ENSF 337– Fall 2018 - Tutorial 9

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Consider the following definition of `struct` City and the following program. Then, write the definition of two functions: `write_binary_file`, and `change_city`. You may assume that function `print_from_binary` that is supposed to read the content of a binary file and print them on the screen, is already defined properly.

```
#include <iostream>
#include <fstream>
using namespace std;
const int size = 3;

struct City {
    double x, y;
    char name[30];
};


void write_binary_file(City cities[], int size, ofstream& stream, char* filename);
/* PROMISES: opens a binary file and writes the content of array cities (0..size-1) into the file. */

void change_city(cost char* bin_filename, const char* old_name, const char* new_name);
/* PROMISES: changes a data field in record in a binary file: Opens the binary file called bin_filename. Searches
 * for the record matching the oldname, and changes the old_name with the new_name, at end closes the file closes
 * the file*/


int main() {
    char txt_filename[] = "cities.txt";
    char bin_filename[] = "cities.bin";

    City cities[size] = {{100, 50, "City of Calgary"}, {100, 150, "City of Edmonton"}
        , {50, 50, "Vancouver"}};

    ofstream out_bin;
    write_binary_file(cities, size, out_bin, bin_filename);
    print_from_binary(bin_filename);
    change_city(bin_filename, "Vancouver", "City of Vancouver" );
    cout << "\nThe content of the binary file after changing city name:";
    print_from_binary(bin_filename);
    return 0;
}
```

Expected output of the program:

```
Name: City of Calgary
x coordinate: 100
y coordinate: 50
-------------------
Name: City of Edmonton
x coordinate: 100
y coordinate: 150
-------------------
Name: Vancouver
x coordinate: 50
y coordinate: 50

The content of the binary file after changing city name: Name: City of Calgary
x coordinate: 100
y coordinate: 50
-------------------
Name: City of Edmonton
x coordinate: 100
y coordinate: 150
-------------------
Name: City of Vancouver
x coordinate: 50
y coordinate: 50
```

```cpp
#include <iostream>
#include <fstream>
const int size = 3;
using namespace std;
struct City {
    double x, y;
    char name[30];
};

void write_text_file(City cities[], int size, ofstream& stream, char* filename){
    stream.open(filename);
    if(stream.fail()){
        cerr << "failed to open file: " << filename << endl;
        exit(1);
    }

    for(int i =0; i < size; i++)
        stream << cities[i].name<< "  " << cities[i]. x << "  "  << cities[i].y;
    stream.close();
}

void write_binary_file(City cities[], int size, ofstream& stream, char* filename){
    stream.open(filename, ios::out | ios::binary);
    if(stream.fail()){
        cerr << "failed to open file: " << filename << endl;
        exit(1);
    }

    for(int i =0; i < size; i++)
        stream.write((char*)&cities[i], sizeof(City));
    stream.close();
}

void print_from_binary(char* filename) {
    ifstream in_out.open(filename, ios::binary |ios::in);
    if(in_out.fail()){
        cerr << "failed to open file: " << filename << endl;
        exit(1);
    }

    while(1){
        City city;
        in_out.read((char*)&city, sizeof(City));
        if(in_out.eof())
            break;
        if(in_out.fail()){
            cerr << "failed to read from: " << filename << endl;
            exit(1);
        }
        cout << "Name: " << city.name << "\nx coordinate: " << city.x
        << "\ny coordinate: " << city.y << "\n--------------------" <<endl;
    }
    in_out.clear();
}

void change_city(const char* file_name, const char* old_name, const char* new_name){
    fstream in_out (file_name, ios::binary | ios:in |ios::out);
    in_out.seekg(0,ios::beg);
    int i = 0;
    while(i < size){
        City city;
        in_out.read((char*)&city, sizeof(City));
        if(strcmp(city.name, old_name) == 0){
            in_out.seekg(-sizeof(City), ios::cur);
            strcpy(city.name, new_name);
            in_out.write((char*)&city, sizeof(city));
            break;
        }
        i++;
    }

    in_out.close();
}
```