

Kerry Ojakian's CSI 32 Class

Due Date: Wednesday April 17 in class

HW #5

General Instructions: Put answers to the following on paper to hand in at the beginning of class.

The Assignment

1. Textbook, page 122: Exercise 4.15 and 4.16 (justify your answers!)
2. (a) How many length 6 binary strings are there?
(b) How many bits are in 2 bytes?
3. Suppose we have the following data stored contiguously in memory (i.e. with no gaps in the bytes): first a then b then c , increasing in memory addresses. Suppose a is a short int, b is a double, and c is an int. Suppose the address of a is `0x4607EA`.
 - (a) What is the address of b ?
 - (b) What is the address of c ?
 - (c) What bytes does c occupy?
 - (d) How many bytes do a , b , and c occupy altogether?
4. Consider the following code, and answer the questions below.

```
short int a = 57;
short int b = 77;
short int& r = a;
short int* p = &b;

cout << &a << endl; // prints: 0x61fe0e
cout << &r << endl;
cout << &b << endl; // prints: 0x61fe0c
cout << p << endl;
```

- (a) What do the two other cout's print? Why?
- (b) Are a and b stored contiguously in memory?
- (c) What is the value of $*p$?
- (d) What is the type of p ?
- (e) Which of the 4 variables is a reference variable?

5. Which of the following lines cause an error? Why?

```
int a = 88;
int b = 99;
const int& aRef = a;
a++;
aRef++;
b++;
a = b;
b = a;
aRef = b;
```

6. Write a C++ function `compare` that takes two pointers to `int`, and returns a `bool`: `true` if the two contents are equal and `false` otherwise.
7. Suppose `x` and `y` are both pointers to `int`. Write code that exchanges the data contained within.
8. Consider the following code, and answer the questions below.

```
int* intPtr1;
int* intPtr2;
int* intPtr3;
int i = 42;

intPtr1 = new int;
intPtr2 = new int;
intPtr3 = &i;
*intPtr1 = 99;
*intPtr2 = 17;
*intPtr3 = (*intPtr3) + 8;

delete intPtr2;
```

- (a) Add any needed lines so that there are no memory leaks?
- (b) Right before the line `delete intPtr2` what are the contents of the 3 pointer variables? (i.e. the values if they are de-referenced?)
- (c) What is the value of variable `i`?