William Veith
Optional Final Project

July 25th, 2018
Applied Math Methods

This chart provides an overview of the program interface displayed by the command line.

Interface	Description
Step 1: Input Feed Chemical Composition Enter Chemical Component 1: methanol Would You Like To Add Another Chemical Component? yes Enter Chemical Component 2: ethanol Would You Like To Add Another Chemical Component? yes Enter Chemical Component 3: 1-propanol Would You Like To Add Another Chemical Component? yes Enter Chemical Component 4: 1-butanol Would You Like To Add Another Chemical Component? no	Enter the names of each component in the mixture. The name must be the component's IUPAC name. Misspelled or incorrect names will result in the program being unable to find antoine coeffients for that component.
How Many Moles Are Fed To The Column: 100 What Fraction Of The Feed Is 1-butanol : .35 What Fraction Of The Feed Is 1-propanol : .15 What Fraction Of The Feed Is ethanol : .20 What Fraction Of The Feed Is methanol : .30 Is this a flash system: yes What Is The Total Pressure Of The System: 760 Is This Pressure In mmHg? yes What Fraction Of The Feed Vaporized : .4 Would You Like To Analysis This System Using Another Model? yes Would You Like To Remodel The System As A Fractional Distillation System? yes What Is The Light Key? methanol What Fraction Of methanol Is Recovered In The Distillate? .95 What Is The Heavy Key? ethanol What Fraction Of ethanol Remains In The Bottoms? .95 Would You Like To Use The Same Total System Pressure Used In The Flash Calculation? yes What Is The Value Of q? 1.10 You Can Input A Reflux Ratio OR Use 1.4X The Minimium Reflux Ratio Would You Like To Input A Reflux Ratio? yes What Is Your Reflux Ratio? 3.0 Would You Like To Analysis This System Using Another Model? no	The program will ask for: 1) Each component's molar fraction of the mixture 2) The operating pressure and percentage of feed vaporized *If this is a flash system a Rachford-Rice Model will be run. Additional models can also be chosen.* 3) Desired product specification of the distillation 4) A reflux ratio. *If no reflux ratio is provided, 1.4X the minimium reflux ratio will be used (distillation heuristic)*
FLASH DISTILLATION RESULTS USING EQUILIBRIUM AND RACHFORD-RICE Equilibrium Results Temperature Results Dew Temperature : 99.65 Celsius Boiling Temperature: 82.79 Celsius Chemical : Liquid Vapor 1-butanol : 0.69 0.09 1-propanol : 0.14 0.08 ethanol : 0.09 0.24 methanol : 0.09 0.59 Rachford-Rice Results Feed Fraction Vaporized : 0.40 Temperature Results Vaporization Temperature: 89.37 Celsius Chemical : Liquid Vapor 1-butanol : 0.48 0.16 1-propanol : 0.17 0.12 ethanol : 0.17 0.25 methanol : 0.19 0.47 MULTICOMPONENT FRACTIONAL DISTILLATION RESULTS USING F.U.G.K Temperature At Top Of Column : 65.17 Celsius Temperature At Bottom Of Column: 95.76 Celsius Light Key : methanol Heavy Key : ethanol Total Feed Rate: 100.00 (mol/hr) Chemical : Distillate 29.50 (mol/hr) Bottoms 70.50 (mol/hr) 1-butanol : 0.00 0.50 1-propanol : 0.00 0.21 ethanol : 0.03 0.27 methanol : 0.97 0.02 The Minimium Reflux Ratio At Total Reflux : 2.27 Minimium Number Of Stages At Total Reflux : 11.41 Number Of Stages For A Reflux Ratio Of 3.00 : 17.39 Feed Tray Location For A Reflux Ratio Of 3.00: 8.28 Program ended with exit code: 0	The results of each model run by the program will print out.