Course: ENSF 614 – Fall 2023
Lab #: Lab 4
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Lab 4 Exercise A:

CODE:

```
String_Vector transpose(const String_Vector& sv) {
    // Ensure there is at least one row in the input vector.
    if (sv.empty()) {
        cerr << "Input vector is empty." << endl;
        String_Vector vs; // Return an empty vector.
        return vs;
    }

    int numRows = sv.size();
    int numCols = sv[0].size(); // Assuming all strings in sv have the
same length.

    // Initialize vs with numRows of empty strings to represent
columns.
    String_Vector vs(numCols, std::string(numRows, ' '));

    for (int i = 0; i < numRows; i++) {
        for (int j = 0; j < numCols; j++) {
            vs[j][i] = sv[i][j]; // Swap rows and columns.
        }
    }

    return vs;
}
```

OUTPUT:

```
ABCD
EFGH
IJKL
MNOP
QRST
AEIMQ
BFJNR
CGKOS
DHLPT
Program ended with exit code: 0
```

Lab 4 Exercise B:

CODE:

```
void print_from_binary(char* filename) {
    /* Studnets must complete the implementaiton of this file. */
    ifstream binaryFile(filename, ios::binary);
    string textFilename(filename);
    textFilename += ".txt";
    ofstream textFile(textFilename);
    City city;
    while (binaryFile.read((char*)&city, sizeof(City))) {
        cout << "Name: " << city.name << ", x coordinate: " << city.x
<< ", y coordinate: " << city.y << endl;
        textFile << "Name: " << city.name << ", x coordinate: " <<
city.x << ", y coordinate: " << city.y << endl;
    }

    binaryFile.close();
    textFile.close();

}
```

OUTPUT:

```
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
```