

COP 3804
Intermediate Java Programming

Examination 4

Name: _____

SAMPLE

This exam has 3 additional pages. Please answer each question on the page on which it is asked. If you need more space than has been provided, you are doing something wrong.

1. [30 pts] Answer the following questions based on this code:

```
public static int foo( int x )
{
    if( x <= 0 )
        return 1;
    else
        return foo( x - 1 ) * 2;
}
```

- (a) What is returned by the call `foo(0)`?
- (b) What is returned by the call `foo(1)`?
- (c) What is returned by the call `foo(2)`?
- (d) What is returned by the call `foo(5)`?
- (e) In the code above, circle the base case.

2. [35 pts] The binomial coefficients are defined as follows

$$B(n, k) = \begin{cases} 1 & \text{if } k = 0 \text{ or } k = N \\ B(n-1, k-1) + B(n-1, k) & \text{otherwise} \end{cases}$$

Implement this function to compute the binomial coefficient:

```
// 0 <= k <= n
public static long binomial( int n, int k )
{
```

3. [35 pts] Method `reverseString` returns the reversal of a string. For instance, the following table shows the result of some calls to `reverseString`

```
str    reverseString( str )
==     =====
""     ""
"abc"  "cba"
"xabc" "cbax"
```

Implement `reverseString` recursively.

```
public static String reverseString( String str )
{
```