Homework 9 Rationale

**parseEquation:**

This is the public function that other programs can call to use this utility. The parseEquation function takes in a String containing the equation to be solved. I chose to parse the string by splitting it into individual characters. It then checks the current state of the state String and calls the appropriate private method for the current input. If the state variable equals exit, the function will return the String containing the answer to the equation.

**String state:**

This is the String that the program uses to determine what to do next. I decided to use a String because I thought it would be faster to code than making an Enum class. In retrospect, this was a horrible idea. I have learned my lesson and will make an Enum class next time.

The String provides six different values throughout the program: init, oparen (short for open parentheses), cparen (short for closed parentheses), num, operator, and exit.

* The value init lets the program know that this is our first time through the while loop. Oparen executes the same general code. This section of code looks for the rightmost open parentheses, removes them, and then looks for a number. It also checks to see if it is time to exit
* Num indicates that we are expecting a numeric value and persists until we have gotten the whole number. It then puts it into a Float and adds it to the operands ArrayList.
* operator looks for values like + and – and puts them into the operators ArrayList.
* cparen removes the closed parentheses that we just found and then solves the innermost portion of the equation. It takes the operators and the operands from their respective ArrayLists and solves that section of the equation following order of operations. It then puts the result back into the equation and returns to the oparen state.