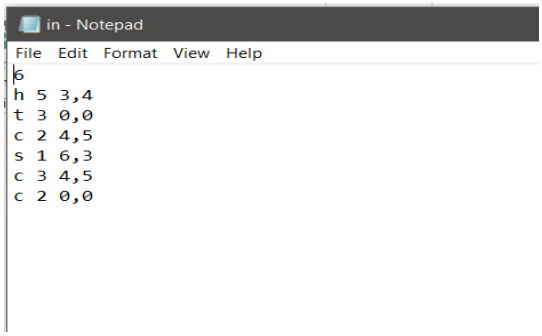
Choose a point on the plane, and fill a collection with several regular shapes (circle, regular triangle, square, regular hexagon). **How many shapes contain the given point?**

Each shape can be represented by its center and side length (or radius), if we assume that one side of the polygons are parallel with x axis, and its nodes lies on or above this side.

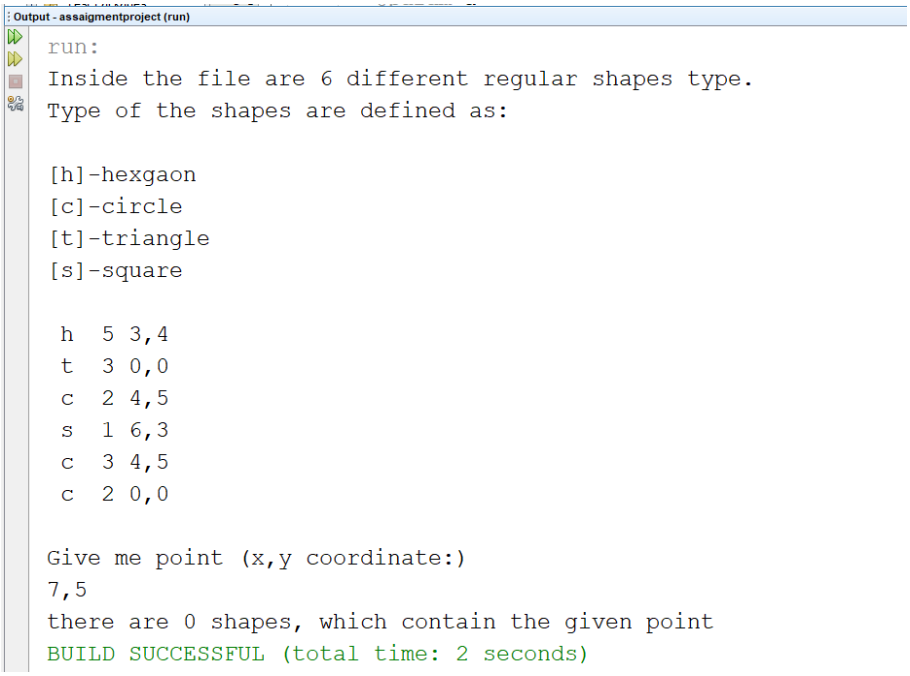
Load and create the shapes from a text file. The first line of the file contains the number of the shapes, and each following line contain a shape. The first character will identify the type of the shape, which is followed by the center coordinate and the side length or radius.

Manage the shapes uniformly, so derive them from the same super class.

INPUT



OUTPUT



Reading

Reading from the file (this method is in the solution class)
Trying to read from the file I need to create an FileReader fl which opens the file in.txt. After that the file that I open I need to read with BufferedReader and later on I put in the scanner where I try to read line by line.
In my input I know that the first line will be a number which will tells me how many shapes are inside the file. Through a for-loop condition I read all the inputs line by line. While I read as an String object some of them I need to convert to an integer.

```
72      public void read() throws FileNotFoundException, IOException, InvalidInputException{
73
74          try {
75
76               FileReader fl = new FileReader ("in.txt");
77               BufferedReader br = new BufferedReader (fl);
78
79              try (Scanner sc = new Scanner (br)) {
80
81                  shape shapes = null;
82                  int cnt = sc.nextInt();
83
84                 System.out.println("Inside the file are " + cnt +" different regular shapes type. ");
85
                    sc.nextLine();
87                  for (int i=1; i<=cnt; i++){
88                  // System.out.println("-----");
89
90                  String simbol=sc.next();
91                  //System.out.print(simbol);
92
93                  String r = sc.next();
94                  int sideLength=Integer.parseInt(r);
95                  //System.out.print(radius);
96
97                  String givenPoint = sc.next();
98
                    String p[] = givenPoint.split(Pattern.quote(","));
```

I would like to mention how I read the coordinates x,y.

I read as string and I split this String in two parts, the first part is the x and the second pars is the y, I convert them and save them.

After reading all the attributes I save them in as an object type which I have and add them to an array.

```
                String p[] = givenPoint.split(Pattern.quote(","));
100             p = givenPoint.split(",",2);
101
102             int x=Integer.parseInt
103             int y=Integer.parseInt
104             // System.out.println(x+"\n"+y);
105
106              switch (simbol) {
107                     case "t":
108                         shapes = new triangle(sideLength,x,y);
109                        //System.out.println("T "+radius+" " +x+","+y);
110                         break;
111                     case "s":
112                         shapes = new square(sideLength,x,y);
113                        //  System.out.println("S "+radius+" " +x+","+y);
114                         break;
115                     case "h":
116                         shapes = new hexagon(sideLength,x,y);
117                          //System.out.println("H "+radius+" " +x+","+y);
118                         break;
119                     case "c":
120                         shapes = new circle(sideLength,x,y);
121                         //System.out.println("C "+radius+" " +x+","+y);
122                         break;
123                     default:
124                         throw new InvalidInputException();
125                }
126             //System.out.println();
127             myshapes.add(shapes);
```

The assigned value is never used

(Alt-Enter shows hints)

In the class shape I have a method Boolean check() which accepted two attributes given from console. Method accepts the attributes and goes through each of the shapes type and check if the given point from console is inside shapes.

While all the shapes have different type of given point I check the difference. Each shapes has a different formula how to find the length of the line from the sidelength given in input.

Those mathematic formula are written and they do the calculation for all the shapes.

I'm interest only to find if the difference between them is in same measure as the height of shapes, I take the difference and check if difference is less than the height it means that is inside the shape if no then is outside.

After checking the calculation return me a value

```
public boolean check(int a, int b){

    if (null != type)switch (type) {
        case "c":
        {
            int difference = (int) Math.sqrt( (Math.pow ( (getX()- a), 2) + Math.pow( ( getY() -b), 2)) );
            return difference < sideLength;
        }
        case "t":
        {
            int difference = (int) Math.sqrt( (Math.pow ( (getX()- a), 2) + Math.pow( ( getY() -b), 2)) );
            int height= (int) ( (Math.sqrt(3) / 2 * sideLength) /2 );
            return difference < height;
        }
        case "h":
        {
            int difference = (int) Math.sqrt( (Math.pow ( (getX()- a), 2) + Math.pow( ( getY() -b), 2)) );
            int height= (int)  ( (Math.sqrt(6) / 2 * sideLength)  /2 ) ;
            return difference < height;
        }
        case "s":
        {
            int difference = (int) Math.sqrt( (Math.pow ( (getX()- a), 2) + Math.pow( ( getY() -b), 2)) );
            int height= (int)  ( (sideLength * Math.sqrt(2) ) /2 );
            return difference < height;
        }
        default:
            return false;
    }
    return false;
```

In the solution class I have a taskSolution() method where I do call the check() method from the shape class.

In this method I do ask the console to give me two points. I convert them as x and y coordinate. The method check accept those two points and does the calculation, I do count each time this method returns true.

```
146     public void taskSolution (){
147
148         int cnt=0;
149         Scanner sc = new Scanner (System.in);
150         System.out.println("\nGive me point (x,y coordinate:) ");
151         String point = sc.nextLine();
            String p[] = point.split(Pattern.quote(","));
153         p = point.split(",",2);
154
155         int x=Integer.parseInt(p[0]);
156         int y=Integer.parseInt(p[1]);
            for (shape j : myshapes){
158             if (j.check(x,y) == true){
159                 cnt++;
160             }
161         }
162         System.out.println("there are " +cnt + " shapes, which contain the given point");
163     }
```

Diagram of the classes: