Your Name: _____   TA's Name: _____

ID#: _____   Section #: _____

SOLUTION: Take-Home: Quiz 3 (15 pts) – More with C and Some C++

Using Canvas https://canvas.wsu.edu/, please submit your solution to the correct quiz folder. Your solution should be a .pdf file with the name `<your last name>_quiz3.pdf` and uploaded. To upload your solution, please navigate to your correct Canvas **lab** course space. Select the "Assignments" link in the main left menu bar. Navigate to the correct quiz submission folder. Click the "Start Assignment" button. Click the "Upload File" button. Choose the appropriate .pdf file with your solution. Finally, click the "Submit Assignment" button.

Short Answer:

1. **(9 pts – 1 pt/question)** Given the following fragment of C code, answer the provided questions.

```c
Line 1: int n1 = 10, n2 = 42, list[] = {6, 8, 42, 3, 2, 2, -6};

Line 2: int * const p1 = &n1;
Line 3: const int * p2 = &n1;
Line 4: int * p3 = list;
Line 5: const int * const p4 = NULL;

Line 6: *p1 = 15;
Line 7: p1 = &n2;

Line 8: p2 = &n2;
Line 9: *p2 = 67;

Line 10: p3[4] = 67;

Line 11: list = &n1;

Line 12: p4 = list;
Line 13: *p4 = 25;
```

   a. (1 pt) Is there any discernible difference between the declared types for `p1` and `p2` on lines 2 and 3? Briefly explain.
      A. Yes, the declaration in line 2 states the *direct* value of p1 *cannot* be modified, but the *indirect* value can be modified. The declaration on line 3 states that the *direct* value of p2 *can* be modified, but the *indirect* value *cannot* be modified.

   b. (1 pt) Is the assignment operation on line 6 legal? Briefly explain.
      A: Yes, the operation is legal and can be applied because the *indirect* value of p1 *can* be modified and assigned a different value.

   c. (1 pt) Is the assignment operation on line 7 legal? Briefly explain.
      A: No, the operation is *not* legal and *cannot* be applied because the *direct* value of p1 *cannot* be modified and assigned a different value.

   d. (1 pt) Is the assignment operation on line 8 legal? Briefly explain.
      A: Yes, the operation is legal and can be applied because the *direct* value of p2 *can* be modified and assigned a different value.

   e. (1 pt) Is the assignment operation on line 9 legal? Briefly explain.
      A: No, the operation is *not* legal and *cannot* be applied because the *indirect* value of p2 *cannot* be modified and assigned a different value.

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f. (1 pt) Is the assignment operation on line 10 legal? Briefly explain.
    A: Yes, the operation is legal and can be applied because p3 stores the address of the first element in the array referred to as list. We can apply array notation to p3 although it was originally declared using pointer notation because it is now pointing to contiguous space. There are not constraints on p3 so memory can be modified in the contiguous space allocated.

g. (1 pt) Is the assignment operation on line 11 legal? Briefly explain.
    A: No, the operation is *not* legal and *cannot* be applied because "list" is the name of an array, which refers to the address of the first element in the contiguous space allocated, but *cannot* be modified. The name of an array is equivalent to a constant pointer (i.e. int * const) and the *direct* value *cannot* be modified.

h. (1 pt) Is the assignment operation on line 12 legal? Briefly explain.
    A: No, the operation is *not* legal and *cannot* be applied because the *direct* value of p4 *cannot* be modified and assigned a different value.

i. (1 pt) Is the assignment operation on line 13 legal? Briefly explain.
    A: No, the operation is *not* legal and *cannot* be applied because the *indirect* value of p4 *cannot* be modified and assigned a different value.

Fill-in-the-blank: (note: each question could require multiple word answers)

2. **(2 pts)** The ability to define multiple functions with the *same* name, but different number, type, and/or order of parameters is called _____**function overloading**_____.

3. **(2 pts)** A class *declaration* is analogous to a(n) _____**blueprint**_____ for a building.

4. **(2 pts)** The ability to *group* data and operations together inside an object is called _____**encapsulation**_____.