

**Course:** ENSF 614 - Fall 2023

**Lab #:** Lab 4

**Instructor:** Moussavi

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## Part A

### Function Definition:

```
String_Vector transpose (const String_Vector& sv) {

    if (sv.empty() || sv[0].empty()) {
        return String_Vector();
    }

    int VS_ROWS = sv.size();
    int VS_COLS = sv[0].size();

    String_Vector vs(VS_COLS, std::string(VS_ROWS, ' '));

    for (int i = 0; i < VS_ROWS; i++) {
        for (int j = 0; j < VS_COLS; j++) {
            vs[j][i] = sv[i][j];
        }
    }

    return vs;
}
```

### Output:

```
cd "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 4/" && g++ lab4ExA.cpp -o lab4ExA && "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 4/"lab4ExA

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) yajurs-macbook:Lab 4 yajurvashisht$ cd "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 4/" && g++ lab4ExA.cpp -o lab4ExA && "/Users/yajurvashisht/Library/CloudStorage/OneDrive-UniversityofCalgary/07 Classes/03 Fall 23/ENSF 614/02 Lab Assignments/Lab 4/"lab4ExA
ABCD
EFGH
IJKL
MNOP
QRST
AEIMQ
BFJNR
CGKOS
DHLPT
(base) yajurs-macbook:Lab 4 yajurvashisht$
```

## Part B

### Function Definition:

```
void print_from_binary(char* filename) {

    ifstream stream(filename, ios::in | ios::binary);
    if (!stream.is_open()) {
        cerr << "Failed to open file: " << filename << endl;
        exit(1);
    }

    string txt_filename = string(filename) + ".txt";
    ofstream txt_stream(txt_filename);

    if (!txt_stream.is_open()) {
        cerr << "Failed to create the text file: " << txt_filename << endl;
        exit(1);
    }

    City city;
    while (stream.read((char*)&city, sizeof(City))) {
        cout << "Name: " << city.name << ", x coordinate: " << city.x << ", y coordinate: " << city.y << endl;
        txt_stream << "Name: " << city.name << ", x coordinate: " << city.x << ", y coordinate: " << city.y << endl;
    }
    stream.close();
    txt_stream.close();
}
```

### Output from Generated .txt File:

```
Name: Calgary, x coordinate: 100, y coordinate: 50
Name: Edmonton, x coordinate: 100, y coordinate: 150
Name: Vancouver, x coordinate: 50, y coordinate: 50
Name: Regina, x coordinate: 200, y coordinate: 50
Name: Toronto, x coordinate: 500, y coordinate: 50
Name: Montreal, x coordinate: 200, y coordinate: 50
```