

```

/*
 * TicTac.c
 *
 * Created: 2016-04-28 10:11:07
 * Author: digpi16
 */

#include <avr/io.h>
#include <avr/interrupt.h>
#include <util/delay.h>
#include <stdlib.h>
#include <math.h>

char val;
char virtualDisplay [8][128];
char gameStarted = 0;

char knapp1 = 0b11001111;
char knapp2 = 0b01001111;
char knapp3 = 0b10001111;
char knapp4 = 0b11101111;
char knapp5 = 0b01101111;
char knapp6 = 0b10101111;
char knapp7 = 0b11011111;
char knapp8 = 0b01011111;
char knapp9 = 0b10011111;

char sq1 = 0;
char sq2 = 0;
char sq3 = 0;
char sq4 = 0;
char sq5 = 0;
char sq6 = 0;
char sq7 = 0;
char sq8 = 0;
char sq9 = 0;
char win = 0;
char i = 1;
char countO = 0;
char countX = 0;
char stage = 0;

int main(void){
    setDataDirection();
    startDisplay();
    clearDisplay();
    setupBoard();
    eraseAll();
    while(1){
        if(win == 0){
            play();
        }
        while(win == 1){
            greenHigh();
            if(PINA == 0b00001111){

```

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eraseAll();
sq1 = 0;
sq2 = 0;
sq3 = 0;
sq4 = 0;
sq5 = 0;
sq6 = 0;
sq7 = 0;
sq8 = 0;
sq9 = 0;
win = 0;
i = 1;
countO = 0;
countX = 0;
stage = 0;
greenLow();
redLow();
    }
}
}
}

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void play(){
    while(stage == 0 && win == 0){
        checkWin();
        if(countO == 3){
            stage = 1;
        }

        if(i == 1 && win == 0){
            checkWin();

            if(PINA == knapp1 && sq1 == 0){
                while(PINA == knapp1){
                }
                if(PINA == 0b00011111){
                    placeX(1,1);

                    sq1 = 1;
                    countX++;
                    i = 0;
                }
            }
        }
    }
}

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if(PINA == knapp2 && sq2 == 0){
    while(PINA == knapp2){

        }
        if(PINA == 0b00011111){
            placeX(2,1);

            sq2 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp3 && sq3 == 0){
    while(PINA == knapp3){
        }
        if(PINA == 0b00011111){
            placeX(3,1);
            i = 0;
            sq3 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp4 && sq4 == 0){
    while(PINA == knapp4){

        }
        if(PINA == 0b00011111){
            placeX(1,2);

            sq4 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp5 && sq5 == 0){
    while(PINA == knapp5){

        }
        if(PINA == 0b00011111){
            placeX(2,2);
            i = 0;
            sq5 = 1;
            countX++;

        }
    }
if(PINA == knapp6 && sq6 == 0){
    while(PINA == knapp6){

        }
        if(PINA == 0b00011111){
            placeX(3,2);

            sq6 = 1;
            countX++;
            i = 0;

        }
    }
}

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if(PINA == knapp7 && sq7 == 0){
    while(PINA == knapp7){

        }
        if(PINA == 0b00011111){
            placeX(1,3);

            sq7 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp8 && sq8 == 0){
    while(PINA == knapp8){

        }
        if(PINA == 0b00011111){
            placeX(2,3);

            sq8 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp9 && sq9 == 0){
    while(PINA == knapp9){

        }
        if(PINA == 0b00011111){
            placeX(3,3);

            sq9 = 1;
            countX++;
            i = 0;

        }
    }
if(PINA == knapp1 && sq1 != 0){
    while(PINA == knapp1){
        redHigh();
    }
    if(PINA == 0b00011111){

        redLow();
        i = 1;

    }
}
if(PINA == knapp2 && sq2 != 0){
    while(PINA == knapp2){
        redHigh();
    }
    if(PINA == 0b00011111){

        redLow();
        i = 1;

    }
}
if(PINA == knapp3 && sq3 != 0){
    while(PINA == knapp3){

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        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp4 && sq4 != 0){
    while(PINA == knapp4){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp5 && sq5 != 0){
    while(PINA == knapp5){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp6 && sq6 != 0){
    while(PINA == knapp6){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp7 && sq7 != 0){
    while(PINA == knapp7){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp8 && sq8 != 0){
    while(PINA == knapp8){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 1;
    }
}
if(PINA == knapp9 && sq9 != 0){

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        while(PINA == knapp9){
            redHigh();
        }
        if(PINA == 0b00011111){
            redLow();
            i = 1;
        }
    }
}
if(i == 0 && win == 0){
    checkWin();

    if(PINA == knapp1 && sq1 == 0){
        while(PINA == knapp1){
        }
        if(PINA == 0b00011111){
            place0(1,1);

            sq1 = 2;
            count0++;
            i = 1;
        }
    }
    if(PINA == knapp2 && sq2 == 0){
        while(PINA == knapp2){
        }
        if(PINA == 0b00011111){
            place0(2,1);

            sq2 = 2;
            count0++;
            i = 1;
        }
    }
    if(PINA == knapp3 && sq3 == 0){
        while(PINA == knapp3){
        }
        if(PINA == 0b00011111){
            place0(3,1);

            sq3 = 2;
            count0++;
            i = 1;
        }
    }
    if(PINA == knapp4 && sq4 == 0){
        while(PINA == knapp4){
        }
        if(PINA == 0b00011111){

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        place0(1,2);

        sq4 = 2;
        count0++;
        i = 1;
    }
}
if(PINA == knapp5 && sq5 == 0){
    while(PINA == knapp5){

    }
    if(PINA == 0b00011111){
        place0(2,2);

        sq5 = 2;
        count0++;
        i = 1;
    }
}
if(PINA == knapp6 && sq6 == 0){
    while(PINA == knapp6){

    }
    if(PINA == 0b00011111){
        place0(3,2);

        sq6 = 2;
        count0++;
        i = 1;
    }
}
if(PINA == knapp7 && sq7 == 0){
    while(PINA == knapp7){

    }
    if(PINA == 0b00011111){
        place0(1,3);

        sq7 = 2;
        count0++;
        i = 1;
    }
}
if(PINA == knapp8 && sq8 == 0){
    while(PINA == knapp8){

    }
    if(PINA == 0b00011111){
        place0(2,3);

        sq8 = 2;
        count0++;
        i = 1;
    }
}
if(PINA == knapp9 && sq9 == 0){

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```

        while(PINA == knapp9){
        }
        if(PINA == 0b00011111){
            place0(3,3);

            sq9 = 2;
            count0++;
            i = 1;
        }
    }
    if(PINA == knapp1 && sq1 != 0){
        while(PINA == knapp1){
            redHigh();
        }
        if(PINA == 0b00011111){

            redLow();
            i = 0;
        }
    }
    if(PINA == knapp2 && sq2 != 0){
        while(PINA == knapp9){
            redHigh();
        }
        if(PINA == 0b00011111){

            redLow();
            i = 0;
        }
    }
    if(PINA == knapp3 && sq3 != 0){
        while(PINA == knapp9){
            redHigh();
        }
        if(PINA == 0b00011111){

            redLow();
            i = 0;
        }
    }
    if(PINA == knapp4 && sq4 != 0){
        while(PINA == knapp9){
            redHigh();
        }
        if(PINA == 0b00011111){

            redLow();
            i = 0;
        }
    }
    if(PINA == knapp5 && sq5 != 0){
        while(PINA == knapp9){
            redHigh();
        }
        if(PINA == 0b00011111){

            redLow();

```



```

        i = 0;
    }
}
if(PINA == knapp6 && sq6 != 0){
    while(PINA == knapp9){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 0;
    }
}
if(PINA == knapp7 && sq7 != 0){
    while(PINA == knapp9){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 0;
    }
}
if(PINA == knapp8 && sq8 != 0){
    while(PINA == knapp9){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 0;
    }
}
if(PINA == knapp9 && sq9 != 0){
    while(PINA == knapp9){
        redHigh();
    }
    if(PINA == 0b00011111){
        redLow();
        i = 0;
    }
}
}
}

while(stage == 1 && win == 0){

    if(i = 1 && win == 0){
        checkWin();

        if(PINA == knapp1 && sq1 == 1 && countX == 3){
            while(PINA == knapp1){

            }
            if(PINA == 0b00011111){
                eraseX(1,1);
            }
        }
    }
}

```

```

        sq1 = 0;
        countX = 2;
    }
}
if(PINA == knapp2 && sq2 == 1 && countX == 3){
    while(PINA == knapp2){

        }
        if(PINA == 0b00011111){
            eraseX(2,1);

            sq2 = 0;
            countX = 2;

        }
    }
if(PINA == knapp3 && sq3 == 1 && countX == 3){
    while(PINA == knapp3){

        }
        if(PINA == 0b00011111){
            eraseX(3,1);

            sq3 = 0;
            countX = 2;

        }
    }
if(PINA == knapp4 && sq4 == 1 && countX == 3){
    while(PINA == knapp4){

        }
        if(PINA == 0b00011111){
            eraseX(1,2);

            sq4 = 0;
            countX = 2;

        }
    }
if(PINA == knapp5 && sq5 == 1 && countX == 3){
    while(PINA == knapp5){

        }
        if(PINA == 0b00011111){
            eraseX(2,2);

            sq5 = 0;
            countX = 2;

        }
    }
if(PINA == knapp6 && sq6 == 1 && countX == 3){
    while(PINA == knapp6){

        }
        if(PINA == 0b00011111){
            eraseX(3,2);

            sq6 = 0;
            countX = 2;

        }
    }
}

```

```

    }
}
if(PINA == knapp7 && sq7 == 1 && countX == 3){
    while(PINA == knapp7){

        }
        if(PINA == 0b00011111){
            eraseX(1,3);

            sq7 = 0;
            countX = 2;

        }
}
if(PINA == knapp8 && sq8 == 1 && countX == 3){
    while(PINA == knapp8){

        }
        if(PINA == 0b00011111){
            eraseX(2,3);

            sq8 = 0;
            countX = 2;

        }
}
if(PINA == knapp9 && sq9 == 1 && countX == 3){
    while(PINA == knapp9){

        }
        if(PINA == 0b00011111){
            eraseX(3,3);

            sq9 = 0;
            countX = 2;

        }
}
if(PINA == knapp1 && sq1 == 0){
    if(countX == 2){
        while(PINA == knapp1){

            }
            if(PINA == 0b00011111){
                placeX(1,1);
                sq1 = 1;
                countX = 3;
                i = 0;

            }

        }
}

if(PINA == knapp2 && sq2 == 0){
    if(countX == 2){
        while(PINA == knapp2){

            }
            if(PINA == 0b00011111){
                placeX(2,1);

```

```

sq2 = 1;
countX = 3;
i = 0;
    }
}

}
if(PINA == knapp3 && sq3 == 0){
    if(countX == 2){
        while(PINA == knapp3){

        }
        if(PINA == 0b00011111){
            placeX(3,1);
            sq3 = 1;
            countX = 3;
            i = 0;
        }
    }
}

}
if(PINA == knapp4 && sq4 == 0){
    if(countX == 2){
        while(PINA == knapp4){

        }
        if(PINA == 0b00011111){
            placeX(1,2);
            sq4 = 1;
            countX = 3;
            i = 0;
        }
    }
}

}
if(PINA == knapp5 && sq5 == 0){
    if(countX == 2){
        while(PINA == knapp5){

        }
        if(PINA == 0b00011111){
            placeX(2,2);
            sq5 = 1;
            countX = 3;
            i = 0;
        }
    }
}

}

```

```
if(PINA == knapp6 && sq6 == 0){
    if(countX == 2){
        while(PINA == knapp6){
            }
            if(PINA == 0b00011111){
                placeX(3,2);
                sq6 = 1;
                countX = 3;
                i = 0;
            }
        }
    }
}
```

```
}
```

```
if(PINA == knapp7 && sq7 == 0){
    if(countX == 2){
        while(PINA == knapp7){
            }
            if(PINA == 0b00011111){
                placeX(1,3);
                sq7 = 1;
                countX = 3;
                i = 0;
            }
        }
    }
}
```

```
}
```

```
if(PINA == knapp8 && sq8 == 0){
    if(countX == 2){
        while(PINA == knapp8){
            }
            if(PINA == 0b00011111){
                placeX(2,3);
                sq8 = 1;
                countX = 3;
                i = 0;
            }
        }
    }
}
```

```
}
```

```
if(PINA == knapp9 && sq9 == 0){
    if(countX == 2){
        while(PINA == knapp9){
            }
            if(PINA == 0b00011111){
                placeX(3,3);
            }
        }
    }
}
```

```

sq9 = 1;
countX = 3;
i = 0;
    }
}

}

}
while(i == 0 && win == 0){
    checkWin();
    if(count0 == 3){

        if(PINA == knapp1 && sq1 == 2){
            while(PINA == knapp1){

            }
            if(PINA == 0b00011111){
                erase0(1,1);

                sq1 = 0;
                count0 = 2;

            }
        }
        if(PINA == knapp2 && sq2 == 2){
            while(PINA == knapp2){

            }
            if(PINA == 0b00011111){
                erase0(2,1);

                sq2 = 0;
                count0 = 2;

            }
        }
        if(PINA == knapp3 && sq3 == 2){
            while(PINA == knapp3){

            }
            if(PINA == 0b00011111){
                erase0(3,1);

                sq3 = 0;
                count0 = 2;

            }
        }
        if(PINA == knapp4 && sq4 == 2){
            while(PINA == knapp4){

            }
            if(PINA == 0b00011111){
                erase0(1,2);

                sq4 = 0;

```

```

count0 = 2;
    }
}
if(PINA == knapp5 && sq5 == 2){
    while(PINA == knapp5){
        }
        if(PINA == 0b00011111){
            erase0(2,2);

            sq5 = 0;
            count0 = 2;

        }
    }
if(PINA == knapp6 && sq6 == 2){
    while(PINA == knapp6){
        }
        if(PINA == 0b00011111){
            erase0(3,2);

            sq6 = 0;
            count0 = 2;

        }
    }
if(PINA == knapp7 && sq7 == 2){
    while(PINA == knapp7){
        }
        if(PINA == 0b00011111){
            erase0(1,3);

            sq7 = 0;
            count0 = 2;

        }
    }
if(PINA == knapp8 && sq8 == 2){
    while(PINA == knapp8){
        }
        if(PINA == 0b00011111){
            erase0(2,3);

            sq8 = 0;
            count0 = 2;

        }
    }
if(PINA == knapp9 && sq9 == 2){
    while(PINA == knapp9){
        }
        if(PINA == 0b00011111){
            erase0(3,3);

            sq9 = 0;
            count0 = 2;

```

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    }
}
if(count0 == 2){
    if(PINA == knapp1 && sq1 == 0){
        while(PINA == knapp1){
            }
            if(PINA == 0b00011111){
                place0(1,1);
                sq1 = 2;
                count0 = 3;
                i = 1;
            }
        }
        if(PINA == knapp2 && sq2 == 0){
            while(PINA == knapp2){
                }
                if(PINA == 0b00011111){
                    place0(2,1);
                    sq2 = 2;
                    count0 = 3;
                    i = 1;
                }
            }
            if(PINA == knapp3 && sq3 == 0){
                while(PINA == knapp3){
                    }
                    if(PINA == 0b00011111){
                        place0(3,1);
                        sq3 = 2;
                        count0 = 3;
                        i = 1;
                    }
                }
                if(PINA == knapp4 && sq4 == 0){
                    while(PINA == knapp4){
                        }
                        if(PINA == 0b00011111){
                            place0(1,3);
                            sq4 = 2;
                            count0 = 3;
                            i = 1;
                        }
                    }
                    if(PINA == knapp5 && sq5 == 0){
                        while(PINA == knapp5){
                            }
                            if(PINA == 0b00011111){

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```

        place0(2,2);
        sq5 = 2;
        count0 = 3;
        i = 1;
    }
}
if(PINA == knapp6 && sq6 == 0){
    while(PINA == knapp6){
        }
        if(PINA == 0b00011111){
            place0(3,2);
            sq6 = 2;
            count0 = 3;
            i = 1;
        }
    }
}
if(PINA == knapp7 && sq7 == 0){
    while(PINA == knapp7){
        }
        if(PINA == 0b00011111){
            place0(1,3);
            sq7 = 2;
            count0 = 3;
            i = 1;
        }
    }
}
if(PINA == knapp8 && sq8 == 0){
    while(PINA == knapp8){
        }
        if(PINA == 0b00011111){
            place0(2,3);
            sq8 = 2;
            count0 = 3;
            i = 1;
        }
    }
}
if(PINA == knapp9 && sq9 == 0){
    while(PINA == knapp9){
        }
        if(PINA == 0b00011111){
            place0(3,3);
            sq9 = 2;
            count0 = 3;
            i = 1;
        }
    }
}
}
}

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    }
}

void checkWin(){
    if (sq1 == 1 && sq2 == 1 && sq3 == 1){
        win = 1;
    }
    if ( sq4 == 1 && sq5 == 1 && sq6 == 1){
        win = 1;
    } if (sq7 == 1 && sq8 == 1 && sq9 == 1){
        win = 1;
    } if (sq1 == 1 && sq4 == 1 && sq7 == 1){
        win = 1;
    } if (sq2 == 1 && sq5 == 1 && sq8 == 1){
        win = 1;
    } if (sq3 == 1 && sq6 == 1 && sq9 == 1){
        win = 1;
    } if (sq1 == 1 && sq5 == 1 && sq9 == 1){
        win = 1;
    } if (sq3 == 1 && sq5 == 1 && sq7 == 1){
        win = 1;
    } if (sq1 == 2 && sq2 == 2 && sq3 == 2){
        win = 1;
    } if (sq4 == 2 && sq5 == 2 && sq6 == 2){
        win = 1;
    } if (sq7 == 2 && sq8 == 2 && sq9 == 2){
        win = 1;
    } if (sq1 == 2 && sq4 == 2 && sq7 == 2){
        win = 1;
    } if (sq2 == 2 && sq5 == 2 && sq8 == 2){
        win = 1;
    } if (sq3 == 2 && sq6 == 2 && sq9 == 2){
        win = 1;
    } if (sq1 == 2 && sq5 == 2 && sq9 == 2){
        win = 1;
    } if (sq3 == 2 && sq5 == 2 && sq7 == 2){
        win = 1;
    }
}
}

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void eraseAll(){
    erase0(1,1);
    erase0(1,2);
    erase0(1,3);
    erase0(2,1);
    erase0(2,2);
    erase0(2,3);
    erase0(3,1);
    erase0(3,2);
    erase0(3,3);
    eraseX(1,1);
    eraseX(1,2);
    eraseX(1,3);
    eraseX(2,1);
    eraseX(2,2);
    eraseX(2,3);
    eraseX(3,1);
}

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        eraseX(3,2);
        eraseX(3,3);
    }

void enableInterrupt() {
    PINA = 0b00000000;
    DDRA = 0b00000000;
    MCUCR |= 0b00001111;
    GICR |= 0b11000000;
    sei();
}

redHigh(){
    PORTD |= 0b10000000;
}

redLow(){
    PORTD &= 0b01111111;
}

greenHigh(){
    PORTD |= 0b01000000;
}

greenLow(){
    PORTD &= 0b10111111;
}

void cs2high() {
    PORTD |= 0b00100000;
}

void cs2low() {
    PORTD &= 0b11011111;
}

void cs1high() {
    PORTD |= 0b00010000;
}

void cs1low() {
    PORTD &= 0b11101111;
}

void resetHigh() {
    PORTD |= 0b00000001;
}

void resetLow() {
    PORTD &= 0b11111110;
}

void rwHigh() {
    PORTD |= 0b00000010;
}

void rwLow() {
    PORTD &= 0b11111101;
}

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void rsHigh() {
    PORTD |= 0b00000100;
}

void rsLow() {
    PORTD &= 0b11111011;
}

void eHigh () {
    PORTD |= 0b00001000;
}

void eLow() {
    PORTD &= 0b11110111;
}

void setX(char x) {
    rsLow();
    rwLow();

    PORTB = 0b10111000 | x;

    eLow();
    eHigh();
}

void setY(char y) {
    rsLow();
    rwLow();

    PORTB = 0b01000000 | y;

    eLow();
    eHigh();
}

void writeData(char x, char y) {
    rsHigh();
    rwLow();

    PORTB = virtualDisplay[x / 8][y];

    eLow();
    eHigh();
}

void eraseData(char x, char y) {
    rsHigh();
    rwLow();

    PORTB = virtualDisplay[x / 8][y];

    eLow();
    eHigh();
}

```

```

void draw(char x, char y) {
    virtualDisplay[x/8][y] |= (1<<(x%8));

    char newY;

    if (y < 64) {
        cs2high();
        cs1low();
        newY = y;
    } else {
        cs1high();
        cs2low();
        newY = y - 64;
    }

    setX(x / 8);
    setY(newY);

    writeData(x,y);
}

void drawBoard() {
    for (char y = 64; y < 128; y++) {
        draw(0, y);
        draw(63, y);
    }
    for (char x = 0; x < 63; x++) {
        draw(x, 64);
        draw(x, 127);
    }
    for (char y = 64; y < 128; y++) {
        draw(42, y);
        draw(21, y);
    }
    for (char x = 0; x < 63; x++) {
        draw(x, 85);
        draw(x, 106);
    }
}

void setupBoard() {
    drawBoard();
}

void erase(char x, char y) {
    virtualDisplay[x/8][y] &= ~(1<<(x%8));

    char newY;

    if (y < 64) {
        cs2high();
        cs1low();
        newY = y;
    } else {
        cs1high();
        cs2low();
        newY = y - 64;
    }
}

```

```

        setX(x / 8);
        setY(newY);

        eraseData(x,y);
    }

void clearDisplay() {
    for (char y = 0; y < 128; y++) {
        for (char x = 0; x < 64; x++) {
            erase(x,y);
        }
    }
}

void placeX(char x, char y){
    if(x == 1 && y == 1){
        char j = 65;
        for(char i = 1; i < 21; i++){
            draw(i,j);
            j++;
        }
        char k = 84;
        for(char f = 1; f < 21; f++){
            draw(f,k);
            k--;
        }
    }

    if(x == 2 && y == 1){
        char j = 86;
        for(char i = 1; i < 21; i++){
            draw(i,j);
            j++;
        }
        char k = 105;
        for(char f = 1; f < 21; f++){
            draw(f,k);
            k--;
        }
    }

    if(x == 3 && y == 1){
        char j = 107;
        for(char i = 1; i < 21; i++){
            draw(i,j);
            j++;
        }
        char k = 126;
        for(char f = 1; f < 21; f++){
            draw(f,k);
            k--;
        }
    }

    if(x == 1 && y == 2){
        char j = 65;
        for(char i = 22; i < 42; i++){

```

```

        draw(i,j);
        j++;
    }
    char k = 84;
    for(char f = 22; f < 42; f++){
        draw(f,k);
        k--;
    }
}
if(x == 2 && y == 2){
    char j = 86;
    for(char i = 22; i < 42; i++){
        draw(i,j);
        j++;
    }
    char k = 105;
    for(char f = 22; f < 42; f++){
        draw(f,k);
        k--;
    }
}
if(x == 3 && y == 2){
    char j = 107;
    for(char i = 22; i < 42; i++){
        draw(i,j);
        j++;
    }
    char k = 126;
    for(char f = 22; f < 42; f++){
        draw(f,k);
        k--;
    }
}
if(x == 1 && y == 3){
    char j = 65;
    for(char i = 43; i < 63; i++){
        draw(i,j);
        j++;
    }
    char k = 84;
    for(char f = 43; f < 63; f++){
        draw(f,k);
        k--;
    }
}
if(x == 2 && y == 3){
    char j = 86;
    for(char i = 43; i < 63; i++){
        draw(i,j);
        j++;
    }
    char k = 105;
    for(char f = 43; f < 63; f++){
        draw(f,k);
    }
}

```

```

        k--;
    }
}

if(x == 3 && y == 3){
    char j = 107;
    for(char i = 43; i < 63; i++){
        draw(i,j);
        j++;
    }
    char k = 126;
    for(char f = 43; f < 63; f++){
        draw(f,k);
        k--;
    }
}

}

void eraseX(char x, char y){
    if(x == 1 && y == 1){
        char j = 65;
        for(char i = 1; i < 21; i++){
            erase(i,j);
            j++;
        }
        char k = 84;
        for(char f = 1; f < 21; f++){
            erase(f,k);
            k--;
        }
    }

    if(x == 2 && y == 1){
        char j = 86;
        for(char i = 1; i < 21; i++){
            erase(i,j);
            j++;
        }
        char k = 105;
        for(char f = 1; f < 21; f++){
            erase(f,k);
            k--;
        }
    }

    if(x == 3 && y == 1){
        char j = 107;
        for(char i = 1; i < 21; i++){
            erase(i,j);
            j++;
        }
        char k = 126;
        for(char f = 1; f < 21; f++){
            erase(f,k);
            k--;
        }
    }
}

```



```
if(x == 1 && y == 2){
    char j = 65;
    for(char i = 22; i < 42; i++){
        erase(i,j);
        j++;
    }
    char k = 84;
    for(char f = 22; f < 42; f++){
        erase(f,k);
        k--;
    }
}
```

```
if(x == 2 && y == 2){
    char j = 86;
    for(char i = 22; i < 42; i++){
        erase(i,j);
        j++;
    }
    char k = 105;
    for(char f = 22; f < 42; f++){
        erase(f,k);
        k--;
    }
}
```

```
if(x == 3 && y == 2){
    char j = 107;
    for(char i = 22; i < 42; i++){
        erase(i,j);
        j++;
    }
    char k = 126;
    for(char f = 22; f < 42; f++){
        erase(f,k);
        k--;
    }
}
```

```
if(x == 1 && y == 3){
    char j = 65;
    for(char i = 43; i < 63; i++){
        erase(i,j);
        j++;
    }
    char k = 84;
    for(char f = 43; f < 63; f++){
        erase(f,k);
        k--;
    }
}
```

```
if(x == 2 && y == 3){
    char j = 86;
    for(char i = 43; i < 63; i++){
        erase(i,j);
        j++;
    }
}
```

```

        char k = 105;
        for(char f = 43; f < 63; f++){
            erase(f,k);
            k--;
        }
    }

    if(x == 3 && y == 3){
        char j = 107;
        for(char i = 43; i < 63; i++){
            erase(i,j);
            j++;
        }
        char k = 126;
        for(char f = 43; f < 63; f++){
            erase(f,k);
            k--;
        }
    }
}

void place0(char x, char y){
    char newX = y - 1;
    char newY = x - 1;
    for(char i = 0; i < 6; i++){
        draw(8 + 21*newX + i, 65 + 21*newY);
    }
    for(char i = 0; i < 6; i++){
        draw(8 + 21*newX + i, 84 + 21*newY);
    }
    for(char i = 0; i < 6; i++){
        draw(1 + 21*newX, 72 + 21*newY + i);
    }
    for(char i = 0; i < 6; i++){
        draw(20 + 21*newX, 72 + 21*newY + i);
    }

    draw(2 + newX*21,70 + newY*21);
    draw(2 + newX*21,71 + newY*21);
    draw(2 + newX*21,78 + newY*21);
    draw(2 + newX*21,79 + newY*21);
    draw(19 + newX*21,70 + newY*21);
    draw(19 + newX*21,71 + newY*21);
    draw(19 + newX*21,78 + newY*21);
    draw(19 + newX*21,79 + newY*21);
    draw(6 + newX*21,66 + newY*21);
    draw(7 + newX*21,66 + newY*21);
    draw(14 + newX*21,66 + newY*21);
    draw(15 + newX*21,66 + newY*21);
    draw(6 + newX*21,83 + newY*21);
    draw(7 + newX*21,83 + newY*21);
    draw(14 + newX*21,83 + newY*21);
    draw(15 + newX*21,83 + newY*21);
    draw(5 + newX*21, 67 + newY*21);
    draw(4 + newX*21, 68 + newY*21);
    draw(3 + newX*21, 69 + newY*21);
    draw(5 + newX*21, 82 + newY*21);
    draw(4 + newX*21, 81 + newY*21);
}

```

```

        draw(3 + newX*21, 80 + newY*21);
        draw(16 + newX*21, 67 + newY*21);
        draw(17 + newX*21, 68 + newY*21);
        draw(18 + newX*21, 69 + newY*21);
        draw(16 + newX*21, 82 + newY*21);
        draw(17 + newX*21, 81 + newY*21);
        draw(18 + newX*21, 80 + newY*21);
    }

void erase0(char x, char y){
    char newX = y - 1;
    char newY = x - 1;
    for(char i = 0; i < 6; i++){
        erase(8 + 21*newX + i, 65 + 21*newY);
    }
    for(char i = 0; i < 6; i++){
        erase(8 + 21*newX + i, 84 + 21*newY);
    }
    for(char i = 0; i < 6; i++){
        erase(1 + 21*newX, 72 + 21*newY + i);
    }
    for(char i = 0; i < 6; i++){
        erase(20 + 21*newX, 72 + 21*newY + i);
    }

    erase(2 + newX*21,70 + newY*21);
    erase(2 + newX*21,71 + newY*21);
    erase(2 + newX*21,78 + newY*21);
    erase(2 + newX*21,79 + newY*21);
    erase(19 + newX*21,70 + newY*21);
    erase(19 + newX*21,71 + newY*21);
    erase(19 + newX*21,78 + newY*21);
    erase(19 + newX*21,79 + newY*21);
    erase(6 + newX*21,66 + newY*21);
    erase(7 + newX*21,66 + newY*21);
    erase(14 + newX*21,66 + newY*21);
    erase(15 + newX*21,66 + newY*21);
    erase(6 + newX*21,83 + newY*21);
    erase(7 + newX*21,83 + newY*21);
    erase(14 + newX*21,83 + newY*21);
    erase(15 + newX*21,83 + newY*21);
    erase(5 + newX*21, 67 + newY*21);
    erase(4 + newX*21, 68 + newY*21);
    erase(3 + newX*21, 69 + newY*21);
    erase(5 + newX*21, 82 + newY*21);
    erase(4 + newX*21, 81 + newY*21);
    erase(3 + newX*21, 80 + newY*21);
    erase(16 + newX*21, 67 + newY*21);
    erase(17 + newX*21, 68 + newY*21);
    erase(18 + newX*21, 69 + newY*21);
    erase(16 + newX*21, 82 + newY*21);
    erase(17 + newX*21, 81 + newY*21);
    erase(18 + newX*21, 80 + newY*21);
}

void setDataDirection() {
    DDRD = 0b11111111;
    DDRB = 0b11111111;
}

```

```
}  
  
void startDisplay() {  
    PORTB = 0b00111111;  
  
    cs1low();  
    cs2low();  
  
    resetHigh();  
    rwLow();  
    rsLow();  
    eHigh();  
  
    cs1high();  
    cs2high();  
  
    eLow();  
    eHigh();  
}  
  
void stopDisplay() {  
    PORTB = 0b00111110;  
  
    cs1low();  
    cs2low();  
  
    resetHigh();  
    rwLow();  
    rsLow();  
    eHigh();  
  
    cs1high();  
    cs2high();  
  
    eLow();  
    eHigh();  
}
```