

The Automatic Reassessment and Relearning System



BY SAMUEL SONG

ADVISED BY NEIL HEFFERNAN

Introduction



- **The Automatic Reassessment and Relearning System**
 - New feature to the ASSISTment tutoring system
 - Periodically retesting students of skills learned
 - Helps them relearn forgotten skills
 - Requires students to show retention of knowledge over an extended period of time
- **Cognitive Science Literature and Research**
 - 2007 Practice Guide by the Institute for Education Sciences
 - Supports periodic testing will improve student learning by returning to past topics periodically to test if students have retained knowledge

Mastery Learning



- Many tutor systems use mastery learning
- Students practice until they reach a mastery threshold
 - Instead of set number of problems
 - Threshold is usually high performance on recent problems
- Amount of time it takes students to learn and become mastered varies
- No requirement to remember over time
 - Students can be mastered in a single day
 - Never retested after gaining mastery status

Spaced Learning



- **Spacing Effect**
 - Students will learn more if practice is spaced out over time instead of a single large practice session
- **Improve measurement of mastery to be more robust**
 - Change criteria for mastery to require students to pass retention tests
- **Why is Spaced Learning is not widely adopted?**
 - Requires tedious bookkeeping
- **Students gain initial mastery then are reassessed**
 - Schedule progressively lengthens time
 - Student that fail test must relearn using ASSISTment tutor

ASSISTment Tutor



- www.assistments.org
- 130 Mastery Learning Skills for Middle School Math

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Rounding

Rounding - Hundredths Place (#37737)

Round the following number to the **hundredths place**.

8.227

[Comment on this question](#)

Show me hint 1 of 4

Type your answer below (mathematical expression):

Submit Answer

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Project Overview



- **Timeline**
 - **A Term**
 - ✦ Studying ASSISTment codebase
 - ✦ Project Design
 - **B Term**
 - ✦ Implementation
 - 24 new files
 - 15 modified files
 - **D Term**
 - ✦ Testing
 - ✦ Deployment

Settings



- Three parameters
 - Reassessment Days
 - Reassessment Schedule
 - Days until Relearning Assignments are due

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Automatic Reassessment and Relearning System

Class: Arrs_Correct

My ARRS Settings

Choose the default Reassessment days or insert a comma-separated list of days into the form. The Reassessment days represent the time between each mastery learning's reassessment occurrence.

Default: [7, 14, 30, 60]

Custom: [1, 2, 3]

Choose a schedule for Reassessment Tests to be assigned. Reassessment Tests contain a mix of mastery problems from the student's mastery learning. The first Reassessment Test will be assigned on the next matching weekday, including today.

Every 1 Week starting Monday (Default)

Every 1 days starting Thursday

Choose the number of days master problems are due after being assigned in the Reassessment Test. This date is used for the Reassessment Report.

3 Days

5 Days (Default)

7 Days

5 days

Save Changes

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Reassessment



- Mixed Review without tutor help
- One problem from each skill

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What is $(-19) + 7$?

Algebra:

What is the value of the expression below?

$$|-12| - |-3|$$

Algebra:

Round the following number to the **ones place**.

5.2

Algebra:

Submit Test

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Assignments Page



- Shows student's progress
- Date of next test
- Relearning Assignments

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Arrs_Sometimes » Assignments

Show old completed assignments

Your next Reassessment Test will be assigned in 1 days on 2010-04-22.

My Teacher's Assignments

1 - Rounding	(Mastered)	You have completed the Reassessment!	✓✓✓
2 - Absolute Value	(Relearning assignment)	✓○○	Due at: April 26, 2010 12:00 AM
3 - Integers- Addition	(Mastered)	You have completed the Reassessment!	✓✓✓

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Relearning Assignment



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Absolute Value

27970 - 7th Grade: Accentuate the Negative - Morph 2006 grade 7 #12 (#47025)

What is the value of the expression below?

$$|-12| - |-3|$$

[Comment on this question](#)

Break this problem into steps

Type your answer below (mathematical expression):

Submit Answer

What is the value of $|-12|$?

[Comment on this question](#)

Show me hint 1 of 2

Type your answer below (mathematical expression):

Submit Answer

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ARRS Report



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Automatic Reassessment and Relearning Report

[Problem based Report](#)

Reassessment Test:

2010-04-21 ▾

Legend:

	Item was completed on time.
	Item is late.

Relearning due: 2010-04-26 (in 4 days)

Student	Status	# of problems	% Correct	Progress of Relearning
Adam B Goldstein	Completed on time	3	66 %	Completed
DWagid	Completed on time	1	100 %	Completed
Arrs_Test	Completed on time	3	66 %	0 / 1 Relearning Assignments Completed

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Student Report



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Student ARRS Report

Reassessment Test:

2010-04-21 ▾

Legend:

■	Item was completed on time.
■	Item is late.

Relearning due date: 2010-04-26 (in 4 days)

Student: Arrs_Test

Problem Set	Result	Student Answer	Correct Answers	Reassessment Level	Current Relearning Assignment Status	Next Date to Retest
1 - Rounding	Correct	5	5	Completed Reassessment	Correct on Reassessment Test	Never
3 - Integers-Addition	Correct	-12	-12	Completed Reassessment	Correct on Reassessment Test	Never
2 - Absolute Value	Wrong	wrong answer here	9	2 days	In progress	Must finish Relearning Assignment

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Problem Based Reports



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Problem Based ARRS Report

[Cumulative Problem Report](#)

Reassessment Test:

2010-04-21 ▾

The following table shows each student results for problems in the selected Reassessment Test

	2 - Absolute Value	1 - Rounding	3 - Integers- Addition
Adam B Goldstein	Correct	Correct	Wrong
DWagid	Correct	Not tested	Not tested
Arrs_Test	Wrong	Correct	Correct
Totals	2 / 3 = 66 %	2 / 2 = 100 %	1 / 2 = 50 %

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Future Work



- **Extend ARRS**
 - Customize schedules to individuals
 - Use student's performance on relearning assignments
- **Research Experiments**
 - How much of an affect does ARRS improve retention?
 - What is the most effective time intervals of spacing?
 - Is some knowledge easier to forget?

Conclusions



- ARRS hopes to improve student learning by helping teachers implement the simple idea of spaced learning from cognitive science.
- ARRS can be the foundation for experimental research
- The project will hopefully affect how and more importantly *when* students learn.

Questions?

