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#include <iostream>
#include <string>
#include <fstream>
#include <iomanip>
using namespace std;

void get_command(string& command);           // 10점
void get_size(int& size);                     // 10점
int** gen_matrix(int size);                  // 20점
void swap(int* a, int* b);                   // 10점
void sort_array(int* ary, int size);          // 10점
void sort_matrix_row(int** matrix, int size); // 10점
void print_matrix(int** matrix, int size);    // 10점
void save_matrix(int** matrix, int size);     // 10점
void free_matrix(int** matrix, int size);     // 10점

int main() {
    string command;
    int** matrix = NULL;
    int size = 0;
    while (1) {
        get_command(command); // 1)

        if(command == "1"){
            get_size(size); //2)
            matrix = gen_matrix(size); //3)
        }else if (command == "2") {
            print_matrix(matrix, size);
        }else if (command == "3") {
            sort_matrix_row(matrix, size);
        }else if (command == "4") {
            save_matrix(matrix, size);
        }else if (command == "0") {
            free_matrix(matrix, size);
            cout << "Exit the program.." << endl;
            exit(104);
        }else {
            cout << "Wrong command" << endl;
        }
    }

    return 0;
}

void get_command(string& command) {
    cout << "1. Generate matrix" << endl;
    cout << "2. Print matrix" << endl;
    cout << "3. Sort matrix" << endl;
    cout << "4. Save matrix" << endl;
    cout << "0. Exit program" << endl;
}

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        cout << ">>";
        cin >> command;
    }

    void get_size(int& size) {
        do {
            cout << "Enter the size in (size x size): ";
            cin >> size;
        } while (size < 2);
    }

    int** gen_matrix(int size) {
        int**matrix = new int*[size];
        for (int i = 0; i < size; i++)
            matrix[i] = new int[size];

        for (int row = 0; row < size; row++) {
            for (int col = 0; col < size; col++) {
                matrix[row][col] = (rand()) % 101;
            }
        }
        cout << endl;

        return matrix;
    }

    void swap(int* a, int* b) {
        int temp = *a;
        *a = *b;
        *b = temp;
    }

    void sort_array(int* ary, int size) {
        for (int i = 0; i < (size - 1); i++) {
            for (int j = i; j < (size - 1); j++) {
                if (ary[j] > ary[j + 1])
                    swap(ary[j], ary[j + 1]);
            }
        }
    }

    void sort_matrix_row(int** matrix, int size) {
        for (int row = 0; row < size; row++) {
            sort_array(matrix[row], size);
        }
        cout << "Completed" << endl;
    }

    void print_matrix(int** matrix, int size) {
        for (int row = 0; row < size; row++) {

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        for (int col = 0; col < size; col++) {
            cout << setw(4) << matrix[row][col];
        }
        cout << endl;
    }
    cout << endl;
}

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void save_matrix(int** matrix, int size) {
    ofstream fout("matrix.txt");
    fout << size << endl;
    for (int row = 0; row < size; row++) {
        for (int col = 0; col < size; col++) {
            fout << setw(4) << matrix[row][col];
        }
        fout << endl;
    }
    fout.close();

    cout << "Saved" << endl;
    cout << endl;
}

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void free_matrix(int** matrix, int size) {
    for (int i = 0; i < size; i++)
        delete[] matrix[i];
    delete[] matrix;
}

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