

# The Tacticmaster

Final Project Report

December 10, 2009

E155

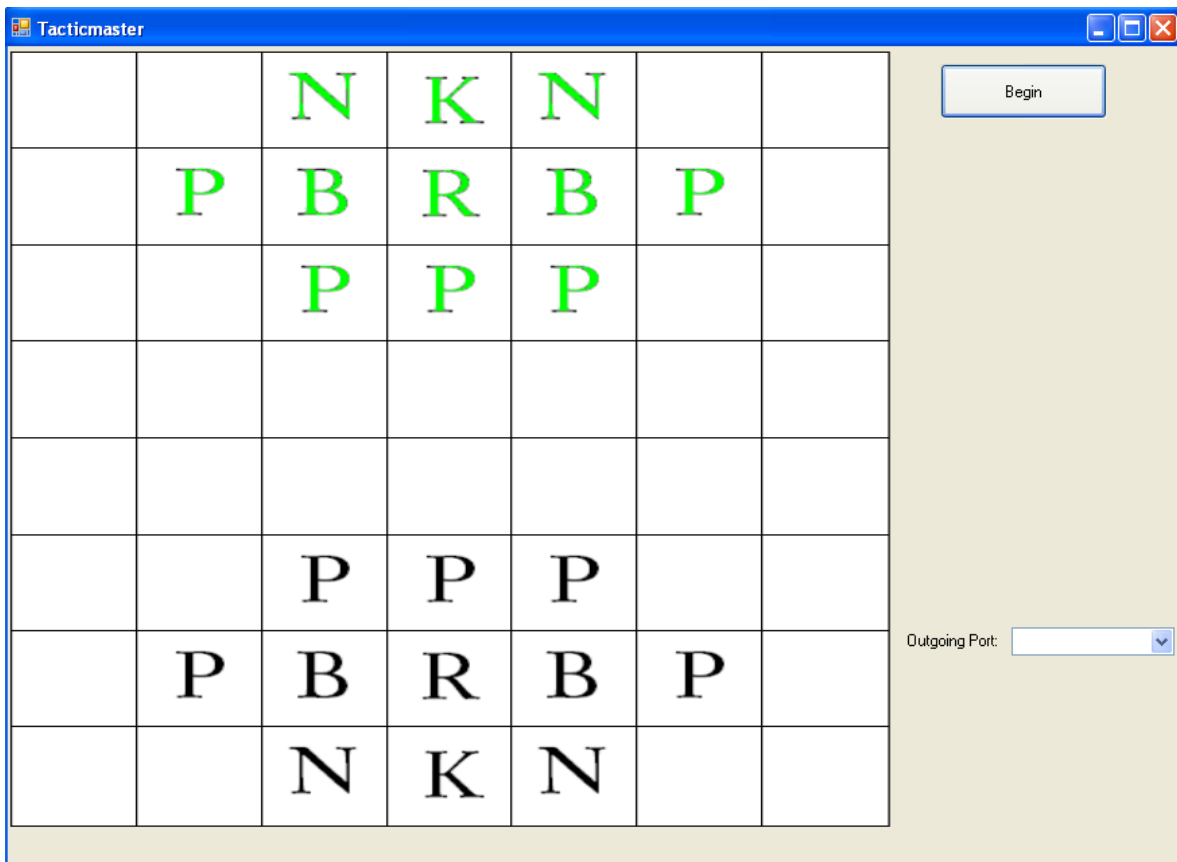
Roger Billingsley

## Abstract:

Tactical video games are a popular pastime among gamers who enjoy the challenge inherent in requiring the skillful utilization of a predetermined configuration of troops in order to achieve victory. This project develops a portable single-player tactical game that uses Bluetooth to communicate between a microprocessor and a PC. A Graphical User Interface (GUI) was developed using Visual Basic, and may be easily run on a PC. The GUI serves two major functions, to display the current setup in the game and to transmit user-inputted instructions via Bluetooth to the microprocessor. On completion of the game, or whenever otherwise desired, the user may reset the game and start over.

## Introduction

The Tacticmaster is a computer game focused on turn-based tactical combat between a human player and an AI, both of whom begin with a preconfigured troop arrangement. The players take turns making moves, with the human player taking the first turn. On a given turn, a player may move with one piece. After moving the piece, the player may also attack with it if any valid targets are within range, or may choose to instead end their turn by defending. The game board is a grid, 7 squares wide and 8 squares high. Each player begins with 5 pawns (P), 2 knights (N), 2 bishops (B), 1 rook (R), and 1 king (K). The initial configuration of the game board is shown in Figure 1, below, where the green pieces are player-controlled and the black ones are computer-controlled.



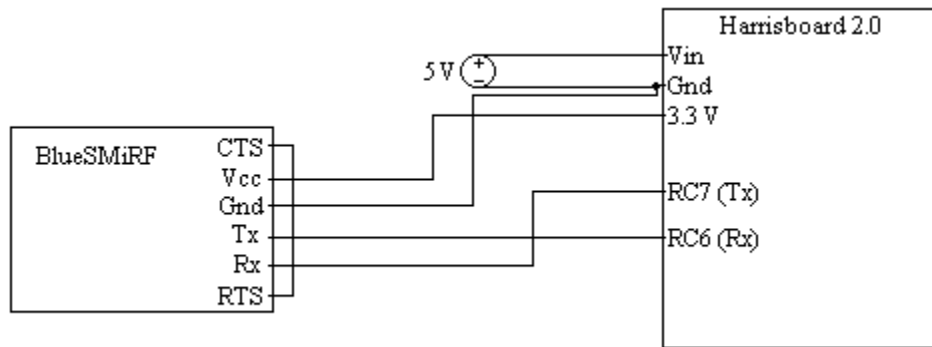
**Figure 1: Initial configuration of game**

This project has two main subsystems: the Graphical User Interface (GUI) on the PC and the game control. The GUI communicates with the Bluetooth module in order to send user input to the PIC, and also receives information from the PIC regarding whether or not the user inputted move is valid and what move was made by the AI, after the AI's turn. Additionally, the GUI uses this information to display the current board configuration. The PIC runs the game itself by checking to see if inputted moves are valid and, if so, updating the locations of the relevant pieces. The PIC also controls the AI, which involves first determining the move to be made and then transmitting it to the GUI as well as internally updating piece locations to reflect the AI's move.



**Figure 2: Block diagram of system**

### Schematic



**Figure 3: The circuit implemented on the breadboard**

As depicted in Figure 3, above, the Harrisboard 2.0 is connected to a 5 volt power supply. The BlueSMiRF is powered using the 3.3 V output from the Harrisboard and grounded using the ground on the Harrisboard. Port RC6 on the Harrisboard, which corresponds to the PIC's Rx port, is connected to the Tx port on the BlueSMiRF, and port

RC7 on the Harrisboard, corresponding to the PIC's Tx port, is connected to the BlueSMiRF's Rx port. The CTS and RTS on the BlueSMiRF are connected to each other, allowing the BlueSMiRF to perform its own handshaking.

## Microcontroller Design

The PIC sends data to the GUI, and receives data from the GUI, using the Bluetooth module and the USART interface. The PIC also runs the code for the game itself, which includes initializing the board setup, checking the validity of user-inputted commands, updating the game to the new configuration if the command is valid, determining and executing the AI's move, and transmitting results to the GUI.

Input to the PIC from the GUI is transmitted as a sequence of three characters, the first corresponding to the type of action being performed and the subsequent two corresponding to the location where this action is being performed. The valid types of actions are selecting a piece at the location, denoted as "S", choosing a location for the previously selected piece to move to, denoted as "M", choosing a location for the piece that was previously moved to attack, denoted as "A", and resetting the game, denoted as "R". The locations are represented as two numbers, with the first number ranging from 1 to 8, inclusive, corresponding to the row in which the selected location resides, and the second number ranging from 1 to 7, inclusive, corresponding to the column in which the selected location resides. For example, the input "S43" can be translated as "select the piece in the fourth row and the third column." The grid with corresponding locations is shown in Figure 4, below.

11	12	13	14	15	16	17
21	22	23	24	25	26	27
31	32	33	34	35	36	37
41	42	43	44	45	46	47
51	52	53	54	55	56	57
61	62	63	64	65	66	67
71	72	73	74	75	76	77
81	82	83	84	85	86	87

**Figure 4: Grid locations**

When the input to the PIC is a select command, i.e. when it begins with an "S", the PIC checks to see if there is a player controlled piece on the corresponding location. If not, then the PIC transmits to the GUI that the player needs to select again; otherwise, it sends the GUI a list of the valid locations that the piece can be moved to as well as that the next command should be where to move the selected piece to.

When the input to the PIC is a move command, the PIC checks to see if the location is both valid and unoccupied. If it isn't, then the PIC transmits that the player should select a different location to move to; otherwise, it updates the piece's location internally and outputs that the next move should be an attack, the location being moved from, the location being moved to, and the type of piece being moved.

When the input to the PIC is an attack command, the PIC first checks to see if it's an attack or a defend command, where the command to defend is represented as an attack at the location "00". If it is a defend command, then the AI's turn begins. Otherwise, the PIC checks if the location being attacked is a valid location for the piece to attack as well as if it is occupied by a computer-controlled piece. If both of these criteria are satisfied then it updates piece information internally and transmits whether or not the piece being attacked was killed, and then the AI's turn begins.

The AI's turn takes place in three stages, similar to the player's turn. First, a piece is selected at random from the available pieces. Next, a location is selected at random from the valid locations that the piece can move to. Lastly, the valid locations that can be attacked from the new position are evaluated, and for those locations that are occupied by a player-controlled piece the value of the attack is determined based on the value of the piece being attacked, with attacks that result in a piece's defeat receiving a much higher value. Once this is done the AI settles upon the location to attack with the highest corresponding value. The PIC then outputs that this is the computer's move, the location that is being selected, the location that is being moved to, the location that is being attacked, and whether or not the piece being attacked is killed.

In the event that the player's king is defeated, the PIC outputs the "Defeat" command. Similarly, if the AI's king is defeated, the PIC outputs the "Victory" command. Additionally, if the PIC receives the reset command, then the information for each piece is set to its initial values.

## Visual Basic Design

The Visual Basic code has several main functions. First, the port being used for Bluetooth communication is selected and configured. A dropdown list is provided so that the user may select the COM port being used by Bluetooth. When the program is launched, the location of the image for each square in the grid is set to the proper locations for when the game is started. Once initialized, the GUI interprets the data sent by the PIC, updates

the game display, and then transmits the user inputted command to the PIC.

When the player clicks on one of the image boxes in the GUI, a command is sent to the PIC by first converting from the image box that the player clicked on to characters representing the location that it corresponds to on the grid, and transmitting it to the PIC preceded by the character corresponding to the type of command that is being issued. At the start of the game the type of command is selecting a piece, and for subsequent orders the type of command is based on the input from the PIC. When interpreting the input from the PIC, the first character corresponds to the type of command that will be sent next. For example, if the last input from the PIC began with "A", then when the user selects a location the GUI will transmit that the player wants to attack the selected location.

If the input from the PIC reads that the next command should be a move command then, for each square that represents a valid location that can be moved to, the image location is changed to its corresponding highlighted image, which is the same as the initial image but with an orange background. If the input from the PIC reads that the next command should be an attack command, then the rest of the input corresponds to the location that should be moved from, the location that should be moved to, and the piece type. The image at the location being moved from is replaced with a blank square, whereas the image at the location being moved to is set to the appropriate image for the player piece, depending on the piece type. Also, the images of any highlighted squares are switched back to blank squares.

If the input from the PIC is the information for the AI's turn, and if the player defeated a piece on their previous turn, then the image for the corresponding location is replaced with a blank square. If the player didn't defeat a piece, then this step is skipped. Next, the image at the location being selected by the AI is replaced with a dark blue box, the image where the piece is being moved to is replaced with the image corresponding to the piece type with a light blue background, and the location being attacked is replaced with the corresponding attacked image. If the piece was killed, this image is a box with a skull and crossbones against a light purple background; otherwise, it's the same as the original piece but with a light purple background. Finally, the type of command for the next output to the PIC is set to be "select". The highlighted images at the locations corresponding to the AI's turn are replaced with normal images the next time the input from the PIC reads that the next command should be a "move" command.

Additionally, there are two buttons which the player may use. The first is the reset

button, which tells the PIC to reset the pieces and then sets the image locations back to their original values. The second is the defend button, which is initially invisible. This button becomes visible when the input from the PIC reads that the next command should be an attack, and goes back to being invisible when the AI's move is received or when the reset button is clicked.

## Results

Overall, this project was successful. The Tacticmaster is playable on any computer with a Bluetooth USB module. The GUI is contained in a small executable file, making this game both portable and easy to run.

One large difficulty that arose early in this project was working with the maximum stack size on the PIC. A stack overflow error in an early iteration of the program was solved by carefully eliminating the usage of unnecessary variables, and by condensing other variables. For example, rather than using an integer to store each location value, two locations may be stored in a single integer by multiplying one of them by a hundred, since each location value falls between 11 and 87. For example, the locations 43 and 87 can be stored as "4387".

The largest difficulty with this project was developing the AI. Code was initially written for a relatively complex AI, using a lot of different criteria to determine the best move. Unfortunately, this code took a very long time to run, largely due to the time required to compute information for every possible move that could be made by the player, and was thus impractical to use. As a result, the AI was drastically simplified, so that piece selection and movement were both determined randomly, and criteria for optimality was only applied in determining the location to attack.



## References

### 1) Wireless Communication

- <http://www3.hmc.edu/~harris/class/e155/lab06.pdf>

### 2) Random Number Generator for the PIC18F

- <http://www.mbeckler.org/coursework/2005-2006/ee2361lab2.pdf>

## Parts List

Name	Quantity	Source	Part Number	Price
BlueSMiRF	1	Lab	WRL-00582	Free

## Appendix A: C Code for the PIC

```
/* tactic1.c
```

```
Written by Roger Billingsley, rbillingsley@hmc.edu
```

```
December 9, 2009
```

```
Harvey Mudd College, E155 Final Project
```

```
C code for the Tacticmaster */
```

```
#include <p18f452.h>
```

```
#include <stdio.h>
```

```
void ISR(void);
```

```
void init(char *type1, int *loc1, int *hp1, int *loc2, int *hp2);
```

```
int AISelect(char *type1, int *loc1, int *hp1, int *loc2, int *hp2);
```

```
char AIIdentify(char *type1, int *loc2, int selLoc);
```

```
int AIMove(char *type1, int *loc1, int *loc2, char pieceType, int selLoc);
```

```
int AIAttack(char *type1, int *loc1, int *hp1, int *loc2, int *hp2, char pieceType, int  
mov2Loc);
```

```
int AICalcAttack(char enemyType, int enemyHp, int pieceDmg);
```

```
int mover(int mLoc1, int mLoc2, int *loc1, char *type1, int *loc2);
```

```
void flashSquares(int mLoc1, int *loc1, char pieceType, int *loc2, int *toFlash);
```

```
int attack (int mLoc1, int mLoc2, int *loc1, char *type1, int *loc2, int *hp2);
```

```
char getcharserial(void);
```

```
void getstrserial(char *buf);
```

```
int checkValid(int mLoc1, int mLoc2, char pieceType, char moveType, int *loc1, int *loc2);
```

```
unsigned int random(void);
```

```
int gameOn = 1;
```

```
int pawn_value = 1;
```

```
int knight_value = 3;
```

```
int bishop_value = 3;
```

```
int rook_value = 5;
```

```

int king_value = 10;

int pawn_dmg = 4;
int knight_dmg = 5;
int bishop_dmg = 5;
int rook_dmg = 10;
int king_dmg = 5;

static unsigned long int SEED_X = 521288629L;
static unsigned long int SEED_Y = 362436069L;

int selLoc, movLoc, atkLoc;
char pieceType;

void main(void) {

    char pieceTypeP1[11]; // Player 1 pieces: Pawn, knight, etc. (Also Player 2
Pieces)
    int pieceLocP1[11]; // Player 1 piece locations
    int pieceHpP1[11]; // Player 1 piece HP
    int pieceLocP2[11]; // Player 2 piece locations
    int pieceHpP2[11]; // Player 2 piece HP
    char move[4]; // Move received
    int valid; // Is choice valid?
    int toFlash[4]; // Squares to flash
    int mLoc1; // Start of move
    int mLoc2; // End of move
    int i; // Variable for for loop
    char pType; // The piece type chosen by the player

```

```

while (1)
{

TRISD = 0;           // LED debugging
PORTD = 0;          // LED debugging
TRISC = 0x80;       // Set RC7 for input, RC6 - RC0 for output
PORTC = 0;          // Initialize PortC as 0
RCSTA = 0x80;       // Set SPEN to enable serial port
PIR1bits.RCIF = 0;  // No input received yet
PIR1bits.TXIF = 0;  // No transmitting yet
TXSTAbits.SYNC = 0; // Asynchronous transmission
TXSTAbits.BRGH = 1; // High speed baud rate
SPBRG = 10;         // Baud rate is approximately 115.2k

if (gameOn == 1)    // Initialize when game is turned on.
{
    init (pieceTypeP1, pieceLocP1, pieceHpP1, pieceLocP2, pieceHpP2);
// Initialize the board
    gameOn = 0;
}

valid = 0;

    getstrserial(move); // Get a string from serial, in the form of "34 A 35" (piece at 34
attacks piece at 35)

    if (move[0] == 'S')
    {
        mLoc1 = ((int)(move[1]-48)*10) + ((int)(move[2]-48)); //

```

Convert location from characters to int

```
    for (i = 0; i < 12; i++)
        if (mLoc1 == pieceLocP1[i])
            {
                valid = 1;
                flashSquares(mLoc1, pieceLocP1,
pieceTypeP1[i], pieceLocP2, toFlash);
                pType = pieceTypeP1[i];
            }
    if (!valid)
        {
            mLoc1 = 0;
            printf("S00"); // Invalid selection, select again
        }
    else // Valid selection
        {
            printf("M%d", mLoc1);
            for (i = 0; i < 4; i++)
                if (toFlash[i])
                    printf("%d",toFlash[i]); // Send
locations to flash
        }
    }
    else if (move[0] == 'M')
        {
            mLoc2 = ((int)(move[1]-48)*10) + ((int)(move[2]-48)); //
Convert location from characters to int
            valid = mover(mLoc1, mLoc2, pieceLocP1, pieceTypeP1,
pieceLocP2); // Check if move is valid

            if (valid)
                {
                    printf("A%d%d%c", mLoc1, mLoc2, pType); //
```

Example: If moving pawn from 11 to 12, print A1112P

```
    }
    else
    {
        printf("M00"); // Invalid selection; move again
    }
}
else if (move[0] == 'A')
{
    mLoc1 = mLoc2; // Attack starts from
end of previous move
    mLoc2 = ((int)(move[1]-48)*10) + ((int)(move[2]-48)); //
Convert location from characters to int
    if ((mLoc2 == 0) && (pieceHpP1[10] > 0) && (pieceHpP2[10]
> 0))
    {
        selLoc = AISelect(pieceTypeP1, pieceLocP1, pieceHpP1,
pieceLocP2, pieceHpP2); // AI selects a piece
        pieceType = AIIdentify(pieceTypeP1, pieceLocP2,
selLoc); // Identify the piece that the AI selected
        movLoc = AIMove(pieceTypeP1, pieceLocP1,
pieceLocP2, pieceType, selLoc); // AI selects a location to move to
        atkLoc = AIAttack(pieceTypeP1, pieceLocP1,
pieceHpP1, pieceLocP2, pieceHpP2, pieceType, movLoc); // AI chooses a valid location
to attack, or defends
        if (movLoc == 0)
            movLoc = selLoc; // Moving to original
location
        printf("CS%dM%dA%d", selLoc, movLoc, atkLoc);
        valid = mover(selLoc, movLoc, pieceLocP2,
pieceTypeP1, pieceLocP1); //Perform the actual moving
and attacking
        valid = attack(movLoc, atkLoc, pieceLocP2,
```

```

pieceTypeP1, pieceLocP1, pieceHpP1); //Perform the actual moving and attacking
    for (i = 0; i < 11; i++)
        {
            if ((atkLoc == pieceLocP1[i] &&
(atkLoc != 0))
                printf("H%d", pieceHpP1[i]);
            // Piece is attacked, but not dead
                }
            printf("%c", pieceType);
        }
    else
        {
            valid = attack(mLoc1, mLoc2, pieceLocP1, pieceTypeP1,
pieceLocP2, pieceHpP2);
            if ((valid) && (pieceHpP1[10] > 0) && (pieceHpP2[10]
> 0))
                {
                    valid = 0;
                    selLoc = AISelect(pieceTypeP1, pieceLocP1,
pieceHpP1, pieceLocP2, pieceHpP2); // AI selects a piece
                    pieceType = AIIdentify(pieceTypeP1,
pieceLocP2, selLoc); // Identify the piece that the AI selected
                    movLoc = AIMove(pieceTypeP1, pieceLocP1,
pieceLocP2, pieceType, selLoc); // AI selects a location to move to
                    atkLoc = AIAttack(pieceTypeP1, pieceLocP1,
pieceHpP1, pieceLocP2, pieceHpP2, pieceType, movLoc); // AI chooses a valid location
to attack, or defends
                    printf("CS%dM%dA%d", selLoc, movLoc,
atkLoc);
                    if (movLoc == 0)
                        movLoc = selLoc; // Moving to
original location
                    for (i = 0; i < 11; i++)

```

```

(atkLoc != 0))
    {
        if ((atkLoc == pieceLocP1[i]) &&
            printf("H%d", pieceHpP1[i]);

            // Piece is attacked, but not dead

            if (mLoc2 == pieceLocP2[i])
                valid = 1;        // Piece is not
dead
    }
    if (!valid)
        printf("L%d", mLoc2);    // Piece at
mLoc2 is dead
        printf("%c", pieceType);
        valid = mover(selLoc, movLoc, pieceLocP2,
pieceTypeP1, pieceLocP1);
        valid = attack(movLoc, atkLoc, pieceLocP2,
pieceTypeP1, pieceLocP1, pieceHpP1);
    }
    else if ((pieceHpP1[10] > 0) && (pieceHpP2[10] > 0))
        {
            printf("A00");
        }
    }
}
else if (move[0] == 'R')        // "RESET"
    {
        init (pieceTypeP1, pieceLocP1, pieceHpP1, pieceLocP2,
pieceHpP2);
    }
else
    printf("INV");              // Invalid input

if ((pieceLocP1[10] == 0))

```



```

        {
            printf("Defeat");          // AI has won
        }
    else if ((pieceLocP2[10] == 0))
    {
        printf("Victory");           // Player has won
    }

}

}

void init(char *type1, int *loc1, int *hp1, int *loc2, int *hp2)    // Initialize the board
to starting positions & values
{
    int pawn_hp = 5;
    int knight_hp = 15;
    int bishop_hp = 10;
    int rook_hp = 30;
    int king_hp = 50;
    int i = 0;

    while (i < 11)
    {
        if (i < 5) // Initialize pawns
        {
            *(type1 + i) = 'P';      // Pawn
            *(hp1 + i) = pawn_hp;    // Pawn HP
            *(hp2 + i) = pawn_hp;    // Pawn HP
            if ((i==0) || (i==4))
            {

```

```

grid
        *(loc1 + i) = 22+i;      // Corresponding location on
grid
        *(loc2 + i) = 72+i;      // Corresponding location on
        }
    else
    {
grid
        *(loc1 + i) = 32+i;      // Corresponding location on
grid
        *(loc2 + i) = 62+i;      // Corresponding location on
        }
    }
else if (i < 7)    // Initialize knights
{
    *(type1 + i) = 'N';          // Knight
    *(hp1 + i) = knight_hp;     // Knight HP
    *(loc1 + i) = 13+2*(i-5); // Corresponding location on grid
    *(hp2 + i) = knight_hp;     // Knight HP
    *(loc2 + i) = 83+2*(i-5); // Corresponding location on grid
}
else if (i < 9)    // Initialize bishops
{
    *(type1 + i) = 'B';          // Bishop
    *(hp1 + i) = bishop_hp;     // Bishop HP
    *(loc1 + i) = 23+2*(i-7); // Corresponding location on grid
    *(hp2 + i) = bishop_hp;     // Bishop HP
    *(loc2 + i) = 73+2*(i-7); // Corresponding location on grid
}
else if (i < 10) // Initialize rooks
{
    *(type1 + i) = 'R';          // Rook
    *(hp1 + i) = rook_hp;       // Rook HP

```

```

        *(loc1 + i) = 24;          // Corresponding location on grid
        *(hp2 + i) = rook_hp;    // Rook HP
        *(loc2 + i) = 74;        // Corresponding location on
grid
    }
    else                          // Initialize kings
    {
        *(type1 + i) = 'K';      // King
        *(hp1 + i) = king_hp;   // King HP
        *(loc1 + i) = 14;       // Corresponding location on grid
        *(hp2 + i) = king_hp;   // King HP
        *(loc2 + i) = 84;       // Corresponding location on
grid
    }
    i++;
}
}

```

```

int mover(int mLoc1, int mLoc2, int *loc1, char *type1, int *loc2) //Move piece from
mLoc1 to mLoc2
{
    int i;
    int isValid = 0; // Invalid if there is no piece on mLoc1.

    for (i = 0; i < 11; i++)
        if (*(loc1+i) == mLoc1)
            {
                isValid = checkValid(mLoc1, mLoc2, *(type1+i), 'M', loc1, loc2);
                if (isValid)
                    *(loc1+i) = mLoc2;
            }
    return isValid;
}

```



```

        if (*(hp2+j) <= bishop_dmg)
            *(loc2+j) = 0;    //
    Location = 0 signifies dead.
    bishop_dmg;
        else
            *(hp2+j) = *(hp2+j) -
    Location = 0 signifies dead.
        else if (*(type1+i) == 'R')
            if (*(hp2+j) <= rook_dmg)
                *(loc2+j) = 0;    //
    Location = 0 signifies dead.
        else
            *(hp2+j) = *(hp2+j) -
    rook_dmg;
        else if (*(type1+i) == 'K')
            if (*(hp2+j) <= king_dmg)
                *(loc2+j) = 0;    //
    Location = 0 signifies dead.
        else
            *(hp2+j) = *(hp2+j) -
    king_dmg;
    }
}
return isValid;
}

```

```

int checkValid(int mLoc1, int mLoc2, char pieceType, char moveType, int *loc1, int *loc2)
    //Check if move or attack is valid
{
    int isValid = 0;
    int i;

    if (moveType == 'M')    // Check if move from mLoc1 to mLoc2 is valid

```

```

        {
            if (mLoc1 != mLoc2)    // If not moving to current location
            {
                if ((pieceType == 'P') || (pieceType == 'B') || (pieceType
== 'K') || (pieceType == 'R')) // Check to make sure move is valid
                    if ((mLoc2 == mLoc1 - 10) || (mLoc2 ==
mLoc1 - 1) || (mLoc2 == mLoc1 + 1) || (mLoc2 == mLoc1 + 10))
                        isValid = 1;
                    else;    // Do nothing
                else if (pieceType == 'N') // Knight
                    if ((mLoc2 == mLoc1 - 21) || (mLoc2 ==
mLoc1 - 12) || (mLoc2 == mLoc1 - 19) || (mLoc2 == mLoc1 - 8) || (mLoc2 == mLoc1 + 8)
|| (mLoc2 == mLoc1 + 12) || (mLoc2 == mLoc1 + 19) || (mLoc2 == mLoc1 + 21))
                        isValid = 1;
                    else;    // Do nothing
                for (i = 0; i < 11; i++)
                    {
                        if ((*loc1+i) == mLoc2) || (*(loc2+i)
== mLoc2))    // Check to see if destination square is occupied
                            isValid = 0;
                    }
            }
            else    // Move to current location is
always valid
                isValid = 1;
        }
    else if (moveType == 'A') // Check if attack from mLoc1 to mLoc2 is valid
    {
        if ((mLoc2 == mLoc1 - 10) || (mLoc2 == mLoc1 + 10) || (mLoc2
== mLoc1 - 1) || (mLoc2 == mLoc1 + 1))
            {
                for (i = 0; i < 11; i++)
                    if (*(loc2+i) == mLoc2)

```

```

        isValid = 1;
    else;
}
else if (pieceType == 'N') // Knights are armed with lances, and
can attack up to 2 squares away
{
    if ((mLoc2 == mLoc1 - 20) || (mLoc2 ==
mLoc1 + 20) || (mLoc2 == mLoc1 - 2) || (mLoc2 == mLoc1 + 2) || (mLoc2 == mLoc1 - 11)
|| (mLoc2 == mLoc1 - 9) || (mLoc2 == mLoc1 + 9) || (mLoc2 == mLoc1 + 11))
        for (i = 0; i < 11; i++)
            if (*(loc2+i) == mLoc2)
                isValid = 1;
            else;
        else;
}
else;
}
else;
return isValid;
}

```

```

void flashSquares(int mLoc1, int *loc1, char pieceType, int *loc2, int *toFlash) //

```

Pick the squares to light up

```

{
    int flash[8]; // Individual locations to flash
    int i;
    int j;

    if (pieceType == 'N')
        {
            flash[0] = mLoc1 - 21;
            flash[1] = mLoc1 - 12;
            flash[2] = mLoc1 - 19;

```

```

        flash[3] = mLoc1 - 8;
        flash[4] = mLoc1 + 8;
        flash[5] = mLoc1 + 12;
        flash[6] = mLoc1 + 19;
        flash[7] = mLoc1 + 21;
    }
else
    {
        flash[0] = mLoc1 - 10;
        flash[1] = mLoc1 - 1;
        flash[2] = mLoc1 + 1;
        flash[3] = mLoc1 + 10;
        flash[4] = 0;
        flash[5] = 0;
        flash[6] = 0;
        flash[7] = 0;
    }
for (i = 0; i < 8; i++)
    {
        for (j = 0; j < 11; j++)
            {
                if ((flash[i] == *(loc1+j)) || (flash[i] == *(loc2+j)))
                    flash[i] = 0;
            }
        if ((flash[i] < 10) || (flash[i] > 88))
            flash[i] = 0;
    }

*(toFlash + 0) = flash[0] + 100*flash[1];
*(toFlash + 1) = flash[2] + 100*flash[3];
*(toFlash + 2) = flash[4] + 100*flash[5];
*(toFlash + 3) = flash[6] + 100*flash[7];

```



```
}
```

```
int AISelect(char *type1, int *loc1, int *hp1, int *loc2, int *hp2) // AI selects a piece
```

```
{
```

```
    int selLoc;
```

```
    int r;
```

```
    int valid;
```

```
    selLoc = 0;
```

```
    // Select a piece
```

```
    while (selLoc == 0)
```

```
    {
```

```
        r = random()%11;
```

```
        if (*(loc1+r) > 0)
```

```
        {
```

```
            selLoc = *(loc2+r);
```

```
        }
```

```
    }
```

```
    return selLoc;
```

```
}
```

```
int AIMove(char *type1, int *loc1, int *loc2, char pieceType, int selLoc) // AI selects a
```

```
location to move to
```

```
{
```

```
    int movLoc;
```

```
    int valid;
```

```
    int movable[8];
```

```
    int r;
```

```
    int i, j;
```

```
    int movMod; // If the modulus of the location being moved to is
```

```
between 1 and 7 (inclusive), then it's valid.
```

```

movLoc = 1;
valid = 1;

if ((pieceType == 'P') || (pieceType == 'B') || (pieceType == 'K') || (pieceType ==
'R'))
    {
        movable[0] = selLoc-10;           // Valid move locations
        movable[1] = selLoc-1;           // Valid move locations
        movable[2] = selLoc+1;           // Valid move locations
        movable[3] = selLoc+10;          // Valid move locations
        movable[4] = 0;
        movable[5] = 0;
        movable[6] = 0;
        movable[7] = 0;
    }
else if (pieceType == 'N')
    {
        movable[0] = selLoc-21;          // Valid move locations
        movable[1] = selLoc-12;          // Valid move locations
        movable[2] = selLoc-19;          // Valid move locations
        movable[3] = selLoc-8;           // Valid move locations
        movable[4] = selLoc+8;           // Valid move locations
        movable[5] = selLoc+12;          // Valid move locations
        movable[6] = selLoc+19;          // Valid move locations
        movable[7] = selLoc+21;          // Valid move locations
    }
for (j = 0; j < 8; j++)
    {
        for (i = 0; i < 11; i++)
            {
                if ((*loc1+i) == movable[j]) ||
(*loc2+i) == movable[j]) // Check to see if destination square is occupied

```

```

movable[j] = 0;
    }
    movMod = movable[j]%10;
    if ((movMod < 1) || (movMod > 7))
        movable[j] = 0;
}
if (!movable[0] && !movable[1] && !movable[2] && !movable[3]
&& !movable[4] && !movable[5] && !movable[6] && !movable[7]) // If the
selected piece can't make any valid moves
    movLoc = selLoc; // If no valid move locations are available, then
don't move
    while (movLoc == 1)
    {
        r = random()%8;
        movMod = movable[r]%10;
        if ((movable[r] > 10) && (movable[r] < 88) && (movMod >= 1) &&
(movMod <= 7)) // If the location is valid to move to
            movLoc = movable[r];
    }
    return movLoc;
}

```

```

int AIAttack(char *type1, int *loc1, int *hp1, int *loc2, int *hp2, char pieceType, int
mov2Loc) // AI chooses a valid location to attack, or defends
{
    // AI choose where to attack from location being moved to

    int k;
    int attackable[12]; // Locations that can be attacked from current move
location by current piece
    int thisAttack;
    int bestAttack;

```

```
int bestAttackLocation; // Corresponding to bestAttack
int pieceDmg;
```

```
pieceDmg = 0;
bestAttack = 0;
bestAttackLocation = 0;
```

```
if (pieceType == 'P')
    pieceDmg = pawn_dmg;
else if (pieceType == 'B')
    pieceDmg = bishop_dmg;
else if (pieceType == 'K')
    pieceDmg = king_dmg;
else if (pieceType == 'R')
    pieceDmg = rook_dmg;
else if (pieceType == 'N')
    pieceDmg = knight_dmg;
```

```
if (pieceType == 'N')
{
    attackable[0] = mov2Loc - 10;
    attackable[1] = mov2Loc - 1;
    attackable[2] = mov2Loc + 1;
    attackable[3] = mov2Loc + 10;
    attackable[4] = mov2Loc - 20;
    attackable[5] = mov2Loc - 2;
    attackable[6] = mov2Loc - 11;
    attackable[7] = mov2Loc - 9;
    attackable[8] = mov2Loc + 2;
    attackable[9] = mov2Loc + 9;
    attackable[10] = mov2Loc + 11;
    attackable[11] = mov2Loc + 20;
```

```

    }
else
    {
        attackable[0] = mov2Loc - 10;
        attackable[1] = mov2Loc - 1;
        attackable[2] = mov2Loc + 1;
        attackable[3] = mov2Loc + 10;
        attackable[4] = 0;
        attackable[5] = 0;
        attackable[6] = 0;
        attackable[7] = 0;
        attackable[8] = 0;
        attackable[9] = 0;
        attackable[10] = 0;
        attackable[11] = 0;
    }
for (k = 0; k < 11; k++)
{
    thisAttack = AICalcAttack(*(type1+k),
*(hp1+k), pieceDmg);
    if (thisAttack >= bestAttack)
    {
        if ((attackable[0] == *(loc1+k)) &&
(attackable[0] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[0];
        }
        else if (attackable[1] == *(loc1+k) &&
(attackable[1] > 0))
        {
            bestAttack = thisAttack;

```

```

        bestAttackLocation =
attackable[1];
    }
    else if (attackable[2] == *(loc1+k) &&
(attackable[2] > 0))
    {
        bestAttack = thisAttack;
        bestAttackLocation =
attackable[2];
    }
    else if (attackable[3] == *(loc1+k) &&
(attackable[3] > 0))
    {
        bestAttack = thisAttack;
        bestAttackLocation =
attackable[3];
    }
    else if (attackable[4] == *(loc1+k) &&
(attackable[4] > 0))
    {
        bestAttack = thisAttack;
        bestAttackLocation =
attackable[4];
    }
    else if (attackable[5] == *(loc1+k) &&
(attackable[5] > 0))
    {
        bestAttack = thisAttack;
        bestAttackLocation =
attackable[5];
    }
    else if (attackable[6] == *(loc1+k) &&
(attackable[6] > 0))

```

```

        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[6];
        }
else if (attackable[7] == *(loc1+k) &&
(attackable[7] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[7];
        }
else if (attackable[8] == *(loc1+k) &&
(attackable[8] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[8];
        }
else if (attackable[9] == *(loc1+k) &&
(attackable[9] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[9];
        }
&& (attackable[10] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[10];
        }

```

```

        else if (attackable[11] == *(loc1+k)
&& (attackable[11] > 0))
        {
            bestAttack = thisAttack;
            bestAttackLocation =
attackable[11];
        }
    }
    return bestAttackLocation;
}

```

```

char AIIdentify(char *type1, int *loc2, int selLoc) // Identify the piece that the AI selected
{
    char identity = 'U';
    int i;

    for (i = 0; i < 11; i++)
        if (*(loc2+i) == selLoc)
            identity = *(type1+i);
    return identity;
}

```

```

void getstrserial(char *buf)
{
    char temp; // For holding input from serial
    int i; // Character number

    i = 0; // Initially 0 characters
    temp = getcharserial(); // Get the first character from serial
}

```



```

while ((temp != '\0') && (i < 3)) // store up to 3 characters
{
    *(buf + i) = temp;          // Store it in memory at location (buf + i)
    temp = getcharserial();    // Get the next character
    i++;                       // Increment for location of next character
}
}

int AICalcAttack(char enemyType, int enemyHp, int pieceDmg)
{
    int calcAttack;

    if (enemyHp < pieceDmg) // If the attack would kill the piece,
multiply "value" of the attack by 50
        if (enemyType == 'P')
            calcAttack = 50 * pawn_value * pieceDmg;
        else if (enemyType == 'N')
            calcAttack = 50 * knight_value * pieceDmg;
        else if (enemyType == 'B')
            calcAttack = 50 * bishop_value * pieceDmg;
        else if (enemyType == 'R')
            calcAttack = 50 * rook_value * pieceDmg;
        else if (enemyType == 'K')
            calcAttack = 50 * king_value * pieceDmg;
        else
            calcAttack = 0; // This shouldn't happen, but if it does count it
as 0.
    else
        if (enemyType == 'P')
            calcAttack = pawn_value * pieceDmg;
        else if (enemyType == 'N')
            calcAttack = knight_value * pieceDmg;
        else if (enemyType == 'B')

```

```

        calcAttack = bishop_value * pieceDmg;
    else if (enemyType == 'R')
        calcAttack = rook_value * pieceDmg;
    else if (enemyType == 'K')
        calcAttack = king_value * pieceDmg;
    else
        calcAttack = 0; // This shouldn't happen, but if it does count it
as 0.
    return calcAttack;
}

```

```

char getcharserial(void) { // For receiving serial input
    RCSTAbits.CREN = 1;           // Enable receiver.
    while (PIR1bits.RCIF == 0);   // Do nothing until input is completely received
    RCSTAbits.CREN = 0;           // Stop receiving.
    PORTD = RCREG;                 // LED debugging
    return RCREG;                 // Return RCREG (input recieved)
(automatically sets RCIF to zero)
}

```

```

unsigned int random(void) // Random number generator from
http://www.mbeckler.org/coursework/2005-2006/ee2361lab2.pdf
{
    static unsigned int a = 18000, b = 30903;
    SEED_X = a*(SEED_X&65535) + (SEED_X>>16);
    SEED_Y = b*(SEED_Y&65535) + (SEED_Y>>16);
    return ((SEED_X&65535) + (SEED_Y&65535))/2;
}

```

## Appendix B: Visual Basic Code

```
Public Class TacticGUI
    Dim inputType As String
    Dim pieceType As String
    Dim toFlash(0 To 8) As String
    Dim toMove(0 To 1) As String
    Dim AILocs(0 To 3) As String
    Dim hp1 As Integer
    Dim hp2 As Integer
    Dim toKill As String

    Private Sub TacticGUI_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
        inputType = "S"           'S for "Select" - first command should be to
select piece

        SerialPort1.PortName = "COM71" 'Outgoing COM port
        SerialPort1.BaudRate = 9600
        SerialPort1.Parity = IO.Ports.Parity.None
        SerialPort1.DataBits = 8
        SerialPort1.StopBits = IO.Ports.StopBits.One
        SerialPort1.Handshake = IO.Ports.Handshake.None
        SerialPort1.RtsEnable = True
        SerialPort1.Open()

        For i As Integer = 1 To 100
            Me.outPort.Items.Add("COM" & i.ToString)
        Next
        Defend.Visible = False

        Reset.Text = "Begin"
    End Sub
```

```
Private Sub Reset_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Reset.Click
    SerialPort1.Write("R")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("0")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("0")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(100)
    inputType = "S"
    AILocs(0) = ""
    AILocs(1) = ""
    AILocs(2) = ""
    toMove(0) = ""
    toMove(1) = ""
    toFlash(0) = ""
    toFlash(1) = ""
    toFlash(2) = ""
    toFlash(3) = ""
    toFlash(4) = ""
    toFlash(5) = ""
    toFlash(6) = ""
    toFlash(7) = ""
    toFlash(8) = ""

    PictureBox7.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"

    PictureBox6.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"

    PictureBox5.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp"
```

PictureBox4.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerKing.bmp"

PictureBox3.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerKnight.bmp"

PictureBox2.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox1.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox8.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox9.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerPawn.bmp"

PictureBox10.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerBishop.bmp"

PictureBox11.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerRook.bmp"

PictureBox12.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerBishop.bmp"

PictureBox13.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerPawn.bmp"

PictureBox14.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox15.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox16.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox17.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerPawn.bmp"

PictureBox18.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerPawn.bmp"

PictureBox19.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PlayerPawn.bmp"

PictureBox20.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox21.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox22.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox23.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox24.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox25.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox26.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox27.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox28.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox29.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox30.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox31.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox32.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox33.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox34.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox35.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox36.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox37.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox38.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PawnSquare.bmp"

PictureBox39.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PawnSquare.bmp"

PictureBox40.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PawnSquare.bmp"

PictureBox41.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox42.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox43.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox44.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PawnSquare.bmp"

PictureBox45.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BishopSquare.bmp"

PictureBox46.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\RookSquare.bmp"

PictureBox47.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BishopSquare.bmp"

PictureBox48.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\PawnSquare.bmp"

PictureBox49.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox50.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

PictureBox51.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"

```
    PictureBox52.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\KnightSquare.bmp"
```

```
    PictureBox53.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\KingSquare.bmp"
```

```
    PictureBox54.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\KnightSquare.bmp"
```

```
    PictureBox55.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"
```

```
    PictureBox56.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\BlankSquare.bmp"
```

```
    Reset.Text = "Reset"
```

```
End Sub
```

```
Private Sub Defend_Click(ByVal sender As System.Object, ByVal e As  
System.EventArgs) Handles Defend.Click
```

```
    SerialPort1.Write("A")
```

```
    System.Threading.Thread.Sleep(100)
```

```
    SerialPort1.Write("0")
```

```
    System.Threading.Thread.Sleep(100)
```

```
    SerialPort1.Write("0")
```

```
    System.Threading.Thread.Sleep(100)
```

```
    SerialPort1.Write(vbCr)
```

```
    System.Threading.Thread.Sleep(500)
```

```
    nextMove(SerialPort1.ReadExisting)
```

```
End Sub
```

```
Private Sub nextMove(ByVal inStr As String)
```

```
    If (Len(inStr) > 1) Then
```

```
        inputType = inStr.Substring(0, 1)
```

```
        If (inputType = "I") Then
```

```
            inputType = "S"
```

```
        End If
```



```

End If
If (inputType = "M") Then
    For i As Integer = 1 To 9
        If (Len(inStr) > 2 * i) Then
            toFlash(i - 1) = inStr.Substring(2 * i - 1, 2)
        ElseIf (inStr.Substring(1, 2) = "00") Then
        Else
            toFlash(i - 1) = ""
        End If
    Next
ElseIf (inputType = "A") Then
    For i As Integer = 1 To 2
        If (Len(inStr) > 2 * i) Then
            toMove(i - 1) = inStr.Substring(2 * i - 1, 2)
        Else
            toMove(i - 1) = ""
        End If
    Next
ElseIf (inputType = "C") Then
    hp2 = inStr.IndexOf("L")      ' Location of computer piece's
remaining HP
    If (hp2 > 0) Then
        If (Len(inStr) >= hp2 + 3) Then
            toKill = inStr.Substring(hp2 + 1, 2)
        Else
            toKill = inStr.Substring(hp2 + 1, 1)
        End If
        dead(toKill)
    End If
End If
If (inputType = "M") Then ' flash locations
    AIClear(AILocs(0), AILocs(1), AILocs(2))
    flashPiece(toFlash(0))

```

```
flashSquare(toFlash(1))
flashSquare(toFlash(2))
flashSquare(toFlash(3))
flashSquare(toFlash(4))
flashSquare(toFlash(5))
flashSquare(toFlash(6))
flashSquare(toFlash(7))
flashSquare(toFlash(8))
AILocs(0) = ""
AILocs(1) = ""
AILocs(2) = ""
```

```
ElseIf (inputType = "A") Then
```

```
    pieceType = Microsoft.VisualBasic.Right(inStr, 1)
    unFlashSquare(toFlash(1))
    unFlashSquare(toFlash(2))
    unFlashSquare(toFlash(3))
    unFlashSquare(toFlash(4))
    unFlashSquare(toFlash(5))
    unFlashSquare(toFlash(6))
    unFlashSquare(toFlash(7))
    unFlashSquare(toFlash(8))
    swapLocation(toMove(0), toMove(1), pieceType)
```

```
ElseIf (inputType = "C") Then
```

```
    pieceType = Microsoft.VisualBasic.Right(inStr, 1)
    AILocs(0) = inStr.Substring(2, 2)
    AILocs(1) = inStr.Substring(5, 2)
    AISwap(AILocs(0), AILocs(1), pieceType)
    If (Len(inStr) >= 10) Then
        AILocs(2) = inStr.Substring(8, 2)
    End If
    hp1 = inStr.IndexOf("H")
    If (hp1 > 0) Then
        AISetAttacked(AILocs(2))
```

```

        ElseIf (hp1 < 0) Then
            AISetSkull(AILocs(2))
        End If
        inputType = "S"
    End If

    If (inputType = "A") Then
        Defend.Visible = True
    Else
        Defend.Visible = False
    End If

    If (inStr.IndexOf("Victory") >= 0) Then
        MsgBox("Victory!")
    ElseIf (inStr.IndexOf("Defeat") >= 0) Then
        MsgBox("Defeat!")
    End If
End Sub

```

```

#Region "Boxclicks"

```

```

    Private Sub PictureBox1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox1.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

```

```
Private Sub PictureBox2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox2.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("1")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("6")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox3_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox3.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("1")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("5")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox4_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox4.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("1")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
```

```

        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox5_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox5.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox6_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox6.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox7_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox7.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)

```

```

        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox8_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox8.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox9_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox9.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox10_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox10.Click
        SerialPort1.Write(inputType)

```

```
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox11_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox11.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox12_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox12.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub
```

```
Private Sub PictureBox13_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox13.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("2")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("2")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox14_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox14.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("2")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("1")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox15_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox15.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("3")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("7")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
```



```
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox16_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox16.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox17_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox17.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox18_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox18.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
```

```

        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox19_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox19.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox20_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox20.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox21_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox21.Click
        SerialPort1.Write(inputType)

```

```
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox22_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox22.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox23_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox23.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub
```

```
Private Sub PictureBox24_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox24.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("5")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox25_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox25.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox26_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox26.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("3")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
```

```
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox27_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox27.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox28_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox28.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox29_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox29.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
```

```

        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox30_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox30.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox31_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox31.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox32_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox32.Click
        SerialPort1.Write(inputType)

```

```
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
End Sub

Private Sub PictureBox33_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox33.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("5")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("3")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub

Private Sub PictureBox34_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox34.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("5")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("2")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox35_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox35.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("5")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("1")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox36_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox36.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("6")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("7")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox37_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox37.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("6")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("6")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
```



```
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox38_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox38.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox39_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox39.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox40_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox40.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
```

```

        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox41_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox41.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox42_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox42.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox43_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox43.Click
        SerialPort1.Write(inputType)

```

```

        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox44_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox44.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox45_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox45.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

```

```
Private Sub PictureBox46_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox46.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("7")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("4")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox47_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox47.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("7")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("3")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
    System.Threading.Thread.Sleep(500)
    nextMove(SerialPort1.ReadExisting)
End Sub
```

```
Private Sub PictureBox48_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox48.Click
    SerialPort1.Write(inputType)
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("7")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write("2")
    System.Threading.Thread.Sleep(100)
    SerialPort1.Write(vbCr)
```

```
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox49_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox49.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox50_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox50.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("7")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox51_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox51.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
```

```

        SerialPort1.Write("6")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox52_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox52.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("5")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox53_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox53.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("4")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox54_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox54.Click
        SerialPort1.Write(inputType)

```

```
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("3")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox55_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox55.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("2")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub

    Private Sub PictureBox56_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox56.Click
        SerialPort1.Write(inputType)
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("8")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write("1")
        System.Threading.Thread.Sleep(100)
        SerialPort1.Write(vbCr)
        System.Threading.Thread.Sleep(500)
        nextMove(SerialPort1.ReadExisting)
    End Sub
```

```
#End Region
```

```
Private Sub swapLocation(ByVal loc1 As String, ByVal loc2 As String, ByVal  
pType As String)
```

```
Dim pic1 As PictureBox
```

```
Dim pic2 As PictureBox
```

```
pic1 = PictureBox1
```

```
pic2 = PictureBox1
```

```
If (loc1 = "17") Then
```

```
pic1 = PictureBox1
```

```
ElseIf (loc1 = "16") Then
```

```
pic1 = PictureBox2
```

```
ElseIf (loc1 = "15") Then
```

```
pic1 = PictureBox3
```

```
ElseIf (loc1 = "14") Then
```

```
pic1 = PictureBox4
```

```
ElseIf (loc1 = "13") Then
```

```
pic1 = PictureBox5
```

```
ElseIf (loc1 = "12") Then
```

```
pic1 = PictureBox6
```

```
ElseIf (loc1 = "11") Then
```

```
pic1 = PictureBox7
```

```
ElseIf (loc1 = "27") Then
```

```
pic1 = PictureBox8
```

```
ElseIf (loc1 = "26") Then
```

```
pic1 = PictureBox9
```

```
ElseIf (loc1 = "25") Then
```

```
pic1 = PictureBox10
```

```
ElseIf (loc1 = "24") Then
```

```
pic1 = PictureBox11
```



```
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
```

```
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
```

```
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If
```

```
If (loc2 = "17") Then
    pic2 = PictureBox1
ElseIf (loc2 = "16") Then
    pic2 = PictureBox2
ElseIf (loc2 = "15") Then
    pic2 = PictureBox3
ElseIf (loc2 = "14") Then
```

```
pic2 = PictureBox4
ElseIf (loc2 = "13") Then
    pic2 = PictureBox5
ElseIf (loc2 = "12") Then
    pic2 = PictureBox6
ElseIf (loc2 = "11") Then
    pic2 = PictureBox7
ElseIf (loc2 = "27") Then
    pic2 = PictureBox8
ElseIf (loc2 = "26") Then
    pic2 = PictureBox9
ElseIf (loc2 = "25") Then
    pic2 = PictureBox10
ElseIf (loc2 = "24") Then
    pic2 = PictureBox11
ElseIf (loc2 = "23") Then
    pic2 = PictureBox12
ElseIf (loc2 = "22") Then
    pic2 = PictureBox13
ElseIf (loc2 = "21") Then
    pic2 = PictureBox14
ElseIf (loc2 = "37") Then
    pic2 = PictureBox15
ElseIf (loc2 = "36") Then
    pic2 = PictureBox16
ElseIf (loc2 = "35") Then
    pic2 = PictureBox17
ElseIf (loc2 = "34") Then
    pic2 = PictureBox18
ElseIf (loc2 = "33") Then
    pic2 = PictureBox19
ElseIf (loc2 = "32") Then
    pic2 = PictureBox20
```

```
ElseIf (loc2 = "31") Then
    pic2 = PictureBox21
ElseIf (loc2 = "47") Then
    pic2 = PictureBox22
ElseIf (loc2 = "46") Then
    pic2 = PictureBox23
ElseIf (loc2 = "45") Then
    pic2 = PictureBox24
ElseIf (loc2 = "44") Then
    pic2 = PictureBox25
ElseIf (loc2 = "43") Then
    pic2 = PictureBox26
ElseIf (loc2 = "42") Then
    pic2 = PictureBox27
ElseIf (loc2 = "41") Then
    pic2 = PictureBox28
ElseIf (loc2 = "57") Then
    pic2 = PictureBox29
ElseIf (loc2 = "56") Then
    pic2 = PictureBox30
ElseIf (loc2 = "55") Then
    pic2 = PictureBox31
ElseIf (loc2 = "54") Then
    pic2 = PictureBox32
ElseIf (loc2 = "53") Then
    pic2 = PictureBox33
ElseIf (loc2 = "52") Then
    pic2 = PictureBox34
ElseIf (loc2 = "51") Then
    pic2 = PictureBox35
ElseIf (loc2 = "67") Then
    pic2 = PictureBox36
ElseIf (loc2 = "66") Then
```

```
    pic2 = PictureBox37
ElseIf (loc2 = "65") Then
    pic2 = PictureBox38
ElseIf (loc2 = "64") Then
    pic2 = PictureBox39
ElseIf (loc2 = "63") Then
    pic2 = PictureBox40
ElseIf (loc2 = "62") Then
    pic2 = PictureBox41
ElseIf (loc2 = "61") Then
    pic2 = PictureBox42
ElseIf (loc2 = "77") Then
    pic2 = PictureBox43
ElseIf (loc2 = "76") Then
    pic2 = PictureBox44
ElseIf (loc2 = "75") Then
    pic2 = PictureBox45
ElseIf (loc2 = "74") Then
    pic2 = PictureBox46
ElseIf (loc2 = "73") Then
    pic2 = PictureBox47
ElseIf (loc2 = "72") Then
    pic2 = PictureBox48
ElseIf (loc2 = "71") Then
    pic2 = PictureBox49
ElseIf (loc2 = "87") Then
    pic2 = PictureBox50
ElseIf (loc2 = "86") Then
    pic2 = PictureBox51
ElseIf (loc2 = "85") Then
    pic2 = PictureBox52
ElseIf (loc2 = "84") Then
    pic2 = PictureBox53
```

```
ElseIf (loc2 = "83") Then
    pic2 = PictureBox54
ElseIf (loc2 = "82") Then
    pic2 = PictureBox55
ElseIf (loc2 = "81") Then
    pic2 = PictureBox56
End If

If (loc2 = loc1) Then
    If (pType = "P") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerPawn.bmp"
    ElseIf (pType = "N") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp"
    ElseIf (pType = "B") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerBishop.bmp"
    ElseIf (pType = "R") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerRook.bmp"
    ElseIf (pType = "K") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKing.bmp"
    End If
Else
    If (pType = "P") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerPawn.bmp"
    ElseIf (pType = "N") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp"
    ElseIf (pType = "B") Then
```

```

        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerBishop.bmp"
        ElseIf (pType = "R") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerRook.bmp"
        ElseIf (pType = "K") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKing.bmp"
        End If
        pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"
    End If
End Sub
Private Sub flashSquare(ByVal loc1 As String)
    Dim pic1 As PictureBox
    pic1 = PictureBox57

    If (loc1 = "17") Then
        pic1 = PictureBox1
    ElseIf (loc1 = "16") Then
        pic1 = PictureBox2
    ElseIf (loc1 = "15") Then
        pic1 = PictureBox3
    ElseIf (loc1 = "14") Then
        pic1 = PictureBox4
    ElseIf (loc1 = "13") Then
        pic1 = PictureBox5
    ElseIf (loc1 = "12") Then
        pic1 = PictureBox6
    ElseIf (loc1 = "11") Then
        pic1 = PictureBox7
    ElseIf (loc1 = "27") Then
        pic1 = PictureBox8
    End If
End Sub

```



```
ElseIf (loc1 = "26") Then
    pic1 = PictureBox9
ElseIf (loc1 = "25") Then
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
```

```
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
```

```
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If
```

```
pic1.ImageLocation = "H:\e155\TacticMaster\Pics from  
PC\Images\FlashingSquare.bmp"
```

```
End Sub

Private Sub unFlashSquare(ByVal loc1 As String)
    Dim pic1 As PictureBox
    pic1 = PictureBox57

    If (loc1 = "17") Then
        pic1 = PictureBox1
    ElseIf (loc1 = "16") Then
        pic1 = PictureBox2
    ElseIf (loc1 = "15") Then
        pic1 = PictureBox3
    ElseIf (loc1 = "14") Then
        pic1 = PictureBox4
    ElseIf (loc1 = "13") Then
        pic1 = PictureBox5
    ElseIf (loc1 = "12") Then
        pic1 = PictureBox6
    ElseIf (loc1 = "11") Then
        pic1 = PictureBox7
    ElseIf (loc1 = "27") Then
        pic1 = PictureBox8
    ElseIf (loc1 = "26") Then
        pic1 = PictureBox9
    ElseIf (loc1 = "25") Then
        pic1 = PictureBox10
    ElseIf (loc1 = "24") Then
        pic1 = PictureBox11
    ElseIf (loc1 = "23") Then
        pic1 = PictureBox12
    ElseIf (loc1 = "22") Then
        pic1 = PictureBox13
    ElseIf (loc1 = "21") Then
        pic1 = PictureBox14
    End If
End Sub
```

```
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
```

```
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
```

```

ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If

If (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingSquare.bmp") Then
    pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"
End If

End Sub

Private Sub dead(ByVal loc1 As String)
    Dim pic1 As PictureBox
    pic1 = PictureBox57

    If (loc1 = "17") Then
        pic1 = PictureBox1
    ElseIf (loc1 = "16") Then
        pic1 = PictureBox2
    
```

```
ElseIf (loc1 = "15") Then
    pic1 = PictureBox3
ElseIf (loc1 = "14") Then
    pic1 = PictureBox4
ElseIf (loc1 = "13") Then
    pic1 = PictureBox5
ElseIf (loc1 = "12") Then
    pic1 = PictureBox6
ElseIf (loc1 = "11") Then
    pic1 = PictureBox7
ElseIf (loc1 = "27") Then
    pic1 = PictureBox8
ElseIf (loc1 = "26") Then
    pic1 = PictureBox9
ElseIf (loc1 = "25") Then
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
```



```
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
```

```
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
```

```
        pic1 = PictureBox52
    ElseIf (loc1 = "84") Then
        pic1 = PictureBox53
    ElseIf (loc1 = "83") Then
        pic1 = PictureBox54
    ElseIf (loc1 = "82") Then
        pic1 = PictureBox55
    ElseIf (loc1 = "81") Then
        pic1 = PictureBox56
    End If

    pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"
```

```
End Sub
```

```
Private Sub flashPiece(ByVal loc1 As String)
```

```
    Dim pic1 As PictureBox
```

```
    pic1 = PictureBox57
```

```
    If (loc1 = "17") Then
```

```
        pic1 = PictureBox1
```

```
    ElseIf (loc1 = "16") Then
```

```
        pic1 = PictureBox2
```

```
    ElseIf (loc1 = "15") Then
```

```
        pic1 = PictureBox3
```

```
    ElseIf (loc1 = "14") Then
```

```
        pic1 = PictureBox4
```

```
    ElseIf (loc1 = "13") Then
```

```
        pic1 = PictureBox5
```

```
    ElseIf (loc1 = "12") Then
```

```
        pic1 = PictureBox6
```

```
    ElseIf (loc1 = "11") Then
```

```
        pic1 = PictureBox7
```

```
ElseIf (loc1 = "27") Then
    pic1 = PictureBox8
ElseIf (loc1 = "26") Then
    pic1 = PictureBox9
ElseIf (loc1 = "25") Then
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
```

```
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
```

```
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If
```

```

        If (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerPawn.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingPawn.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingKnight.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerBishop.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingBishop.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerRook.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingRook.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKing.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\FlashingKing.bmp"
        End If
    End Sub

    Private Sub AISwap(ByVal loc1 As String, ByVal loc2 As String, ByVal pType
As String)
        Dim pic1 As PictureBox
        Dim pic2 As PictureBox
        pic1 = PictureBox57
        pic2 = PictureBox57

        If (loc1 = "17") Then
            pic1 = PictureBox1
        ElseIf (loc1 = "16") Then

```

```
    pic1 = PictureBox2
ElseIf (loc1 = "15") Then
    pic1 = PictureBox3
ElseIf (loc1 = "14") Then
    pic1 = PictureBox4
ElseIf (loc1 = "13") Then
    pic1 = PictureBox5
ElseIf (loc1 = "12") Then
    pic1 = PictureBox6
ElseIf (loc1 = "11") Then
    pic1 = PictureBox7
ElseIf (loc1 = "27") Then
    pic1 = PictureBox8
ElseIf (loc1 = "26") Then
    pic1 = PictureBox9
ElseIf (loc1 = "25") Then
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
```



```
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
```

```
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
```

```
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If
```

```
If (loc2 = "17") Then
    pic2 = PictureBox1
ElseIf (loc2 = "16") Then
    pic2 = PictureBox2
ElseIf (loc2 = "15") Then
    pic2 = PictureBox3
ElseIf (loc2 = "14") Then
    pic2 = PictureBox4
ElseIf (loc2 = "13") Then
    pic2 = PictureBox5
ElseIf (loc2 = "12") Then
    pic2 = PictureBox6
ElseIf (loc2 = "11") Then
    pic2 = PictureBox7
ElseIf (loc2 = "27") Then
    pic2 = PictureBox8
ElseIf (loc2 = "26") Then
    pic2 = PictureBox9
ElseIf (loc2 = "25") Then
    pic2 = PictureBox10
ElseIf (loc2 = "24") Then
```

```
    pic2 = PictureBox11
ElseIf (loc2 = "23") Then
    pic2 = PictureBox12
ElseIf (loc2 = "22") Then
    pic2 = PictureBox13
ElseIf (loc2 = "21") Then
    pic2 = PictureBox14
ElseIf (loc2 = "37") Then
    pic2 = PictureBox15
ElseIf (loc2 = "36") Then
    pic2 = PictureBox16
ElseIf (loc2 = "35") Then
    pic2 = PictureBox17
ElseIf (loc2 = "34") Then
    pic2 = PictureBox18
ElseIf (loc2 = "33") Then
    pic2 = PictureBox19
ElseIf (loc2 = "32") Then
    pic2 = PictureBox20
ElseIf (loc2 = "31") Then
    pic2 = PictureBox21
ElseIf (loc2 = "47") Then
    pic2 = PictureBox22
ElseIf (loc2 = "46") Then
    pic2 = PictureBox23
ElseIf (loc2 = "45") Then
    pic2 = PictureBox24
ElseIf (loc2 = "44") Then
    pic2 = PictureBox25
ElseIf (loc2 = "43") Then
    pic2 = PictureBox26
ElseIf (loc2 = "42") Then
    pic2 = PictureBox27
```

```
ElseIf (loc2 = "41") Then
    pic2 = PictureBox28
ElseIf (loc2 = "57") Then
    pic2 = PictureBox29
ElseIf (loc2 = "56") Then
    pic2 = PictureBox30
ElseIf (loc2 = "55") Then
    pic2 = PictureBox31
ElseIf (loc2 = "54") Then
    pic2 = PictureBox32
ElseIf (loc2 = "53") Then
    pic2 = PictureBox33
ElseIf (loc2 = "52") Then
    pic2 = PictureBox34
ElseIf (loc2 = "51") Then
    pic2 = PictureBox35
ElseIf (loc2 = "67") Then
    pic2 = PictureBox36
ElseIf (loc2 = "66") Then
    pic2 = PictureBox37
ElseIf (loc2 = "65") Then
    pic2 = PictureBox38
ElseIf (loc2 = "64") Then
    pic2 = PictureBox39
ElseIf (loc2 = "63") Then
    pic2 = PictureBox40
ElseIf (loc2 = "62") Then
    pic2 = PictureBox41
ElseIf (loc2 = "61") Then
    pic2 = PictureBox42
ElseIf (loc2 = "77") Then
    pic2 = PictureBox43
ElseIf (loc2 = "76") Then
```

```
    pic2 = PictureBox44
ElseIf (loc2 = "75") Then
    pic2 = PictureBox45
ElseIf (loc2 = "74") Then
    pic2 = PictureBox46
ElseIf (loc2 = "73") Then
    pic2 = PictureBox47
ElseIf (loc2 = "72") Then
    pic2 = PictureBox48
ElseIf (loc2 = "71") Then
    pic2 = PictureBox49
ElseIf (loc2 = "87") Then
    pic2 = PictureBox50
ElseIf (loc2 = "86") Then
    pic2 = PictureBox51
ElseIf (loc2 = "85") Then
    pic2 = PictureBox52
ElseIf (loc2 = "84") Then
    pic2 = PictureBox53
ElseIf (loc2 = "83") Then
    pic2 = PictureBox54
ElseIf (loc2 = "82") Then
    pic2 = PictureBox55
ElseIf (loc2 = "81") Then
    pic2 = PictureBox56
End If

If (loc2 = loc1) Then
    If (pType = "P") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BluePawn.bmp"
    ElseIf (pType = "N") Then
```

```
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKnight.bmp"
    ElseIf (pType = "B") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueBishop.bmp"
    ElseIf (pType = "R") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueRook.bmp"
    ElseIf (pType = "K") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKing.bmp"
    End If
Else
    If (pType = "P") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BluePawn.bmp"
    ElseIf (pType = "N") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKnight.bmp"
    ElseIf (pType = "B") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueBishop.bmp"
    ElseIf (pType = "R") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueRook.bmp"
    ElseIf (pType = "K") Then
        pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKing.bmp"
    End If
    If (loc2 = "0A") Then
    Else
        pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueSquare.bmp"
```

```
        End If
    End If
End Sub
Private Sub AISetAttacked(ByVal loc1 As String)
    Dim pic1 As PictureBox
    pic1 = PictureBox57

    If (loc1 = "17") Then
        pic1 = PictureBox1
    ElseIf (loc1 = "16") Then
        pic1 = PictureBox2
    ElseIf (loc1 = "15") Then
        pic1 = PictureBox3
    ElseIf (loc1 = "14") Then
        pic1 = PictureBox4
    ElseIf (loc1 = "13") Then
        pic1 = PictureBox5
    ElseIf (loc1 = "12") Then
        pic1 = PictureBox6
    ElseIf (loc1 = "11") Then
        pic1 = PictureBox7
    ElseIf (loc1 = "27") Then
        pic1 = PictureBox8
    ElseIf (loc1 = "26") Then
        pic1 = PictureBox9
    ElseIf (loc1 = "25") Then
        pic1 = PictureBox10
    ElseIf (loc1 = "24") Then
        pic1 = PictureBox11
    ElseIf (loc1 = "23") Then
        pic1 = PictureBox12
    ElseIf (loc1 = "22") Then
        pic1 = PictureBox13
    End If
End Sub
```



```
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
```

```
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
```

```
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If

If (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerPawn.bmp") Then
    pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedPawn.bmp"
    ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp") Then
        pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedKnight.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerBishop.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedBishop.bmp"
```

```

        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerRook.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedRook.bmp"
        ElseIf (pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKing.bmp") Then
            pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedKing.bmp"
        End If
    End Sub
Private Sub AISetSkull(ByVal loc1 As String)
    Dim pic1 As PictureBox
    pic1 = PictureBox57

    If (loc1 = "17") Then
        pic1 = PictureBox1
    ElseIf (loc1 = "16") Then
        pic1 = PictureBox2
    ElseIf (loc1 = "15") Then
        pic1 = PictureBox3
    ElseIf (loc1 = "14") Then
        pic1 = PictureBox4
    ElseIf (loc1 = "13") Then
        pic1 = PictureBox5
    ElseIf (loc1 = "12") Then
        pic1 = PictureBox6
    ElseIf (loc1 = "11") Then
        pic1 = PictureBox7
    ElseIf (loc1 = "27") Then
        pic1 = PictureBox8
    ElseIf (loc1 = "26") Then
        pic1 = PictureBox9
    ElseIf (loc1 = "25") Then

```

```
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
```

```
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
```

```
        pic1 = PictureBox43
    ElseIf (loc1 = "76") Then
        pic1 = PictureBox44
    ElseIf (loc1 = "75") Then
        pic1 = PictureBox45
    ElseIf (loc1 = "74") Then
        pic1 = PictureBox46
    ElseIf (loc1 = "73") Then
        pic1 = PictureBox47
    ElseIf (loc1 = "72") Then
        pic1 = PictureBox48
    ElseIf (loc1 = "71") Then
        pic1 = PictureBox49
    ElseIf (loc1 = "87") Then
        pic1 = PictureBox50
    ElseIf (loc1 = "86") Then
        pic1 = PictureBox51
    ElseIf (loc1 = "85") Then
        pic1 = PictureBox52
    ElseIf (loc1 = "84") Then
        pic1 = PictureBox53
    ElseIf (loc1 = "83") Then
        pic1 = PictureBox54
    ElseIf (loc1 = "82") Then
        pic1 = PictureBox55
    ElseIf (loc1 = "81") Then
        pic1 = PictureBox56
    End If

    pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedSkull.bmp"
End Sub

Private Sub AIClear(ByVal loc1 As String, ByVal loc2 As String, ByVal loc3
As String)
```

```
Dim pic1 As PictureBox
Dim pic2 As PictureBox
Dim pic3 As PictureBox
pic1 = PictureBox57
pic2 = PictureBox57
pic3 = PictureBox57

If (loc1 = "17") Then
    pic1 = PictureBox1
ElseIf (loc1 = "16") Then
    pic1 = PictureBox2
ElseIf (loc1 = "15") Then
    pic1 = PictureBox3
ElseIf (loc1 = "14") Then
    pic1 = PictureBox4
ElseIf (loc1 = "13") Then
    pic1 = PictureBox5
ElseIf (loc1 = "12") Then
    pic1 = PictureBox6
ElseIf (loc1 = "11") Then
    pic1 = PictureBox7
ElseIf (loc1 = "27") Then
    pic1 = PictureBox8
ElseIf (loc1 = "26") Then
    pic1 = PictureBox9
ElseIf (loc1 = "25") Then
    pic1 = PictureBox10
ElseIf (loc1 = "24") Then
    pic1 = PictureBox11
ElseIf (loc1 = "23") Then
    pic1 = PictureBox12
ElseIf (loc1 = "22") Then
    pic1 = PictureBox13
```



```
ElseIf (loc1 = "21") Then
    pic1 = PictureBox14
ElseIf (loc1 = "37") Then
    pic1 = PictureBox15
ElseIf (loc1 = "36") Then
    pic1 = PictureBox16
ElseIf (loc1 = "35") Then
    pic1 = PictureBox17
ElseIf (loc1 = "34") Then
    pic1 = PictureBox18
ElseIf (loc1 = "33") Then
    pic1 = PictureBox19
ElseIf (loc1 = "32") Then
    pic1 = PictureBox20
ElseIf (loc1 = "31") Then
    pic1 = PictureBox21
ElseIf (loc1 = "47") Then
    pic1 = PictureBox22
ElseIf (loc1 = "46") Then
    pic1 = PictureBox23
ElseIf (loc1 = "45") Then
    pic1 = PictureBox24
ElseIf (loc1 = "44") Then
    pic1 = PictureBox25
ElseIf (loc1 = "43") Then
    pic1 = PictureBox26
ElseIf (loc1 = "42") Then
    pic1 = PictureBox27
ElseIf (loc1 = "41") Then
    pic1 = PictureBox28
ElseIf (loc1 = "57") Then
    pic1 = PictureBox29
ElseIf (loc1 = "56") Then
```

```
    pic1 = PictureBox30
ElseIf (loc1 = "55") Then
    pic1 = PictureBox31
ElseIf (loc1 = "54") Then
    pic1 = PictureBox32
ElseIf (loc1 = "53") Then
    pic1 = PictureBox33
ElseIf (loc1 = "52") Then
    pic1 = PictureBox34
ElseIf (loc1 = "51") Then
    pic1 = PictureBox35
ElseIf (loc1 = "67") Then
    pic1 = PictureBox36
ElseIf (loc1 = "66") Then
    pic1 = PictureBox37
ElseIf (loc1 = "65") Then
    pic1 = PictureBox38
ElseIf (loc1 = "64") Then
    pic1 = PictureBox39
ElseIf (loc1 = "63") Then
    pic1 = PictureBox40
ElseIf (loc1 = "62") Then
    pic1 = PictureBox41
ElseIf (loc1 = "61") Then
    pic1 = PictureBox42
ElseIf (loc1 = "77") Then
    pic1 = PictureBox43
ElseIf (loc1 = "76") Then
    pic1 = PictureBox44
ElseIf (loc1 = "75") Then
    pic1 = PictureBox45
ElseIf (loc1 = "74") Then
    pic1 = PictureBox46
```

```
ElseIf (loc1 = "73") Then
    pic1 = PictureBox47
ElseIf (loc1 = "72") Then
    pic1 = PictureBox48
ElseIf (loc1 = "71") Then
    pic1 = PictureBox49
ElseIf (loc1 = "87") Then
    pic1 = PictureBox50
ElseIf (loc1 = "86") Then
    pic1 = PictureBox51
ElseIf (loc1 = "85") Then
    pic1 = PictureBox52
ElseIf (loc1 = "84") Then
    pic1 = PictureBox53
ElseIf (loc1 = "83") Then
    pic1 = PictureBox54
ElseIf (loc1 = "82") Then
    pic1 = PictureBox55
ElseIf (loc1 = "81") Then
    pic1 = PictureBox56
End If
```

```
If (loc2 = "17") Then
    pic2 = PictureBox1
ElseIf (loc2 = "16") Then
    pic2 = PictureBox2
ElseIf (loc2 = "15") Then
    pic2 = PictureBox3
ElseIf (loc2 = "14") Then
    pic2 = PictureBox4
ElseIf (loc2 = "13") Then
    pic2 = PictureBox5
ElseIf (loc2 = "12") Then
```

```
    pic2 = PictureBox6
ElseIf (loc2 = "11") Then
    pic2 = PictureBox7
ElseIf (loc2 = "27") Then
    pic2 = PictureBox8
ElseIf (loc2 = "26") Then
    pic2 = PictureBox9
ElseIf (loc2 = "25") Then
    pic2 = PictureBox10
ElseIf (loc2 = "24") Then
    pic2 = PictureBox11
ElseIf (loc2 = "23") Then
    pic2 = PictureBox12
ElseIf (loc2 = "22") Then
    pic2 = PictureBox13
ElseIf (loc2 = "21") Then
    pic2 = PictureBox14
ElseIf (loc2 = "37") Then
    pic2 = PictureBox15
ElseIf (loc2 = "36") Then
    pic2 = PictureBox16
ElseIf (loc2 = "35") Then
    pic2 = PictureBox17
ElseIf (loc2 = "34") Then
    pic2 = PictureBox18
ElseIf (loc2 = "33") Then
    pic2 = PictureBox19
ElseIf (loc2 = "32") Then
    pic2 = PictureBox20
ElseIf (loc2 = "31") Then
    pic2 = PictureBox21
ElseIf (loc2 = "47") Then
    pic2 = PictureBox22
```

```
ElseIf (loc2 = "46") Then
    pic2 = PictureBox23
ElseIf (loc2 = "45") Then
    pic2 = PictureBox24
ElseIf (loc2 = "44") Then
    pic2 = PictureBox25
ElseIf (loc2 = "43") Then
    pic2 = PictureBox26
ElseIf (loc2 = "42") Then
    pic2 = PictureBox27
ElseIf (loc2 = "41") Then
    pic2 = PictureBox28
ElseIf (loc2 = "57") Then
    pic2 = PictureBox29
ElseIf (loc2 = "56") Then
    pic2 = PictureBox30
ElseIf (loc2 = "55") Then
    pic2 = PictureBox31
ElseIf (loc2 = "54") Then
    pic2 = PictureBox32
ElseIf (loc2 = "53") Then
    pic2 = PictureBox33
ElseIf (loc2 = "52") Then
    pic2 = PictureBox34
ElseIf (loc2 = "51") Then
    pic2 = PictureBox35
ElseIf (loc2 = "67") Then
    pic2 = PictureBox36
ElseIf (loc2 = "66") Then
    pic2 = PictureBox37
ElseIf (loc2 = "65") Then
    pic2 = PictureBox38
ElseIf (loc2 = "64") Then
```

```
    pic2 = PictureBox39
ElseIf (loc2 = "63") Then
    pic2 = PictureBox40
ElseIf (loc2 = "62") Then
    pic2 = PictureBox41
ElseIf (loc2 = "61") Then
    pic2 = PictureBox42
ElseIf (loc2 = "77") Then
    pic2 = PictureBox43
ElseIf (loc2 = "76") Then
    pic2 = PictureBox44
ElseIf (loc2 = "75") Then
    pic2 = PictureBox45
ElseIf (loc2 = "74") Then
    pic2 = PictureBox46
ElseIf (loc2 = "73") Then
    pic2 = PictureBox47
ElseIf (loc2 = "72") Then
    pic2 = PictureBox48
ElseIf (loc2 = "71") Then
    pic2 = PictureBox49
ElseIf (loc2 = "87") Then
    pic2 = PictureBox50
ElseIf (loc2 = "86") Then
    pic2 = PictureBox51
ElseIf (loc2 = "85") Then
    pic2 = PictureBox52
ElseIf (loc2 = "84") Then
    pic2 = PictureBox53
ElseIf (loc2 = "83") Then
    pic2 = PictureBox54
ElseIf (loc2 = "82") Then
    pic2 = PictureBox55
```

```
ElseIf (loc2 = "81") Then
    pic2 = PictureBox56
End If
```

```
If (loc3 = "17") Then
    pic3 = PictureBox1
ElseIf (loc3 = "16") Then
    pic3 = PictureBox2
ElseIf (loc3 = "15") Then
    pic3 = PictureBox3
ElseIf (loc3 = "14") Then
    pic3 = PictureBox4
ElseIf (loc3 = "13") Then
    pic3 = PictureBox5
ElseIf (loc3 = "12") Then
    pic3 = PictureBox6
ElseIf (loc3 = "11") Then
    pic3 = PictureBox7
ElseIf (loc3 = "27") Then
    pic3 = PictureBox8
ElseIf (loc3 = "26") Then
    pic3 = PictureBox9
ElseIf (loc3 = "25") Then
    pic3 = PictureBox10
ElseIf (loc3 = "24") Then
    pic3 = PictureBox11
ElseIf (loc3 = "23") Then
    pic3 = PictureBox12
ElseIf (loc3 = "22") Then
    pic3 = PictureBox13
ElseIf (loc3 = "21") Then
    pic3 = PictureBox14
ElseIf (loc3 = "37") Then
```

```
    pic3 = PictureBox15
ElseIf (loc3 = "36") Then
    pic3 = PictureBox16
ElseIf (loc3 = "35") Then
    pic3 = PictureBox17
ElseIf (loc3 = "34") Then
    pic3 = PictureBox18
ElseIf (loc3 = "33") Then
    pic3 = PictureBox19
ElseIf (loc3 = "32") Then
    pic3 = PictureBox20
ElseIf (loc3 = "31") Then
    pic3 = PictureBox21
ElseIf (loc3 = "47") Then
    pic3 = PictureBox22
ElseIf (loc3 = "46") Then
    pic3 = PictureBox23
ElseIf (loc3 = "45") Then
    pic3 = PictureBox24
ElseIf (loc3 = "44") Then
    pic3 = PictureBox25
ElseIf (loc3 = "43") Then
    pic3 = PictureBox26
ElseIf (loc3 = "42") Then
    pic3 = PictureBox27
ElseIf (loc3 = "41") Then
    pic3 = PictureBox28
ElseIf (loc3 = "57") Then
    pic3 = PictureBox29
ElseIf (loc3 = "56") Then
    pic3 = PictureBox30
ElseIf (loc3 = "55") Then
    pic3 = PictureBox31
```



```
ElseIf (loc3 = "54") Then
    pic3 = PictureBox32
ElseIf (loc3 = "53") Then
    pic3 = PictureBox33
ElseIf (loc3 = "52") Then
    pic3 = PictureBox34
ElseIf (loc3 = "51") Then
    pic3 = PictureBox35
ElseIf (loc3 = "67") Then
    pic3 = PictureBox36
ElseIf (loc3 = "66") Then
    pic3 = PictureBox37
ElseIf (loc3 = "65") Then
    pic3 = PictureBox38
ElseIf (loc3 = "64") Then
    pic3 = PictureBox39
ElseIf (loc3 = "63") Then
    pic3 = PictureBox40
ElseIf (loc3 = "62") Then
    pic3 = PictureBox41
ElseIf (loc3 = "61") Then
    pic3 = PictureBox42
ElseIf (loc3 = "77") Then
    pic3 = PictureBox43
ElseIf (loc3 = "76") Then
    pic3 = PictureBox44
ElseIf (loc3 = "75") Then
    pic3 = PictureBox45
ElseIf (loc3 = "74") Then
    pic3 = PictureBox46
ElseIf (loc3 = "73") Then
    pic3 = PictureBox47
ElseIf (loc3 = "72") Then
```

```
    pic3 = PictureBox48
ElseIf (loc3 = "71") Then
    pic3 = PictureBox49
ElseIf (loc3 = "87") Then
    pic3 = PictureBox50
ElseIf (loc3 = "86") Then
    pic3 = PictureBox51
ElseIf (loc3 = "85") Then
    pic3 = PictureBox52
ElseIf (loc3 = "84") Then
    pic3 = PictureBox53
ElseIf (loc3 = "83") Then
    pic3 = PictureBox54
ElseIf (loc3 = "82") Then
    pic3 = PictureBox55
ElseIf (loc3 = "81") Then
    pic3 = PictureBox56
End If
```

```
    If (pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedPawn.bmp") Then
        pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerPawn.bmp"
        ElseIf (pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedKnight.bmp") Then
            pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKnight.bmp"
            ElseIf (pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedBishop.bmp") Then
                pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerBishop.bmp"
                ElseIf (pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedRook.bmp") Then
```

```
        pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerRook.bmp"
        ElseIf (pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\AttackedKing.bmp") Then
            pic3.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PlayerKing.bmp"
        End If

    If (loc2 = loc1) Then
        If (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BluePawn.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PawnSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKnight.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\KnightSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueBishop.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BishopSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueRook.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\RookSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKing.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\KingSquare.bmp"
        End If
    Else
        pic1.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlankSquare.bmp"
```

```

        If (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BluePawn.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\PawnSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKnight.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\KnightSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueBishop.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BishopSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueRook.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\RookSquare.bmp"
        ElseIf (pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\BlueKing.bmp") Then
            pic2.ImageLocation = "H:\e155\TacticMaster\Pics from
PC\Images\KingSquare.bmp"
        End If
    End If
End Sub

```

```

Private Sub outPort_SelectedIndexChanged(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles outPort.SelectedIndexChanged
    SerialPort1.Close()
    SerialPort1.PortName = Me.outPort.SelectedItem
    SerialPort1.BaudRate = 9600
    SerialPort1.Parity = IO.Ports.Parity.None
    SerialPort1.DataBits = 8
    SerialPort1.StopBits = IO.Ports.StopBits.One
    SerialPort1.Open()

```

End Sub

End Class