Artificial Intelligence Lab – 1

**AI vs Non-AI Techniques**

Name – Mokshit Oswal

Class – AI B

Batch – B2

Roll Number – 32

PRN - 12111304

#include <stdio.h>

char gridChar(int i) {

switch(i) {

case -1:

return 'X';

case 0:

return ' ';

case 1:

return 'O';

}

}

void draw(int b[9]) {

printf(" %c | %c | %c\n",gridChar(b[0]),gridChar(b[1]),gridChar(b[2]));

printf("---+---+---\n");

printf(" %c | %c | %c\n",gridChar(b[3]),gridChar(b[4]),gridChar(b[5]));

printf("---+---+---\n");

printf(" %c | %c | %c\n",gridChar(b[6]),gridChar(b[7]),gridChar(b[8]));

}

int win(const int board[9]) {

//determines if a player has won, returns 0 otherwise.

unsigned wins[8][3] = {{0,1,2},{3,4,5},{6,7,8},{0,3,6},{1,4,7},{2,5,8},{0,4,8},{2,4,6}};

int i;

for(i = 0; i < 8; ++i) {

if(board[wins[i][0]] != 0 &&

board[wins[i][0]] == board[wins[i][1]] &&

board[wins[i][0]] == board[wins[i][2]])

return board[wins[i][2]];

}

return 0;

}

int minimax(int board[9], int player) {

//How is the position like for player (their turn) on board?

int winner = win(board);

if(winner != 0) return winner\*player;

int move = -1;

int score = -2;//Losing moves are preferred to no move

int i;

for(i = 0; i < 9; ++i) {//For all moves,

if(board[i] == 0) {//If legal,

board[i] = player;//Try the move

int thisScore = -minimax(board, player\*-1);

if(thisScore > score) {

score = thisScore;

move = i;

}//Pick the one that's worst for the opponent

board[i] = 0;//Reset board after try

}

}

if(move == -1) return 0;

return score;

}

void computerMove(int board[9]) {

int move = -1;

int score = -2;

int i;

for(i = 0; i < 9; ++i) {

if(board[i] == 0) {

board[i] = 1;

int tempScore = -minimax(board, -1);

board[i] = 0;

if(tempScore > score) {

score = tempScore;

move = i;

}

}

}

//returns a score based on minimax tree at a given node.

board[move] = 1;

}

void playerMove(int board[9]) {

int move = 0;

do {

printf("\nInput move ([0..8]): ");

scanf("%d", &move);

printf("\n");

} while (move >= 9 || move < 0 && board[move] == 0);

board[move] = -1;

}

int main() {

int board[9] = {0,0,0,0,0,0,0,0,0};

//computer squares are 1, player squares are -1.

printf("Computer: O, You: X\nPlay (1)st or (2)nd? ");

int player=0;

scanf("%d",&player);

printf("\n");

unsigned turn;

for(turn = 0; turn < 9 && win(board) == 0; ++turn) {

if((turn+player) % 2 == 0)

computerMove(board);

else {

draw(board);

playerMove(board);

}

}

switch(win(board)) {

case 0:

printf("A draw. How droll.\n");

break;

case 1:

draw(board);

printf("You lose.\n");

break;

case -1:

printf("You win. Inconceivable!\n");

break;

}

}