

A Student Competition to Develop a Chemical Engineering App for the iPhone

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Paper 388c: CACHE Symposium: Honoring Award Recipients
American Institute of Chemical Engineers Annual Meeting
Salt Lake City, UT
November 7-12, 2010



Introduction

□ Fall 2009

- *ChBE 234 - Product Design*
 - Interdisciplinary course offered in multiple engineering departments
 - Students intended to form cross-department teams to complete product design projects offered by faculty
 - 1-credit hour course in fall for design
 - Optional 3-credit hour course in spring to complete product
- *Design brief:*
 - You are to design the killer iPhone app for chemical engineering students. This app –codename DistillNation – will be so useful to every English-speaking chemical engineering student with an iPhone or an iPod Touch will be willing to spend \$2 to buy it. It will be that useful.
 - To design the app, you must design every screen (i.e., provide a screen shot and navigation between screens) and define the functionality of every button. It needs to be complete enough that we can put it in the hands of an iPhone app programmer who has no chemical engineering experience and be able to write the code.



Introduction

❑ Challenge taken up by team of 5

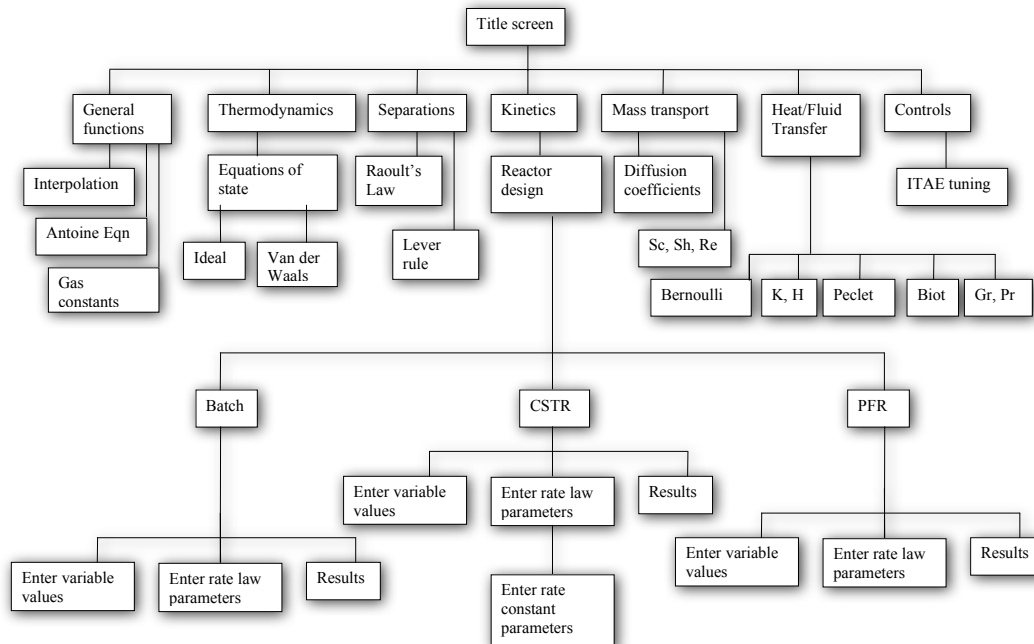
- Michael Skoumal (ChBE), Tracy Grant (ChBE), Gary Owen (ChBE), Joel Westwood (ChBE), Kimberly Lesnick (ChBE), Guy Kopsombut (EECS)

❑ Deliverables at conclusion of fall

- *Functionality defined*
- *Detailed mock-ups of screen shots and menus*



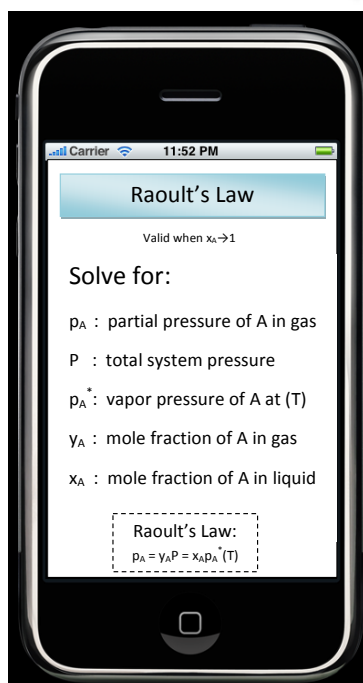
Proposed App Structure



- *Students divided sections among themselves for detailed specs*



Proposed App Screen Shots



- Several hundred pages of documentation

Reactor Design Main Screen

- Choose reactor type by pushing on the orange buttons for each reactor type
- "Back" and "Main" buttons always present
- "Back" will go back to ChE menu
- "Main" will come back to THIS page

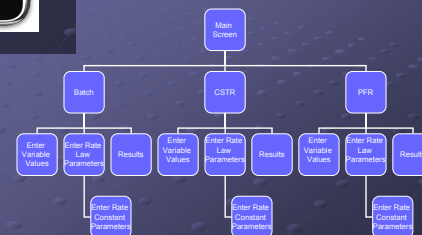


CSTR Screen – 3b

- This is the screen for entering rate constant parameters
- The user can enter values for the constant and the temperature at which the constant was obtained
- If the reactor temp is different from the constant temp, then the program will adjust the rate constant for the reactor temp using
- "Activation Energy" should be 'inactive' unless reactor temp is different than constant temp
- Arrow button goes back to Screen 1



Overall Flow Sheet



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Implementation

- ❑ Students decided they wanted to build actual app
 - Primary programming performed by Guy Kopsombut (EECS) and Michael Skoumal (ChBE)
 - Other students worked on code pieces within framework established by Kopsombut
 - Preliminary version finished by end of semester
 - Getting an app onto an iPhone or into app store non-trivial
 - Provisioning certificate
 - Hence, project completion was graded on three elements:
 - Youtube video showing functionality of app using simulator
 - <http://www.youtube.com/user/skm10505#p/u/4/XqytjH2jPms>
 - Youtube video showing app working on iPhone
 - <http://www.youtube.com/user/skm10505#p/u/3/FCNdCw43yRg>
 - Videos are searchable by by author, skm10505
 - Poster presented at end-of-course poster session for product design
 - Missing documentation for some parts of app



Recent Developments

ChEZ for AICHE - Android

http://www.androidzoom.com/android_applications/tools/chez-for-aiche_nchw.html

ChEZ for AICHE - Android

Program Information Download Changelog

Ads by Google

[Free Remote Access Trial](#) Bomgar.com/RemoteSupport
View, Control & Fix PC/Mac/Linux From One Desk. Lower IT Costs Now.

[Mobile Data Capture](#) www.intouchsurvey.com
Anytime, anywhere. Instant Insight. I devices, Android, Windows

"ChEZ for the AICHE Conference."

Add to list Embed

Rating: No rated yet
Price: Free
Version: 1.3
Added: November 07, 2010
Publisher: [Michael Skoumal](#)
File size: 1.19 MB
Downloads: <50

Download

ChEZ for the AICHE Conference.

Recent changes:
Significant update coming in December, 2010!

Package: michael.Chez_AICHE

Sponsored Links (Ads by Google)

[Salt Lake City Coupons](#) www.Groupon.com/Salt-Lake-City
1 ridiculously huge coupon a day. Like doing Salt Lake at 90% off!

Related applications

App Name	Downloads	Price	Rating
NDC	100-500 downloads	Free	★★★★★
BC Test App	<50 downloads	Free	★★★★★
JavaZone Conference Cl...	1000-5000 downloads	Free	★★★★★
Oracle OpenWorld 2010	500-1000 downloads	Free	★★★★★
Recommender	<50 downloads	Free	★★★★★
Hudson2Go Lite	<50 downloads	Free	★★★★★
Kugl 2.1	<50 downloads	Free	★★★★★
Testing	<50 downloads	Free	★★★★★
Credit Usage Lite	100-500 downloads	Free	★★★★★
Interval Timer	1000-5000 downloads	Free	★★★★★

Other apps by Michael Skoumal

App Name	Downloads	Price	Rating
ChEZ Lite	100-500 downloads	Free	★★★★★
ChEZ	<50 downloads	\$0.99	★★★★★

AndroidZoom.com on

Recent Developments

App Store > Education > CHEZ

ChEZ

Description

ChEZ - the app for chemical engineering students! ChE students encounter a wide variety of equations that, while not difficult to solve, are mundane and perhaps better handled by a computer. Want to see the full equation and supplemental information behind this powerful problem solver? Click the "Reference" button and see the supporting inf

ChEZ Support >

Free App

Category: Education
Released: Nov 06, 2010
Version: 1.0
1.0
2.0 MB
Language: English
Seller: Peter Cummings
© Peter Cummings

Rated 4+

Requirements: Compatible with iPhone, iPod touch, and iPad. Requires iOS 3.1.2 or later

Nothing Selected

Recent Developments

❑ Since graduation...

- *Skoumal and Kopsombut refined code*
- *Skoumal created Android version*
 - http://www.androidzoom.com/android_applications/tools/chez-for-aiche_nchw.html
- *Kopsombut and Skoumal submitted CheZ to Apple app store*
 - App approved and now available from App Store on device or from iTunes
 - Currently available for free
 - *Feedback desired*
 - *Functionality not sufficient to warrant charging*



Lessons Learned

❑ Plus

- *Students love to program for iPhone*
 - Exposure to modern programming language and project management (Xcode)

❑ Minus

- *Too ambitious*
 - Instead, focus on one area (e.g., thermodynamics)
- *Better project management by faculty*
 - Student ideas not consistent with expectations
 - More review of content
- *How could app be better?*
 - Graphics
 - More interactivity
 - Connection to on-line information/data
 - Validation



Conclusions

❑ iPhone app project

- *Enthusiastically embraced by students*
- *Excellent tool for teaching group software project*
 - Software project broken down in interoperable parts
 - *Shell created by computer scientist*
 - *Code written by ChBE students*
 - Use of modern software development tools
 - *Xcode*
 - Learn modern programming tools without realizing it
- *Students like cool factor*
 - Immediate feedback from simulator

❑ Next step

- *National competition?*
 - CAChE, AIChE
 - *Revenue model*
- *Other mobile devices*
 - Android, Blackberry

