IQ-STEPS

Draft!

Chan Xu (u6233112)

Yiwen Peng (u6071714)

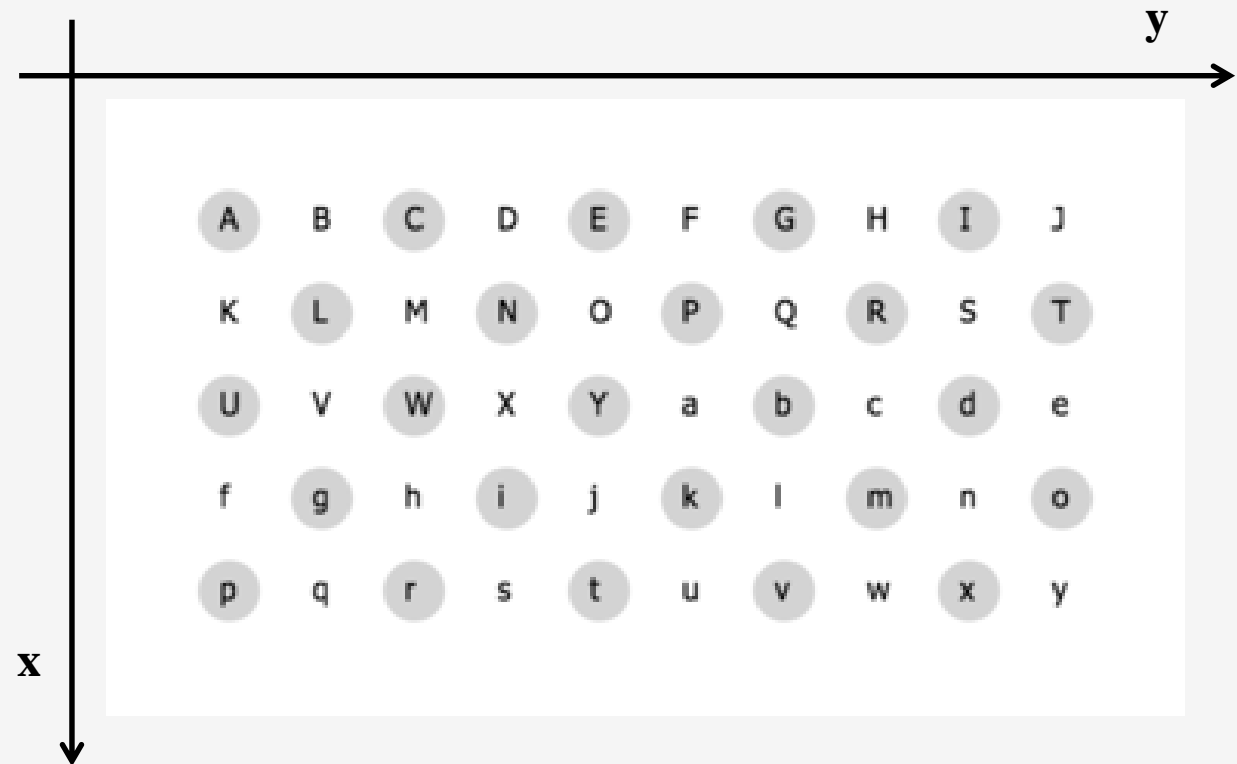*Qingsen Kuang(u5917277)*

Design

Encoding

UI

gui
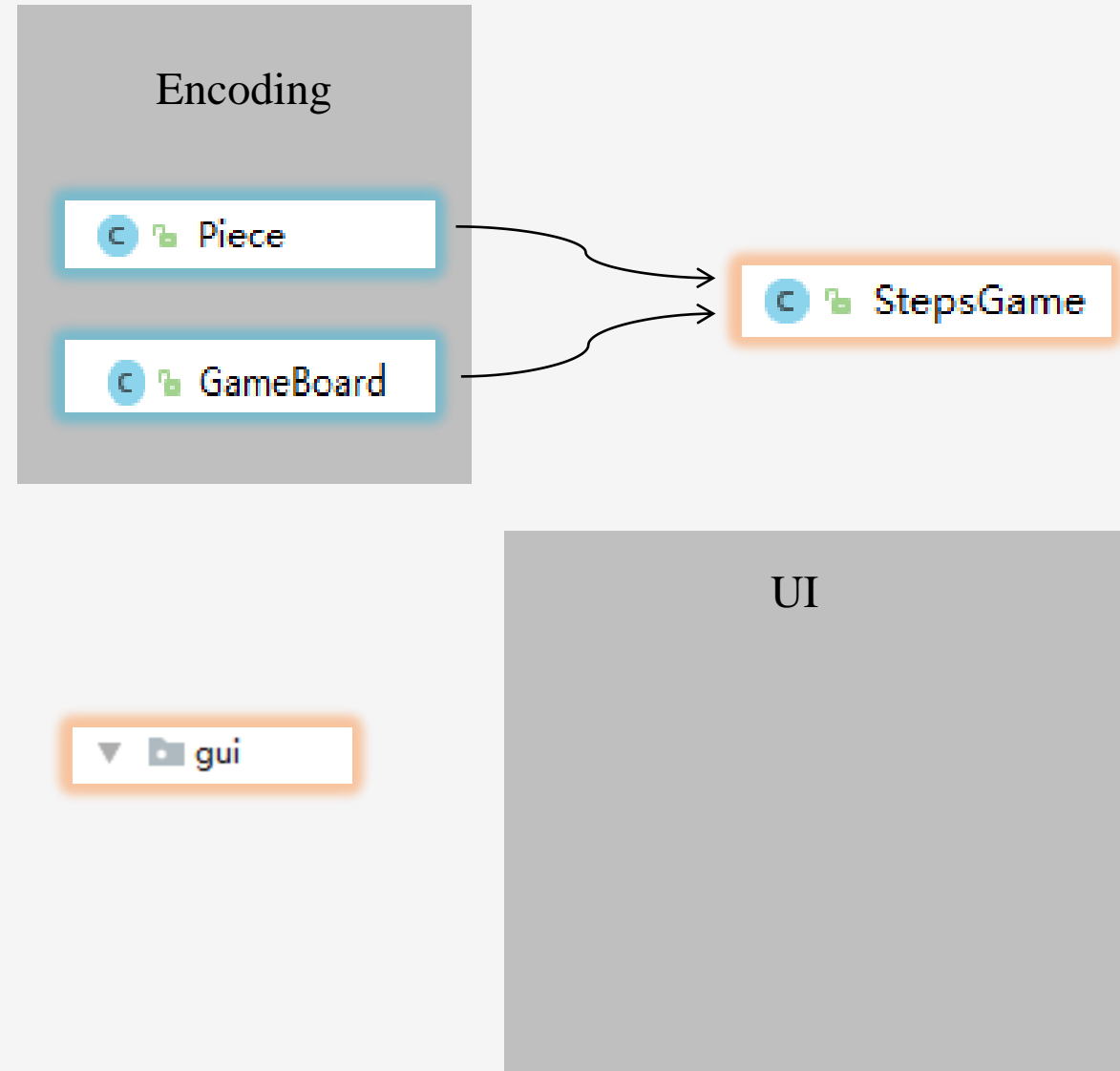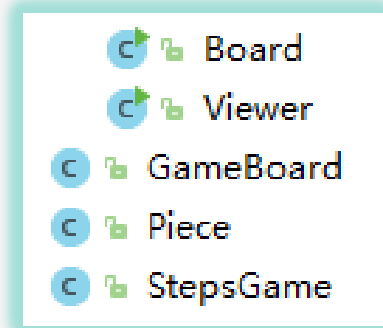
> Building basic classes:

   Piece, GameBoard

> StepsGame: Combine classes

> Board: UI

Encoding Board

- Positions of board: A – Y & a – y

- Encoded to 0 – 49

- Convert to x: 0 – 4

  y: 0 – 9

y

x

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	a	b	c	d	e
f	g	h	i	j	k	l	m	n	o
p	q	r	s	t	u	v	w	x	y

Encoding Pieces

- A piece string: Three chars
    1. The shape
    2. The orientation
    3. The location (on the board)
- Represented by number: '0','1','2'

    '0' means no ring

    '1' means low layer ring

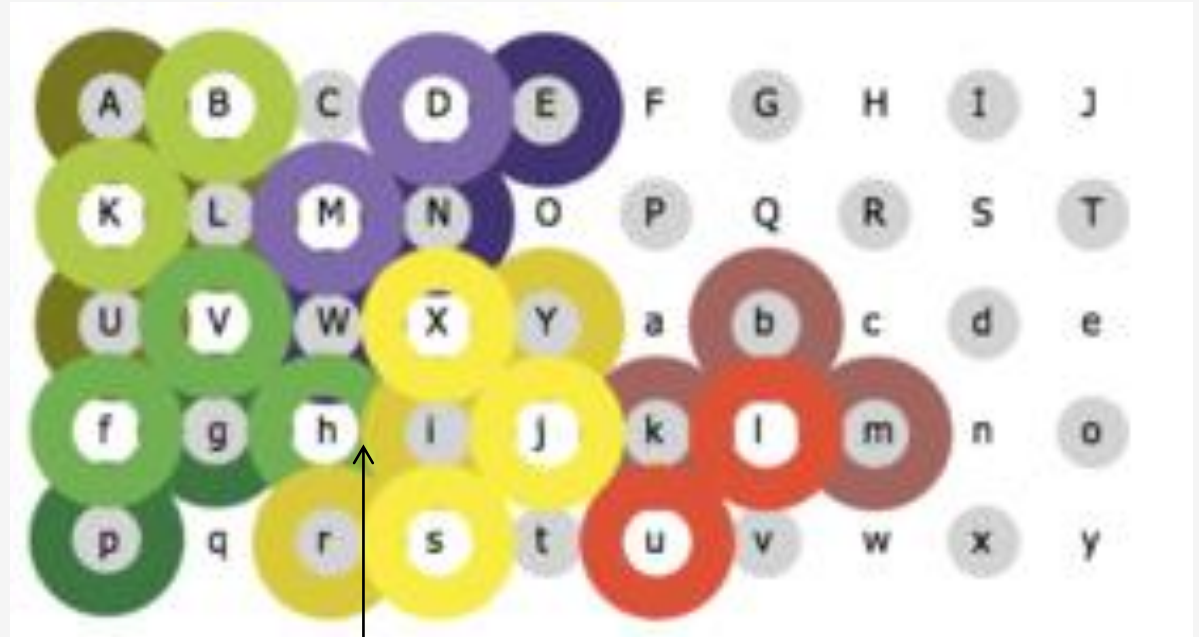   '2' means high layer ring
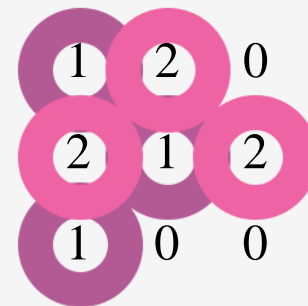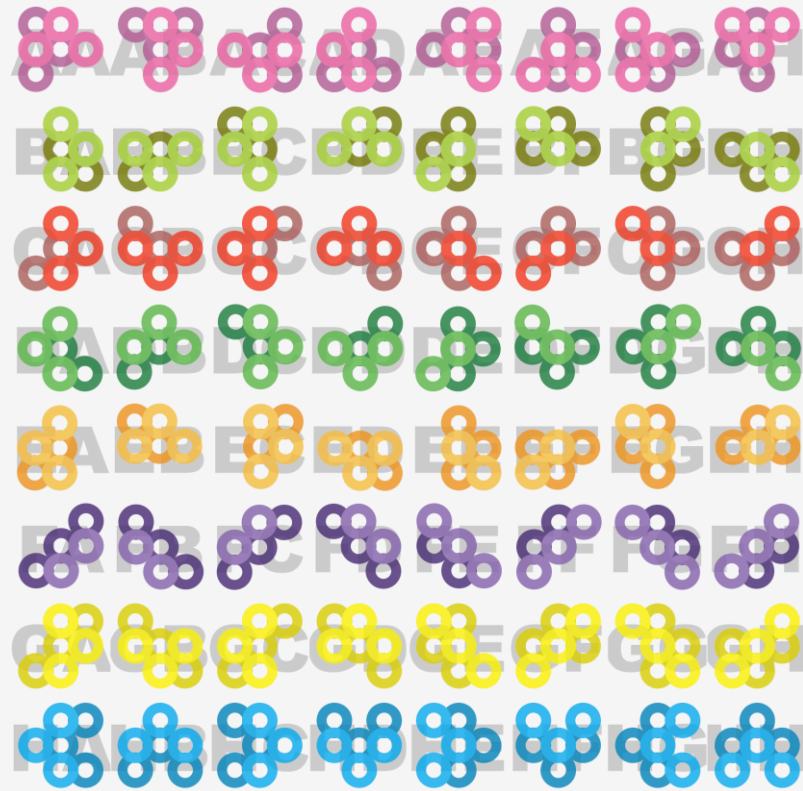
Pieces Validity

- The piece is in the range of the board
- At most eight pieces can be put into board
- Each piece can be used at most once

Checking Obstruction

Obstruction:

- The low layer ring is placed after a high layer ring.

Obstruction!

Checking Obstruction

How to fix obstruction ?

- Firstly,
- Get the coordinates.

```java
/* get the coordinates of home ring in board. */
private class Coord {
    int x, y;

    Coord(int pos) {
        x = pos / 10;
        y = pos % 10;
    }

    Coord(int X, int Y) {
        this.x = X;
        this.y = Y;
    }
}
```

Checking Obstruction

How to fix obstruction ?

- Secondly,

- Place low rings and check neighbors

- How to check neighbors?

- If the ring types of neighbor coordinates is high, this ring cannot be placed.

```java
private boolean checkNeighbours(int currentX, int currentY, int ringType) {
    if (ringType == Piece.Low)
    {
        Coord[] neighbours = new Coord[]
                {
                        new Coord( X: currentX - 1, currentY),
                        new Coord( X: currentX + 1, currentY),
                        new Coord(currentX,    Y: currentY + 1),
                        new Coord(currentX,    Y: currentY - 1)
                };

        for (Coord pos : neighbours)
        {
            if (    0 <= pos.x && pos.x <= 4 &&
                    0 <= pos.y && pos.y <= 9 &&
                    board[pos.x][pos.y] == Piece.High)
            {
                return false;
            }
        }
    }
    return true;
}
```

Checking Obstruction

How to fix obstruction ?

- Thirdly,

- Place high rings

How to place rings ?

- Using "for loop" twice to put rings into the board.

- Using cellNumber of the piece ring to replace the number of the corresponding positions on the board (placed the ring successfully).

```java
private boolean placeRing(int[][] currentShape, int ringType, Coord coord) {
    int x = coord.x;
    int y = coord.y;

    for (int i = -1; i <= 1; i++) {
        for (int j = -1; j <= 1; j++) {
            int cellNumber = currentShape[i + 1][j + 1];
            int currentX = x + i;
            int currentY = y + j;
            if (cellNumber == ringType)
            {
                if (   0 <= currentX && currentX <= 4 &&
                       0 <= currentY && currentY <= 9)
                {
                    if (   board[currentX][currentY] == 0 &&
                           checkNeighbours(currentX, currentY, ringType))
                    {
                       board[currentX][currentY] = cellNumber;
                    } else
                    {
                       return false;
                    }
                } else
                {
                    return false;
                }
            }
        }
    }
    return true;
}
```

THANKS

Chan Xu (u6233112)

Yiwen Peng (u6071714)

Qingsen Kuang(u5917277)