

MIDTERM EXAM 2

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CSCI 135

NAME: FIRST LAST

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1. Write code that creates and sets `int` pointer variables `a`, `b`, `c`, `d`, `e`, and `f` – to show each of the possibilities below. Include other variable definitions, when appropriate:

a) a pointer to a single automatic integer variable

b) a pointer to an automatic array of integers

c) a null pointer

d) a pointer to garbage

e) a pointer to a single integer object on heap

f) a pointer to a dynamic array of integers

2. What does the following code print?

```
double a = 1000;
double b = 2000;
double* p = &a;
double* q = p;
b = *q;
p = &b;
a = *p + *q;
cout << a << " " << b << endl;
```

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First, use this table to show how values of variables change as instructions execute. Use the **address-of** operator to show values of pointer variables:

a	b	p	q

3. Write a function that checks whether all elements in a two-dimensional array have the same value.

```
const int COLUMNS = 3;  
bool all_values_identical(int values[][COLUMNS], int rows) {
```

```
}
```

4. Write a code snippet that will use an array of pointers and dynamic memory (remember to deallocate it after you are done) to initialize a triangular array of integers with side 4, assign zero to all elements, and print them out -- like this:

```
0  
00  
000  
0000
```

5. Design a simple class `Section` that contains (or "has") its `course_name` and its `section_number` , and a simple class `Student` that contains (or "has") a `name` and a pointer to a `Section` object. In the `main()` function define three `Student` and two `Section` objects, and correctly establish the pointer links so that two students be in the first section, and one student in the second section.

6. Define an enumerated type `PhaseOfWater`, which can hold three possible values: `SOLID`, `LIQUID`, and `GASEOUS`. Write a `main()` function that will use a `switch` statement, which will hinge on a variable of this type to print: `"Ice"`, `"Water"`, or `"Steam"`.