

3) (10 pts) ALG (Stacks) Suppose we pass the string “cupcake” to the following function. What will the function’s output be, and what will the stacks *s1* and *s2* look like when the function terminates? You may assume the stack functions are written correctly and that the stacks are designed for holding characters.

```
void string_shenanigans(char *str)
{
    int i, len = strlen(str);
    char *new_string = malloc(sizeof(char) * (len + 1));
    Stack s1, s2;
    init(&s1);
    init(&s2);

    for (i = 0; i < len; i++) {
        push(&s1, str[i]); // this pushes onto stack s1
        push(&s2, str[i]); // this pushes onto stack s2
    }

    for (i = 0; i < len; i++) {
        if (i % 2 == 0) {
            // Note: pop() returns the character being removed from the stack.
            if (!isEmpty(&s1))
                new_string[i] = pop(&s1);
            if (!isEmpty(&s1))
                push(&s2, pop(&s1));
        }
        else {
            pop(&s2);
            new_string[i] = pop(&s2);
        }
    }

    new_string[len] = '\0';
    printf("%s\n", new_string);
    free(new_string);
}
```

eeakpac	(the stack is empty)	c <- top p u c
<i>printf()</i> output	final contents of <i>s1</i> (please label ‘top’ for clarity)	final contents of <i>s2</i> (please label ‘top’ for clarity)

Grading: Award 7 points for the correct output (“eeakpac”), 1 pt per letter, 1 pt for the correct contents of *s1*, and 2 pts for the correct contents of *s2*. (Give 1 pt if the stack is flipped.) If the output looks reasonably close and has a minor error, feel free to award partial credit.