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I am confirming that I have completed this lab completely based on the requirements and it is working and fully functional.

Screenshots:

Lab8.java

```
public class Lab8 {

    public static final int WIDTH = 20;
    public static final int HEIGHT = 20;

    public static void main(String[] args) {

        // initialize turtle position
        int x = 0;
        int y = 0;

        // move forward distance
        int distance;

        int input = 0;

        int[][] shape = new int[WIDTH][HEIGHT];
        Scanner sc = new Scanner( source:System.in);

        Turtle turtle = new Turtle(x, y,  dir:Direction.EAST);
```

```
while(input != 9)
{
    System.out.print( s:"Enter command (9 to end input): ");
    input = sc.nextInt();

    switch (input) {
        case 1 -> turtle.penUp(turtle);
        case 2 -> turtle.penDown(shape, turtle);
        case 3 -> turtle.turnRight();
        case 4 -> turtle.turnLeft();
        case 5 -> {
            System.out.print( s:"Enter forward spaces: ");
            distance = sc.nextInt();
            turtle.moveForward(shape, turtle, distance);
        }
        case 6 -> printShape(shape);
        case 9 -> { }
        default -> { }
    }
}
```

```
// print shape
public static void printShape(int [][] shape)
{
    for(int w = 0 ; w < WIDTH ; w++)
    {
        for(int h = 0 ; h < HEIGHT ; h++)
        {
            if(shape[w][h] == 1)
            {
                System.out.print( s:"*");
            }
            else
            {
                //System.out.print(shape[w][h]);
                System.out.print( s:" ");
            }
        }
        System.out.println();
    }
}
```

Turtle.java

```java
public class Turtle {

    // coordinates of the turtle
    public int x;
    public int y;
    public boolean penStatus;

    // direction of the turtle
    public Direction dir;

    public Turtle(int x, int y, Direction dir)
    {
        this.x = x;
        this.y = y;
        this.dir = dir;
        this.penStatus = false;
    }

    public void penDown(int[][] shape, Turtle turtle)
    {
        turtle.penStatus = true;
        shape[turtle.x][turtle.y] = 1;
    }

    public void penUp(Turtle turtle)
    {
        turtle.penStatus = false;
    }
```

```
public void turnLeft()
{
    if(dir == Direction.EAST)
    {
        dir = Direction.NORTH;
    }
    else if(dir == Direction.NORTH)
    {
        dir = Direction.WEST;
    }
    else if(dir == Direction.WEST)
    {
        dir = Direction.SOUTH;
    }
    else
    {
        dir = Direction.EAST;
    }

}
```

```
public void turnRight()
{
    if(dir == Direction.EAST)
    {
        dir = Direction.SOUTH;
    }
    else if(dir == Direction.SOUTH)
    {
        dir = Direction.WEST;
    }
    else if(dir == Direction.WEST)
    {
        dir = Direction.NORTH;
    }
    else
    {
        dir = Direction.EAST;
    }
}
```

```
public void moveForward(int[][] shape, Turtle turtle, int distance)
{
    if(turtle.penStatus == true)
    {
        while(distance > 0)
        {
            if(turtle.dir == Direction.EAST)
            {
                shape[x][turtle.y] = 1;
                if(turtle.y < 19)
                {
                    turtle.y++;
                }
            }
            else if(turtle.dir == Direction.WEST)
            {
                shape[x][turtle.y] = 1;
                if(turtle.y > 0)
                {
                    turtle.y--;
                }
            }
            else if(turtle.dir == Direction.SOUTH)
            {
                shape[turtle.x][y] = 1;
                if(turtle.x < 19)
                {
                    turtle.x++;
                }
            }
            else
            {
                shape[turtle.x][y] = 1;
                if(turtle.x > 0)
                {
                    turtle.x--;
                }
            }
```

Direction.java

```java
/**
 *
 * @author Jie Mei
 */
public enum Direction {
    EAST,
    SOUTH,
    WEST,
    NORTH
}
```

```
Enter command (9 to end input): 2
Enter command (9 to end input): 5
Enter forward spaces: 12
Enter command (9 to end input): 3
Enter command (9 to end input): 5
Enter forward spaces: 12
Enter command (9 to end input): 3
Enter command (9 to end input): 5
Enter forward spaces: 12
Enter command (9 to end input): 3
Enter command (9 to end input): 5
Enter forward spaces: 12
Enter command (9 to end input): 6
**********
*          *
*          *
*          *
*          *
*          *
*          *
*          *
*          *
*          *
*          *
*          *
**********
```

```
Enter command (9 to end input): 9
BUILD SUCCESSFUL (total time: 16 seconds)
```