CS 2334: Project 5
Graphics

Project 4 Lessons

Project 4 Lessons

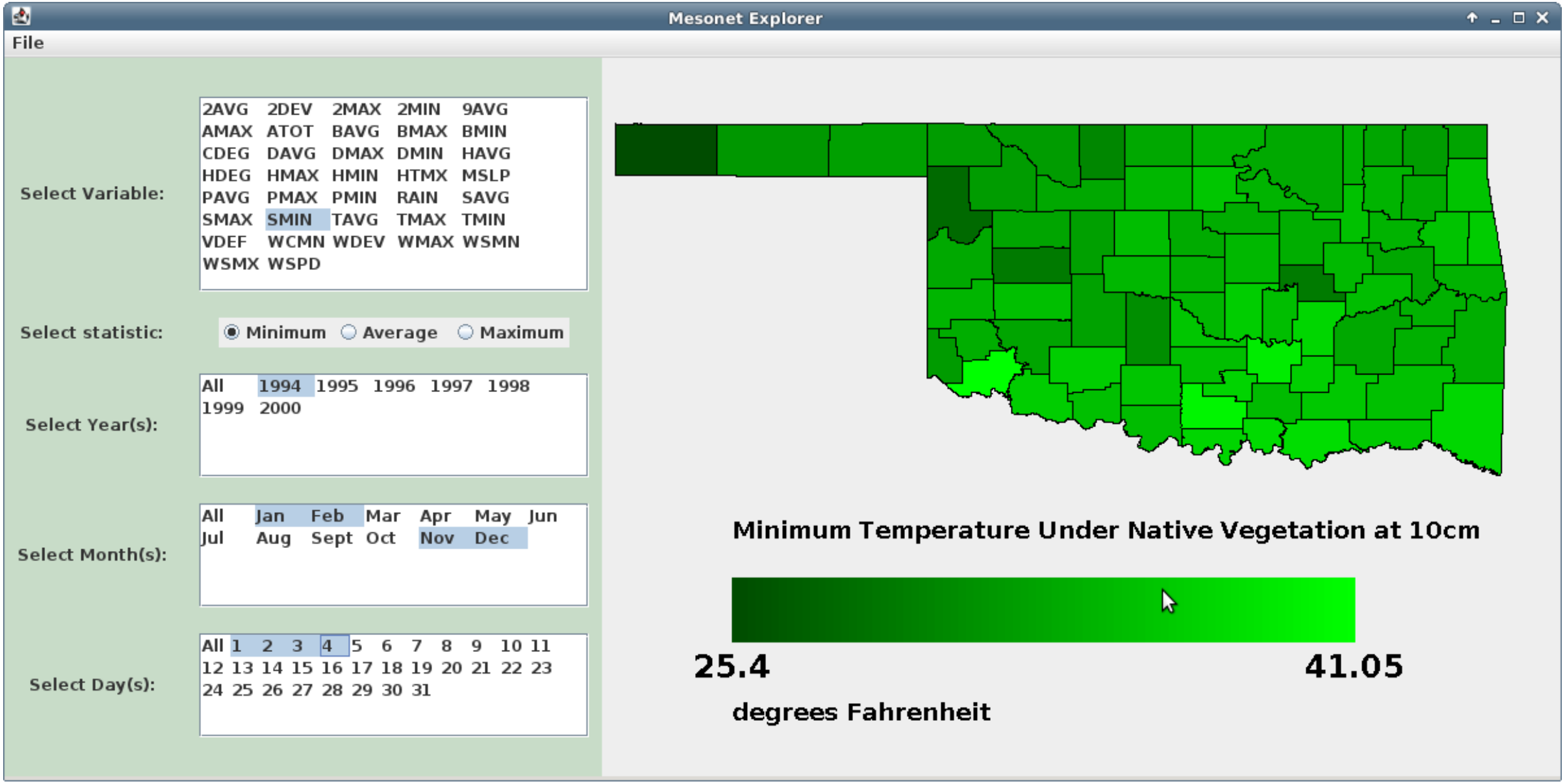
- Graphical User Interfaces
- Event-driven programming
  - Non-linear flow of control
- Multiple threads
  - One thread can throw an exception while others keep executing
- Debuggers are your friends
- Unit testing is critical
- Creating an object instance from another instance

Project 5

Enable the user to explore the data:

- Select single variable
- Select a statistic: max, min, average
- Select one or more years, months and days

- For each county in Oklahoma, paint the county with a color that represents the statistic for the county

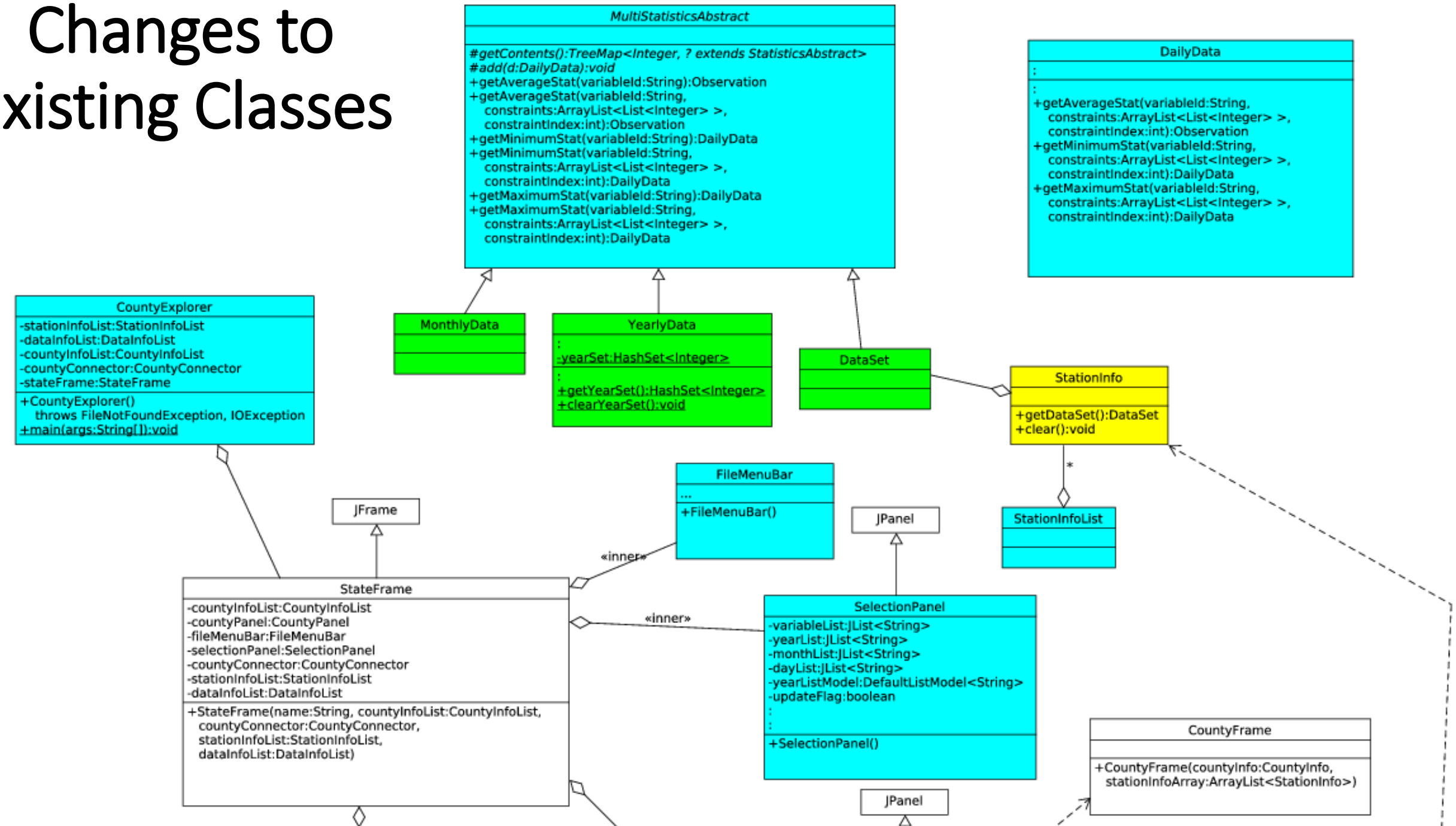

Mesonet Explorer
File
Select Variable:
2AVG 2DEV 2MAX 2MIN 9AVG
AMAX ATOT BAVG BMAX BMIN
CDEG DAVG DMAX DMIN HAVG
HDEG HMAX HMIN HTMX MSLP
PAVG PMAX PMIN RAIN SAVG
SMAX SMIN TAVG TMAX TMIN
VDEF WCMN WDEV WMAX WSMN
WSMX WSPD
Select statistic:
Minimum
Average
Maximum
Select Year(s):
All 1994 1995 1996 1997 1998
1999 2000
Select Month(s):
All Jan Feb Mar Apr May Jun
Jul Aug Sept Oct Nov Dec
Select Day(s):
All 1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23
24 25 26 27 28 29 30 31
Minimum Temperature Under Native Vegetation at 10cm
25.4
41.05
degrees Fahrenheit

- Demonstration ….

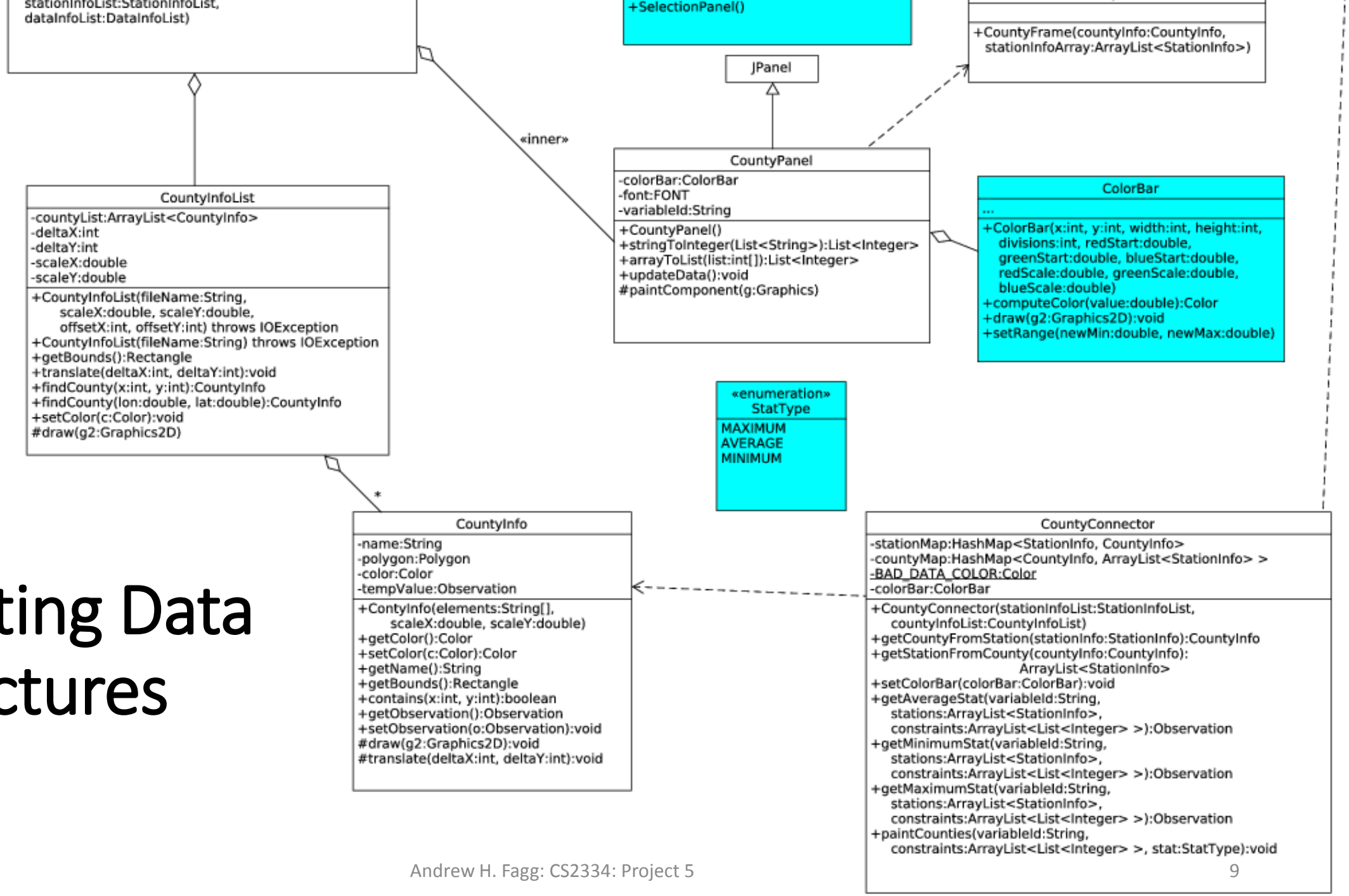
Objectives

- Representing complex 2D shapes
  - Rendering
  - Detection of shape selection by a mouse click
- Compute min/max/avg statistics over a set of stations in a county
- Pop-up windows that have a structure that is data-driven

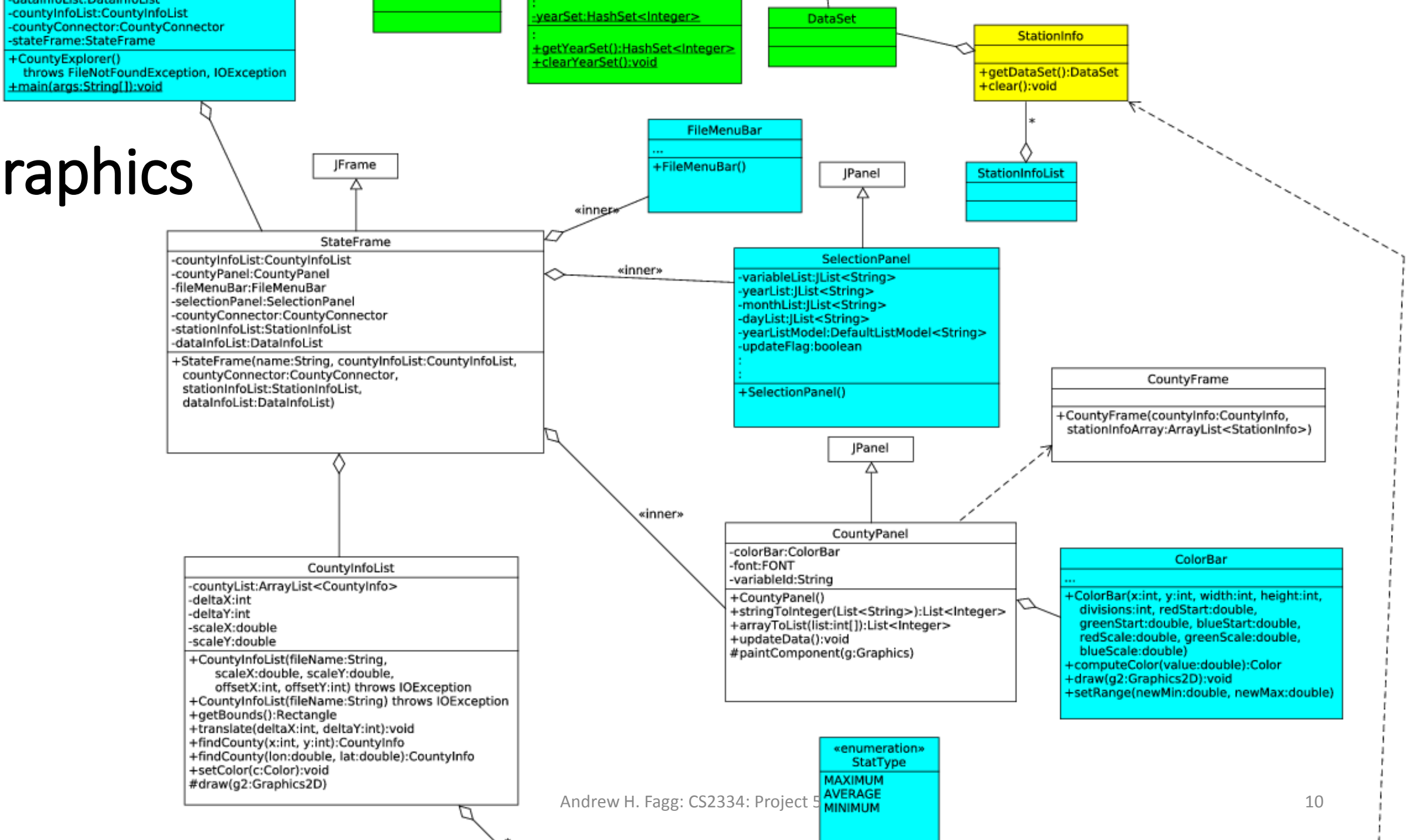
Changes to Existing Classes



Supporting Data Structures



Graphics


-countyInfoList:CountyInfoList
-countyConnector:CountyConnector
-stateFrame:StateFrame
+CountyExplorer()
throws FileNotFoundException, IOException
+main(args:String[]):void
-yearSet:HashSet<Integer>
+getYearSet():HashSet<Integer>
+clearYearSet():void
DataSet
StationInfo
+getDataSet():DataSet
+clear():void
FileMenuBar
+FileMenuBar()
JFrame
JPanel
StationInfoList
«inner»
StateFrame
-countyInfoList:CountyInfoList
-countyPanel:CountyPanel
-fileMenuBar:FileMenuBar
-selectionPanel:SelectionPanel
-countyConnector:CountyConnector
-stationInfoList:StationInfoList
-dataInfoList:DataInfoList
+StateFrame(name:String, countyInfoList:CountyInfoList,
countyConnector:CountyConnector,
stationInfoList:StationInfoList,
dataInfoList:DataInfoList)
SelectionPanel
-variableList:JList<String>
-yearList:JList<String>
-monthList:JList<String>
-dayList:JList<String>
-yearListModel:DefaultListModel<String>
-updateFlag:boolean
+SelectionPanel()
CountyFrame
+CountyFrame(countyInfo:CountyInfo,
stationInfoArray:ArrayList<StationInfo>)
CountyInfoList
-countyList:ArrayList<CountyInfo>
-deltaX:int
-deltaY:int
-scaleX:double
-scaleY:double
+CountyInfoList(fileName:String,
scaleX:double, scaleY:double,
offsetX:int, offsetY:int) throws IOException
+CountyInfoList(fileName:String) throws IOException
+getBounds():Rectangle
+translate(deltaX:int, deltaY:int):void
+findCounty(x:int, y:int):CountyInfo
+findCounty(lon:double, lat:double):CountyInfo
+setColor(c:Color):void
#draw(g2:Graphics2D)
CountyPanel
-colorBar:ColorBar
-font:FONT
-variableId:String
+CountyPanel()
+stringToInteger(List<String>):List<Integer>
+arrayToList(list:int[]):List<Integer>
+updateData():void
#paintComponent(g:Graphics)
ColorBar
+ColorBar(x:int, y:int, width:int, height:int,
divisions:int, redStart:double,
greenStart:double, blueStart:double,
redScale:double, greenScale:double,
blueScale:double)
+computeColor(value:double):Color
+draw(g2:Graphics2D):void
+setRange(newMin:double, newMax:double)
«enumeration»
StatType
MAXIMUM
AVERAGE
MINIMUM

Supporting Data Structures

CountyInfo

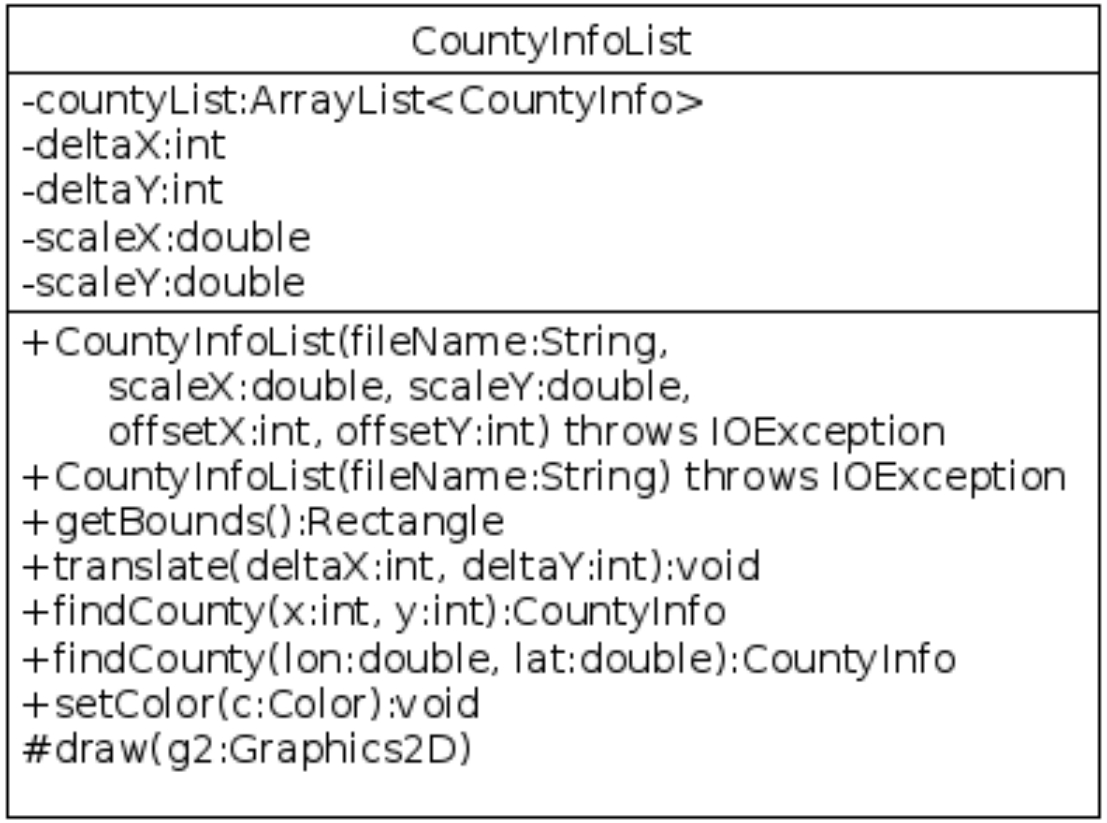
- Represent polygonal shape of a county
- Rendering: paint the county on a panel
- Selecting counties by mouse clicks

CountyInfo
-name:String -polygon:Polygon -color:Color -tempValue:Observation
+CountyInfo(elements:String[], scaleX:double, scaleY:double) +getColor():Color +setColor(c:Color):Color +getName():String +getBounds():Rectangle +contains(x:int, y:int):boolean +getObservation():Observation +setObservation(o:Observation):void #draw(g2:Graphics2D):void #translate(deltaX:int, deltaY:int):void

Supporting Data Structures

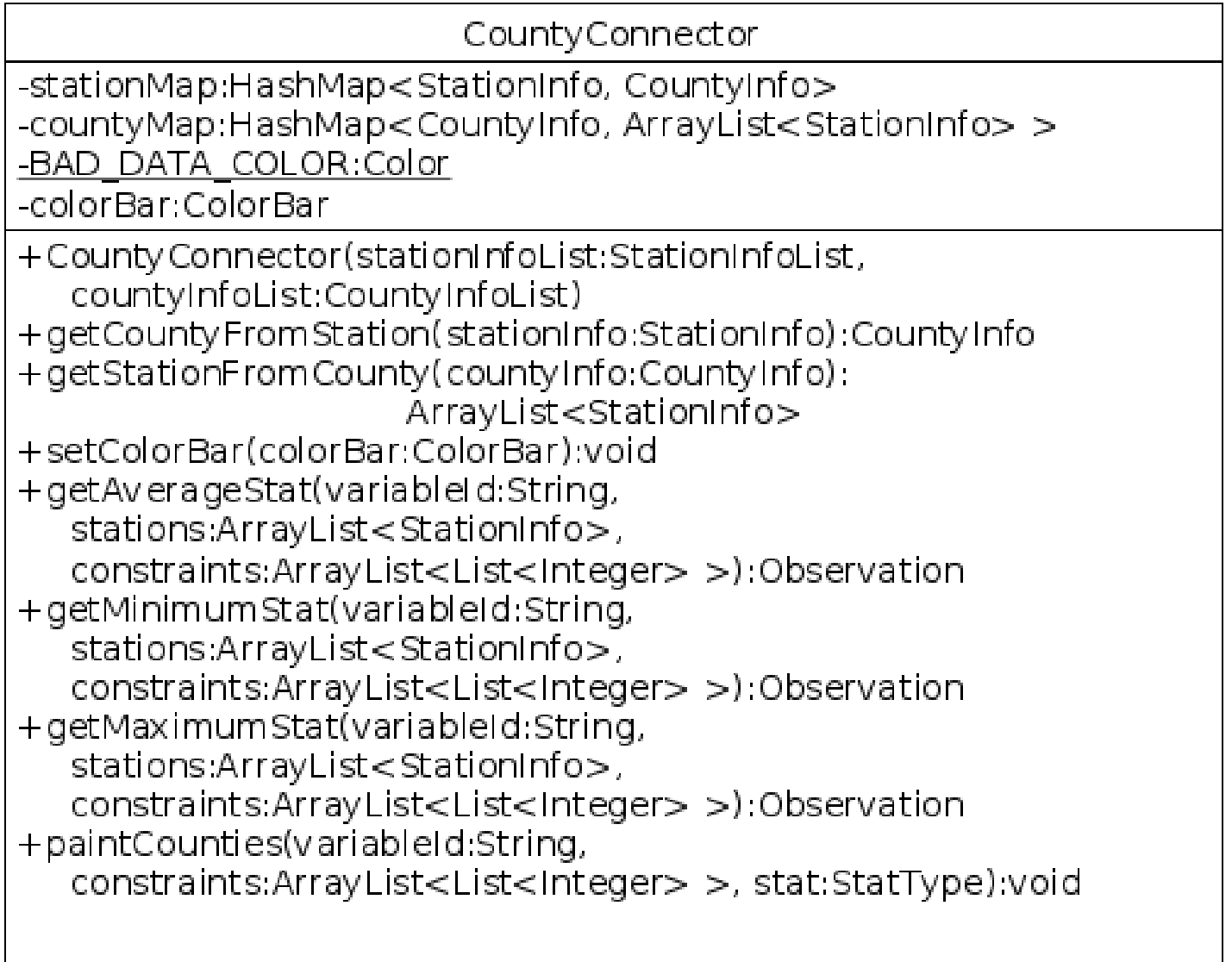
CountyInfoList

- Load configuration file and create counties
- Configure polygon set for representation in a panel
- Translate screen or long/lat into a selected county



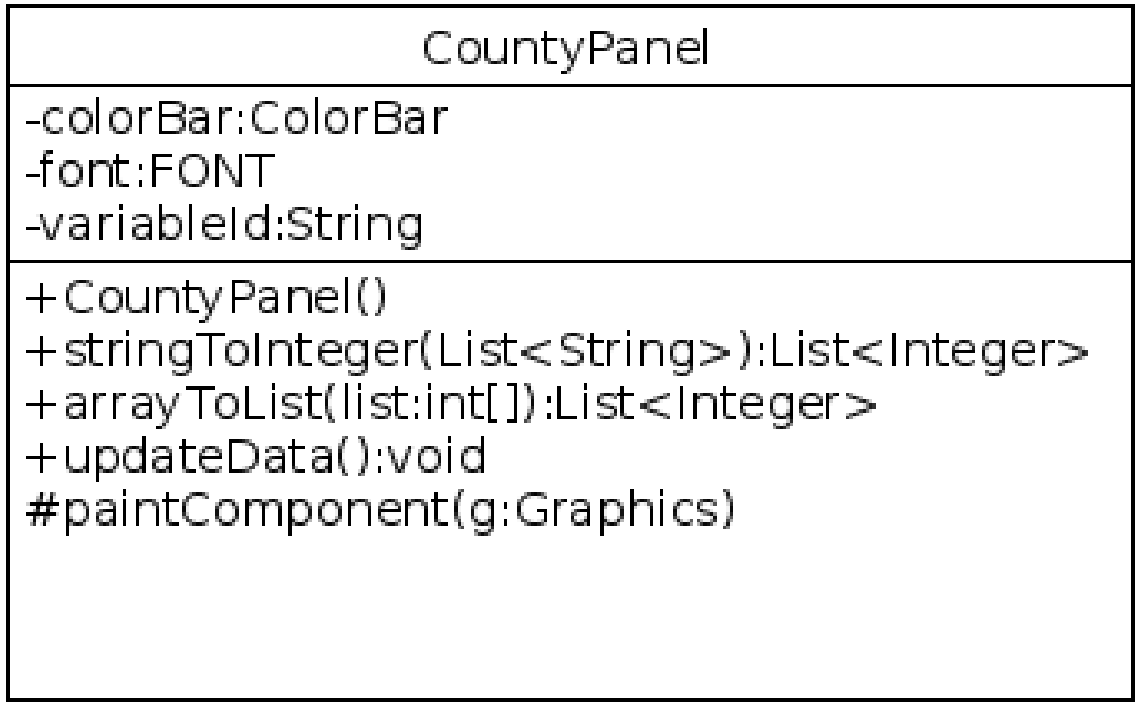
Supporting Data Structures: CountyConnector

- Make connections between a county and a set of stations
- Compute statistics over all stations in a county
- Paint counties by value



Graphics: CountyPanel

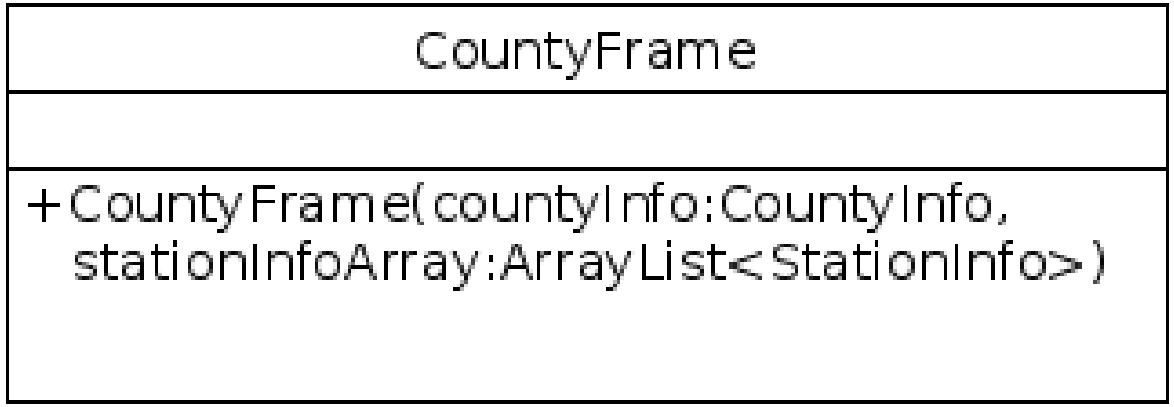
- Render state map
- Display selected variable information (name and units)
- Display color bar



GUI: CountyFrame

Pop-up window for a county

- Display all stations within the county
- The number of stations will vary: so structure is dynamic



Notes

- Supporting code will be released in two pieces
  - Today: Code not necessary for project 4
  - Friday: Classes that overlap with project 4
  - (there is plenty to do in the mean time)

- Implement and test incrementally

Deadlines

- Project must be submitted by Monday, Dec 7th @1:29pm
- Code review must be completed by Friday, Dec 11th