**Design Sketch for Twenty Questions**

**GameApplication**

GameApplication runs the program with xml file arguments.

* Instance methods
  + main()

**GameController**

GameController is the controller for the 20 questions game. It makes changes to the models based on user’s input. It also changes the view to reflect the models. Extends JComponent. Implements ActionListener.

* Instance variables
  + JButton yes
  + JButton no
  + JButton restart – restart the game
  + GameView view
* Instance methods
  + actionPerformed – call updateQuestion and updateTree accordingly
  + createView – display all the labels
  + createButtons – display the three buttons

**GameView**

* Instance variables
  + JLabels[][] labels – all the pre-specified choices
  + FileReader reader
  + BinaryTree<String> gameTree
* Instance methods
  + setUpChoices – return a JPanel containing all the choice labels
  + setUpQuestion – return a JLabel of question
  + updateQuestion (String answer) – update the question according to user’s answer
  + updateTree (String input) – update the decision tree based on user’s input

**GameFileReader**

* Instance methods
  + readFile (File file)
  + parseFile (Document document)
  + parseNode (Node n, BinaryTree<String> decisionTree)
  + parseElement (Element element)

**xmlFile**

* Person
  + Ginny Weasley
  + Draco Malfoy
  + Minerva McGonagall
  + Lord Voldemort
* Place
  + Weasleys’ Wizard Wheezes – in Diagon Ally
  + The Three Broomsticks
  + Azkaban
  + Room of Requirement
* Object
  + Elder Wand
  + Golden Snitch
  + Invisibility Cloak
  + The Marauder’s Map
* Others
  + Basilisk – magical creature
  + Nagini – horcrux
  + Crookshanks – pet
  + Sectumsempra – spell