

**60-140-1 and 60-140-2 ASSIGNMENT #2**  
**Handed Out: Thurs. Oct 1, 2015 for (60-140-01 and 60-140-02)**  
**Due: Thurs Oct 8, 2015 for (60-140-01 and 60-140-02)**  
**Total: 50 marks**

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**Objective of Assignment:** To write an algorithm and a C program to solve a problem using no decision or repetition and no function calls, but going through all 6 problem solving steps.

**Scope:** Assignment covers materials up until end of chapter 3.

**Other Things to learn from Assignment :** How to trace through an algorithm or program with hand, use of C's increment and decrement operators, operator assign operations and output formatting

**Important:** Do not forget to type in your *full name, student number, lecture section number* and *date* in BOTH the algorithm and source C program files.

**Electronic Assignment Submission:**

**03-60-140-1 students: email script file to cs140\_01@cs.uwindsor.ca with subject including: Name, student id, lecture section, lab [section], assignment #2 (in the subject of the mail submission of script file).**

**03-60-140-2 students: email script file to cs140\_02@cs.uwindsor.ca with subject including: Name, student id, lecture section, lab [section], assignment #2 (in the subject of the mail submission of script file).**

\*Only the assignments currently due that are submitted to this site within two days before and by the due date, are retrieved for marking. Others are deleted soon after.

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**CONFIDENTIALITY AGREEMENT & STATEMENT OF HONESTY**

I confirm that I will keep the content of this assignment/examination confidential.

I confirm that I have not received any unauthorized assistance in preparing for or doing this assignment/examination. I confirm knowing that a mark of 0 may be assigned for copied work.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Student Name (please print)

\_\_\_\_\_  
Student I.D. Number

\_\_\_\_\_  
Date

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**Problem:**

Write a program by going through the 6 problem solving steps that reads in the length and width of a rectangular yard in feet, the length and width of a rectangular house located in the yard in feet, and calculates and displays the time required to cut the grass in the yard at the rate of **2 square feet per second** (we assume that the part of the yard that is not covered by the house is covered by grass and needs to be cut). The computed time has to be given in **Hours, Minutes, and Seconds**. Your program should also print the areas (length \* width) of (i) the yard, (ii) the house and (iii) the grass area in both square feet and square meter. Your program is also required to print the perimeters ( $2 * (\text{length} + \text{width})$ ) of (i) the yard and (ii) the house in both feet and meter. Note that 1 (foot) feet is equal to 0.3048 meter.

As done in class (Chapter 2), and Laboratory Exercise 2, you are required to write the **Six Problem solving Steps (RCMACT)** (1. *Requirements analysis (or problem definition)*, 2. *Components Analysis Phase*, 3. *Modular Design Phase*, 4. *Algorithm Design Phase*, 5. *Coding Phase*, and 6. *Testing and verification*).

- Type all six problem solving steps in a text file called your `userid_asn2.txt`
- Type the C program solution into a source file called your `userid_asn2.c`
- Compile your C program with `cc userid_asn2.c (cc userid_asn2.c -lm`, if you include the math library in your program)
- Run (execute it with `./a.out`). When your program is running with no errors, Create a script file called `userid_script2.txt` and hand in your script file for marking as follows

```
script userid_script2.txt
cat userid_asn2.txt
cat userid_asn2.c
cc userid_asn2.c
./a.out
```

[note here when prompted by the cpu, enter the input data from the keyboard as your program has asked to read it and the result will be displayed on the monitor and captured in the script file].  
exit

### **Important**

Your script file should show ALL **six** problem solving steps including the algorithm, your source program, the compilation of the program, the running of the program with the input and output data shown.

### **Sample Input Data:**

<i>What is the length of the rectangular yard?</i>	<i>: 200.00</i>
<i>What is the width of the rectangular yard?</i>	<i>: 100.00</i>
<i>Please scan in the length of the rectangular house</i>	<i>:180.00</i>
<i>Please scan in the width of the rectangular house</i>	<i>:80.00</i>

### **Your output should be (Note:can present the areas and perimeters up to 2 decimal places):**

*The time required to cut the grass in the yard is: 0 hours 46 minutes 40 seconds.*  
*The area of the yard in square feet is: 20000.00 sq. ft.*  
*The area of the yard in square meter is: 1858.06 sq. meter.*  
*The area of the house in square feet is: 14400.00 sq. ft.*  
*The area of the house in square meter is: 1337.80 sq. meter.*  
*The area of the grass area in square feet is: 5600.00 sq. ft.*  
*The area of the grass area in square meter is: 520.26 sq. meter.*

*The perimeter of the yard in feet is: 600.00 ft.*  
*The perimeter of the yard in meter is: 182.88 meter.*  
*The perimeter of the house in feet is: 520.00 ft.*  
*The perimeter of the house in meter is: 158.50 meter.*

*Thank you for using our property evaluation software !!*

*Have a great day!*

**Marking Scheme:**

- **Steps 1 and 2** (Requirement & Components analysis) -- (7 marks)
- **Step 3** Top Down Design (Not needed for this assignment)
- **Step 4** (Correct Algorithm) -- (8 marks)
- **Step 5** Coding in C -- (25 marks)
  - Correct Program Solution -- (25 marks)
    - Variable declarations -- 5
    - Reading (scanning) and Printing (displaying)-- 5
    - Correct logic -- 5
  - Error free Compilation of Program -- 5
  - Correct execution With right Input/Output -- 5
- **Step 6** Hand tracing the program for testing and evaluation -- (10 marks)

**Reminder Notes:**

- State **your name, Course Lecture Section and Your Course Lab Section** as well as **your Instructor** on the Assignment submission email subject or Envelope so that your assignment does not get sent to the wrong lab and your marks can always be found. Also include confidentiality agreement and statement of honesty.

