

CIS 130 - Intro to Programming - Fall 2005
Homework Assignment #5

Homework #5:

HW #5 PART 1 is due by **12:00 NOON** on **Wednesday, October 12, 2005**;

HW #5 PART 2 is due by **12:00 NOON** on **Friday, October 14, 2005**

Week "7" Lab Exercise - due at end of your registered lab section
on either 10-7 or 10-10

WEEK "7" LAB EXERCISE

1. Follow these steps to obtain and set up a copy of **funct_play2** in your directory:
 - a. Use ssh to connect to cs-server, and log onto your cs-server account (remember to use your NHW 244 password).
 - b. While in your home directory (where you are when you first log in), do the following commands, all at the cs-server prompt (explanation is in Times New Roman font, commands you are to type are in Courier New):

Copy **funct_play2** from my account into your **bin** directory:

```
cp ~st10/bin/funct_play2 bin
```

Make your new copy of **funct_play2** executable:

```
chmod 700 bin/funct_play2
```

- c. Now try typing **funct_play2** at the cs-server prompt, followed by typing the enter key. If you see the tool's greeting, you are set!

(If you don't --- try logging off, then on again, and try again. If that doesn't work, ask for help!)

Remember to answer **n** (for no) when asked if you are creating a function that doesn't use other functions, and answer **y** (for yes) when asked if you are creating a function that does use other functions.

For the rest of lab exercise, you are **encouraged** to check your answers with classmates. In fact, you are **required** to do so with at least one classmate who has not yet had his/her work checked yet before you have me check your work; write the name(s) of those you checked your work with below:

(The point here is to have to argue, er, discuss with others why your answers are correct if they think they are not, or why others' are not correct if they think they are, but you do not...)

2. Answer the following in the space provided:
 - (a) Write an appropriate named constant declaration for a named constant to represent the number of yards in a rod. (note: 1 rod is 5.5 yards)

- (b) Write an appropriate named constant declaration for a named constant to represent the number of rods in a furlong. (note: 1 furlong is 40 rods)
- (c) Write an **expression** that will be true if **hrs_worked** is less than or equal to **FT_LIMIT**.
- (d) Write an **expression** that will be true if **gross_pay** is equal to **adjusted_pay**.
- (c) Consider the following function definition:

```
// Contract: semester_grade: double double double -> double
//
// Purpose: return the semester grade for someone who has
//          a cumulative homework score of <hw_avg> (which should
//          make up 50% of the semester grade),
//          a cumulative quizzes score of <quiz_avg> (which should
//          make up 30% of the semester grade), and
//          a final exam score of <final_grade> (which should
//          make up 20% of the semester grade).
//
// Examples: semester_grade(100, 100, 100) should return 100
//           semester_grade(90, 80, 70) should return 83
//           semester_grade(80, 70, 90) should return 79

double semester_grade(double hw_avg, double quiz_avg, double
final_grade)
{
    return (hw_avg * 0.5) + (quiz_avg * 0.3) + (final_grade * 0.2);
}
```

Rewrite the **function definition** of **semester_grade** so that it makes appropriate use of named constants. (Note that this doesn't change the contract, purpose, or examples --- that's why you don't have to rewrite those.) For this problem, placed the named constant declarations **inside** the function body.

- (d) Now, using **funct_play2**, type in your revised version of **semester_grade**, being sure to enter in your named function declarations when prompted. Run the examples as tests to verify your version of **semester_grade**.

When this runs like you would like, check your work with at least one classmate, and then write your name on the 'Next:' list on the board to get your work checked.

All of the above must be completed before the end of your lab time.

HOMEWORK #5

You are to work **individually** on this assignment.

PART 1: (30% of the HW #5 grade) Create a file **130hw5_part1.txt** on cs-server. Inside this file, write your **contracts** for all of your functions for the problems below.

You must submit this file using ~st10/130submit (typed at the cs-server prompt, from the directory where your 130hw5_part1.txt file resides!!) by **12:00 noon** on **Wednesday, October 12th** to receive **any** credit for Part 1 of HW #5.

PART 2: (70% of the HW #5 grade) Finish problems 1 and 2 below (and the bonus, if you'd like) HERE PLEASE. For this part, you must enter these functions using **funct_play2**, and test them using either **funct_play*** or **expr_play**.

When you are ready, you must submit all of your **.cpp** and **.h** files --- for all of your functions and auxiliary functions for questions 1-2 --- using **~st10/130submit**. These must be submitted by **12:00 noon** on **Friday, October 14th** to receive **any** credit for Part 2 of HW #5.

REMEMBER: You are now REQUIRED to use the **program design recipe** for all functions, from here on out, and your functions need to each include the program design recipe elements (including contract, purpose, and specific examples).

1. Do Exercise 3.3.1 (pp. 23-24) in the CIS 130 - "HtDP" Reading Packet. Notice that this question is asking you to write 10 functions. Use **funct_play2** to enter these functions, and use **funct_play*** or **expr_play** (your choice) to test your function by calling each with at least two different arguments.
2. Write a function **worked_overtime** that expects one parameter, the number of hours worked. It should return **bool** true if number of hours worked is strictly more than 40, and it should return **bool** false otherwise. Use **funct_play2** to enter this function, and use **funct_play*** or **expr_play** (your choice) to test your function by calling each with at least **three** different arguments: at least one strictly less than 40, 40, and at least one strictly greater than 40.

When you are ready --- but before the deadlines above ---be sure to submit your **130hw5_part1.txt** and all of your functions' and auxiliary functions' **.h** and **.cpp** files using **~st10/130submit**. Remember to **cd** to the directory where your files are before trying to call **~st10/130submit**! And also remember: you can submit improved versions of any file up until the deadline; I'll grade the latest version of each.