

CS251 Data Structures – Fall 2009  
Homework 2 – 30 points  
Due: Oct. 1

1. (5 points) Determine the output of the following program fragment

```
int i = 7;
int *p = &i;
int *q = new int;
*q = i;
i = 17;
cout << i << ', ' << *p << ', ' << *q << endl;
q = p;
i = 29;
cout << i << ', ' << *p << ', ' << *q << endl;
```

2. (10 points) The destructor and copy constructor methods are sometimes used in places when you don't expect them. As an example of this, download the file `h2.cpp` from the `~/bonomo/public/cs251/hw` directory. This file contains a skeleton class called `Sample` which contains four routines: a constructor, a copy constructor, a destructor and an overloaded assignment operator. All these methods do is just output a message identifying themselves. The rest of the file contains two functions and a `main` routine. Note that the two functions differ only in the fact that the first one has a single value parameter while the second has a single reference parameter.
- (a) Run this program and copy down the output. Note the differences in the output produced when `func1` is called and the output produced when `func2` is called. For each output line generated by the `Sample` class, explain where in the program it occurred and why.
  - (b) Use the results above to explain why the argument to any copy constructor *must* be a reference parameter and not a value parameter.
3. (15 points)
- (a) Write a new method `DynArr append(Dynarr rhs)` which returns a new `DynArr` object which is equal to the result of appending the values of `rhs` to the values of the object receiving the message. Note that the receiving object should not be changed. The resulting object should only allocate as much memory as it needs.
  - (b) Overload the `+` operator to perform the append operation.