

Reinventing homework as cooperative, formative assessment

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Reinventing homework

The problem

- Students need practice
- Students need feedback

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The problem

- Grading is a lot of work
- Matching comments to grades/rubrics is hard
- Delay between work and feedback
- Solitary work: not the best mode for everyone
- A lot of them don't read the comments anyway

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Automation

- Off-the-shelf programming problems
- Testing systems with grading hooks
- Online quizzes

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A homework question

Devise at least two interestingly-different tiebreakers for A* pathfinding on a 2D grid, and show a test case where they behave differently.

Analyse which of your tiebreakers performs “best” on your test case, and discuss whether there is a tie-breaking strategy that will work well for all test cases or whether their relative performance depends on the problem.

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An earlier attempt

- “Work together, write alone”
 - Confusion about acceptable collaboration
 - Grading multiple “copies”

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An earlier attempt, 2

- Revisions
 - Good for learning!
 - Unexpected revision, no time, skip it
 - “I already got (almost) full credit”
 - Apathy
 - If the workload was heavy before. . .

Reinventing homework

Idea

- Group work
- Revision cycle
- Comments, no grades
- Grades, no comments
- Limited scale

Reinventing homework

Limited scale

- 5: The answer **is correct**, or may have very minor errors in areas not addressed by the problem (e.g. simple arithmetic mistakes)
- 3: The answer **demonstrates substantial understanding** but is incomplete or contains errors in areas relevant to the problem.
- 0: The answer may or may not have included relevant facts, formulas, or figures, but **demonstrates little or no clear understanding** of how to apply them or approach the problem.

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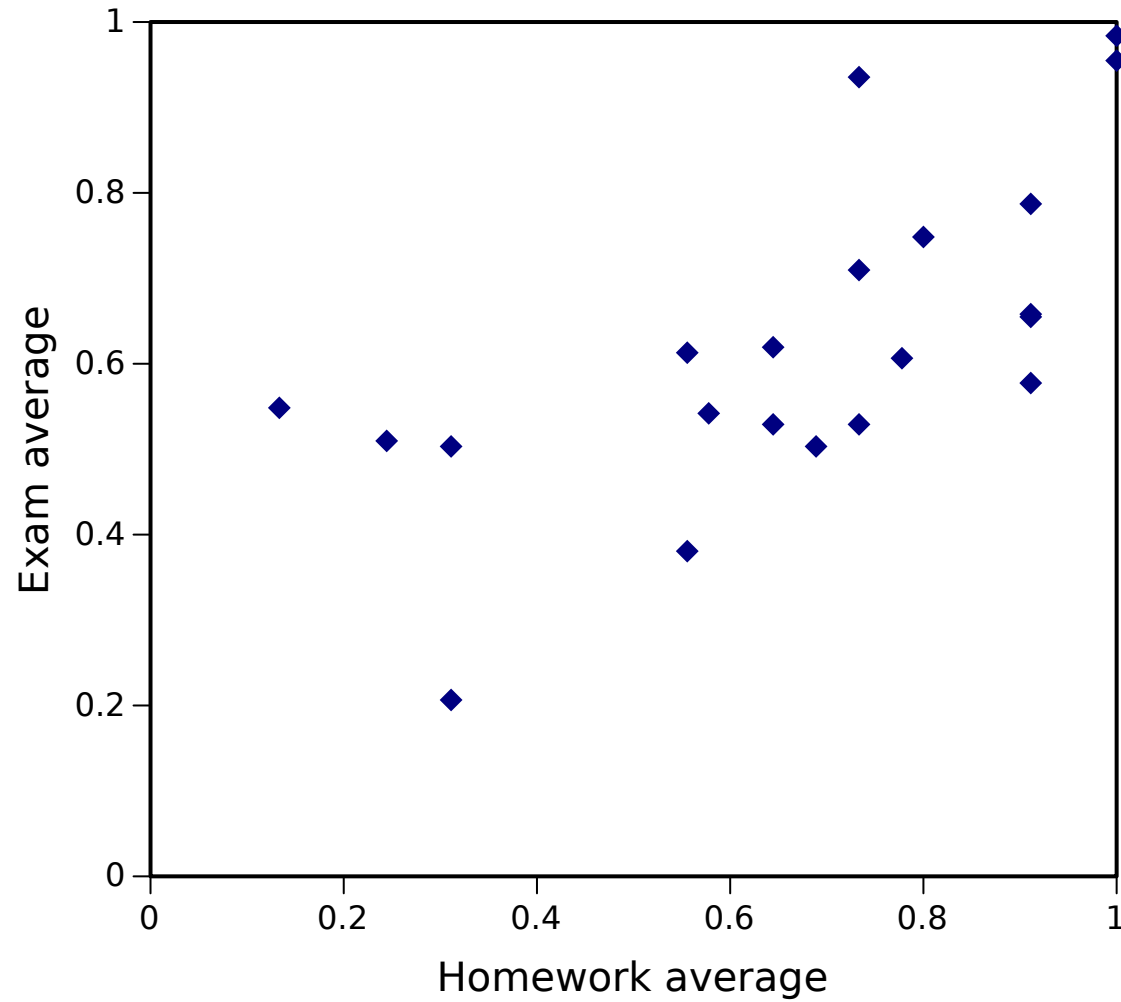
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Possible worries

- “Free rider” in group
- Grades swing + or –
- Students dislike—or “like”

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Outcomes



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Revision performance

Original score:	0	3	5
Count:	26	45	25

Original score	Revision score			
	none	0	3	5
5	2			23
3	0		21	24
0	3	6	11	6

Final score:	0	3	5
Count:	9	32	55

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Revision performance (a different class)

Original score:	0	3	5
Count:	13	27	10

Original score	Revision score			
	none	0	3	5
5	4			6
3	14		4	9
0	6		6	1

Final score:	0	3	5
Count:	6	24	20

Reinventing homework

Revision performance (yet another class)

Original score:	0	3	5
Count:	11	18	9

Original score	Revision score			
	none	0	3	5
5	3			6
3	1		12	5
0	4	4	2	1

Final score:	0	3	5
Count:	8	15	15

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Revision performance (aggregate)

Original score:	0	3	5
Count:	56	108	51

Original score	Revision score			
	none	0	3	5
5	9		1	41
3	15		42	51
0	13	12	21	10

Final score:	0	3	5
Count:	25	78	102

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Student response

Question	Response					Avg
	1	2	3	4	5	
Q1 Liked group work	0	0	2	3	8	4.46
Q2 Group work effective	0	0	5	2	6	4.08
Q3 Comment/revision effective	0	1	1	3	8	4.38

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Conclusion

- Group work
- Revision cycle
- Comments, no grades
- Grades, no comments
- Limited scale
- Increased cooperation
- More repeat engagement
- Less grading work
- And . . .

Reinventing homework

Students appreciate it

The homework policy *“gave more motivation to actually read comments, and having the opportunity to address them definitely helped concepts sink in.”*

- Any questions?
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