactory**
Heading **Weight 10.00%**	**100.00%** Included program heading and information is fully completed.	**50.00%** Included program heading, but is missing information.	**25.00%** Included program heading, but did not fill information.	**0.00%** Did not include program heading.
Documentation **Weight 15.00%**	**100.00%** Program is fully commented, comments are placed above the statements and comments are your own words.	**50.00%** More than half comments added to program, comments are placed above the statements, and/or comments are your own words.	**25.00%** Less than half comments added to program, comments not placed above statements and/or comments are not your own words.	**0.00%** No comments added to program.
Organization **Weight 20.00%**	**100.00%** White space is applied appropriately and program follows a structured organization. Ex: Follows algorithm and/or some pattern.	**50.00%** White space is mostly added and follows mostly structured organization. Ex: Follows algorithm and/or some pattern.	**25.00%** White space is minimally added and follows minimally structured organization. Ex: Follows algorithm and/or pattern.	**0.00%** No white space is added and follows no structured organization. Ex: Follows algorithm and/or pattern.
Requirements **Weight 35.00%**	**100.00%** Program requirements were fully met. Look at program handout requirements.	**50.00%** More than half of the program requirements were met. Look at program handout requirements.	**25.00%** Less than half of the program requirements were met. Look at program handout requirements.	**0.00%** Program requirements were not met. Look at program handout requirements.
Accuracy **Weight 20.00%**	**100.00%** Program output is accurate and is formatted appropriately. Ex: Spacing, new lines, etc.	**50.00%** Program output is accurate and/or mostly formatted appropriately. Ex: Spacing, new lines, etc.	**25.00%** Program output is not accurate and/or mostly formatted appropriately. Ex: Spacing, new lines, etc.	**0.00%** Program output is not accurate and is not formatted appropriately. Ex: Spacing, new lines, etc.

i Look at Chapter 03 for file manipulation.
ii Pay attention to the new lines when displaying the message. Look at screenshot and/or sample executable program.
iii Pay attention to the new lines when displaying the message. Look at screenshot and/or sample executable program.
iv Be careful for mixed datatypes.
v Be careful for mixed datatypes.
vi Pay attention to the new lines when displaying the message. Look at screenshot and/or sample executable program.
vii More points may be lost for other reasons not listed in the criteria rubric and/or requirements.