**Tutorial-3**

1. Implement C program for 8 Puzzle problem.

**CODE::**

#include<stdio.h>

#include<string.h>

#include<unistd.h>

#include<sys/types.h>

#include <sys/stat.h>

#include <stdlib.h>

#include<time.h>

#define r 3

#define c 3

char matrix[r][c];

char new [r][c];

int count;

char final[r][c] = {{'1','2','3'},{'4','5','6'},{'7','8',' '}};

int i, j;

char z;

int p, q, x, y;

int t = 0;

int result = 0;

void load()

{

for (i = 0; i < 3; i++) {

for (j = 0; j < 3; j++) {

if (new [i][j] == '0') {

matrix[i][j] = ' ';

continue;

}

matrix[i][j] = new [i][j];

}

}

}

void blank()

{

for (i = 0; i < 3; i++) {

for (j = 0; j < 3; j++) {

new [i][j] = ' ';

}

}

}

int main() {

time\_t T = time(NULL);

struct tm tm = \* localtime( & T);

char f[4];

int rsl;

int random, t;

int randvalues[9];

main:

count = 0;

blank();

T = time(NULL);

tm = \* localtime( & T);

srand(tm.tm\_sec);

while (count != 9) {

rsl = rand() % 9;

sprintf(f, "%d", rsl);

for (i = 0; i < r; i++) {

for (j = 0; j < c; j++) {

if ((new [i][j]) == f[0]) {

i = 4;

j = 4;

continue;

} else if ((new [i][j]) == ' ') {

new [i][j] = f[0];

i = 4;

j = 4;

count++;

}

}

}

}

load();

for (i = 0; i < r; i++) {

for (j = 0; j < c; j++) {

printf("|%c|", matrix[i][j]);

}

printf("\n");

}

while (1) {

printf("enter value to change its position to blank space\n");

scanf(" %c", & z);

if (z == 'q') {

printf("\n\*\*\*\*\*You Quit\*\*\*\*\*\n");

goto main;

// break;

}

for (i = 0; i < r; i++) {

for (j = 0; j < c; j++) {

if ((matrix[i][j]) == z) {

p = i;

q = j;

} else if ((matrix[i][j]) == ' ') {

x = i;

y = j;

}

}

}

t = 0;

int m, n;

m = p - 1;

n = q;

if (m >= 0) {

if ((matrix[m][n]) == ' ') t = 1;

}

m = p + 1;

if (m <= 2) {

if ((matrix[m][n]) == ' ') t = 1;

}

m = p;

n = q - 1;

if (n >= 0) {

if ((matrix[m][n]) == ' ') t = 1;

}

n = q + 1;

if (n <= 2) {

if ((matrix[m][n]) == ' ') t = 1;

}

if (t == 1) {

matrix[x][y] = z;

matrix[p][q] = ' ';

}

t = 0;

for (i = 0; i < r; i++) {

for (j = 0; j < c; j++) {

if ((matrix[i][j]) == final[i][j]) {

t++;

}

}

}

system("clear");

for (i = 0; i < r; i++) {

for (j = 0; j < c; j++) {

printf("|%c|", matrix[i][j]);

}

printf("\n");

}

if (t == 9) {

printf("\n\*\*\*\*you Win\*\*\*\*\n");

break;

}

}

return 1;

}