MIDTERM EXAM 2

EMPLID

CSCI 135

NAME: FIRST LAST

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;
```

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"`**.