Programing Assignment 7 Comments

My implementation has four classes which names are DrawSkylinePanel, Point, Rectangle and Skyline. The details of these four classes has shown down below:

- DrawSkylinePanel : Draws skyline to panel
  - *public DrawSkylinePanel(Vector<Point> points, int maxHeight)*
    - Takes points and maximum height of reading rectangles from file.
  - *public void paintComponent(Graphics g)*
    - Takes Graphic object and draws line by taking points.
- Point : keeps coordinates data
  - *public Point(int x, int y)*
    - Takes x and y value for coordinates of point
  - Setters and Getters
- Rectangle : keeps rectangle data
  - *public Rectangle(int width, int height, int position)*
    - Takes width , height and position values
  - *private int leftPosition*
    - Keeps width + position
  - Setters and Getters
- Skyline : main object, reads file and finds skyline points
  - *public Skyline()*
    - Default constructor for initializing first value of variables
  - *public Skyline(String filename)*
    - Taking filename constructor
  - *private void readFile()*
    - Reads file and fills rectangle vector
  - *private void findLineWidth()*
    - Rinds line width value by rectangles left positions
  - *private void fillHeightsToLine()*
    - Finds max heights by rectangle position and fills position line vector
  - *private void findSkylinePoints()*
    - Finds skyline points and fills them to points vector
  - *public void printSkylinePoints()*
    - Prints skyline points to output
  - *private void findMaxHeight()*
    - Finds max height of rectangles
  - Setters and Getters

Program flow

My main class is Skyline in this implementation. Skyline object is created with filename in Main. Skyline constructor calls needful functions. The first call function readfile(), opens file and read width height and position value one by one until the end of the file. While reading file creates new rectangles objects and fills them rectangles vector. Next function is findLineWidth(), finds line(line is distance between first rectangle position and last rectangle right position in the visual) width.
The next function is fillHeightToLine(), takes height of the rectangle that is in the position and fills positionLine array with that heights .
Next function is findSkylinePoints() uses positionLine array for finding skyline points. If there is any change in between indexes height that means in that position is skyline points.
And last function is findMaxHeigth(), finds height of the highest rectangle.
After called printSkylinePoint() and created JFrame for DrawSkylinePanel in the main.

Efficiency and Complexity

My main class is Skyline in this implementation so only that class's functions had been analyzed. Down below could be seen the main method complexity analyzes.

- *readFile()*
    - Assume n is the line number of the file and in this method contain only one loop which is while( ), the other statements take constant time. While loop continue until end of file so it repeat n times. According to this analyze this method's complexity is **O(n)**. About efficiency the best way to read file is read line by line. With three scanner.nextInt() statements in the while loop we can read file three times fast than a while loop without scanner.nextInt() inside.
- *findLineWidth()*
    - First for loop repeat as size of rectangles. Assume n is the size of rectangles, this for loop complexity is **O(n)**. Second for loop repeat as positionLineWidth, lets assume m is the positionLineWidth. So this for loop complexity is **O(m).** Whole method complexity is **max(O(n),O(m)).**
- *fillHeightsToLine()*
    - This method contains nested for loop. Outer for loop repeat as rectangle.size(**O(n)**) and inner loop repeat as rectangle width(**O(m)**). Method complexity is **O(n*m).**
- *findSkylinePoints()*
    - This method contains one for loop. Loop repeats as positionLine.size()-1. Assume that positionLine.size() is n. So method complexity is **O(n-1)**. But constant is not important beside n. According to these time complexity is **O(n)**.

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