

## CS 180: Data Structures, Fall 2013

### Homework 2

This is a homework you must complete individually.

1. (a) Fill in the diagram below to represent the underlying memory configuration that is present after the following commands are executed:

```
char a('X');
char *b = new char('Y');
char &c(a);
char d(c);
char *f = &d;
```

memory contents	memory address
	262
	263
	264
	265
	266
	267
	268
	269
	270
	271

- (b) Now use the diagram below to update the memory configuration from part (a) after the following 5 commands are executed.

```
b = 'U';
*f = 'Z';
char *g = b;
b = f;
a = 'W';
```

memory contents	memory address
	262
	263
	264
	265
	266
	267
	268
	269
	270
	271

2. Write a class `Line` that implements a line, which is represented by the formula  $y = ax + b$ . Your class should store  $a$  and  $b$  as (private) double member variables. In addition, write the following member functions:

- A constructor that accepts two doubles as input (for  $a$  and  $b$ ). If no inputs are specified, it should default to 0 for both values.
- The function `intersect( $\ell$ )` that takes another line as input and returns the  $x$  coordinate at which this line intersects line  $\ell$ . In addition, implement error handling so that if the two lines are parallel, it prints an appropriate error message.
- A function `slope()` that returns the slope of the line.

Finally, write a main function that declares several lines and tests each of your functions.