

1) (10 pts) DSN (Dynamic Memory Management in C)

Suppose we have a stack implemented with an array as shown in the structure below. Write a function called `grow_stack` that will increase the stack's capacity while preserving the exact values currently in the stack and their current locations. Your function should take 2 parameters: a pointer to the current stack and an integer representing the amount to increase the stack's capacity by. **You may not use the `realloc` function.** You may assume `s` isn't NULL and `pts` to a valid struct stack. You may assume that `capacity` stores the current size of the array that the pointer array is pointing to and that `top` represents the number of items currently in the stack (items are stored in indexes 0 through `top-1`).

```
struct Stack {
    int *array;
    int top;
    int capacity;
};

void grow_stack(struct Stack *s, int increase) {

    // Calculates new size as an increase to current capacity
    // 1 point
    int new_size = s->capacity + increase;

    // Has a mechanism to prevent "losing" the current array pointer
    // 2 points
    int *hold = s->array;
    int i;

    // Allocates space for the increased stack array
    // 2 points
    s->array = malloc(sizeof(int) * new_size);

    // Copies values from old array to new array
    // 3 points
    for(i = 0; i < s->top; i++)
        s->array[i] = hold[i];

    // Cleans up old memory space
    // 1 point
    free(hold);

    // Updates capacity
    // 1 point
    s->capacity = new_size;

}
```