HW08 - Pointers, Pointer Arithmetic & Dynamic Memory [100 pts]

Answer the following questions by modifying the hw08.cpp source file and/or answering the question directly:

1. Complete Q#1 pointer examples. Complete Q#1 reference examples. Indicate if an operation is not allowed and explain why. Complete the implementations for the increment functions (i.e. *increment_value, increment_pointer, increment_reference*). Describe what a pointer is. Describe what a reference is. What's the difference between a pointer and a reference?
2. [read pointer arithmetic, watch pointer arithmetic] Complete Q#2 pointer arithmetic examples. Indicate if an operation is not allowed and explain why.
3. [read arrays and functions, watch pointers and dynamic memory, pointers and 2d arrays] Complete the function definition for the *print_2darray_pointer* function. How is the *twoDDoubles* 2d array laid out in memory? Why is it necessary to cast *twoDDoubles* to a *double** in the *print_2darray_pointer* function call?
4. Complete the dynamic allocation examples. Indicate if an operation is not allowed and explain why. How do the *delete* statements at [4.7], [4.8] affect the values of *variables ri, ri2, ri3*? Add the needed *delete* statement in the function definition for *dynamic_allocation_array_doubles*; this will prevent the function from leaking memory. Add the needed *delete* statement at [4.9] to ensure the *array_of_doubles* returned from the call to *dynamic_allocation_array_doubles* is freed.
5. Complete the function definition for the *print_2darray_dynamic_pointer* function. How is the *p_p_tictactoe* 2d dynamic array laid out in memory (i.e. why is *p_p_tictactoe* an *int***)? Why do we need to pass a

pointer to a pointer of type int in the *print_2darray_dynamic_pointer* function call?

Include comments in your code to indicate which code segment answers which question. Appended written answers to the bottom of the hw08.cpp source file (as source comments via //).

Use the command script to capture your interaction compiling and running the program, including all operations, as shown below:

CS1C Summer 2019 MTWTH HW08 100pts **Due: Fr 7/5/2019**

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ script hw08.scr
Script started, file is hw08.scr
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ date
...
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ ls -l
...
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ make all
...
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ ls -l
...
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ ./hw08

... // print out output from steps 1 thru 5

cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ exit
Script done, file is hw08.scr
cs1c@cs1c-VirtualBox ~/cs1c/hw/08 $ make tar
...
Submit the tar package file hw08.tar by Friday July 5, 2019.
```