Scantron™

LON-CAPA & Scantron™ Exams

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Simon Fraser University

1) Jan 2005 South Carolina - Scantron Exams -- Guy Albertelli
2) Summer Semester 2005 implemented for Chem110/111 -Gerrit Keizer
3) Chose to run 2 or 3 part exams in which 1st part is LON-CAPA and last part handwritten/graded.
4) Similarly in the subsequent semesters.
5) Why? Numerous reasons not necessarily individually compelling but collectively so.
   a) It becomes relatively effortless to generate new versions of exams, as needed.
   b) Complete control over dynamically generated content.
   c) Provides a permanent and cumulative association of assessment resources with statistics reflecting their effectiveness.
   d) By creating and grading M/C exams in LON-capa, we are now able to easily maintain a semi-quantitative evaluation of every Exam question, which can be readily reviewed when selecting questions for a new exam.

Building an Exam in Your Course

1. Click Menu item: "Edit Course"

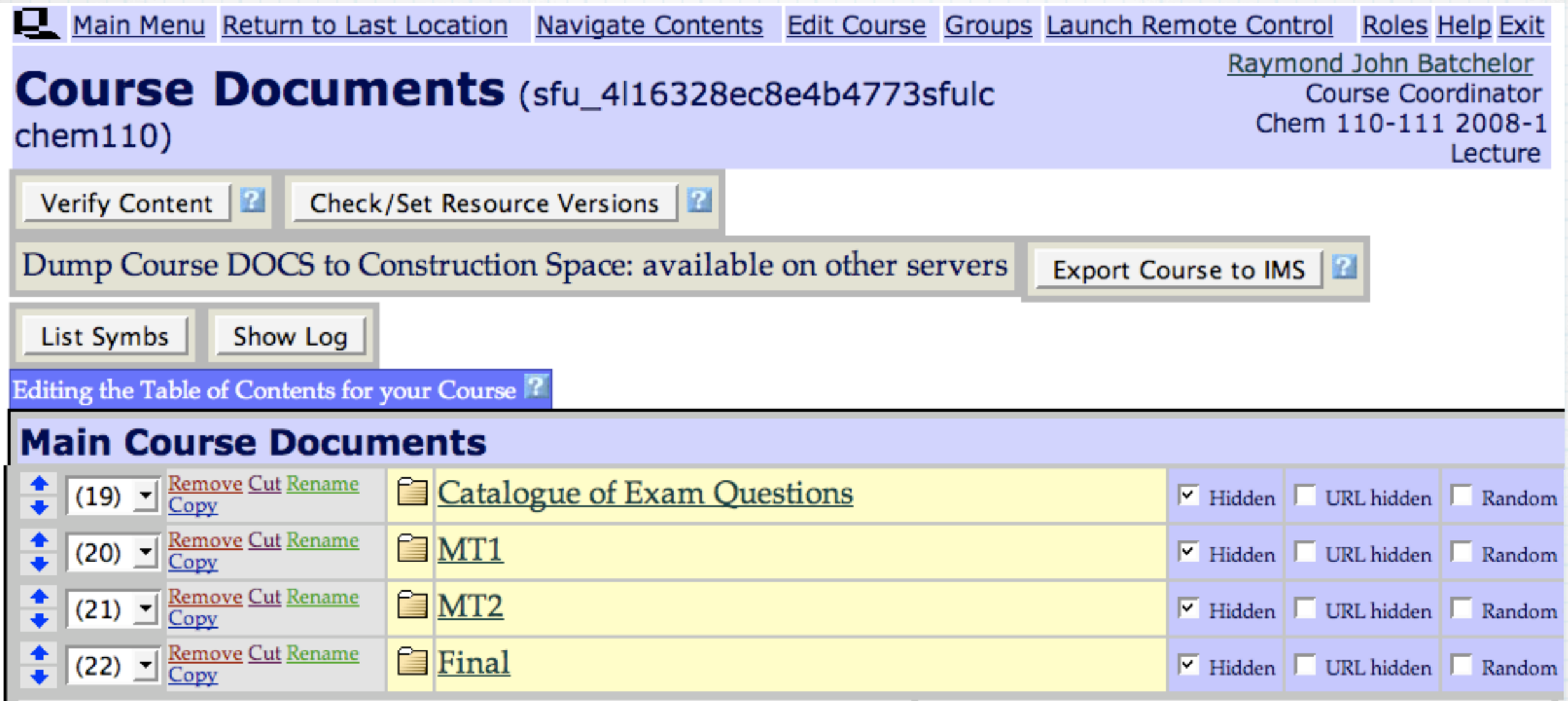
2. Create a New Folder for the exam and rename it e.g. "Final"

3. Mark the folder as "hidden" from the students.

4. Open the folder.

5. *Browse* or ***Search*** the repository for resources of *type* = ".problem" or "**.exam**" & *import* them into the folder.

1) As I walk through the steps in assembling and grading a LON-CAPA/Scantron exam I expect it will become apparent where the advantages lie.
2) Creating an exam is just the same as creating a homework sequence.
3) Four folders, one as just a place-holder for resources which are considering to use.
4) All hidden folders. Click to enter.



1) As I walk through the steps in assembling and grading a LON-CAPA/Scantron exam I expect it will become apparent where the advantages lie.
2) Creating an exam is just the same as creating a homework sequence.
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4) All hidden folders. Click to enter.

Editing the Table of Contents for your Course

Main Course Documents->**Final**

Parameters:

- contents hidden

(1)	Remove Cut Rename Copy	Units conversion. (MT1_073: 0.11ds, 64%)	Hidden
(2)	Remove Cut Rename Copy	Significant Figures and Units in Compound Computations.(a) (F_061; 0.41ds,39%)	Hidden
(3)	Remove Cut Rename Copy	Formula of an Alkaline Earth Hydrogen Phosphate (MT1_072:-0.10ds,47%)	Hidden
(4)	Remove Cut Rename Copy	Limiting Reagent and Percent Yield (F_073: 0.39ds, 53%)	Hidden
(5)	Remove Cut Rename Copy	Molar Concentration and Mass of Solute	Hidden
(6)	Remove Cut Rename Copy	edot.atoms.exam	Hidden
(7)	Remove Cut Rename Copy	Dalton's Law of Partial Pressures	Hidden
(8)	Remove Cut Rename Copy	Ideal Gas: Moles to Volume: Reaction Stoichiometry (revised) (F_073:0.57ds,47%)	Hidden
(9)	Remove Cut Rename Copy	Comparative Electronegativities (MT2_071: 0.31ds, 67%.F061: 0.31ds, 80%)	Hidden
(10)	Remove Cut Rename Copy	Simple Lewis Diagrams (F_072: 0.34ds, 66%)	Hidden
(11)	Remove Cut Rename Copy	Iced Water (New 2007-2, could be tricky)	Hidden
(12)	Remove Cut Rename Copy	Vapour Pressures (MT2_071: 0.22ds, 42%)	Hidden
(13)	Remove Cut Rename Copy	Relative Acidity, Basicity or pH of Aqueous Solutions.	Hidden
(14)	Remove Cut Rename Copy	Net Ionic Equations	Hidden
(15)	Remove Cut Rename Copy	Formal Oxidation Numbers	Hidden
(16)	Remove Cut Rename Copy	Oxidation and Reduction	Hidden
(17)	Remove Cut Rename Copy	Half-Reaction Method (New Problem 20071)	Hidden

1) Use Title to add little self-reminders (since the title is not printed on the exam).
2) Would remove such comments IF we were to allow the students to access the exam online.
3) Recommend to use SEARCH to locate and choose new questions to add to the exam sequence.

CLICK on SEARCH

(1)	Remove Cut Rename Copy	??	Units conversion. (MT1_073: 0.11ds, 64%)	Hidden
(2)	Remove Cut Rename Copy	??	Significant Figures and Units in Compound Computations.(a) (F_061; 0.41ds,39%)	Hidden
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(15)	Remove Cut Rename Copy	??	Formal Oxidation Numbers	Hidden
(16)	Remove Cut Rename Copy	??	Oxidation and Reduction	Hidden
(17)	Remove Cut Rename Copy	??	Half-Reaction Method (New Problem 20071)	Hidden
(18)	Remove Cut Rename Copy	??	Rates of Reactions	Hidden
(19)	Remove Cut Rename Copy	??	Mass, Volume and Keq	Hidden
(20)	Remove Cut Rename Copy	??	Le Chatelier's Principle (4 foils - 3choices) (F053: 0.09ds, 80%. F061: 0.46ds, 65%)	Hidden

Upload a new main course document | **Import a document** | **Special d**

Published documents

Search

Import

New Folder

New Compo

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3) Recommend to use SEARCH to locate and choose new questions to add to the exam sequence.

CLICK on SEARCH

There are 166 matches to your query. Revise search

Search: owner: batchelo
mime: exam
mime contains **problem OR quiz OR exam**

IMPORT

Sort by Mean Degree of Discrimination | Descending | Prev | Reload | Next | Summary View

Results 1 to 20 out of 166

0.56 Different Ways of Expressing Concentration

/res/sfu/batchelo/chem121/problems/lecture/set11/examQs/wper.molar.molal.chi.exam

Raymond John Batchelor, batchelo@sfu -- 2006-05-03 12:54:15
Customized right of use ...

0.541247 Ideal Gas: Moles to Volume: Reaction Stoichiometry

/res/sfu/batchelo/chem111/problems/lecture/set8/examQs/KNO3.to.O2.SF.exam

Raymond John Batchelor, batchelo@sfu -- 2006-06-26 21:17:51
Customized right of use ...

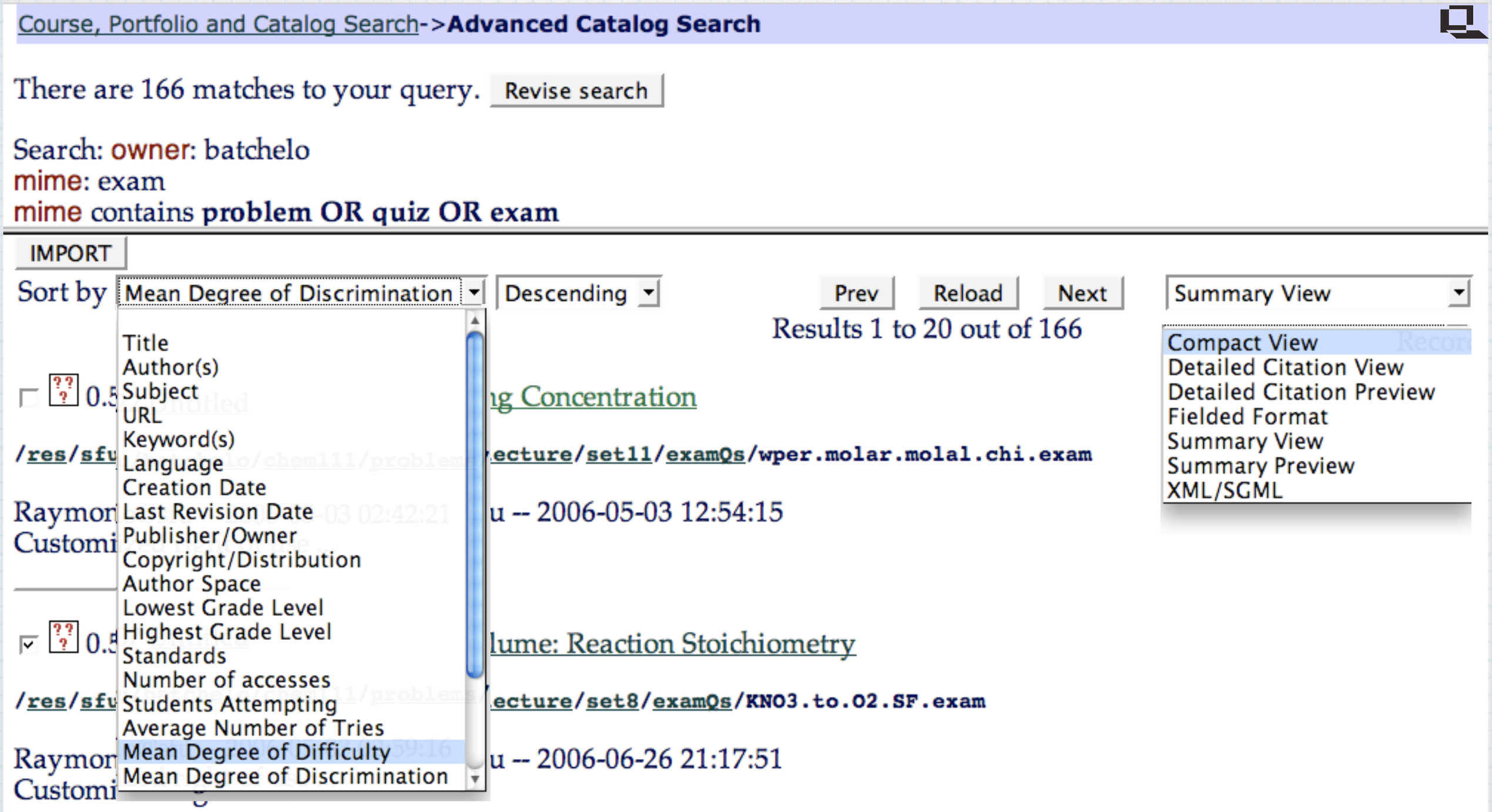
0.535985 Untitled

/res/sfu/batchelo/chem111/problems/lecture/set7/examQs/3phase.heat.rev.exam

, batchelo@sfu -- 2006-06-26 20:51:20
System wide - can be used for any courses system wide

---

1) Advanced search results (jumped over the input form of search criteria)
2) searched for EXAM resources owned by myself in the domain sfu -- 166 found.
3) Displayed in “Summary” view sorted on descending Degree of Discrimination.
   (cumulative statistics are sortable /searchable items)
4) could try narrower search -- Compact View -- sorted on Degree of Difficulty instead.



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Search: title: -untitled
owner: batchelo
mime: exam
mime contains **problem OR quiz OR exam**
stdno>25
disc>.2
difficulty>.3
difficulty<.5
in LON-CAPA domain **sfu**

IMPORT

Sort by Mean Degree of Difficulty Descending Prev Reloa
Re

0.484375 Mole Ratios and PV/T /res/sfu/batchelo/chem111/problems/lecture/set8/examQs/Rxn.stoich.Idea

0.479899 Purity and Stoichiometry /res/sfu/batchelo/chem111/problems/lecture/set6/examQs/pcnt.purity

0.474684 Half-Reaction Method /res/sfu/batchelo/chem111/problems/lecture/set10/examQs/bal.acidic.hal

0.46075 Stoichiometry of Sequential Reactions. /res/sfu/batchelo/chem111/problems/lecture/set6/exam

0.455959 Density of an Ideal Gas /res/sfu/batchelo/chem111/problems/lecture/set8/examQs/TPtodens.exa

0.451613 Balancing RedOX-- Oxidation Number Change Braces -- Mole Ratios -- 2parts /res/sfu/

0.438095 Relative Sizes of Atoms and Ions /res/sfu/batchelo/chem121/problems/lecture/set7/examQs/re

0.411765 Isotopes and the Mass of One Molecule /res/sfu/batchelo/chem111/problems/lecture/set2/mo

0.382488 Simple Calorimetry /res/sfu/batchelo/chem111/problems/lecture/set2/examQs/rel.sp.H.sl2.exam

0.37537 Dalton's Law of Partial Pressures /res/sfu/batchelo/chem111/problems/lecture/set8/examQs/DL

Note this search criteria narrowed to try to identify problems
of reasonable difficulty
with significant discrimination.
Also specified resources must have a Title.

Next we can look at Detailed Citation View to see, for individual question:
Number of student who have answered
Average tries = 1 for an exam.
Degree of discrimination
Degree of difficulty (fraction of respondents who got it wrong)

Can click on question to view samples, if I LIKE the question I add it to my shopping basket by checking the little box and eventually choosing to IMPORT all such selected resources.

Done assembling the Exam!

Search: title: -untitled
owner: batchelo
mime: exam
mime contains **problem OR quiz OR exam**
stdno>25
disc>.2
difficulty>.3
difficulty<.5
in LON-CAPA domain **sfu**

Mole Ratios and PV/T

Raymond John Batchelor, *batchelo@sfu*

/res/sfu/batchelo/chem111/problems/lecture/set8/examQs/Rxn.stoich.Id

Subject: Reaction stoichiometry based on volumes of gaseous reactants at specific pressure
Keywords: atm,degrees,gas,gaseous,pressure,react,reactant,reaction,stoichiometry,tempera
Notes: Level: Introductory Chemistry
MIME Type: Checkout Written Exam
Copyright/Distribution: Customized right of use ...
Access Count: 1155
Number of Students: 407
Average Tries: 1.00
Degree of Discrimination: 0.39
Degree of Difficulty: 0.48

Note this search criteria narrowed to try to identify problems
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Number of student who have answered
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Can click on question to view samples, if I LIKE the question I add it to my shopping basket by checking the little box and eventually choosing to IMPORT all such selected resources.

Done assembling the Exam!

Setting the Parameters

- Globally set the parameter “question type” to “exam” (this is the default for a resource of mime type “.exam”).

- Globally or individually set “number of bubbles” parameter as you desire, subject to the limitations necessitated by the layout of your Scantron^{tm} form.

e.g. If you set “number of bubbles=5” then each question will be presented with 5 choices, 4 of which are distractors.

Two important parameters:
1) Just in case one wants to import resources of mime type .problem as well as .exam, should always globally set “question type” = “exam” so that all resources are rendered as M/C exam questions.

2) Set “Number of Bubbles” = a value consistent with the scantrom bubble sheet format you are going to use.

How Exam Questions will be Scored

- *exam* questions are rendered, and printed, as multiple choice ("1-of-N correct" - radiobutton or bubble) questions, the responses to which are uploaded as the file output of a Scantron^{tm} reader.

- Distractors for *numerical* response problems are generated pseudo-randomly unless the resource has been coded to produce specific algorithmically wrong answers. (preferred)

- *radiobutton*- and *numerical* response types are graded as they would be for normal homework problems (i.e. full credit or none)

- *Individual* *option* response, *match* response or *rank* response problems, are rendered as a series of individually numbered statements (*foils*), each requiring a separate choice of bubble, as though for distinct questions, on the Scantron^{tm} form.

  Internally, LON-CAPA still handles the question as a unit, but *partial credit* is assigned based upon the responses to the individual "foils".

- *essay*- and *string* responses may be included but must be manually graded, and marks input using the grading interface.

* Most of the various response types will then be rendered as multiple-choice questions automatically.

* Numerical response, distractors chosen pseudo-randomly, or according to specified algorithms in the resource code.

* Scored as usualy: full credit or none.

* Leniently graded response types garner partial credit for the student.

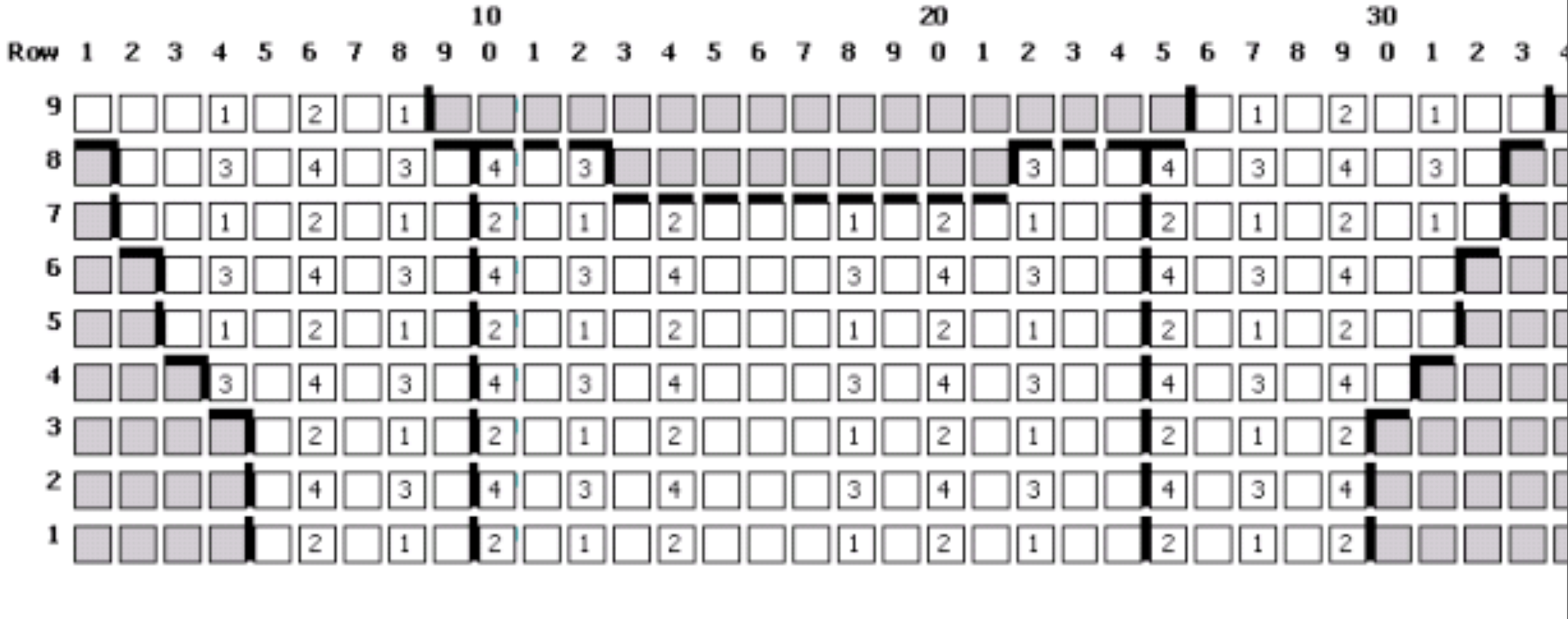
* Essay, string, or formula response type may be included but need to be handgraded.

Options for Administering a Coded Set of Randomly Generated Exam Papers

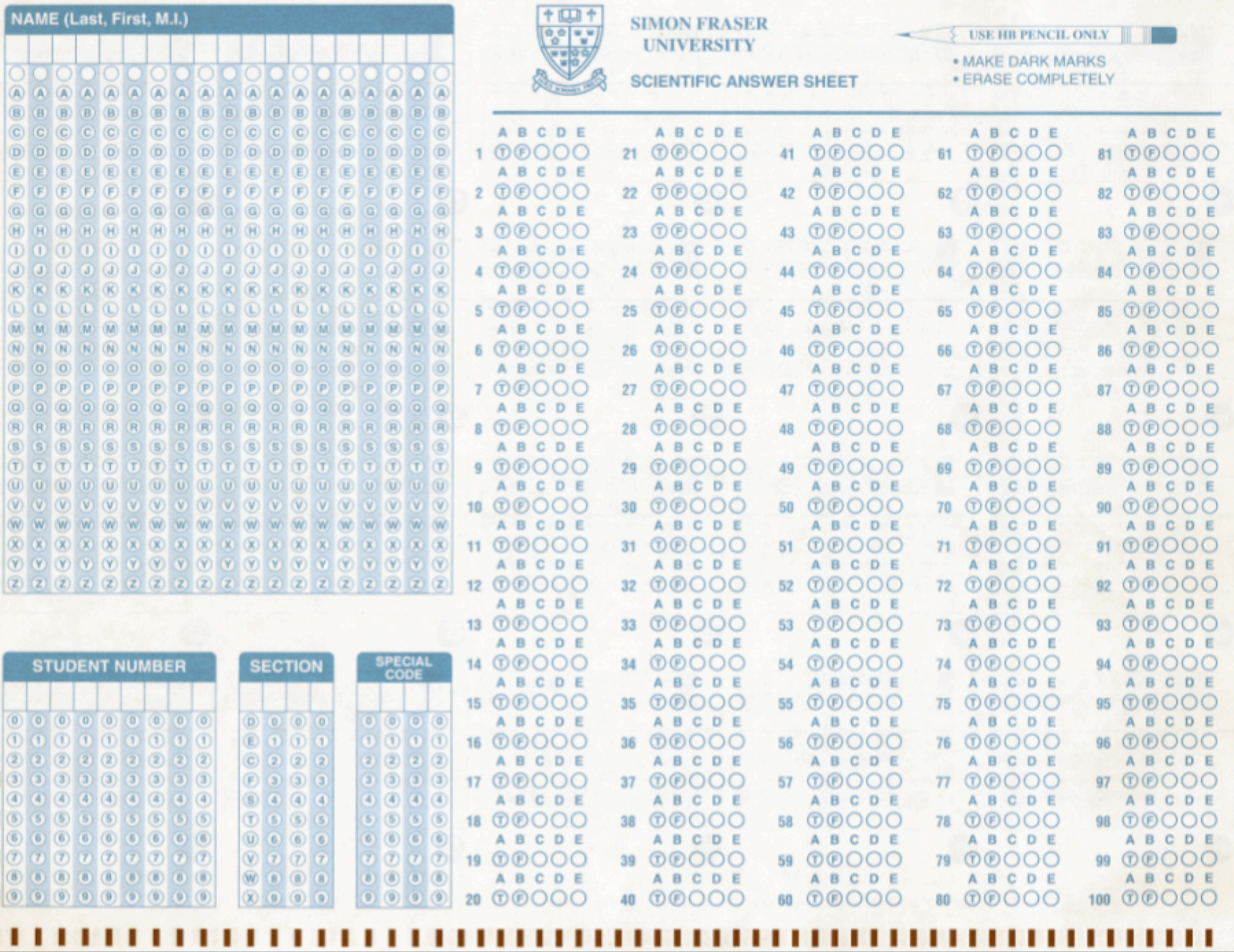
- Fully randomized -- every student gets a 'different' LON-CAPA exam -- (used at MSU and elsewhere).
- N chosen versions (e.g. N=4) to permit quality control/ post-analysis. (used at SFU Chem Dept).
- Students "bubble-in" a *code* specifying their exam version.
- Pre-print bubbles for student IDs and exam version codes directly onto Scantron™ sheets and collate them with the corresponding LON-CAPA exam papers.
- Pre-assigned seating and exam version with photo-ID bubblesheets for a Final exam.

1.Full randomization of personalized versions, used elsewhere.
2.Our study used only 4 versions of each exam.
3.For final exams we usually use a laser printer to pre-bubble the student ID and exam version directly onto the bubble sheets.
4.We then setup the room according to a pre-designed seating plan, matching the bubble sheets with correct versions of the exam.

Seating Plans



1. Prepare seating plans/room maps showing the distribution of different exam versions to minimize lines of sight.
2. Lay out collated exams and personalized bubble sheets in advance and seat students according to the design.
3. Three people can set up this room in 10-15 minutes
4. Students can find their exam and seat themselves in 5-10 minutes.
5. Simplifies attendance and identity checking.



1. On a midterm, time is short, so we cannot prepare the room and allow for assigned seat location.
2. Therefore use generic bubble sheet on which student identifies both themselves
3. AND their exam version
4.Note “Special Code” -- four digit number identifying which version of the exam they have.

YE

Zuo

111111111

Department of Chemistry

CHEM122_20081_BRNBY

Final

Version: 3333

358

R6S22

SIMON FRASER UNIVERSITY

SCIENTIFIC ANSWER SHEET

USE HB PENCIL ONLY

- MAKE DARK MARKS
- ERASE COMPLETELY

1 T F	21 T F	41 T F	61 T F	81 T F
2 T F	22 T F	42 T F	62 T F	82 T F
3 T F	23 T F	43 T F	63 T F	83 T F
4 T F	24 T F	44 T F	64 T F	84 T F
5 T F	25 T F	45 T F	65 T F	85 T F
6 T F	26 T F	46 T F	66 T F	86 T F
7 T F	27 T F	47 T F	67 T F	87 T F
8 T F	28 T F	48 T F	68 T F	88 T F
9 T F	29 T F	49 T F	69 T F	89 T F
10 T F	30 T F	50 T F	70 T F	90 T F
11 T F	31 T F	51 T F	71 T F	91 T F
12 T F	32 T F	52 T F	72 T F	92 T F
13 T F	33 T F	53 T F	73 T F	93 T F
14 T F	34 T F	54 T F	74 T F	94 T F
15 T F	35 T F	55 T F	75 T F	95 T F
16 T F	36 T F	56 T F	76 T F	96 T F
17 T F	37 T F	57 T F	77 T F	97 T F
18 T F	38 T F	58 T F	78 T F	98 T F
19 T F	39 T F	59 T F	79 T F	99 T F
20 T F	40 T F	60 T F	80 T F	100 T F

STUDENT NUMBER

1	1	1	1	1	1	1	1	1

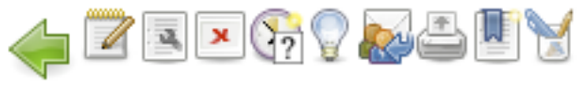
SECTION

D	0	0	0
E	1	1	1
C	2	2	2
F	3	3	3
S	4	4	4
T	5	5	5
U	6	6	6
V	7	7	7
W	8	8	8
X	9	9	9

SPECIAL CODE

3	3	3	3

1. For final exams, lots of time.
2. Use preassigned seats and photo-personalized bubblesheets.
3. Use laser printer to generate these on custom scantron form.
4. Student ID and exam version already bubbled.
5. Effective.
6. NEXT: How to prepare the printout of the exam versions.



Generating Printouts for Sets of CODE-Identified Exams

Ideal Gas: Moles to Volume: Reaction Stoichiometry (revised).

$2KNO_3(s) \longrightarrow 2KNO_2(s) + O_2(g)$

What volume of oxygen gas at 41°C and 1.07 atm pressure can be produced from the decomposition of 2.95 g of potassium nitrate, according to the above equation?

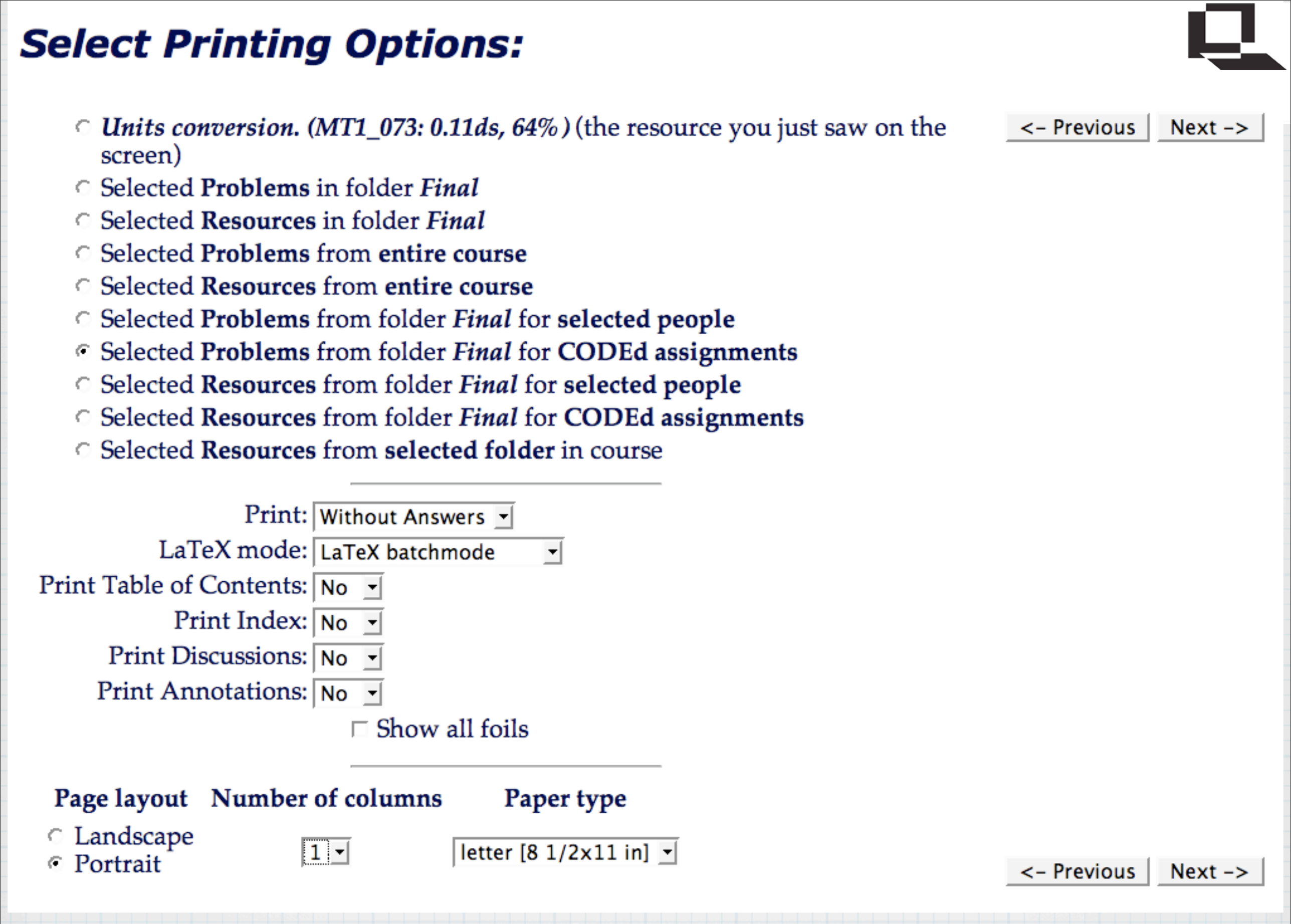
- 176 mL
- 351 mL
- 703 mL
- 45.9 mL
- 35.6 L

Submit Answer | Tries 0/10

Post Discussion | Send Message

jsMath

1. Start by Navigating to any question in the exam sequence.
2. click on printer icon.... (wait for it)
3. Choose to print a Coded Set of Exams for selected problems in the sequence (will select all of them).
4. Choose 1-column format.
5. Click “NEXT”



1. Start by Navigating to any question in the exam sequence.
2. click on printer icon.... (wait for it)
3.Choose to print a Coded Set of Exams for selected problems in the sequence (will select all of them).
4.Choose 1-column format.
5.Click “NEXT”

Specify CODEd Assignments

Fill out one of the forms below

Generate new CODEd Assignments

Number of CODEd assignments to print: 6

Names to save the CODEs under for later: Finalby6

Bubble sheet type: sfuchem default

Print a Specific CODE

Enter a CODE to print:

Reprint a Set of Saved CODEs

Select saved CODEs:

1.Choose how many different version you want.
2. Give a NAME by which this set of versions will be identified.
3.specify the Bubble sheet type (more about that later)
4. Click “NEXT” again. Two more clicks to accept defaults then...
5.DONE! Get a pdf of exam paper for each or all of the coded versions.
6.NOW, how do these questions appear and how are they graded?? -- a couple of examples.

Optionresponse Question

Ethene gas can be hydrogenated in the following catalyzed reaction, performed in a closed container.

$$C_2H_4(g) + H_2(g) \rightleftharpoons C_2H_6(g) + \text{heat}$$

Indicate the direction in which the **equilibrium position** would shift as a consequence of each of the following actions:

[ ] removing $C_2H_6(g)$ from the mixture

[ ] increasing the relative concentration of $C_2H_4(g)$ (by addition)

[ ] decreasing the temperature

[ ] increasing the pressure in the container by adding an inert gas

---

Submit Answer | Tries 0/10 Previous Tries

1.Optionresponse problem, as homework must make all choices and submit at once for full credit or none...
2. as Exam, each “Foil” is treated as an individual M/C question and fractional credit given for each.
3. Described in the Course Coordinators Manual as “Lenient Grading”.
4.Note: 4-digit code identifying which version of the exam this is.
5.Next: numericalresponse.

Optionresponse Question as Printed Exam Question

CODE - 1944 - Chem 110-111 2008-2 Lecture 7
Final

1 pt

Ethene gas can be hydrogenated in the following catalyzed reaction, performed in a closed container.

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Indicate the direction in which the **equilibrium position** would shift as a consequence of each of the following actions:

▷ removing $C_2H_6(g)$ from the mixture
20. **A**◯ Left **B**◯ Right **C**◯ No Effect

▷ increasing the relative concentration of $C_2H_4(g)$ (by addition)
21. **A**◯ Left **B**◯ Right **C**◯ No Effect

▷ decreasing the temperature
22. **A**◯ Left **B**◯ Right **C**◯ No Effect

▷ increasing the pressure in the container by adding an inert gas
23. **A**◯ Left **B**◯ Right **C**◯ No Effect

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Numerical Question

The specific heat of ice is 2.09 J/(g · °C).
The specific heat of liquid water is 4.18 J/(g · °C).
The heat of fusion of ice is 334 J/g at its melting point of 0 °C.

An ice cube is removed from a freezer maintained at -13 °C and immediately placed into 269 g of water, which was initially at 27 °C, in a perfectly insulating coffee cup.
All of the ice melts.
The final temperature of all water in the cup is 13 °C.
What was the initial mass, in grams, of the ice cube?

Submit Answer | Tries 0/10

1. Homework numerical question, direct number entered... no choices, must be correct, no guessing.
2. As Exam question (still html), distractors and correct alternates presented for M/C.
3. Shown, as printed.
4.So, a printout is produced for the required number of version and the test is administered.
5.Bubble sheets are passed through a Scantron Reader and a text file containing their choices is produced.
6.These can be of different formats and contents depending upon the form used and practice at your institution or department.
7.NEXT: How do you get LON-CAPA to grade the Scantron reader output?

Numerical Question Rendered for Exam

The specific heat of ice is 2.09 J/(g · °C).
The specific heat of liquid water is 4.18 J/(g · °C).
The heat of fusion of ice is 334 J/g at its melting point of 0 °C.

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All of the ice melts.
The final temperature of all water in the cup is 13 °C.
What was the initial mass, in grams, of the ice cube?

A: 21	B: 29	C: 38	D: 51	E: 67

Submit Answer | Tries 0/10

1. Homework numerical question, direct number entered... no choices, must be correct, no guessing.
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Numerical Question Rendered for Exam as Printed

1 pt

The specific heat of ice is 2.09 J/(g · °C).
The specific heat of liquid water is 4.18 J/(g · °C).
The heat of fusion of ice is 334 J/g at its melting point of 0 °C.

An ice cube is removed from a freezer maintained at -13 °C and immediately placed into 269 g of water, which was initially at 27 °C, in a perfectly insulating coffee cup.
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11.A◯ 21 **B**◯ 29 **C**◯ 38 **D**◯ 51 **E**◯ 67

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How LON-CAPA Exam Grading Works

Previously, the format of the Scantron^{tm} output file was specified on the LON-CAPA server by a record in the (self-commented) file:

`/home/httpd/lonTab/scantronformat.tab`

The relevant record in this file might look something like this:

```
sfuchemcode:sfuchem default:number:26:4:31:9:41:1: :number:1:19:21:4:1:19
```

Scantron^{tm} output, compatible with this "sfuchem default" format, for an exam of 23, 5-option questions (choices: A,B,C,D,E) could look like this:

```
123456789 123456789 123456789 123456789 123456789 123456789 123456789
Self-Identification Sect CODE StudentID Responses..............
ALBERTELLI GUY II   C102 1944 4x1075740 25131551355313444222331
BATCHELOR ?AY            433? 222222222 4433?123232133215433 3?
BERRYMAN FELICIA    C106 1944 4x1098646 25131551355313444222331
CHIN FRED           D101 4337 4x1045623 54332123454433215433212
KEIZER GERRIT       D100 6450 4x1024351 34235511125442513233123
KORTEMEYER GERD     C100 6450 4x1078753 33333333333333333333333
KORTELING RALPH     D102 6964 4x1062258 12142135314211315113221
MACFARLANE KEN      D102 6964 4x1062259 11142135314211315113225
RAEBURN STUART      C100 1944 4x1025674 25431551345313454232331
```

1. Output produce by a reader like the one shown (costs $5500 + $900 for software)
2. Note the exam code.
3. Responses correspond to choices A,B,C,D, or E.
4. Note bubbling errors in record for second student.

```
#name:description:CODE type:CODEstart:CODElength:IDstart:IDlength:
Qstart:Qlength:Qoff:Qon:PaperID:PaperIDlength:FirstName:FirstNamelength:
LastName:LastNamelength

#CODE type can be either 'none' 'letter' 'number'
#Qon can be either the symbol that says a bubble has been selected,
#    'letter' (for when the selected letter appears, or
#     'number' for when a number indicating the selected letter appears
```

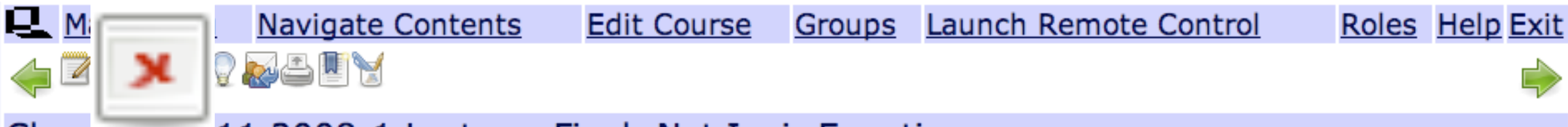
The above record says that:

-The exam version code is represented as 4 numerical digits starting in column 26.
-The student ID is 9 characters in length, staring in column 31.
-Answers to multiple choice questions are 1 character in length each starting in column 41 up to ?
-These characters are “numbers”: 1=A, 2=B 3=C etc up to 9=I (other characters or spaces can be optionally assigned as “missed bubbles”).
-The bubbled characters denoting the student's self-identification are in columns 1-19, and a further 4 characters in 21-24 for special purposes
-In this case the same 19 characters are used to identify both the paper and the student.

To Grade, Start from any Question in the Exam Sequence

1. Starting from any Question in the exam sequence:
2. Click on Grading Icon. (wait for it)
3. Will go to the Grading interface associated with this problem and the enclosing sequence.

To Grade, Start from any Question in the Exam Sequence



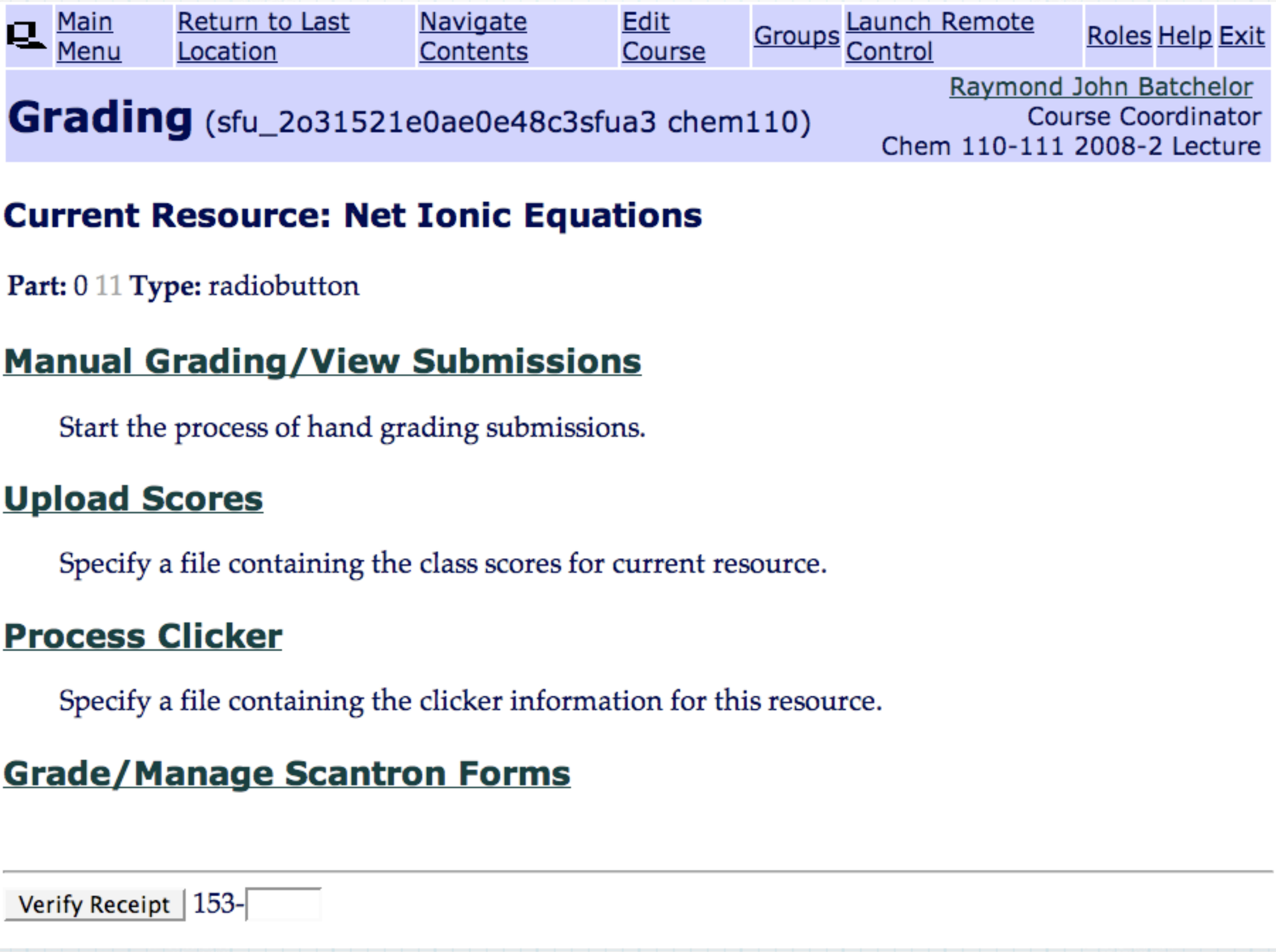
Select the correct balanced **net ionic equation** for the following postulated reaction, occuring in water.

$$Na_2CO_3 + Pb(NO_3)_2 \rightarrow 2NaNO_3 + PbCO_3$$

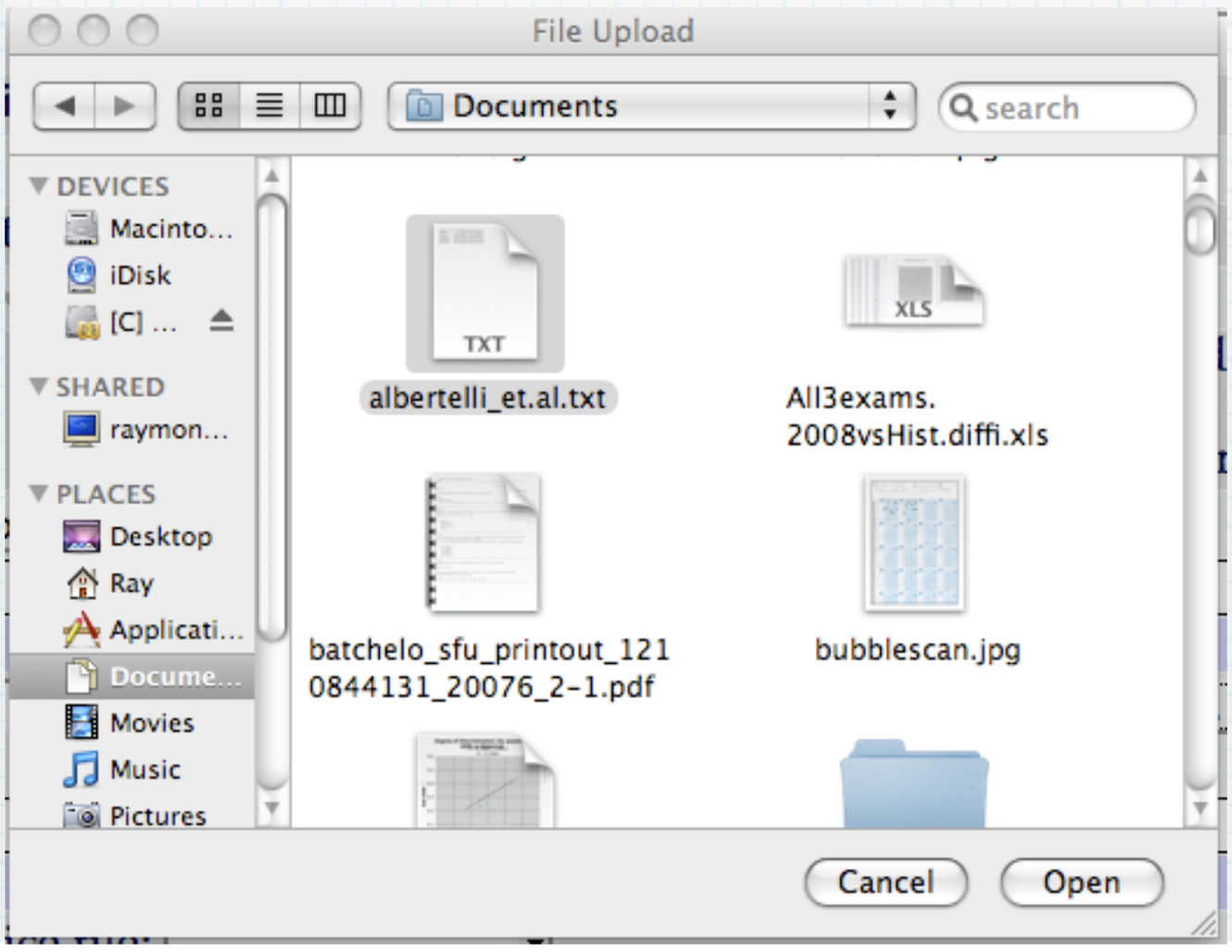
- $CO_3^{2-} + Pb^{2+} \rightarrow PbCO_3$
- $Na_2CO_3 + Pb^{2+} \rightarrow 2Na^{+} + PbCO_3$
- $Pb(NO_3)_2 + 2Na^{+} \rightarrow Pb^{2+} + 2NaNO_3$
- $2NO_3^{-} + 2Na^{+} \rightarrow 2NaNO_3$
- None of the above

Submit Answer | Tries 0/10

1. Starting from any Question in the exam sequence:
2. Click on Grading Icon. (wait for it)
3. Will go to the Grading interface associated with this problem and the enclosing sequence.



1. Click on last option -- Grade/Manage Scantron Forms
2. Goes to a web form where you can upload the file output by the “Sheet-Reader” machine.

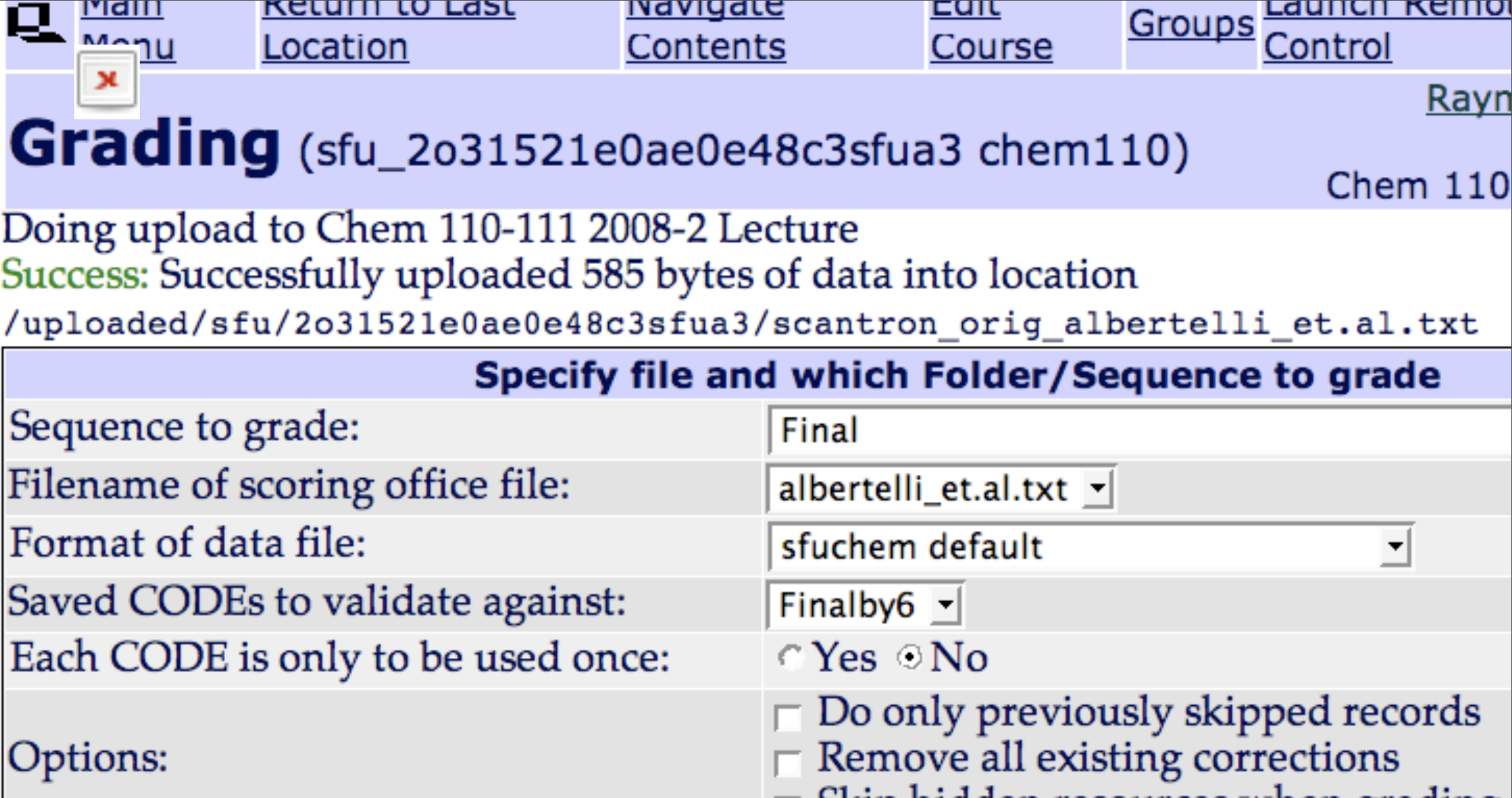


Specify a Scantron data file to upload.

File to upload: /Users/Ray/Documents/LONCAPA.conference/exams.presentatio Browse...

Upload Scantron Data

1. Browse your local computer for the Scantron Reader output txt file.
2. Click “Upload Scantron Data”
3. Now ensure that you have selected the correct:
    1. Sequence to grade (i.e. “Final”)
    2. Filename of the data file just uploaded.
    3. Format as specified in the scantronformat.tab file
    4. The saved name of the set of Exam version codes (4-digit identifiers) for this exam.
    5. Choose that each CODE can be used for more than one student.
    6. Click Grading: Validate Scantron Records.



1. Browse your local computer for the Scantron Reader output txt file.
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    2. Filename of the data file just uploaded.
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    4. The saved name of the set of Exam version codes (4-digit identifiers) for this exam.
    5. Choose that each CODE can be used for more than one student.
    6. Click Grading: Validate Scantron Records.

Main Menu | Return to Last Location | Navigate Contents | Edit Course | Groups | Launch Remote Control | Roles | Help | Exit

Grading (sfu_2o31521e0ae0e48c3sfua3 chem110)

Raymond John Batchelor
Course Coordinator
Chem 110-111 2008-2 Lecture

Please double check the information below before clicking on 'Grading: Validate Records'

Sequence to be Graded: Final
Data File that will be used: `albertelli_et.al.txt`
List of CODES to validate against: `Finalby6`

If this information is correct, please click on 'Grading: Validate Records'.

If something is incorrect, please click the 'Grading Menu' button to start over.

Grading: Validate Records

Grading Menu

One chance to Back OUT... click Grading: Validate Records to proceed.

	Main Menu	Return to Last Location	Navigate Contents	Edit Course	Groups	Launch Rem Control

Ra

Grading (sfu_2o31521e0ae0e48c3sfua3 chem110)

Chem 1

Please double check the information below before clicking on 'Grading: Validate

Sequence to be Graded: Final

Data File that will be used: `albertelli_et.al.txt`

List of CODES to validate against: `Finalby6`

If this information is correct, please click on 'Grading: Validate Records'.

If something is incorrect, please click the 'Grading Menu' button to start over.

Grading: Validate Records

Grading Menu

One chance to Back OUT... click Grading: Validate Records to proceed.

Gathering necessary information.

Validating sequence
Validating ID
Validating CODE

An error was detected (incorrectCODE) for PaperID `BATCHELOR ?AY`

The encoded CODE is not in the list of possible CODEs.

The CODE on the form is `'433?'`

The ID on the form is `222222222`
The name on the paper is BATCHELOR ?AY ,

How should I handle this?

- Use the similar CODE **4337** instead.
- Use the CODE **433?** that is was on the paper, ignoring the error.
- Select a CODE from the list of all CODEs and use it. Selected CODE is
- Use as the CODE.

Continue -> using corrected info
Skip this scanline saving it for later.

1. Records with an bubbling error.
2. Exam version does not match any in the set of CODES specified.
3. Student probably double-bubbled the last digit, hence the “?”.
4. Options offered for recovery:
    1. finds nearest match in the set of CODES
    2. allows you to grade against whatever code the student did bubble
    3. Offers you a list of all CODES in the set from which you can choose one.
    4. Allows you to input your own choice of CODE.
5. Click Continue, once having selected the appropriate CODE for this student.

Gathering necessary information.

Validating sequence
Validating ID
Validating CODE
Validating doublebubble

An error was detected (doublebubble) for PaperID `BATCHELOR ?AY`

There have been multiple bubbles scanned for some question(s)

The ID on the form is `222222222`
The name on the paper is BATCHELOR ?AY ,

Please indicate which bubble should be used for grading

5	A	B	C	D	E	F	G	H	I	J	● No bubble
23	A	B	C	D	E	F	G	H	I	J	● No bubble

Continue -> using corrected info
Skip this scanline saving it for later.

Grading Menu

1. Error detected for student who double-bubbled answers to M/C questions 5 & 23.
2. Options to choose a specific response (up to J)
3. or “No Bubble” which is generally the preferred choice here.
4. Click “Continue”.

Gathering necessary information.

Validating doublebubble
Validating missingbubbles

An error was detected (missingbubble) for PaperID BATCHELOR ?AY

There have been **no** bubbles scanned for some question(s)

The ID on the form is 222222222
The name on the paper is BATCHELOR ?AY ,

Please indicate which bubble should be used for grading.

Some questions have no scanned bubbles.

21	○ A	○ B	○ C	○ D	○ E	○ F	○ G	○ H	○ I	○ J	◉ No bubble

Continue -> using corrected info
Skip this scanline saving it for later.

Grading Menu

Reports student having left unbubbled one question #21.
Choose “No bubble” again.

Gathering necessary information.

Validating missingbubbles
Validation process complete.

Please double check the information below before clicking on 'Start Grading'

Sequence to be Graded: Final
Data File that will be used: `albertelli_et.al.txt`
List of CODES to validate against: `Finalby6`

If this information is correct, please click on 'Start Grading'.

If something is incorrect, please click the 'Grading Menu' button to start over.

Start Grading

Grading Menu

1.Last chance to back out!!
2.If OK then click “Start Grading”.
3.You do not want to repeat grading, because these are student submissions, and if you grade more than once due to mistakes, then you will find that each student has been attributed with having made more than 1 try.
4.This impacts the stored statistics on the problem adversely.
5.Important to keep these stats pristine so that they will become valid indices of the quality and reliability of the individual resources.

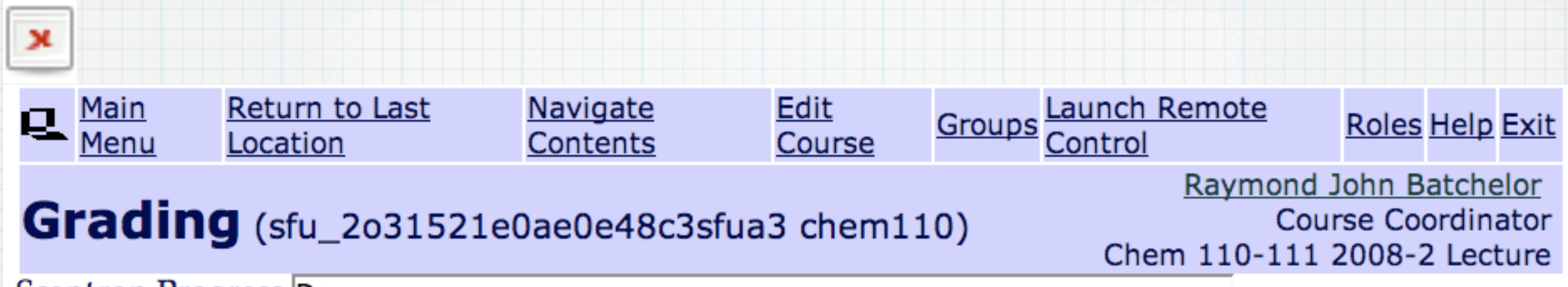
Main Menu | Return to Last Location | Navigate Contents | Edit Course | Groups | Launch Remote Control | Roles | Help | Exit

Grading (sfu_2o31521e0ae0e48c3sfua3 chem110)

Raymond John Batchelor
Course Coordinator
Chem 110-111 2008-2 Lecture

Scantron Progress 6/9: 19 seconds remaining (5.79 seconds for last student)

1. Takes some time to store grades in distributed database. Tolerable.
2. DONE GRADING -- NEXT the results. this slide automatically transitions to next slide.
3. WAIT FOR IT (about 5 seconds while in this presentation).



Next: View the Grades

Main Menu/Grading and Statistics/ View the course assessment progress chart

1. Takes some time to store grades in distributed database. Tolerable.
2. DONE GRADING -- NEXT the results. this slide automatically transitions to next slide.
3. WAIT FOR IT (about 5 seconds while in this presentation).

Grading & Statistics -- Course Progress Chart

Chem 110-111 2008-2 Lecture

Chem 110-111 2008-2 Lecture->**Chart**

Chart

Sections	Groups	Student Data	Access Status	Sequences and Folders	Output Format	Output Data
all test 110 111	all	all fullname username domain id	Currently Has Access Will Have Future Access Previously Had Access Any Access Status	Assignment 10. Chem 110-111 Introductory Chemistry Catalogue of Exam Questions MT1 MT2 Final	HTML, with links HTML, with all links HTML, without links Excel CSV	Scores Summary Scores Per Problem Tries Parts Correct

Generate Chart | Select One Student | Clear Caches | Status Done

Section test. All groups. Active access status.

Chem 110-111 2008-2 Lecture Thu May 15 14:15:30 2008

Score on each Problem Part

fullname	username	id	section	Final	
ALBERTELLI, GUYII	ALBERTELLIGUYII	4x1075740	test	0011011001010000001*	7/ 20
Batchelor, Raymond John	batchelo	222222222	test	0001000011000000010*	4/ 20
BERRYMAN, FELICIA	BERRYMANFELICIA	4x1098646	test	0011011001010000001*	7/ 20
CHIN, FRED	CHINFREDH1	4x1045623	test	0001000000000000010*	2/ 20
KEIZER, GERRIT	KEIZERGERRIT	4x1024351	test	1000000001000000010*	3/ 20
KORTELING, RALPH	KORTELINGRALPH	4x1062258	test	0000000010010010011*	6/ 20
KORTEMEYER, GERD	KORTEMEYERGERD	4x1078753	test	1010000010101100000*	6/ 20
MACFARLANE, KEN	MACFARLANEKEN	4x1062259	test	0000000010010010011*	6/ 20
RAEBURN, STUART	RAEBURNSTUART	4x1025674	test	0001011000010000000*	4/ 20

Summary Tables

Title	Average	Maximum
Final	5.11	20

1. Selected to view results for my “test” section of 9 fictional students.
2. Final exam only.
3. Scores per problem.
4. Note that I made no attempt to input correct answers,
5. therefore these represent “guessing” scores
6. and a “guessing” average.... a little higher than statistical, but a small group.
7. Next: STATS for this EXAM.

Real Exam Statistics -- 93 Students

Sections: all, testing, 110, 111 | Groups: all | Access Status: Currently Has Access, Will Have Future Access, Previously Had Access, Any Access Status | Sequences and Folders: Assignment 10. Chem 110-111 Introductory Chemistry, Catalogue of Exam Questions, MT1, MT2, Final | Statistics: all, #Stdnts, Tries, Max Tries, Min Tries | Limit by time: Start Time: May 8 2008; End Time: May 15 2008

Status: Done

Generate Statistics | Plot | Clear Caches | Update Caches | Produce Excel Output

Sections 110 and 111. All groups. Expired access status.

Compiling statistics for 20 problems

Sequence Statistics

Sequence	#Items	Score Mean	Score STD	Score Max	Score Min	Score N	Count Mean	Count STD	Count Max	Count Min	Count N	KR-21
Final	20	11.64	3.56	20.00	2.50	93	11.64	3.56	20.00	2.50	93	0.65

P#	Title	%Wrng (plot)	DoDiff (plot)	DoDisc (plot)
1	Units conversion.	25.8	0.26	0.29
2	Significant Figures and Units in Compound Computations.	70.9	0.71	0.17
3	Formula of an Alkaline Earth Hydrogen Phosphate.	72.0	0.72	0.33
4	Limiting Reagent and Percent Yield.	37.6	0.38	0.25
5	Molar Concentration and Mass of Solute.	11.8	0.12	0.21
6	Electron Dot Diagrams of Atoms.	18.2	0.18	0.21
7	Dalton's Law of Partial Pressures.	15.0	0.15	0.33

1. Click to scroll to show full list.
2. Actual STATS for the 20 exam questions for a class of 93 students.
3. KR-21 reliability index (for what it's worth).
4. All problems have positive and even good degrees of discrimination.
5. Difficulty level is high for some problems.
6. Since Exam has only 1 try, difficulty level equates to fraction of class getting the question wrong.
7. How do these results compare with Historical results for the same resources?
8. Been using these for 9 semesters now, same instructor.
9. Next slide shows dynamic meta data for Q19 which was used in 6 of those semesters.

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7	Dalton's Law of Partial Pressures.	15.0	0.15	0.33
8	Ideal Gas: Moles to Volume: Reaction Stoichiometry (revised).	40.6	0.41	0.52
9	Comparative Electronegativities.	44.0	0.44	0.33
10	Simple Lewis Diagrams.	35.4	0.35	0.33
11	Iced Water.	62.6	0.63	0.48
12	Vapour Pressures.	64.5	0.65	0.25
13	Relative Acidity, Basicity or pH of Aqueous Solutions.	55.9	0.56	0.29
14	Net Ionic Equations.	47.3	0.47	0.29
15	Formal Oxidation Numbers.	13.9	0.14	0.25
16	Oxidation and Reduction.	40.8	0.41	0.29
17	Half-Reaction Method.	44.0	0.44	0.42
18	Rates of Reactions.	48.3	0.48	0.25
19	Mass, Volume and Keq.	50.5	0.51	0.50
20	Le Chatelier's Principle (4 foils).	34.1	0.34	0.27

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Summary Stats for an Individual Question: Q#19. "Mass Volume and Keq"

Overall Assessment Statistical Data

Statistics calculated for number of students	340
Average number of tries till solved	1.00
Degree of difficulty	(0.51)
Degree of discrimination	(0.54)

Recent Detailed Assessment Statistical Data

Course	Section(s)	Num Students	Mean Tries	Degree of Difficulty	Degree of Discrimination
Chem 110-111 2007-2 Lecture	110 111	35	1.00	0.60	0.44
Chem 110-111 2006-3 Lecture	110 111	63	1.00	0.51	0.69
Chem 110-111 2008-1 Lecture	110 111	91	1.00	0.41	0.52
Chem 110-111 2006-2 Lecture	110 111	48	1.00	0.38	0.54
Chem 110-111 2007-3 Lecture	110 111	94	1.00	0.61	0.54

1. Stats averaged over all students summarized in grey fields.
2. Number of students
3. Tries =1 exactly.
4. Relatively high difficulty
5. Good degree of discrimination
6. Stats for individual semester/classes listed for 5 semesters at the bottom.
7. Note that consistency is reasonable.
8. Next: Does the consistency extend to all the questions used in this particular exam?

Compiling statistics for 20 problems

Sequence Statistics

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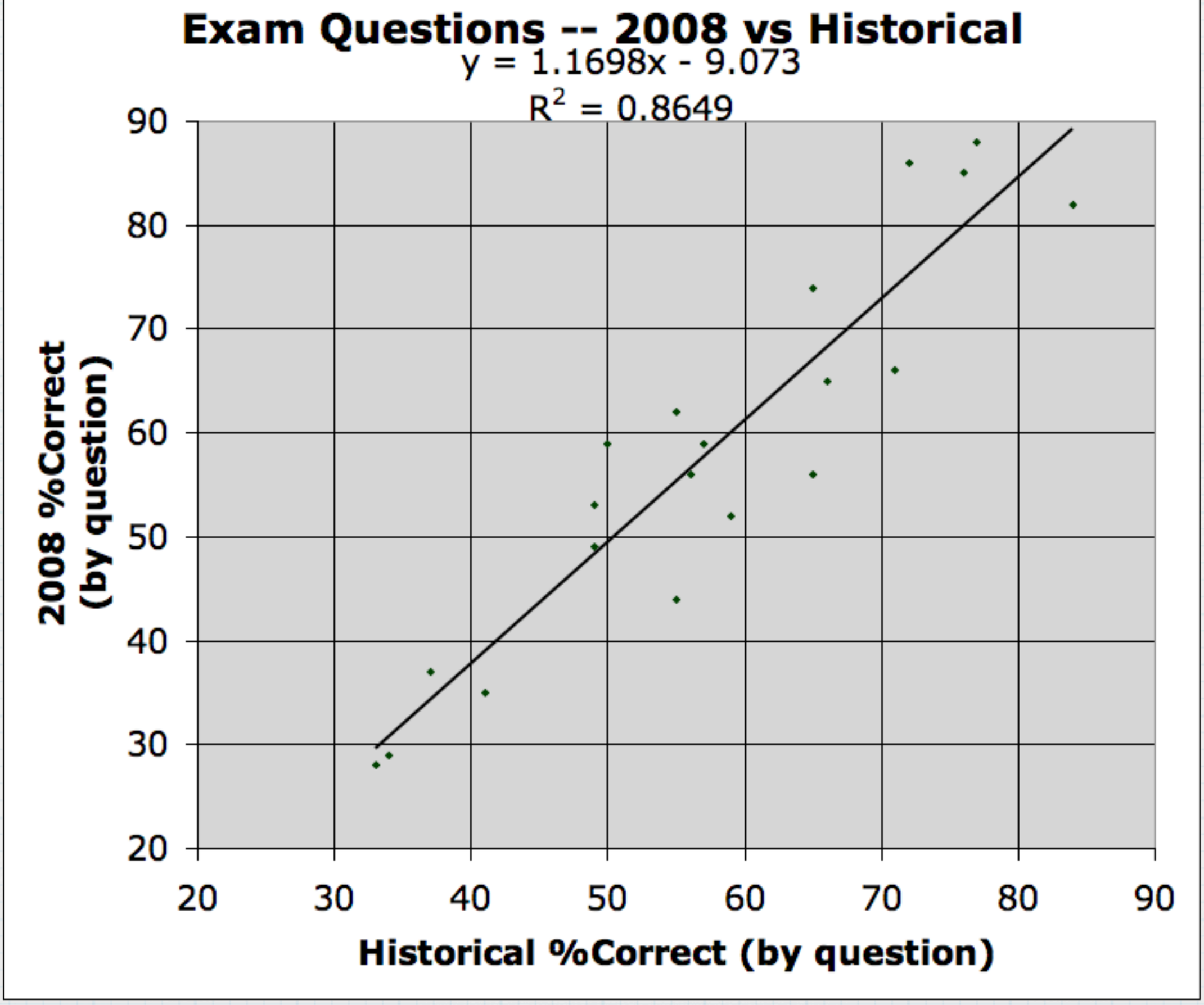
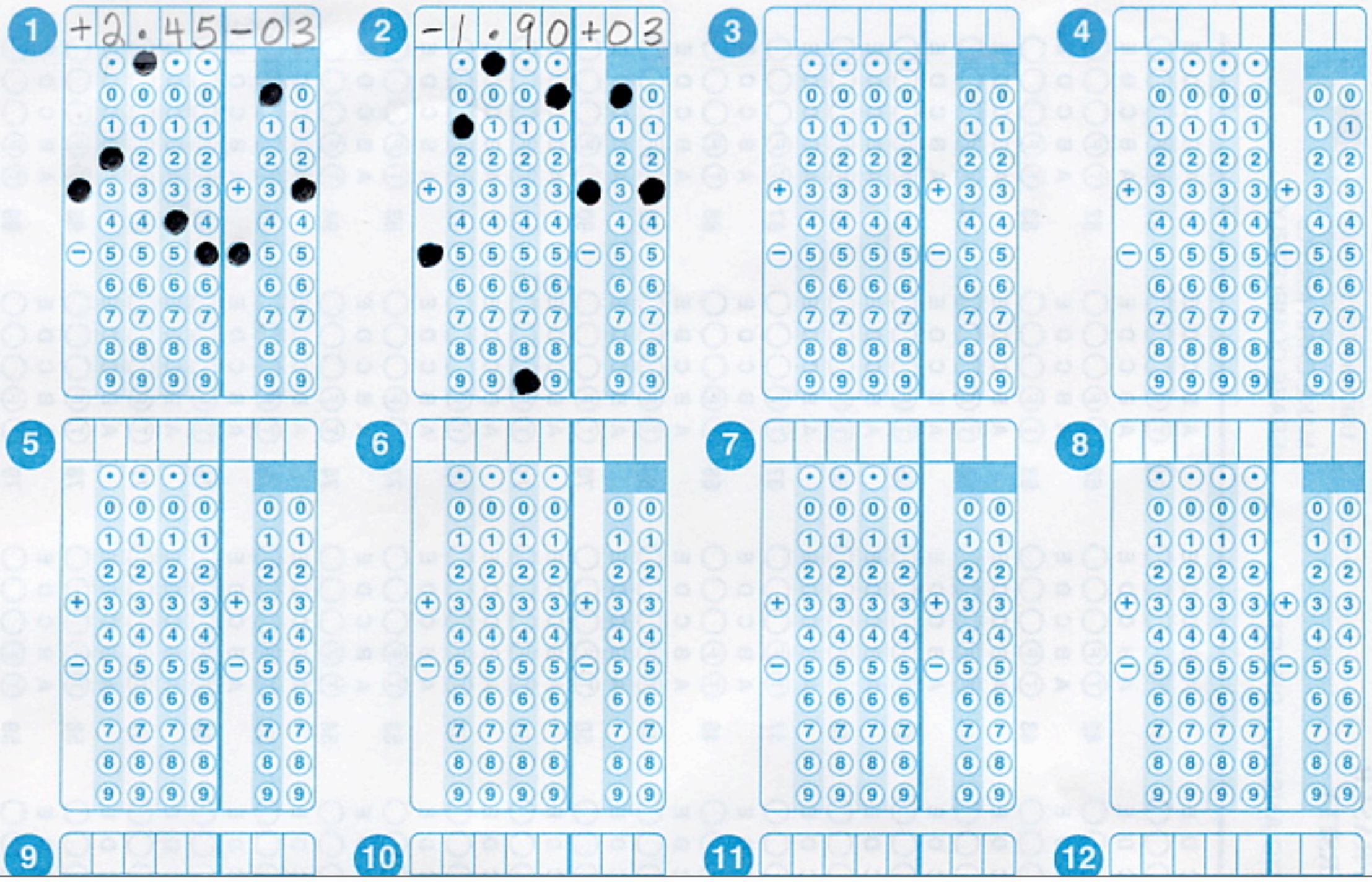


1. Note that the correlation predicts the actual exam results quite well.
2. It appears we can use the average historical degree of difficulty for all questions in the exam to predict the average score and distribution.
3.Means that the resource (randomized) is robust over several semesters.
4.But what about guessing? Can we avoid M/C and still machine grade?

Numerical Submissions

Posed & Scored directly -- not M/C



1. SFU Chemistry Scientific Notation bubble sheet.
2. Allows you to pose and machine read actual numerical responses without having to resort to M/C.
3. Little project to incorporate the facility to upload such a file of data as direct responses to numerical questions.
4. Consider the huge number of numerical problems in LON-CAPA this could be very advantageous for exam designers.
5. That's all.... reflect on the impact of guessing on individual exam results and learning.

Conference Evaluation Survey

* Questionaire & bubble sheet in your folio.
* Return penciled sheets to IRMACS Reception.
* Or later, online, in LON-CAPA, using the login info *from your bubble sheet* as follows:
* Username: Response*xx*
  (where xx="01" thru "52")
* Password: R*y*S*z*
  (y="1" - "6"; z="1" - "10")