CSE 143 Quiz 6, May 15, 2001 Name _____

There are several ways to implement a stack of integers. Here is one representation, using an array:

```
class IntStack {
public:
    …
private:
    int capacity;          // number of elements in the dynamically allocated array items
    int * items;           // integers in the stack are stored in items[0..size-1]
    int size;              // items[size-1] is the integer on the top of the stack
};
```

1. Give an implementation of the pop operation for class IntStack. Recall that pop removes the topmost item from the stack and returns a copy of it.

```
// Remove topmost element from this stack and return a copy of it
int IntStack::pop( ) {
    assert(size > 0);              [optional]
    int answer = items[size-1];
    size --;
    return answer;
}
```

or

```
// Remove topmost element from this stack and return a copy of it
int IntStack::pop( ) {
    assert(size > 0);              [optional]
    size --;
    return items[size];
}
```

2. In lecture, we developed two implementations of a stack: one using arrays (as in question 1), and the other using a linked list. If it were important for a particular application that the push and pop operations be as fast as possible, which implementation would you use, and why? (Be brief)

An array. The linked list implementation given in class allocated and deleted list nodes as items were pushed onto and popped from the stack. That dynamic storage management is considerably more expensive than simple assignments to array elements.

3. What is the essential difference between a stack and a queue?

LIFO vs FIFO.

(i.e., in a stack, the last element added is the first one removed, while in a queue, the first element added is the first one removed.)