Code Layout:

The code can broadly be divided into the following sections:

1. Decision making functions for the AI.

2. I/O Functions to take input from the keypad as well as display information on the LCD panel and LED matrix.

3. Game functions which have been used to construct Tic-Tac-Toe

4. Miscellaneous functions which include various delays as well as debugging functions

1) AI Internal Functions:

AIMOVE: Main AI function which calls MIN to determine where to move.

MIN: Function which plays as the AIs opponent optimally and returns a score found by calling MAX.

MAX: Function which plays as the AI optimally and returns a score which is calculated by calling MIN.

2)I/O Functions:

**INPUT FUNCTIONS:**

KEYIN: Function which takes input from the keypad.

**OUTPUT FUNCTIONS:**

Liquid Crystal Display

LCDINIT: Function which initialises and configures the LCD into the 2-line mode.

LCDSTRINGDISP: Function which prints a string.

LCDL2: Function which prints a string on the next line.

CMD: Function to send a command byte to the LCD.

DATA: Function to send a data byte to the LCD.

LED Matrix

UPDATE2: Function which displays the board state on the LED matrix.

TXBOARD: Function which transforms internal game board ‘BOARD’ into ‘TBOARD’, depending on a flag.

SETWPOS: Stores the winning combination in memory.

BLINKRSD: Function used to implement the blinking of a winning combination.

3) Game functions:

CWIN: Function which evaluates the board and returns information about who wins.

CFULL: Function which determines if the 3x3 board ‘BOARD’ is full.

PLAYERMOVE: Function which takes player input and places it on the board.

AIMOVE: Function that plays a move according to the minimax algorithm.

4) Miscellaneous functions:

INIT\_RAM: Function which initialises various RAM locations at the start of each game.

DELAY 10/30/100MS: Functions to implement various delays in milliseconds.

SETSOD: Function which sets the SOD led.

RESETSOD: Function which resets the SOD led.

BLINKSOD: Function which blinks the SOD led.

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MEMORY MAP:

8200-8208H: ‘BOARD’

8100-8108H: ‘BMAP’

8400-8408H: ‘TBOARD’

8300H: ‘COLOURFLAG’

LOOKUP TABLE USED:

‘WINLIST’ : Contains offsets to various winning combinations which have been stored in a manner that adding successive offsets gives the actual offset.