Computer Science 381
Programming Unix in C
The College of Saint Rose
Winter Immersion 2014

Lab 4: Introduction to Pointers and Arrays
Recommended Due Date: Tuesday, January 7, 2014

In this lab you will start to learn about pointers and the closely related topics (at least for C programmers) of arrays and strings. Even if you never write a C program after this course, understanding how C programs manage pointers will improve your programming in nearly any language.

Read About It

Read the first 4 sections of Chapter 5 in K&R. It's only 11 pages, but it's a pretty intense 11 pages.

> **? Lab Question 1:**
> In your own words in a sentence or two, explain what happens when you execute a statement like `p = &c;` at the top of page 94. (1 point)

> **✎ Practice Program:**
> Write a C program called `swapper.c` that demonstrates that the `swap` function in the middle of p. 95 does not perform a swap of the values passed in (from the perspective of the caller), but the `swap` function at the top of p. 96 does. Include tests that attempt to swap regular `int` variables as well as array entries. (7 points)

> **? Lab Question 2:**
> Explain briefly, again in your own words, why the first `swap` function cannot work as intended. (2 points)

A Pointer/Array Example

See Example:
`/home/cs381/examples/isort`

The above example includes two C functions that each perform an insertion sort on an array of `int`. You can switch between the two implementations of the sorting function to verify that both do work.

❓Lab Question 3:

Draw memory diagrams (like those on p. 96, but show all varibles in existence in both `main` and the sort function) to show the state of memory during the second iteration of the `for` loop right before the `while` loop starts in the `isort` example. Include diagrams for an execution using the `isort` function as shown in the example and when that call is replaced with a call to `isortptr`. (6 points)

📝Practice Program:

Add a function to `isort.c` to perform a pointer-based array printing (along the lines of `isortptr`) called `print_array_ptr`. (4 points)

Submission

Please submit all required files as email attachments to *terescoj@strose.edu*. You are recommended to do so by Tuesday, January 7, 2014. Be sure to check that you have used the correct file names and that your submission matches all of the submission guidelines listed on the course home page.