**Course**: ENSF 614 – Fall 2023

**Lab #**: Lab 4

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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:

A screenshot of a computer

Description automatically generated

**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