

CSE 1321L: Programming and Problem Solving I Lab

Assignment 1 – 100 points

Solving Problems

What students will learn:

- 1) Problem solving
- 2) Terminology
- 3) Basic program structure
- 4) Input and output with the user
- 5) Basic calculations and those calculations requiring an intermediate solution

Overview: For most of you, this will be the first time you've done any programming, which is exciting! The writeup of this first assignment will be a little longer than others because we want you to have an understanding of how things are going to roll out the rest of the semester. Advice: start early (certainly not the day the assignment is due), practice, and ask a lot of questions.

For this assignment set, you're going to solve problems by working with pseudocode only. This is the way that programming professionals often show a solution to a problem - and you'll see it again in textbooks and even job interviews. When showing the solution to a problem, you don't care about the syntax of things like semicolons, curly braces and so on. The hard part was coming up with the solution! That being said, people who are new to programming tend to focus on semicolons and curly braces because they can be tricky when you first start. That gets much easier with time. And trust us: at some point in your career, the problems become much harder than what you'll see in this course.

For each problem below, you are required to write pseudocode in a text file (see Module 1 of the Pseudocode Guide on the [CCSE FYE Website](#) for more information).

Unless calculations are trivial, you'll almost always want to use an intermediate variable – where you store part of the solution. For example, you might remember the quadratic equation as:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

How would you write this as code? You might solve it in parts instead of one shot because it makes it easier to check. It would look something like:

MAIN

```
CREATE temp1, temp2, x1, x2, a, b, c
temp1 = b*b - (4*a*c)
temp2 = sqrt(temp1)
x1 = (-b + temp2)/2*a
x2 = (-b - temp2)/2*a
```

END MAIN

Final note: [don't cheat](#). If your temptation is to look online, don't. Come see us instead and ask questions – we're here to help. Remember, you're going to have to write code in your future job interviews, so learn it now in order to secure a high-paying job later.

Assignment1A: *What's your integrity worth?* There are several sites out there that will do your homework for you. For example, for a monthly fee, Chegg.com allows students to post assignments and have one of their "experts" solve the problem. Folks that use these sites don't realize the harm they're doing to themselves because they'll eventually have a highly-embarrassing technical job interview (e.g. when live coding during the interview). In the long run, these students become weaker and weaker compared to their classmates (which is bad for them, but good for you because you'll have a better shot at that job!). For this assignment, you're going to write a simple calculator that determines how much an irreputable subscription-based company makes per month as well as per year.

As stated above, you'll only want to produce the pseudocode implementation. Since it's pseudocode, you can save your work as a text file, a Word doc, or a PDF. Either way, call the file Assignment1A.

Note: when prompting the user for input, you should use PRINT, not PRINTLINE.

Sample Output #1:

```
Enter the monthly subscription fee: 15
Enter the number of paying customers: 3000000
This company makes $45000000 per month.
This company makes $540000000 per year.
```

Sample Output #2:

```
Enter the monthly subscription fee: 99
Enter the number of paying customers: 475000
This company makes $47025000 per month.
This company makes $564300000 per year.
```

Assignment1B: *Who needs Ancestry.com?* Traditionally in Spain, when children are born, their last name becomes a composite of two last names (surnames). [According to Wikipedia](#), the child's first surname is traditionally the father's first surname and the child's second surname is the mother's first surname. In their example, if "*Eduardo Fernández Garrido*" marries a woman named "*María Dolores Martínez Ruiz*" and they have a child named *José*, there are several legal options, but their child would most usually be known as *José Fernández Martínez*."

For this assignment, you are going to ask the user for the father's first name, first surname and second surname, and do the same for the mother. Then, ask for the first name of the child. Finally, you will print out the traditional Spanish name of the child.

Again, create a pseudocode implementation. Note, the last two lines of output are separate. Save your work into a file called Assignment1B.

Sample Output:

```
Enter the father's first name: Juan Carlos
Enter the father's first surname: Garrido-Leon
Enter the father's second surname: Campanella
Enter the mother's first name: Ana Maria
Enter the mother's first surname: Perez
Enter the mother's second surname: Vidal
Enter the child's first name: Miguel Antonio
Parents Juan Carlos and Ana Maria
will have a child named Miguel Antonio Garrido-Leon Perez.
```

Assignment1C: *Yeah, right...* Everyone has seen advertisements that show incredibly fit people working out using some kind of new, but bizarre, apparatus. The claim is that you can burn a whole lot of calories in only a few minutes per day! [According to Healthline.com](http://Healthline.com), running appears to be one of the highest burning activities at nearly 5.2 calories. So the question is, how many hours will take to use one of these new devices to burn a certain amount of pounds? If one pound of fat is 3,600 calories, let's find out.

For this assignment, you will ask the user for the name of the device, the number of calories it burns per pound per hour, the weight of the user, the total amount of weight the user wants to lose. It will then calculate the number of hours the user needs to spend working out.

Save your pseudocode implementation into a file called Assignment1C.

Sample Output #1:

```
Enter the name of the device: Flexinator
Enter its calorie rate per pound per hour: 5
Enter your weight: 200
Enter the amount of weight to lose: 20
Burn rate is 1000 calories per hour.
It will take ~4 hours to lose one pound.
It will take ~72 hours to lose 20 lbs using the Flexinator.
```

Sample Output #2:

```
Enter the name of the device: Doloroso
Enter its calorie rate per pound per hour: 9
Enter your weight: 120
Enter the amount of weight to lose: 4
Burn rate is 1080 calories per hour.
It will take ~3 hours to lose one pound.
It will take ~13 hours to lose 4 lbs using the Doloroso.
```

Submission:

1. You will submit 3 separate files – one for each of the assignments above.
2. Upload separate files (one for each assignment) to the assignment submission folder in Gradescope. Do NOT submit homework in D2L.
3. Submit your work by the due date.

APPENDIX – Example programs that round in Java, C# and C++

//===== NOTE: this would be put into a file called Assignment1A.java =====
//===== Also note: the pseudocode is interlaced with actual code =====

// Assignment1A

// Author: Miguel Antonio Garrido-Leon Perez

// Date: 5/26/20

import java.util.Scanner;

class Assignment1A {

// BEGIN MAIN

public static void main(String[] args) {

Scanner myScan = new Scanner (System.in);

// CREATE num1, num2, result

float num1 = 0;

float num2 = 0;

float result = 0;

// PRINT "Enter a number: "

System.out.print ("Enter a number: ");

// num1 = READ

num1 = myScan.nextFloat();

// PRINT "Enter a number: "

System.out.print ("Enter another number: ");

// num2 = READ

num2 = myScan.nextFloat();

// result = num1 + num2

result = num1 + num2;

// PRINT "Result of adding is " + result

System.out.println ("Result of adding is " + Math.round(result));

```
}  
// END MAIN  
}
```

```

//===== NOTE: this would be put into a file called Assignment1A.cs =====
//===== Also note: the pseudocode is interlaced with actual code =====
// Assignment1A
// Author: Miguel Antonio Garrido-Leon Perez
// Date: 5/26/20
using System;

class Assignment1A {
    // BEGIN MAIN

    public static void Main (string[] args) {
        // CREATE num1, num2, result

        float num1 = 0;
        float num2 = 0;
        float result = 0;

        // PRINT "Enter a number: "
        Console.Write ("Enter a number: ");

        // num1 = READ
        num1 = float.Parse(Console.ReadLine());

        // PRINT "Enter a number: "
        Console.Write ("Enter another number: ");

        // num2 = READ
        num2 = float.Parse(Console.ReadLine());

        // result = num1 + num2
        result = num1 + num2;

        // PRINT "Result of adding is " + result
        Console.WriteLine ("Result of adding is " + Math.Round(result));

    // END MAIN
    }
}

```



```
//===== NOTE: this would be put into a file called Assignment1A.cpp =====
//===== Also note: the pseudocode is interlaced with actual code =====
// Assignment1A
// Author: Miguel Antonio Garrido-Leon Perez
// Date: 5/26/20
#include <iostream>
#include <cmath>

using namespace std;

int main() {
    // CREATE num1, num2, result
    float num1 = 0;
    float num2 = 0;
    float result = 0;

    // PRINT "Enter a number: "
    cout << "Enter a number: ";
    // num1 = READ
    cin >> num1;
    // PRINT "Enter a number: "
    cout << "Enter another number: ";
    // num2 = READ
    cin >> num2;

    // result = num1 + num2
    result = num1 + num2;

    // PRINT "Result of adding is " + result
    cout << "Result of adding is " << round(result) << endl;

    // END MAIN
}
```

