**Algorithm:**

1. Welcome the user
2. Explain the purpose of the program to the user
3. Ask the user for the inputs of Carbon, Hydrogen, Sulfur, and Oxygen.
4. Read the inputs
   1. Test to see if Carbon is in the valid range of 44-79%
   2. Test to see if Hydrogen is in the valid range of 2-5%
   3. Test to see if Sulfur is in the valid range of .5-4.5%
   4. Test to see if Oxygen is in the valid range of 1-30%
   5. Test to see if the total of all inputs is less than or equal to 100%
   6. Test to make sure the inputs are actual numbers and not characters
5. If any values are wrong print out the issue out to the user and thank them
6. Calculate Coal Calorific Value
   1. The calorific formula is Q = (337 \* C) + 1442 \* ( H – O/8) + (93 \* S)
   2. Divide the total by 100 to get the actual value needed
7. Print the Coal Calorific Value back to the user with only one decimal
8. Thank the user

**Test Cases:**

1. Carbon tests:
   1. Put in an amount below 44
      1. Should print out an error
   2. Put in 44
   3. Put in an amount greater than 44 but less than 79
   4. Put in 79
   5. Put in amount greater than 79
      1. Should print out an error
2. Hydrogen tests:
   1. Put in an amount below 2
      1. Should print out an error
   2. Put in 2
   3. Put in an amount greater than 2 but less than 5
   4. Put in 5
   5. Put in an amount greater than 5
      1. Should print out an error
3. Sulfur tests:
   1. Put in an amount below 0.5
      1. Should print out an error
   2. Put in 0.5
   3. Put in an amount greater than 0.5 but less than 4.5
   4. Put in 4.5
   5. Put in an amount greater than 4.5
      1. Should print out an error
4. Oxygen tests:
   1. Put in an amount below 1
      1. Should print out an error
   2. Put in 1
   3. Put in an amount greater than 1 but less than 30
   4. Put in 30
   5. Put in an amount greater than 30
      1. Should print out an error
5. Input 79 for Carbon, 5 for Hydrogen, 4.5 for Sulfur, and 30 for Oxygen
   1. Should print out that the percentages input is greater than 100%
6. Input a random character for any of the inputs
   1. Should print out an error that the inputs must be in number form inside of their valid ranges.