#include <stdio.h>

#include <stdlib.h>

#define MAX\_SIZE 1000

int load\_data(const char \*filename, double data[], int max\_size) {

FILE \*file = fopen(filename, "r");

if (file == NULL) {

perror("Error opening file");

return -1;

}

int count = 0;

while (fscanf(file, "%lf", &data[count]) != EOF && count < max\_size) {

count++;

}

fclose(file);

return count;

}

void find\_peaks\_and\_minima(double data[], int size, int indices[], double values[], int \*max\_count, int \*min\_count) {

\*max\_count = 0;

\*min\_count = 0;

for (int i = 1; i < size - 1; i++) {

if (data[i] > data[i - 1] && data[i] > data[i + 1]) {

indices[(\*max\_count)] = i;

values[(\*max\_count)] = data[i];

(\*max\_count)++;

} else if (data[i] < data[i - 1] && data[i] < data[i + 1]) {

indices[(\*min\_count)] = i;

values[(\*min\_count)] = data[i];

(\*min\_count)++;

}

}

}

void save\_results(const char \*filename, int indices[], double values[], int count) {

FILE \*file = fopen(filename, "w");

if (file == NULL) {

perror("Error opening file");

return;

}

for (int i = 0; i < count; i++) {

fprintf(file, "%d %.2f\n", indices[i], values[i]);

}

fclose(file);

}

int main() {

double data[MAX\_SIZE];

int indices[MAX\_SIZE];

double values[MAX\_SIZE];

int count, max\_count, min\_count;

count = load\_data("Data\_1.txt", data, MAX\_SIZE);

if (count < 0) return 1;

find\_peaks\_and\_minima(data, count, indices, values, &max\_count, &min\_count);

save\_results("data1\_maxima.txt", indices, values, max\_count);

save\_results("data1\_minima.txt", indices, values, min\_count);

count = load\_data("Data\_2.txt", data, MAX\_SIZE);

if (count < 0) return 1;

find\_peaks\_and\_minima(data, count, indices, values, &max\_count, &min\_count);

save\_results("data2\_maxima.txt", indices, values, max\_count);

save\_results("data2\_minima.txt", indices, values, min\_count);

return 0;

}