Name (and unix username):_____

What is the runtime of the following methods based on the contents of an array of size N. Analyze it in terms of compares and array access. Describe the worst case input and the best case input you can think of. Why is it the worst case or the best case?

1)

```
public static void BubbleSort( int [ ] num ) {
        int j;
        boolean flag = true;   // set flag to true to begin first pass
        int temp;   //holding variable

        while ( flag ) {
                flag= false;    //set flag to false awaiting a possible swap
                for( j=0;  j < num.length -1;  j++ ) {
                        if ( num[ j ] < num[j+1] ) {   // change to > for ascending sort
                                temp = num[ j ];              //swap elements
                                num[ j ] = num[ j+1 ];
                                num[ j+1 ] = temp;
                                flag = true;            //shows a swap occurred
                        }
                }
        }
} // Code credit: mathbits.com
```

Answer:
bubbleSort (in terms of input array size N):

array access:	best=	, worst=
compare:	best=	, worst=

Describe the worst and best case you can think of:

2)
What the code does:
Given a non-negative number represented as an array of digits, plus one to the number. The digits are stored such that the most significant digit is at the head of the list.

```
    public int[] plusOne(int[] digits) {
        int len = digits.length;
        int carry = 1;
        for (int i = len - 1; i >=0; i--){
            int digit = digits[i] + carry;
            digits[i] = digit % 10;
            carry = digit / 10;
            if (carry == 0) return digits;
        }
        int[] result = new int[len + 1];
        result[0] = 1;
        for (int i = 0; i < len; i++){
            result[i + 1] = digits[i];
        }
        return result;
    }
// Code credit github user: yuduozhou
```

Answer:
plusOne (in terms of input array size N):

array access:	best=		, worst=
compare:	best=		, worst=

Describe the worst and best case you can think of: