#include <iostream>

#include <stdlib.h>

#include <string>

// Use Dev C++ compiler

// Could use also shellC++ environment

using namespace std;

bool A3\_number(string input\_string);

int main (void){

cout << "\n--------------------------------------------------\n";

string input\_str = "11";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

bool ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "1010";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "00";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

//ret\_val = A1\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "0101";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "0000";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "111";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "0001";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

cout << "\n--------------------------------------------------\n";

input\_str = "1110";

cout << "\ninput\_str, same as the A1 Tape: " << input\_str << endl;

ret\_val = A3\_number(input\_str);

cout << "\n Return value: " << ret\_val << " input\_str is: " << input\_str << endl;

system ("PAUSE");

return 0;

}

// A1\_number is the A1 automaton (in our Finite State Automaton A1, presentation.

// Return the true if string is accepted.

bool A3\_number(string input\_string)

{

// Use Automaton A1 in the class examples

// States: q0, q1; q0 is start state

// Input alphabet, symbols: 0, 1,.....8, 9, +

// Final States: q0 (g0od), q1 (bad)

// Mapping Function:

// returns a state, first parameter is present state and the char on the tape.

string A3\_map(string state, char symbol);

// Automaton Tape: is input\_string

string state = "q0";

string final\_state = "q0";

for (int i=0; i < input\_string.length(); i++)

{

cout << input\_string[i];

if (( input\_string.length() == 3 ))

return false;

break;

// use A1\_map() to calculate the next state

state = A3\_map(state, input\_string[i]);

if ((state == ""))

break; //gets out of the loop

}

if (state == final\_state)

return true;

else

return false;

}

string A3\_map(string state, char symbol)

{

if (state == "q0" && symbol == '0')

return "q0";

else if (state == "q0" && symbol == '1')

return "q1";

else if (state == "q1" && symbol == '0')

return "q3";

else if (state == "q3" && symbol == '1')

return "q2";

else if (state == "q2" && symbol == '0')

return "q0";

else if (state == "q0" && symbol == '0')

return "q2";

else if (state == "q2" && symbol == '1')

return "q3";

else if (state == "q3" && symbol == '0')

return "q1";

else if (state == "q1" && symbol == '1')

return "q0";

else

return ""; // case where there are other chars than the

// symbols of the alphabet.

}

