

CS602-104 Final Exam

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Planning Document

Use Case	Travel Sales Man Problem
Primary Actor	User Runs the stimulator in eclipse
Pre-Conditions	Eclipse with JRE installed on user's Machine
Main Success Scenario	User runs the program with argument "Monday" or "Tuesday"

Source code

```
import java.awt.Color;
import java.util.Vector;
import javax.swing.JFrame;

public class TSP {
    static int[][] day1 =
    {{64,90},{20,70},{14,89},{50,67},{91,64},{51,31},{1,71},{43,43},{78,88}
    }};
    static int[][] day2 =
    {{25,14},{72,48},{88,94},{89,76},{16,27},{36,72},{20,38},{72,59},{29,80}
    }};
    static int sumAll = 0;

    public static class PermAndCal implements Runnable {
        static Vector<Integer> points = new Vector<Integer>(1,1);
        static PlotPoints plot = new PlotPoints(points);
        static int count =0;
        static int total_chem = 0, total_fuel =0, chem_con =
0, fuel_con =0, total_cost=0;
        static double time_flow=0;
        static int fuel_cost = 0, chem_cost=0;
        static JFrame window1 = new JFrame();
        static int[][] day;

        public PermAndCal(int[][] day){

            window1.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
```

```

        window1.setBounds(30,30,700,600);
        window1.setBackground(Color.BLUE);
        window1.setVisible(true);
        PermAndCal.day = day;
    }

    public static void generatePerm(int size) throws Exception{
        if(size==1){
            System.out.println(count++);
            calculateDistanceAndPlot(day);
        }
        else{
            for(int i=0;i<size-1;i++){
                generatePerm(size-1);
                if(size%2==0)
                    day = swap(i,size-1, day);
                else
                    day = swap(0,size-1, day);
            }
            generatePerm(size-1);
        }
    }

    public static int[][] swap(int a, int b, int[][] day){
        int[] temp = day[a];
        day[a] = day[b];
        day[b] = temp;
        return day;
    }

    public static void calculateDistanceAndPlot(int[][] day)
throws Exception{
        points.removeAllElements();
        points.add(20);
        points.add(25);
        total_fuel=0; total_chem=0; total_cost =0;
time_flow=0; fuel_cost=0; chem_cost=0;
        int distance;
        total_fuel+=50; total_chem+=100;
        fuel_con=50; chem_con=100;
        fuel_cost+=50*5;
        chem_cost+=100*16;
        int sum=0;

```

```

        for(int i=0;i<day.length;i++){
            if(chem_con!=0){
                distance = (int)
trigDistance(points.get(points.size()-2)-
day[i][0],points.get(points.size()-1)-day[i][1]);
                sum+= distance;
                points.add(day[i][0]);
                points.add(day[i][1]);
                time_flown+=0.5;
                chem_con-=25;
                fuel_con-=5;
            }
            else{
                double distance1 =
trigDistance(points.get(points.size()-2)-20, points.get(points.size()-
1)-25);

                double distance2 =
trigDistance(points.get(points.size()-2)-70, points.get(points.size()-
1)-80);

                if(distance1>distance2){
                    points.add(70);
                    points.add(80);
                    points.add(day[i][0]);
                    points.add(day[i][1]);
                    total_chem+=100;
                    total_fuel+= 50-fuel_con;
                    fuel_cost+=(50-fuel_con)*6;
                    chem_cost+=100*15;
                    fuel_con = 45;
                    chem_con=75;
                    time_flown+=0.83;
                    sum+=distance2;
                }
                else{
                    points.add(20);
                    points.add(25);
                    points.add(day[i][0]);
                    points.add(day[i][1]);
                    total_chem+=100;
                    total_fuel+= 50-fuel_con;
                    fuel_cost+=(50-fuel_con)*5;
                    chem_cost+=100*16;
                    fuel_con =40;
                    chem_con=75;
                }
            }
        }
    }
}

```

```

        time_flown+=0.83;
        sum+=distance1;
    }
}

System.out.println(time_flown+" Time");
window1.getContentPane().removeAll();
window1.getContentPane().add(plot);
window1.setVisible(true);
System.out.println(sum+" "+sumAll+"print");

if(sumAll==0){
    sumAll=sum;
    plot.total_distance=sumAll;
    System.out.println(sumAll+"dist");
    plot.setPoints(points);
    plot.total_chem=total_chem;
    plot.total_fuel=total_fuel;
    time_flown+=sumAll/100;
    total_cost+= fuel_cost+chem_cost;
    total_cost+=time_flown*120;
    total_cost+=(time_flown+1)*100;
    plot.total_cost=total_cost;
    window1.repaint();
    window1.setBackground(Color.BLUE);
    window1.setVisible(true);
}
else if(sumAll>sum){
    sumAll=sum;
    plot.total_distance=sumAll;
    plot.setPoints(points);
    plot.total_chem=total_chem;
    plot.total_fuel=total_fuel;
    time_flown+=sumAll/100;
    total_cost+=time_flown*120;
    total_cost+=(time_flown+1)*100;
    total_cost+= fuel_cost+chem_cost;
    plot.total_cost=total_cost;
    window1.repaint();
    window1.setBackground(Color.BLUE);
    window1.setVisible(true);
}
time_flown+=sumAll/100;

```

```

        System.out.println(time_flow+" Time");
        System.out.println(fuel_cost+" Fuel");
        System.out.println(chem_cost+" Chem");
        total_cost+= fuel_cost+chem_cost;
        total_cost+=time_flow*120;
        total_cost+=(time_flow+1)*100;
        System.out.println("totalcost"+total_cost);
    }
    @Override
    public void run() {
        // TODO Auto-generated method stub
        try {
            generatePerm(day.length);
        } catch (Exception e) {
            // TODO Auto-generated catch block
            e.printStackTrace();
        }
    }
}

public static void main(String[] args){
    Thread day1Thread;
    if(args[0].equals("monday"))
        day1Thread = new Thread(new PermAndCal(day1));
    else
        day1Thread = new Thread(new PermAndCal(day2));
    day1Thread.start();
}

    public static double trigDistance(int distanceX, int distanceY){
        return
Math.sqrt(Math.pow(((double)distanceX),2)+Math.pow(((double)distanceY)
, 2));
    }

}

```

PlotPoints.java

```

import java.awt.Color;
import java.awt.Graphics;
import java.util.Vector;

```

```

import javax.swing.JComponent;

public class PlotPoints extends JComponent {
    private static final long serialVersionUID = 1L;
    public Vector<Integer> points;
    //public int[] stat = new int[3];
    int size=0;
    public int
total_distance=0,total_chem=0,total_fuel=0,total_cost=0;
    public PlotPoints(Vector<Integer> point){
        points = point;
        size = points.size();
    }

    public void setPoints(Vector<Integer> point){
        points=point;
        size = points.size();
    }

    public void paint(Graphics g){
        g.setColor(Color.blue);
        g.fillRect(0, 0, getWidth(), getHeight());
        g.setColor(Color.white);
        int i;
        int count = 1;
        for( i=0; i<points.size()-4;i+=2){

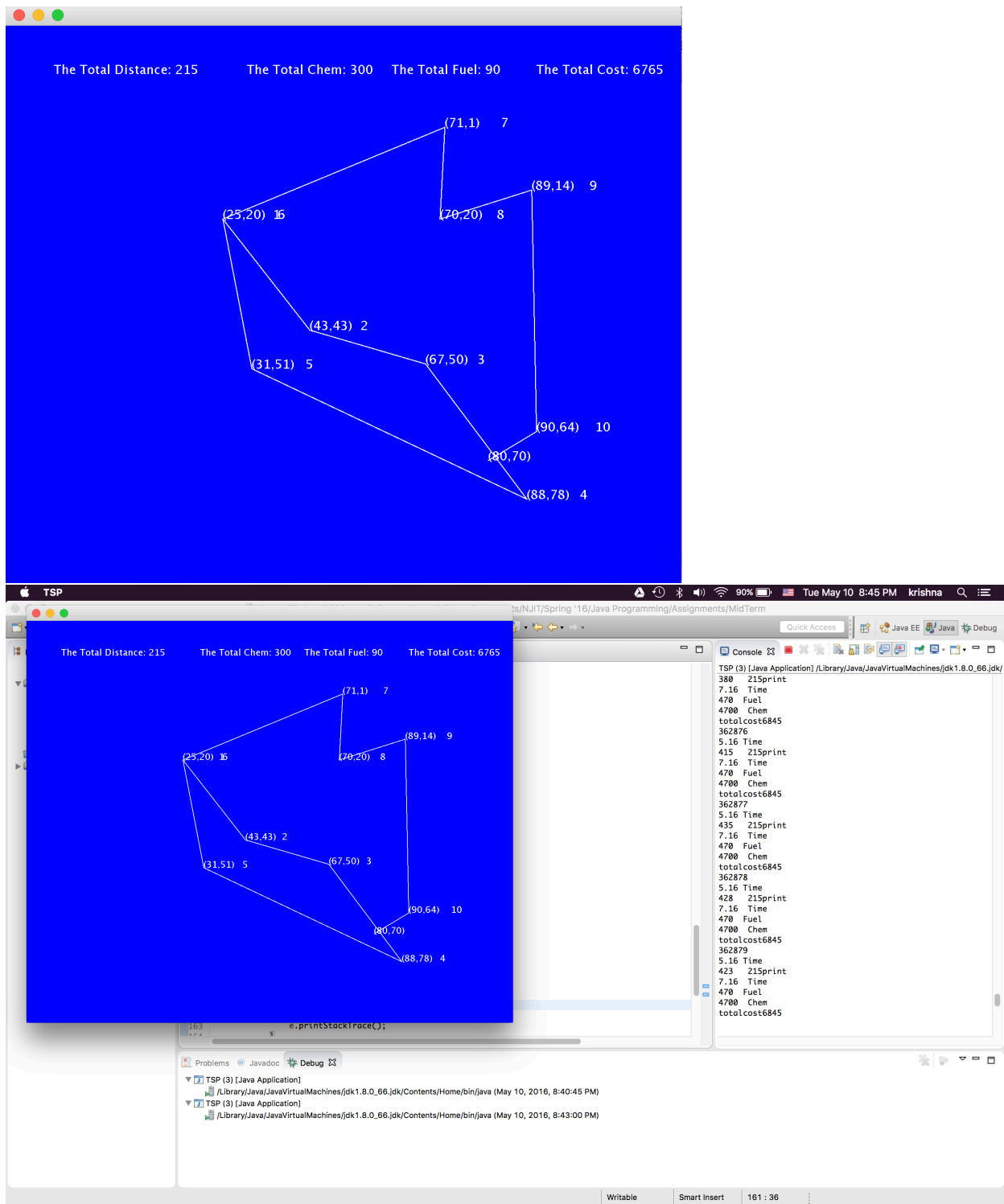
            g.drawString("("+points.get(i+1)+","+points.get(i)+")",
100+points.get(i+1)*5, 100+points.get(i)*5);

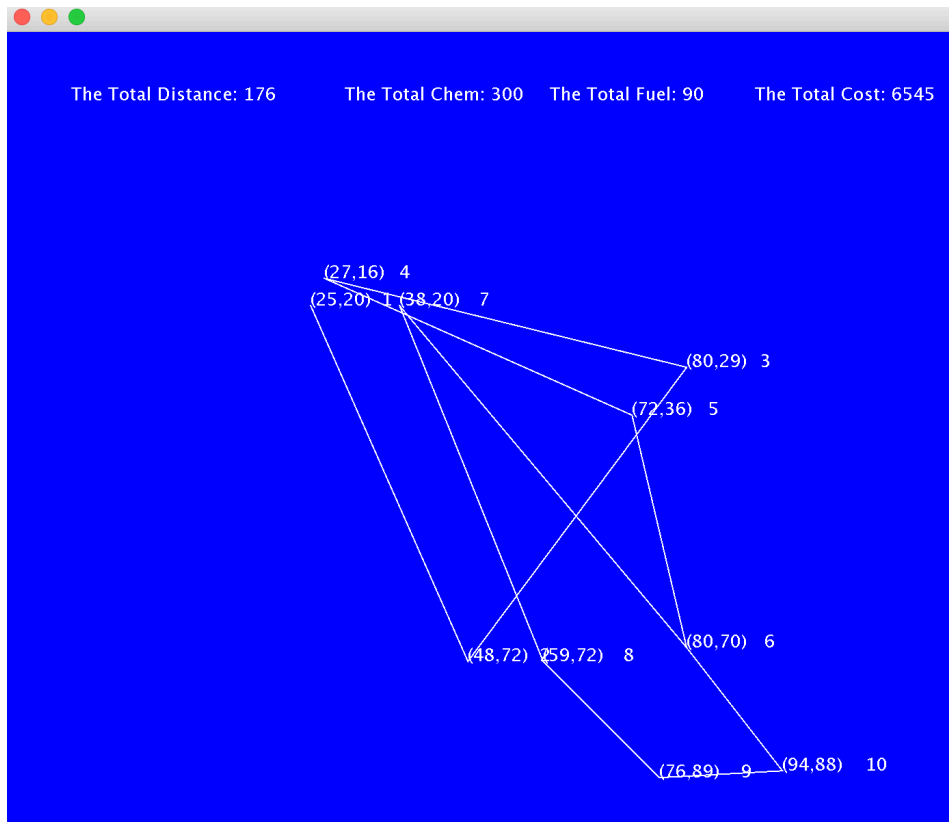
            g.drawString("("+points.get(i+3)+","+points.get(i+2)+")",100+
points.get(i+3)*5,100+ points.get(i+2)*5);
            g.drawLine(100+points.get(i+1)*5, 100+points.get(i)*5,
100+points.get(i+3)*5, 100+points.get(i+2)*5);
            g.drawString(" "+count++, count+150+points.get(i+1)*5,
100+points.get(i)*5);
        }
        g.drawString("The Total Distance: "+total_distance, 50,
50);

        g.drawString("The Total Chem: "+total_chem, 250, 50);
        g.drawString("The Total Fuel: "+total_fuel, 400, 50);
        g.drawString("The Total Cost: "+total_cost, 550, 50);
    }
}

```

Screenshots:





ts/NJIT/Spring '16/Java Programming/Assignments/MidTerm

Quick Access

Java EE Java Debug

The Total Distance: 176 The Total Chem: 300 The Total Fuel: 90 The Total Cost: 6545

Nodes and Coordinates:

- (27,16) 4
- (25,20) 1
- (38,20) 7
- (80,29) 3
- (72,36) 5
- (48,72) 8
- (59,72) 8
- (80,70) 6
- (76,89) 9
- (94,88) 10

Console

```
TSP (3) [Java Application] [/Library/Java/JavaVirtualMachines/jdk1.8.0_66.jdk/
406 176print
406 176print
6.16 Time
490 Fuel
4600 Chem
totalcost6545
362876
5.16 Time
377 176print
6.16 Time
490 Fuel
4600 Chem
totalcost6545
362877
5.16 Time
423 176print
6.16 Time
490 Fuel
4600 Chem
totalcost6545
362878
5.16 Time
369 176print
6.16 Time
490 Fuel
4600 Chem
totalcost6545
362879
5.16 Time
356 176print
6.16 Time
490 Fuel
4600 Chem
totalcost6545
```

Problems Javadoc Debug

TSP (3) [Java Application]
/Library/Java/JavaVirtualMachines/jdk1.8.0_66.jdk/Contents/Home/bin/java (May 10, 2016, 8:40:45 PM)

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