

CSCE 113 Cover Page

Homework Assignment #1

due January 24 at midnight

User Name

E-mail address

January 12, 2014

Please list all sources in the table below including web pages which you used to solve or implement the current homework. If you fail to cite sources you can get a lower number of points or even zero, read more on Aggie Honor System Office webpage <http://aggiehonor.tamu.edu/>

Type of sources				
People				
Web pages (provide URL)				
Printed material				
Other Sources				

I certify that I have listed all the sources that I used to develop the solutions/codes to the submitted work.
“On my honor as an Aggie, I have neither given nor received any unauthorized help on this academic work.”

Your Name

Date

This is an individual assignment. Please submit an electronic version of your solution to this assignment using CSNet and return the hardcopy of your solutions follow by the Cover Page from the class web page to your TA by noon on Friday.

Aggie Code of Honor: “An Aggie does not lie, cheat, or steal, or tolerate those who do.”

1. (20 points) Read chapters 2 and 3, understand the meaning of all terms used in the chapters and provide answers the following review questions:
 - (a) Name four parts of a function definition.
 - (b) What is a purpose of a compiler?
 - (c) What is purpose of the `include` directive?
 - (d) What does a `.h` suffix at the end of a file name signify in C++?
 - (e) What does the linker do for your program?
 - (f) What is the difference between a source file and an object file?
 - (g) What is an IDE and what does it do for you?
 - (h) What terminates input into an integer or a string?
 - (i) What is an object?
 - (j) What is a literal? Name their different types.
 - (k) What is a variable? Name their types and typical sizes.
 - (l) What measure do we use for the size of small entities in memory, such as `int` and `string`?
 - (m) What is the difference between `=` and `==`?
 - (n) What is a definition?
 - (o) What is an initialization and how it differ from an assignment?
 - (p) What is the string concatenation and how do you make it work in C++?
 - (q) What are some good rules for choosing names?
 - (r) What is type safety and why is it important?
 - (s) Why the conversion from `double` to `int` be a bad thing?
 - (t) Define a rule to help decide if a conversion from one type to another is safe or unsafe.
2. (50 points) Write a well structured and commented C++ program that consists of three functions described below. A hexadecimal number should be represented as a string.
 - (a) Function 1 – takes an unsigned decimal integer as an argument and returns its hexadecimal form. Your function must throw an exception in the case of an incorrect input.
 - (b) Function 2 – takes two hexadecimal numbers as arguments and returns their sum in hexadecimal form. Your function must throw an exception in the case of incorrect input argument(s).
 - (c) Function 3 – takes a hexadecimal number as an argument and returns its decimal form.
 - (d) Call these functions from the main function. Use the try and catch block mechanism(s).
 - (e) Test your program for correctness, for example, using:
 - i. correct input
 - ii. incorrect input
 - iii. empty input
 - (f) Write how to modify this program to do testing from a command line where your program takes two hexadecimal numbers as line arguments and returns their sum as output.

3. (50 points) Write a program that prompts the user to enter two values of the same fundamental types like integers, float, or double and store these values in variables named `val1` and `val2` in order to determine their smallest and largest value, and their sum, difference, product and ratio and report (print out) them to the user.
4. (50 points) Write a program that computes the sequence of Fibonacci numbers. The formula for generating the next Fibonacci number is: $F_n = F_{n-1} + F_{n-2}$, where $F_1 = 1$ and $F_2 = 2$. For example, $F_3 = F_2 + F_1 = 2 + 1 = 3$. You will notice that at some point Fibonacci numbers are too large and they do not fit in type **int**. This is called an integer overflow. When they become negative (or non-increasing), stop the program.
- How many Fibonacci numbers fit in type **int**? What is the value of the largest one?
 - How many Fibonacci numbers fit in type **long**? What is the value of the largest one?
 - How many Fibonacci numbers fit in type **long long**? What is the value of the largest one?

Note: “13 year old makes solar power breakthrough by harnessing the Fibonacci’s sequence”, see <http://inhabitat.com/13-year-old-makes-solar-power-breakthrough-by-harnessing-the-fibonacci-sequence/>