#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <stdbool.h>

#define MAX\_STATES 100

#define MAX\_SYMBOLS 100

void finite\_automata() {

int num\_inputs, num\_states, initial\_state, num\_accepting\_states;

char input\_symbols[MAX\_SYMBOLS];

int accepting\_states[MAX\_STATES];

int transition\_table[MAX\_STATES][MAX\_SYMBOLS];

printf("Finite Automata Setup\n");

printf("Number of inputs: ");

scanf("%d", &num\_inputs);

printf("Input symbols (space-separated): ");

for (int i = 0; i < num\_inputs; i++) {

scanf(" %c", &input\_symbols[i]);

}

printf("Number of states: ");

scanf("%d", &num\_states);

printf("Initial state: ");

scanf("%d", &initial\_state);

printf("Number of accepting states: ");

scanf("%d", &num\_accepting\_states);

printf("Accepting states (space-separated): ");

for (int i = 0; i < num\_accepting\_states; i++) {

scanf("%d", &accepting\_states[i]);

}

printf("\nEnter the transition table:\n");

for (int i = 0; i < num\_states; i++) {

for (int j = 0; j < num\_inputs; j++) {

printf("State %d to %c: ", i + 1, input\_symbols[j]);

scanf("%d", &transition\_table[i][j]);

}

}

char input\_string[100];

while (1) {

printf("\nEnter input string: ");

scanf("%s", input\_string);

int current\_state = initial\_state;

bool valid = true;

for (int k = 0; input\_string[k] != '\0'; k++) {

char char\_input = input\_string[k];

int symbol\_index = -1;

for (int j = 0; j < num\_inputs; j++) {

if (input\_symbols[j] == char\_input) {

symbol\_index = j;

break;

}

}

if (symbol\_index == -1) {

printf("Invalid symbol '%c' in input string.\n", char\_input);

valid = false;

break;

}

current\_state = transition\_table[current\_state - 1][symbol\_index];

}

if (!valid) {

continue;

}

bool is\_accepted = false;

for (int i = 0; i < num\_accepting\_states; i++) {

if (current\_state == accepting\_states[i]) {

is\_accepted = true;

break;

}

}

if (is\_accepted) {

printf("\nInput string is ACCEPTED by the finite automaton.\n");

} else {

printf("\nInput string is REJECTED by the finite automaton.\n");

}

// Step 5: Ask if the user wants to run again

printf("\nDo you want to test another string? Press 1 for Yes or 0 for Exit: ");

int choice;

scanf("%d", &choice);

if (choice != 1) {

printf("Exiting...\n");

break;

}

}

}

int main() {

finite\_automata();

return 0;

}