18.9.24

Ex No:7 Minimization of DFA

**Program:**

#include <stdio.h>

void printDFA(int dfa[][2], int numStates) {

printf("\nMinimized DFA Transitions:\n");

printf(" State Input(0) Input(1) \n");

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

printf(" q%-3d q%-5d q%-5d \n", i, dfa[i][0], dfa[i][1]);

}

}

int remove\_UnreachableStates(int dfa[][2], int numStates, int reachable[]) {

int newDFA[numStates][2];

int newStateMap[numStates];

int newStateCount = 0;

reachable[0] = 1;

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

if (reachable[i]) {

reachable[dfa[i][0]] = 1;

reachable[dfa[i][1]] = 1;

}

}

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

if (reachable[i]) {

newStateMap[i] = newStateCount;

newDFA[newStateCount][0] = dfa[i][0];

newDFA[newStateCount][1] = dfa[i][1];

newStateCount++;

} else {

newStateMap[i] = -1;

}

}

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

newDFA[i][0] = newStateMap[newDFA[i][0]];

newDFA[i][1] = newStateMap[newDFA[i][1]];

}

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

dfa[i][0] = newDFA[i][0];

dfa[i][1] = newDFA[i][1];

}

return newStateCount;

}

int main() {

int numStates;

char option;

do {

printf("Enter the number of states: ");

scanf("%d", &numStates);

int dfa[numStates][2];

int reachable[numStates];

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

reachable[i] = 0;

}

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

printf("Enter the state for {q%d,0}-> ", i);

scanf("%d", &dfa[i][0]);

printf("Enter the state for {q%d,1}-> ", i);

scanf("%d", &dfa[i][1]);

}

int minimizedStates = remove\_UnreachableStates(dfa, numStates, reachable);

printDFA(dfa, minimizedStates);

printf("Do you want to continue? (y/n): ");

while (getchar() != '\n');

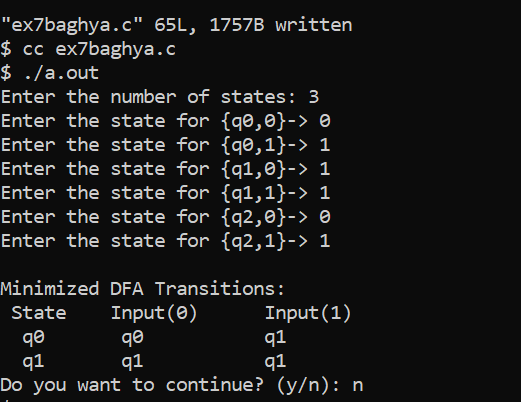
scanf("%c", &option);

} while (option == 'y');

return 0;

}

**Output:**

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