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

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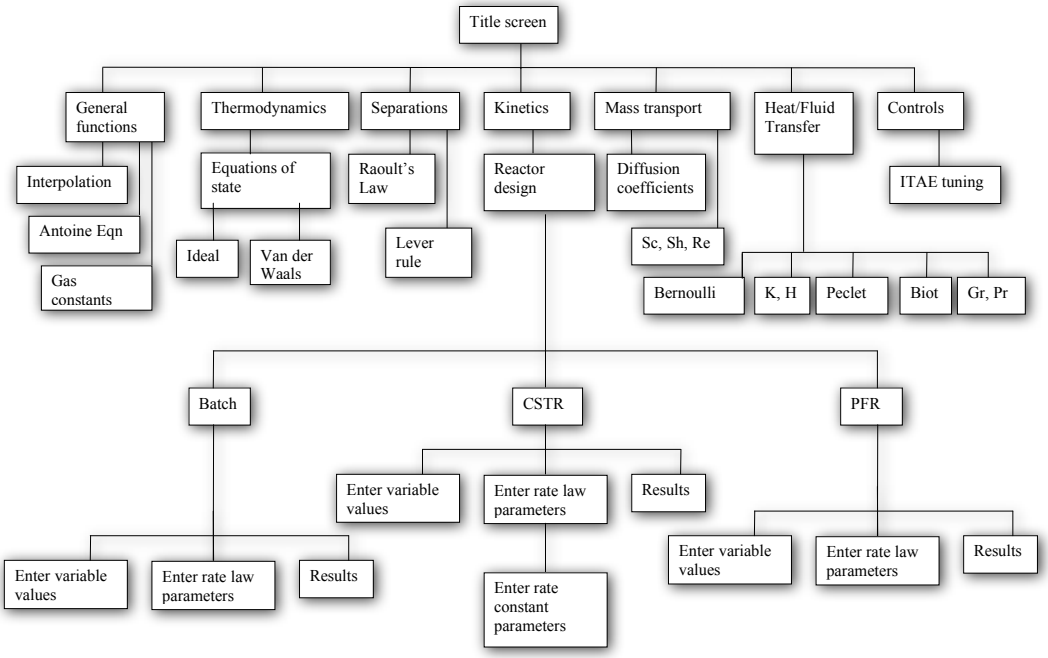
Introduction

- 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

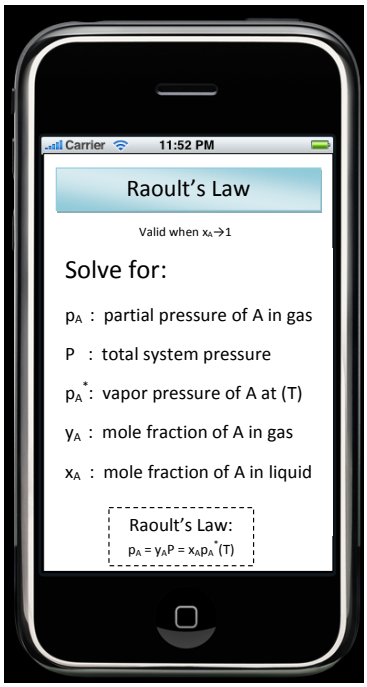
- Challenge taken up by team of 5
  - *Michael Skoumal (ChBE), Tracy Grant (ChBE), Gary Owen (ChBE), Joel Westwood (ChBE), Kimberly Lesnick (ChBE), Guy Kopsombut (EECS)*
- Deliverables at conclusion of fall
  - *Functionality defined*
  - *Detailed mock-ups of screen shots and menus*

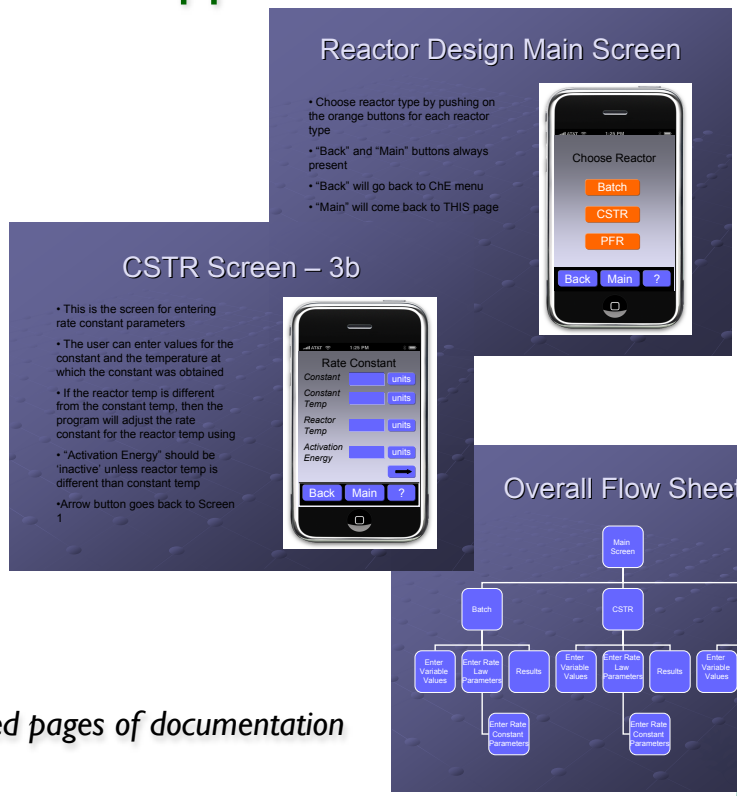
Proposed App Structure



- *Students divided sections among themselves for detailed specs*

Proposed App Screen Shots



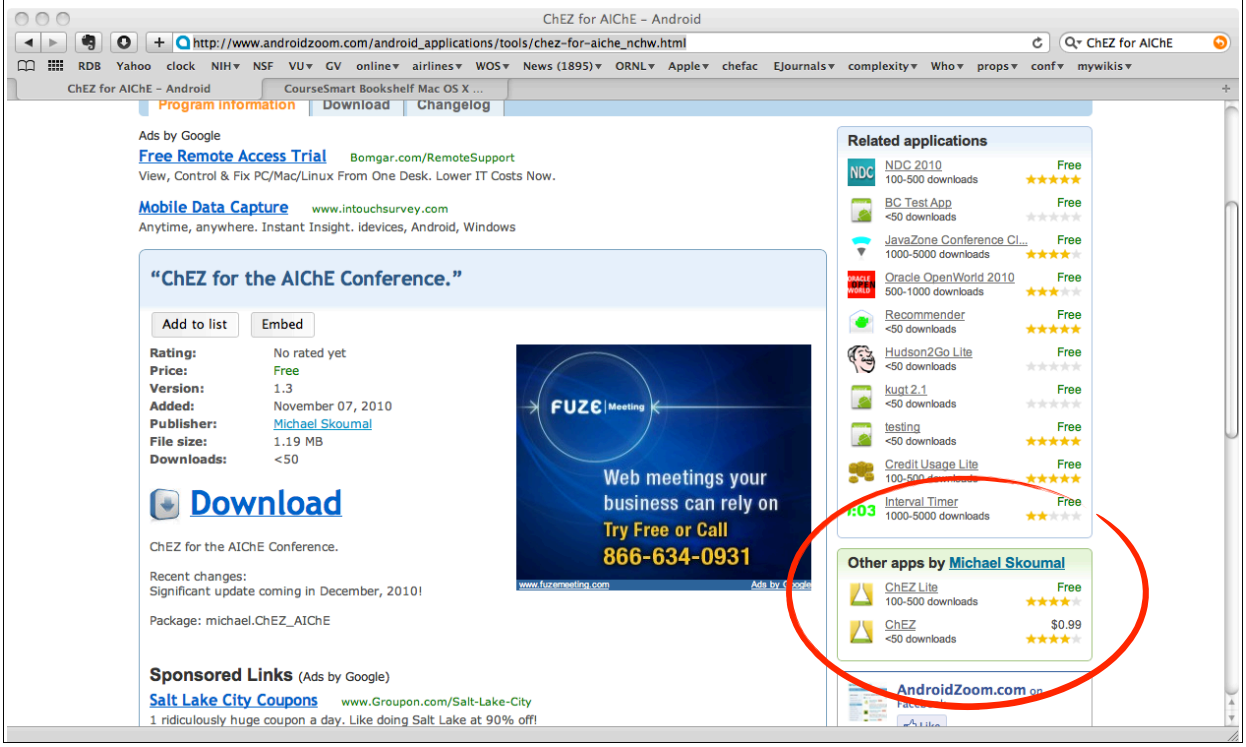


- *Several hundred pages of documentation*

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



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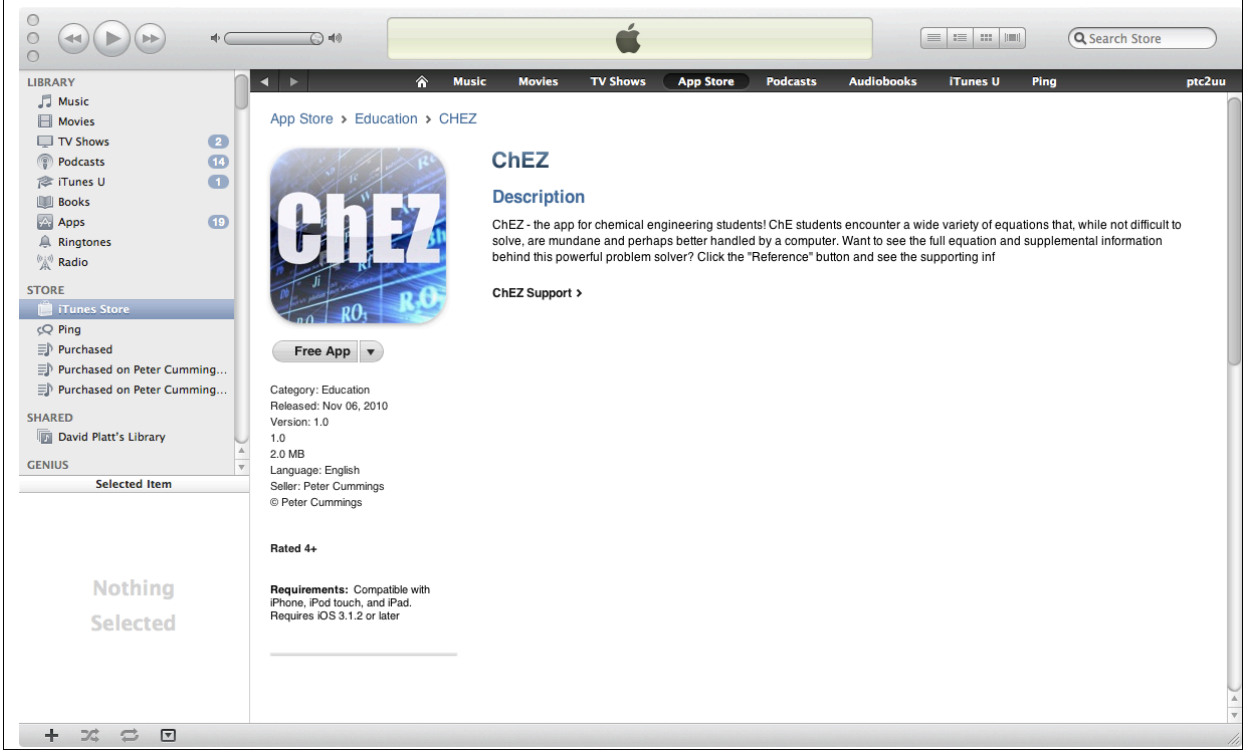

Recent Developments

- 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