

Name: _____

CS 211
Spring 2004
Midterm

- 1) Using classic compact “what, me worry?” C style, define the C string function `strcat(s1, s2)` which copies the characters in `s2` onto the end of `s1`. For example, if `s1 = "abc"` and `s2 = "def"` then afterwards `s1 = "abcdef"`.
- 2) Using reference parameters, not explicit pointers, define a function `swap` to swap two integers. Show how `swap` would be called to exchange `a[i]` and `a[j]`.

- 3) The following C string code is so bad, it's not worth fixing. Circle every mistake and describe what's wrong and what might happen if this code is run. Be specific!

```
#include <iostream>
using std::cin;
using std::cout;
using std::endl;

#include <string.h>
using std::strcat;

char * getResponse();

int main()
{
    char *response = getResponse();
    cout << response << endl;
}

char * getResponse()
{
    char name[20];
    char response[40];
    cout << "Enter name: ";
    cin >> name;
    strcat( response, "Hello, " );
    strcat( response, name );
    return response;
}
```

- 4) Deitel gives this algorithm for shuffling an array of N cards: Make an array A of N empty slots; For each of the N cards, choose a slot in A at random until you find an empty one. Put the card there.

Explain why this algorithm is incredibly inefficient. Be specific. Give an example.

- 5) On the following pages, implement the classes `Book` and `BookList` so that code like the following will work. The `Book` constructor should default both title and author to empty strings, and store them as instances of `string` internally. The `BookList` constructor should take any integer N, and internally create an array of `Book`'s. Follow best practices, e.g., make everything `const` that can be, minimize the amount of implementation code in the header file, and so on.

```
#include <iostream>
using std::cout;
using std::endl;
using std::ostream;

#include "booklist.h"

int main()
{
    BookList books(2);
    books.setBook(0, Book("C++", "Deitel"));
    books.setBook(1, Book("ICBR", "Riesbeck"));
    for (int i = 0; i < books.size(); ++i)
    {
        Book b = books.getBook(i);
        cout << i << ": " << b << endl;
    }
}
```

prints

```
0: C++ by Deitel
1: ICBR by Riesbeck
```

- a) Write a single complete header file, `booklist.h`, for `Book` and `BookList`, with `#include's`, using declarations, and header guard.

- b) Write the implementation file `booklist.cpp` for `Book` and `BookList`. Don't forget to overload `operator<<`.