PeerWise

Collaborative Student Learning

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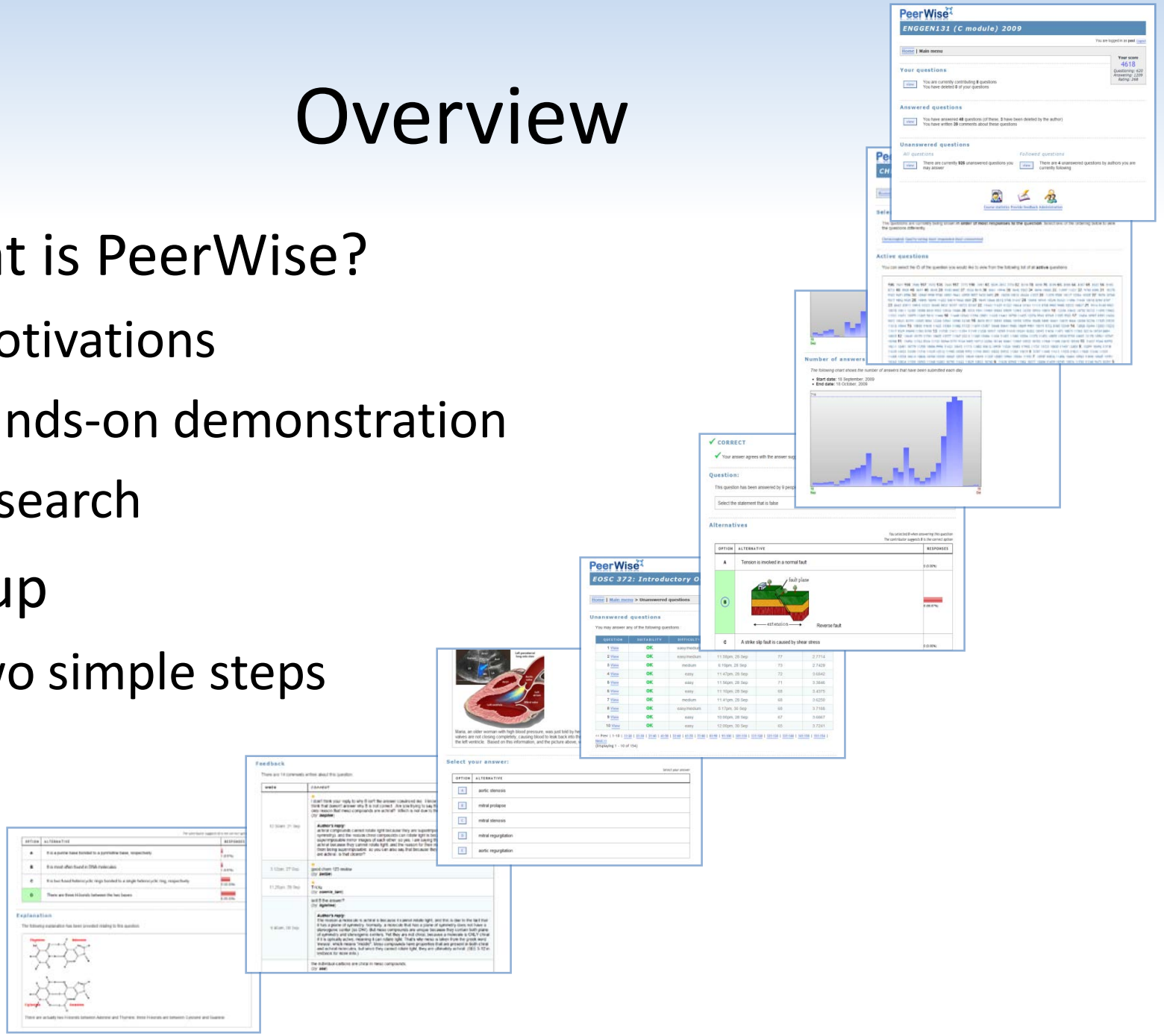
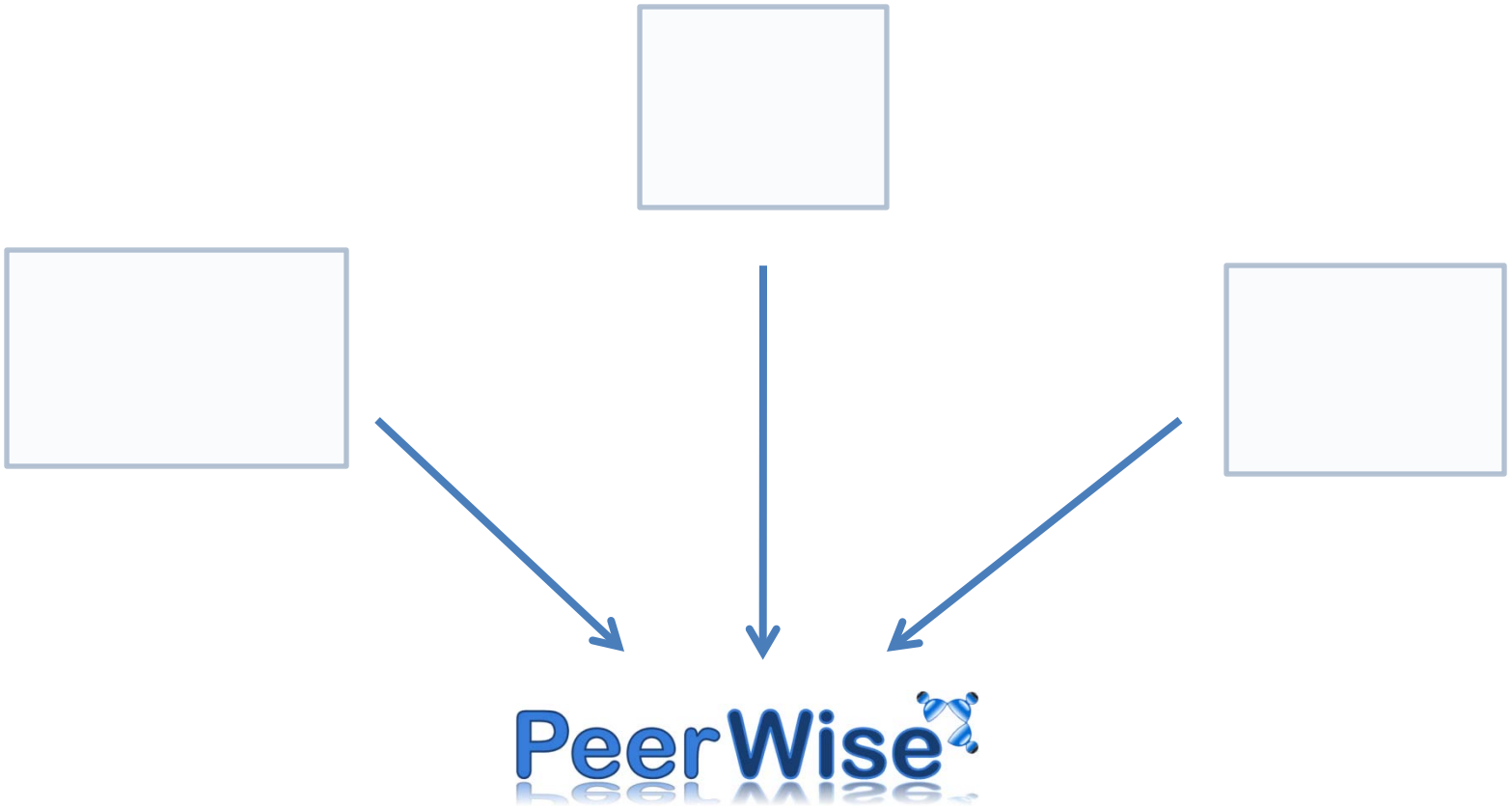
New Zealand

Overview

- What is PeerWise?
  - motivations
  - hands-on demonstration
  - research
- Set up
  - two simple steps



Motivations



Large classes

- A powerful resource

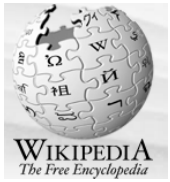
ENGGEN 131, 10am Stream
Semester Two, 2009

Motivations

The energy and creativity of a large class

Student familiarity with Web 2.0

- Characteristics
  - user-generated content
  - contributions by many users
  - techniques for content discovery
  - engaging



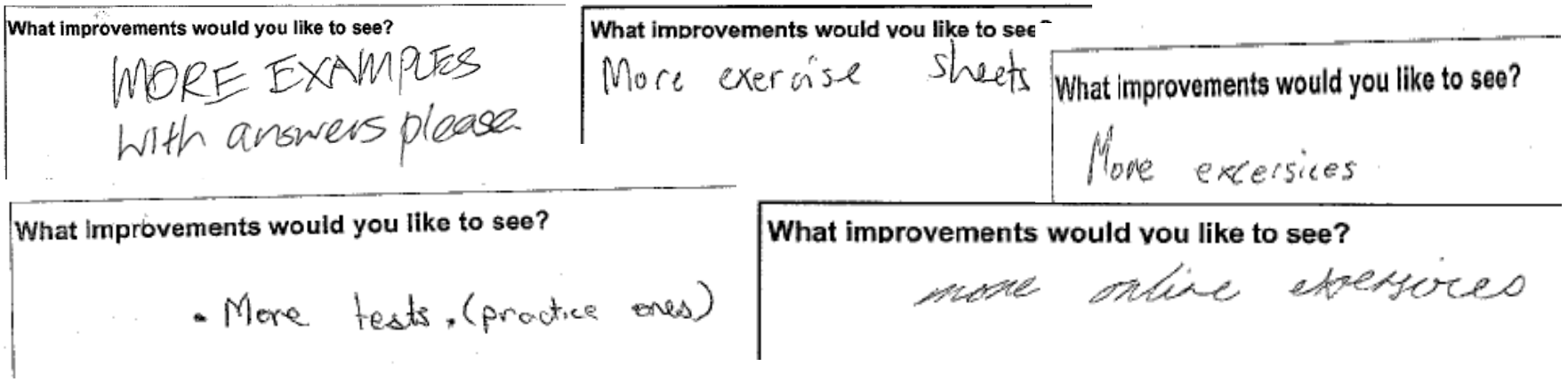
Motivations

The energy and creativity of a large class

Student familiarity with Web 2.0

digg flickr bebo YouTube Broadcast Yourself™ Wikipedia The Free Encyclopedia facebook

Student generated questions



- Not a unique idea:
  - Balajthy (1984), Yu et al. (2002), Fellenz (2004), Barak and Rafaeli (2004), Chang et al. (2005), Horgen (2007), ...
  - I had tried, but with the wrong technology

Motivations

The energy and creativity of a large class

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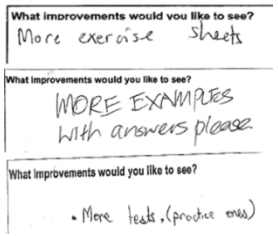

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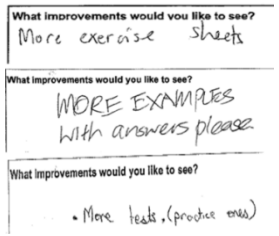
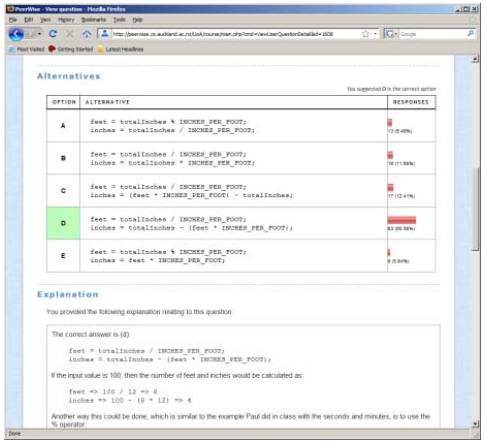
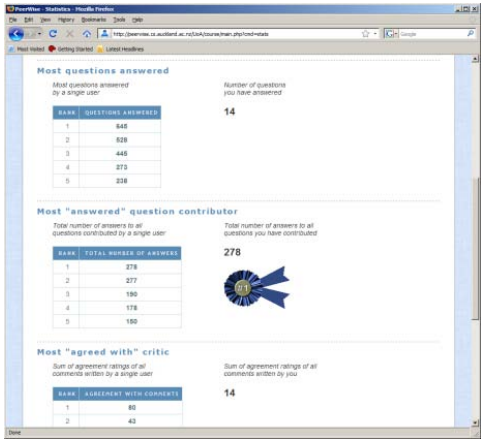


PeerWise

What is PeerWise?

- Web-based MCQ repository built by students
- Students:
  - develop new questions with associated explanations
  - answer existing questions and rate them for quality and difficulty
  - take part in discussions
  - compete with other students to appear on leaderboards





PeerWise

- Web-based MCQ repository built by students
- A student contributing a new question would develop the question stem:

Question

Which of the following loops *could* you use to cycle through **all** elements of the following array ***without*** going out of bounds and causing the program to crash?

```
int[] array = new int[15];
```

Assume that in all cases, **array[i]** will be used without any other math operating inside the square brackets (dereferencing operator).

PeerWise

- And a set of alternatives
- These should target misconceptions
- Of course, the correct answer must be indicated

Alternatives

A	int i = 0;
	while (i <= array.length) {
	i++;
	// code
	}

B	for (int i = 0; i <= array.length; i ++) {
	// code
	}

C	for (int i = array.length - 1; i >= 0; i--) {
	// code
	}

D	for (int i = array.length - 1; i > 0; i--) {
	// code
	}

E	int i = 1;
	while (i < array.length) {
	i++
	// code
	}

PeerWise

- And an explanation, in their own words
- Useful for students who answer incorrectly

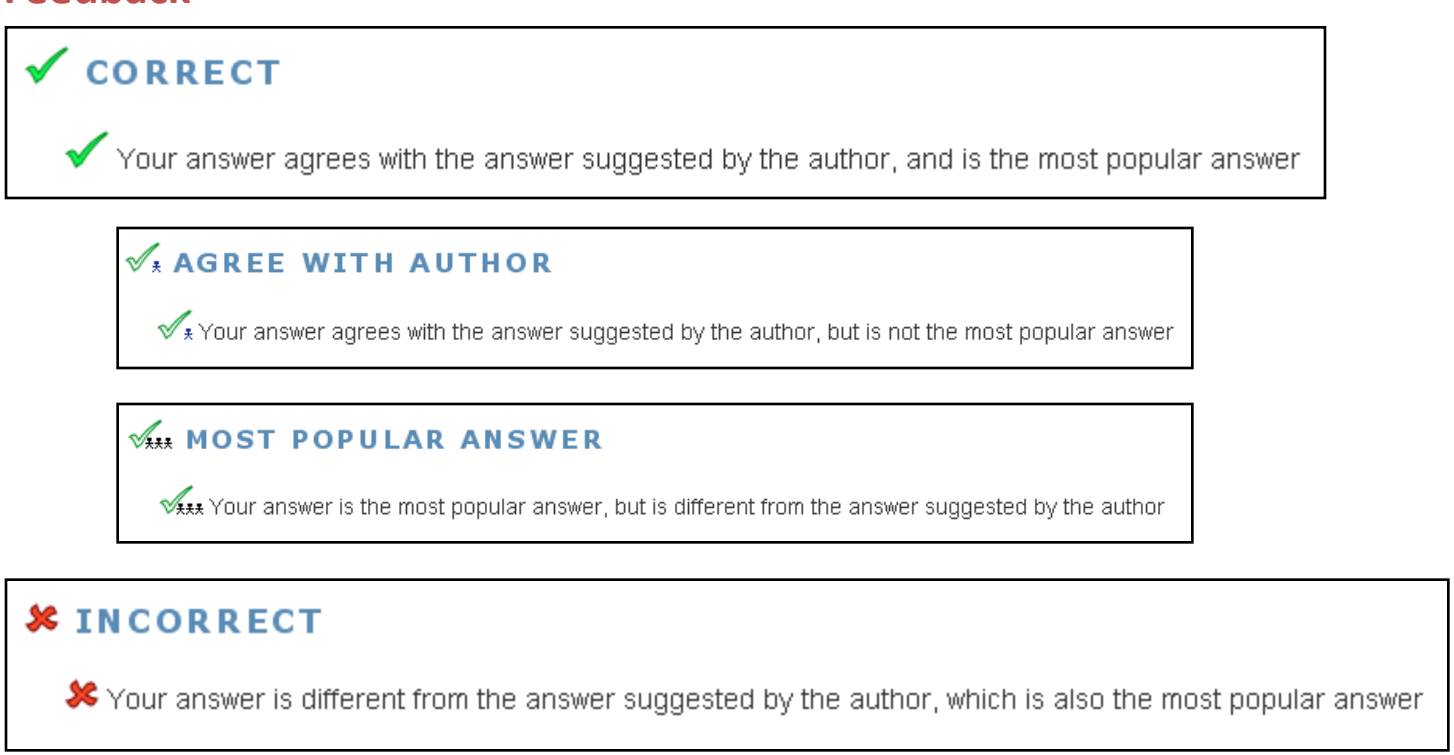
Explanation

When dealing with arrays, there are a few things to remember. 1) When created, the value used inside the square brackets indicates the length of the array, or how many elements it can contain. The length counts from a starting point of 1. The INDEX however, begins at 0. Meaning that in this case, where we created our integer array with a length of 15, the valid index values are 0-14.
(C) is the correct answer because:
i = array.length - 1, evalutes to 14. The last index of the array.
The conditional statement will go down to AND include 0, the first index of the array, but will not pass this point and go out of bounds.
i-- means subtract 1 from i every time it goes around, so every number from 14 to 0 will be a value of i during the loops lifespan.

Why are the other's incorrect?
(A) This loop would crash at the end.
i = 0, this is fine, it is the first value of the index and is correct.
BUT
The conditional inside the while loop is: i <= array.length, which means it can be less than OR equal to array.length, which is 15. The last index is 14, thus when it attempted to find index 15 of the array, it would crash with an out of bounds error.
(B) This suffers the exact same problem as A, but has been rendered in 'for' loop format.
(D) The loop shown for D would not crash, but nor would it completely cycle through all values of this array.
int i = array.length - 1 as discussed above will result in 14 which is correct for the last index of our array,
However,
The conditional: i > 0 will not ever allow this loop to check index 0. It will stop after cycling through 1.
(E) This loop again will not crash, but will notcycle completely through all values of this array.
int i = 1 means that 0 will not be evaluated.
the conditional inside the while loop will stop the cycle correctly at 14 to prevent the crash.
i++ means that it will increment the index until the conditional stops this loop.

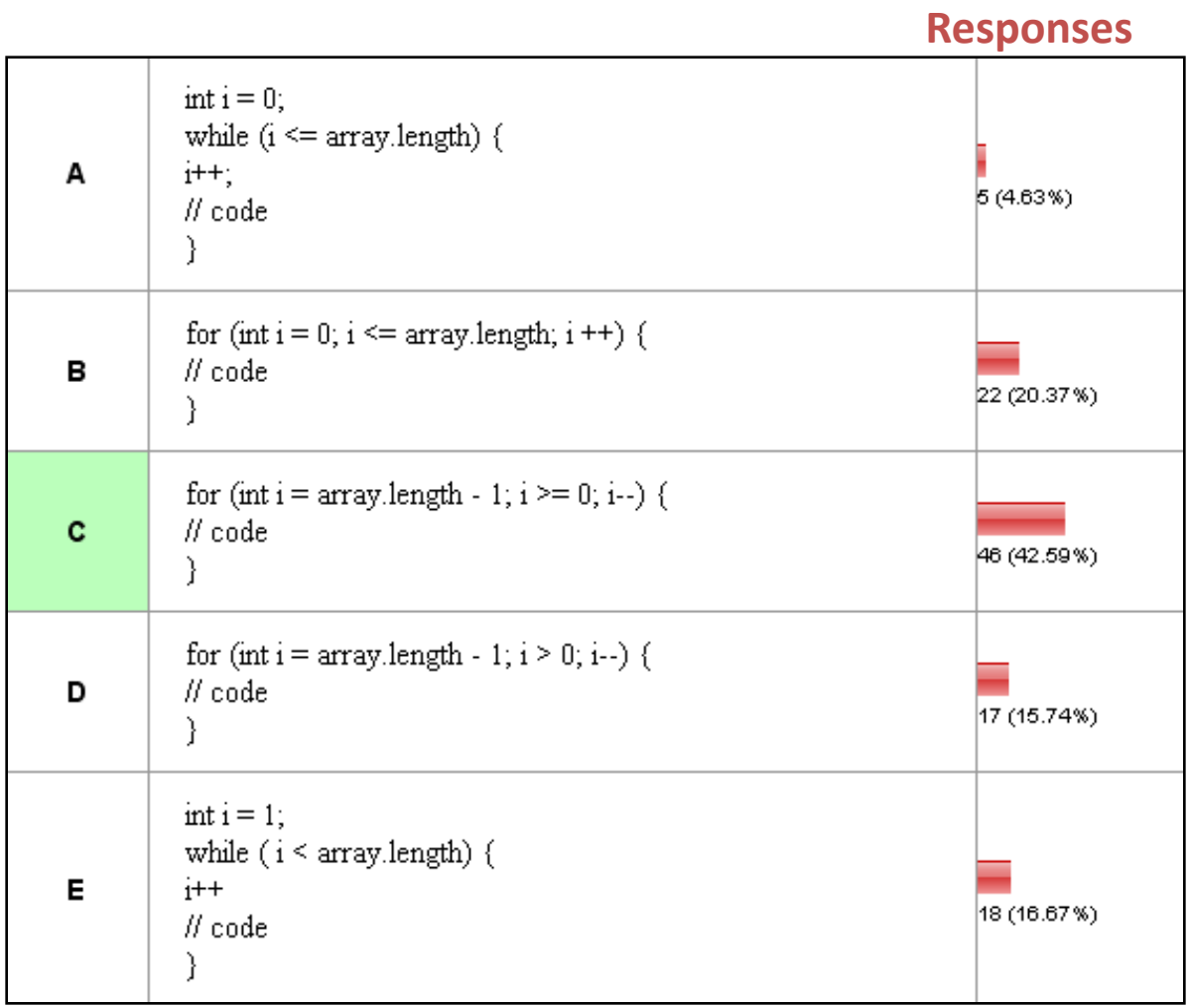
PeerWise

- Students answering questions are given immediate feedback on their selection:



PeerWise

- And can see how other students have answered the question



PeerWise

- And can participate in discussions about the question

Discussion

WHEN	COMMENT
9:59pm, 08 May	★★★★★★★★★ Sneaky. Very good, although it is not how one normally thinks of looping through an array, it is a common pitfall and very well highlighted. Well explained as well. ***Author's reply:*** Thanks for the feedback! Going through an array backwards might be sensible if the elements are sorted and you want to print them in reverse order.
3:58pm, 09 May	★★★★ Good testing of understanding of loops. Awesome.
9:20pm, 08 May	★★ while I think the question is quite confusing, this is a great question.(and very great explaination by the way). ***Author's reply:*** I hope it wasn't too confusing... it was difficult to describe carefully while trying to keep the code to a minimum
12:30pm, 09 May	★★ Nice question. A way of looping I hadn't considered until now, but still applicable and within the scope of the course.
9:59pm, 10 May	★★ Thinking about the various different increments and conditions which can be used in a loop! I think it's a nice change from the usual loop questions that normally involve an ascending value of i. Brilliant:)
5:12pm, 09 May	★ Good questions to understand loops and array... Good explanations as well... thank you...

PeerWise

- Students can agree or disagree with comments in the discussions, and can rate the questions for quality and difficulty

Agreements

WHEN	COMMENT	AGREE WITH COMMENT	DISAGREE WITH COMMENT
9:59pm, 08 May	★★★★★★★★★ Sneaky. Very good, although it is not how one normally thinks of looping through an array, it is a common pitfall and very well highlighted. Well explained as well. ***Author's reply:*** Thanks for the feedback! Going through an array backwards might be sensible if the elements are sorted and you want to print them in reverse order.	★ 0	✕ 0
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12:30pm, 09 May	★★ Nice question. A way of looping I hadn't considered until now, but still applicable and within the scope of the course.	★ 0	✕ 0

Ratings

DIFFICULTY	RATING
easy/medium	2.0357
easy/medium	2.6557
medium	3.6667
medium	3.6200
medium	3.1731
easy	3.2549
medium/hard	3.5439
medium/hard	3.5179
easy/medium	2.3265
easy	1.1458

PeerWise

- Good contributions are highlighted on a leaderboard

Leaderboard

Most "answered" question contributor

Total number of answers to all questions contributed by a single user

RANK	TOTAL NUMBER OF ANSWERS
1	403
2	365
3	245
4	143
5	142

Total number of answers to all questions you have contributed

403

Top rated questions

Top 5 rated questions for this course (rated by at least 5 users)

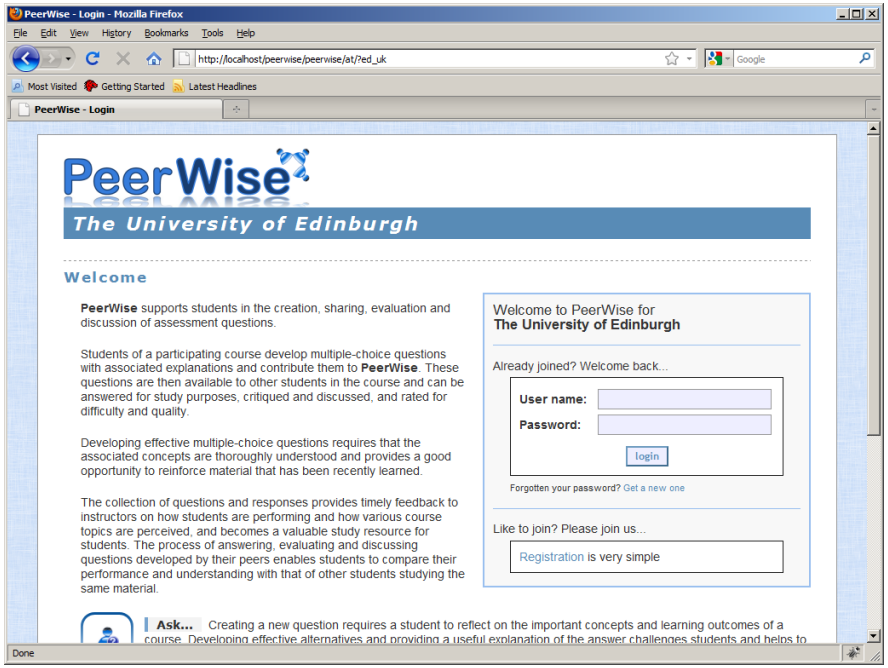
RANK	QUESTION RATING
1	4.5333
2	4.2619
3	4.1250
4	3.9535
5	3.9412

Highest rating of any of your questions (rated by at least 5 users)

3.8500

Hands-on demonstration

- Registration
- Creating, answering, evaluating questions
- Administration



peerwise.cs.auckland.ac.nz

Research

- What do students think?
- Repository quality?
- Activity linked to performance?

What do students think?

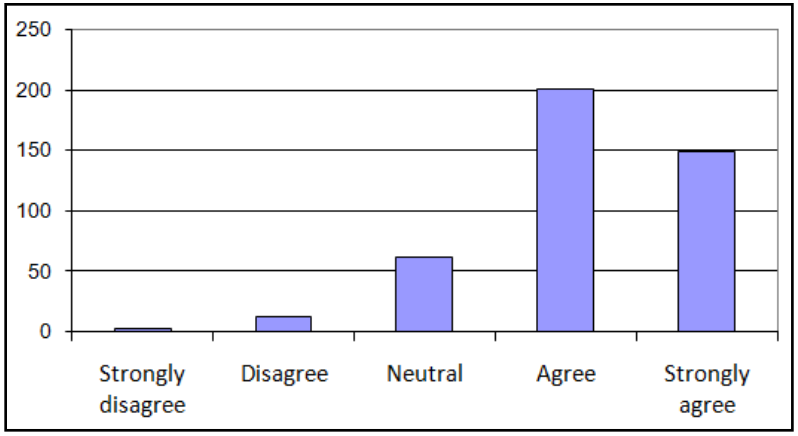
“I actually found it enjoyable, as sad as that sounds.”

Student feedback

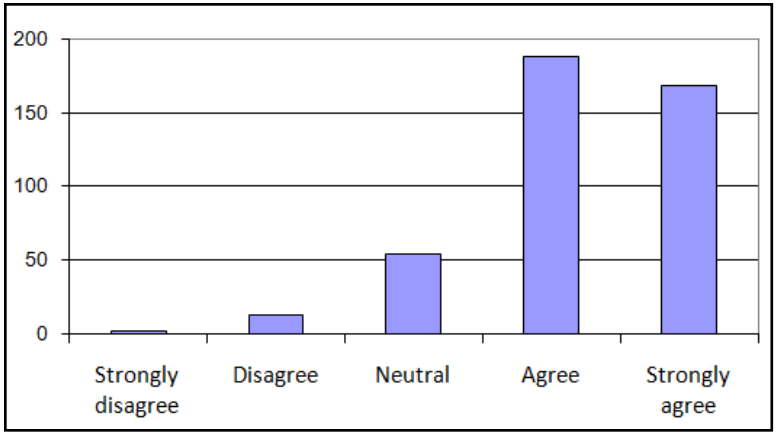
What do students think?

- Survey responses (n = 439)
  - ENGGEN 131, Semester 2, 2007

Developing new questions helped me learn



Answering other student's questions helped me learn



What do students think?

- Survey responses (n = 387)
  - ENGGEN 131, Semester 2, 2009

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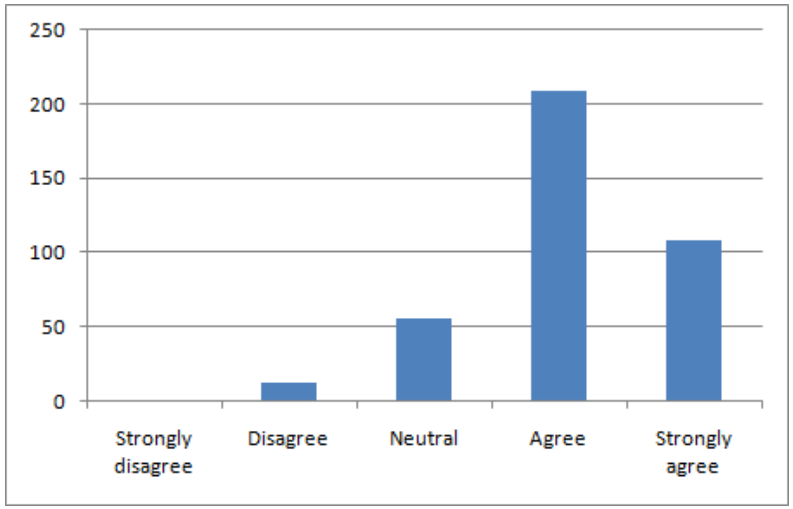

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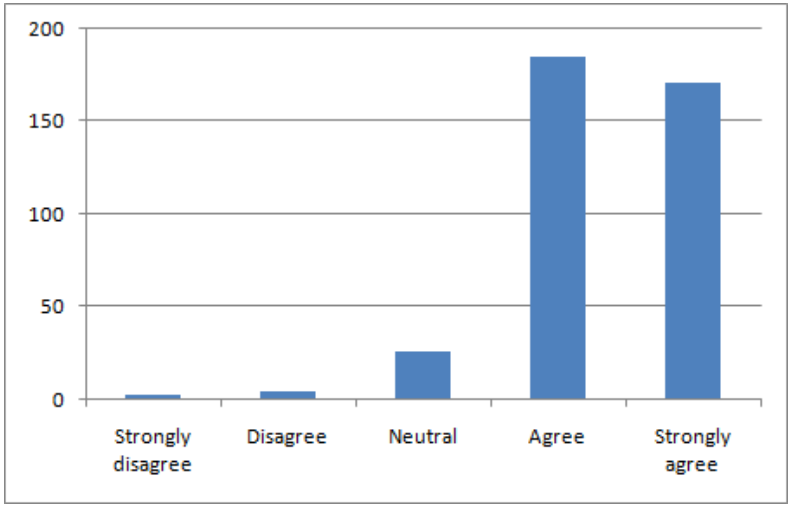


What do students think?

- Focuses attention on learning outcomes

> "What I found most interesting was how other people structured their questions. It kind of **made me think** about what kind of **topics or concepts** people felt **were important to the course**, hence their choice of making a question on a particular topic."

What do students think?

- Focuses attention on learning outcomes
- Express understanding in their own words

"The **biggest learning experience** for me was setting up my multi-choice question...

...in the end it was a lot of help because **i was just about able to answer any question that was on the same topic as my question**"

What do students think?

- Focuses attention on learning outcomes
- Express understanding in their own words
- Question bank for drill and practice revision

"I answered over 100 questions, it was a quick way to test my knowledge and if I got the answer wrong the explanations **helped me learn** something I wasn't too sure with."

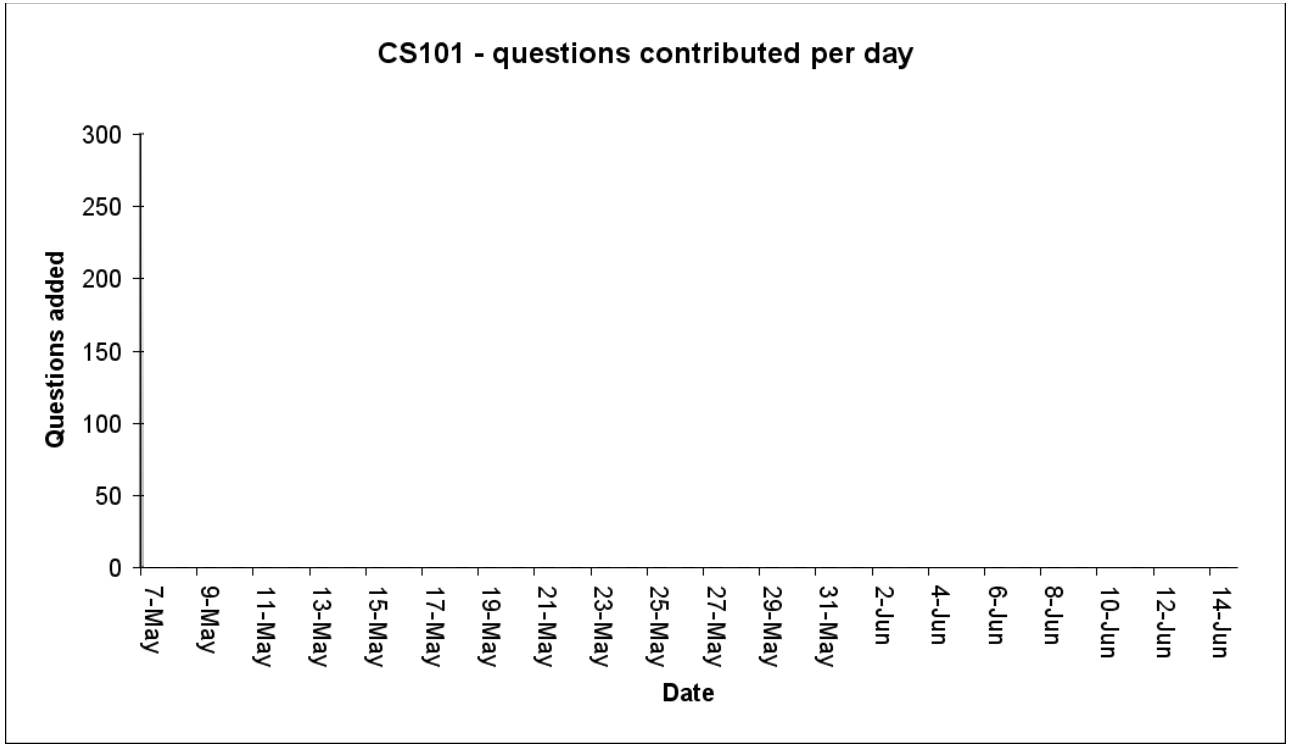
What do students think?

- Focuses attention on learning outcomes
- Express understanding in their own words
- Question bank for drill and practice revision
- Peer comparison

"Being able to see how other people answered was great as it allowed me to **recognise at which level I was at compared to everyone else**"

What do students think?

- Voluntary usage?
  - COMPSCI 101, Semester 1, 2007 (n = 460)



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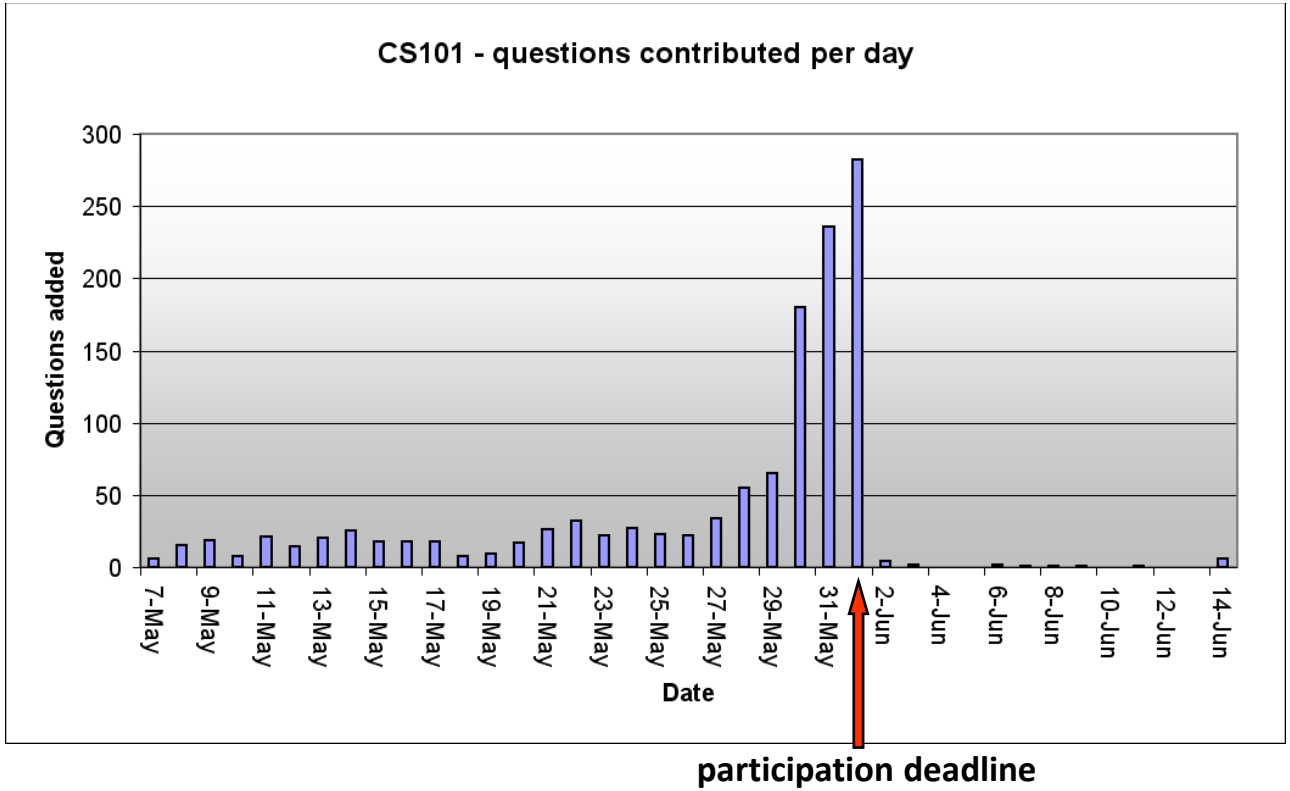

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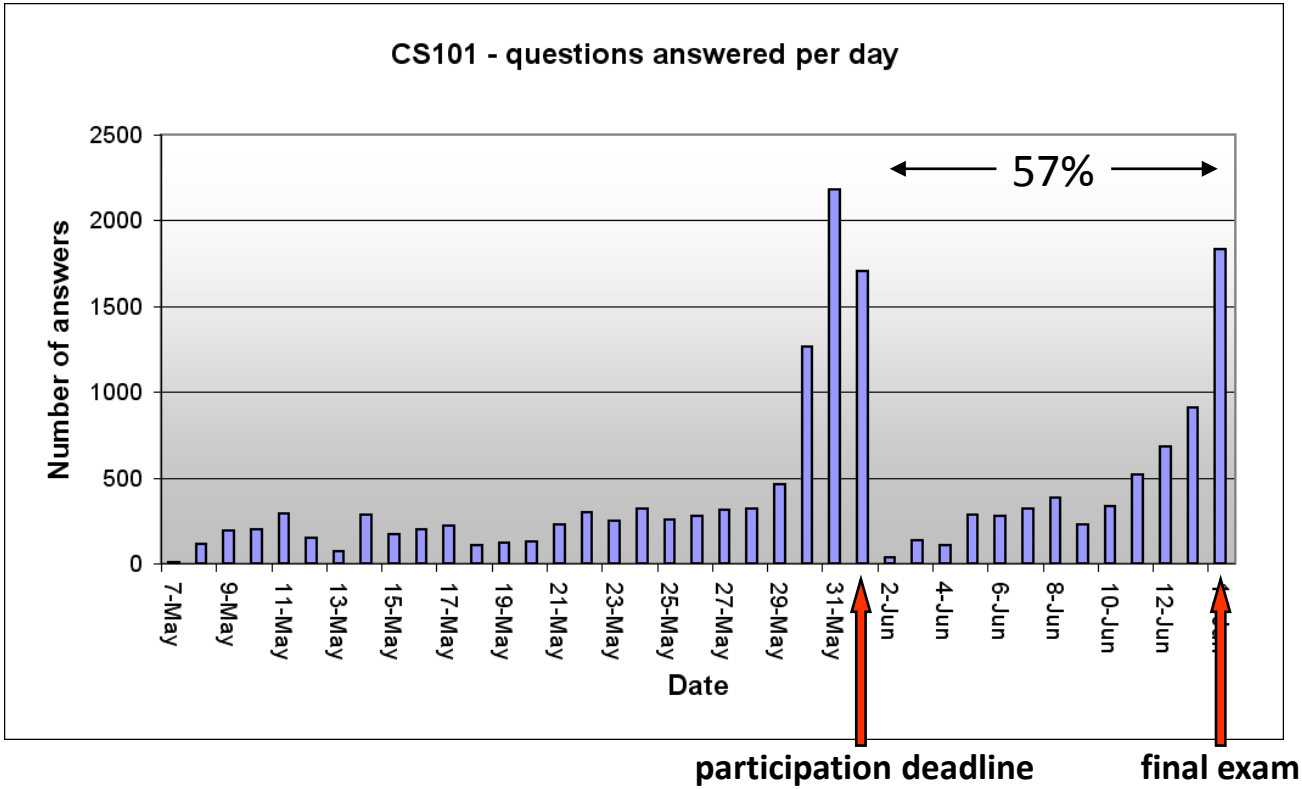
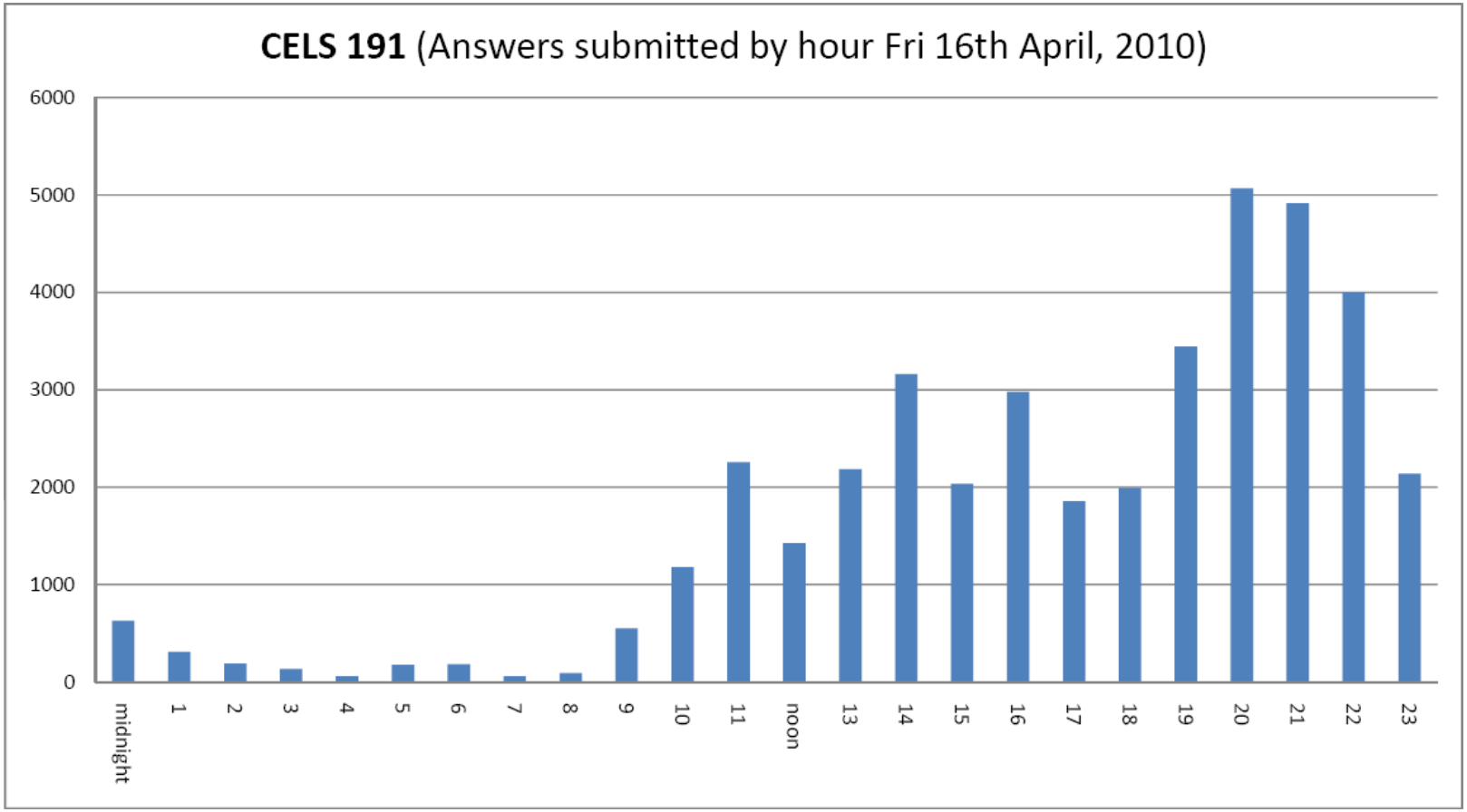


CELS 191 – University of Otago



Voluntary activity, 1000 students participating, 117959 answers

Repository quality?

"The quality of questions range from meaningless questions to questions that stimulate your brain."

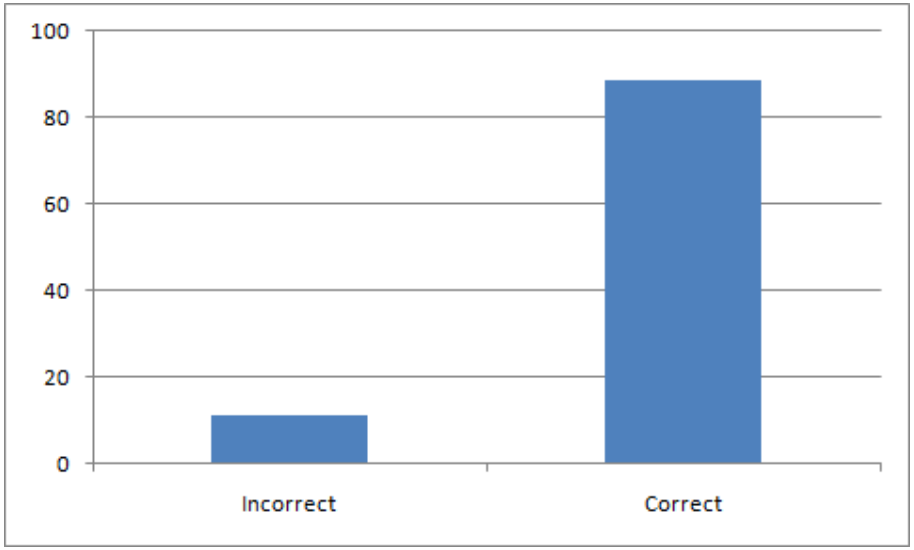
Student feedback

Repository quality?

- Considerable analysis of a CS1 repository
- Selected finding
  - how often is the author's answer incorrect?

Repository quality?

- Author's answer incorrect?
  - COMPSCI 101, Semester 1, 2008
    - 617 questions
    - we examined every tenth question



What is the appropriat
following returns false:

!A || B && !B || A

Alt A 2 (14.29%)	A = Fal B = Tru
Alt B 3 (21.43%)	A = Tru B = Tru
Alt C 0 (0.00%)	A = Fal B = Fal
Alt D 9 (64.29%)	None o

The Answer is A:
When A = False, B =
!A || B && !B || A =>
(True) || (True) && (
=> True && False =

★★★
Check this page. && is higher than ||.
http://java.sun.com/docs/books/tutorial/java/nutsandbolts/operators.html

so the equation is A + B!B + !A, which becomes A + !A, which always evaluates to true.

So it doesnt matter what values you put into A and B, the expression is never going to be false.

★
I think that the && operation has a higher priority and so will be evaluated before the ||
i.e. (!A) || (B && (!B)) || (A)
havent double-checked in textpad though...

★
As explained by the person above me who linked to the sun page, as that expression stands, it cannot be false. In bracket form it would look like: (!A || B) && (A || !B).

Of the answers you gave, none of the above is the correct one. :P

> **Author's reply**
> Sorry everyone..thanx for the reply..i've posted the new version of this question. Feel free to check it out n comment on it (i've 'repaired' my understanding, i hope i got it right this time :D)

---

ya && is at a higher lvl than || so always do && so in this case the answer can only be true no matter what

---

Wow that actually helped me alot lol. Totally forgot about the order of && and ||

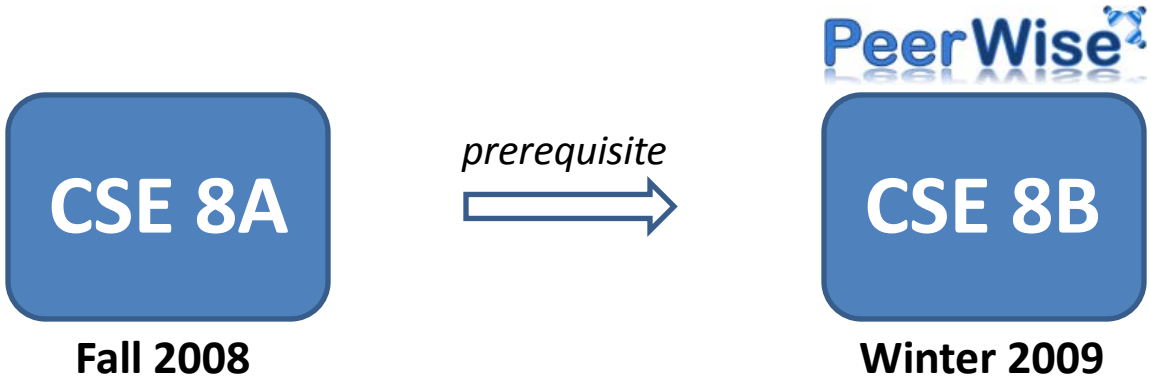
Activity linked to performance?

“Using PeerWise was very useful for learning things I didn't know I didn't know.”

Student feedback

Activity linked to performance?

- Do the most active students improve their position in class?
  - study at the University of California, San Diego



Activity linked to performance?

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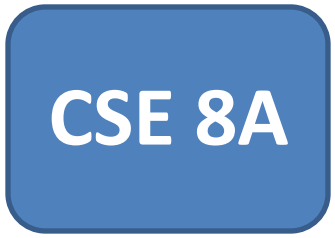


Fall 2008

Final exam grade provides class rank in CSE 8A

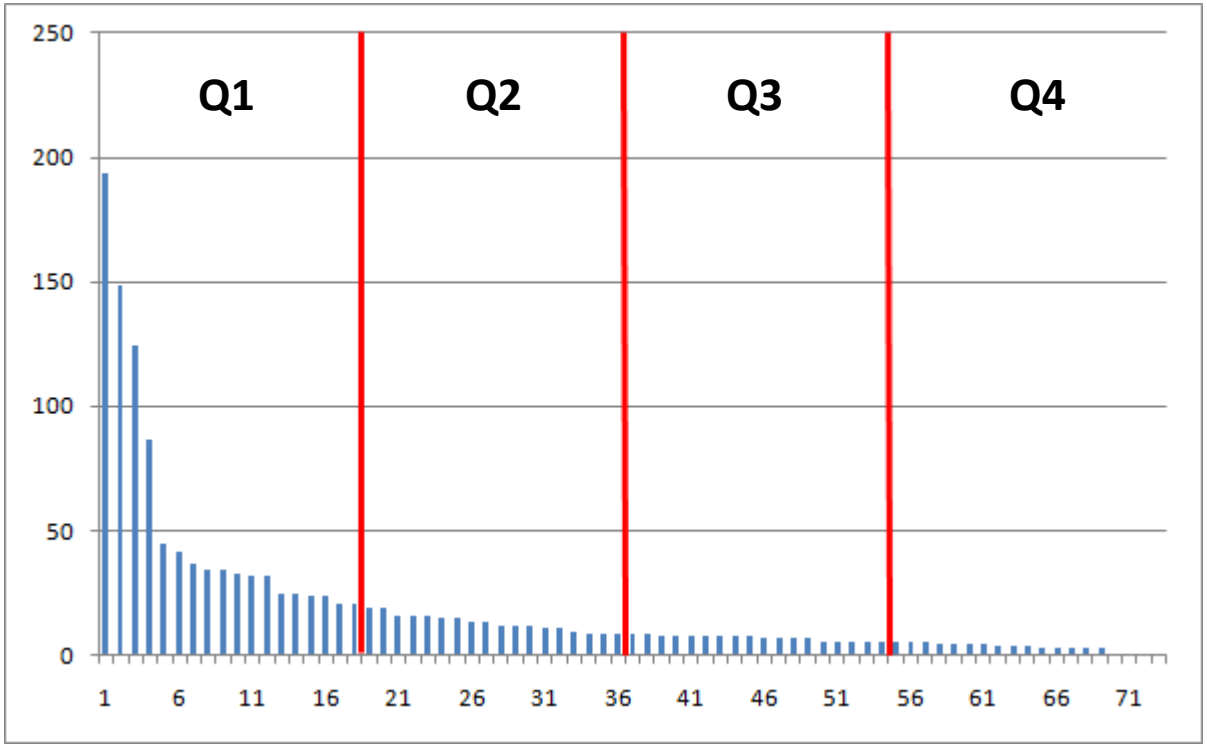
Winter 2009

Final exam grade provides class rank in CSE 8B

n = 73

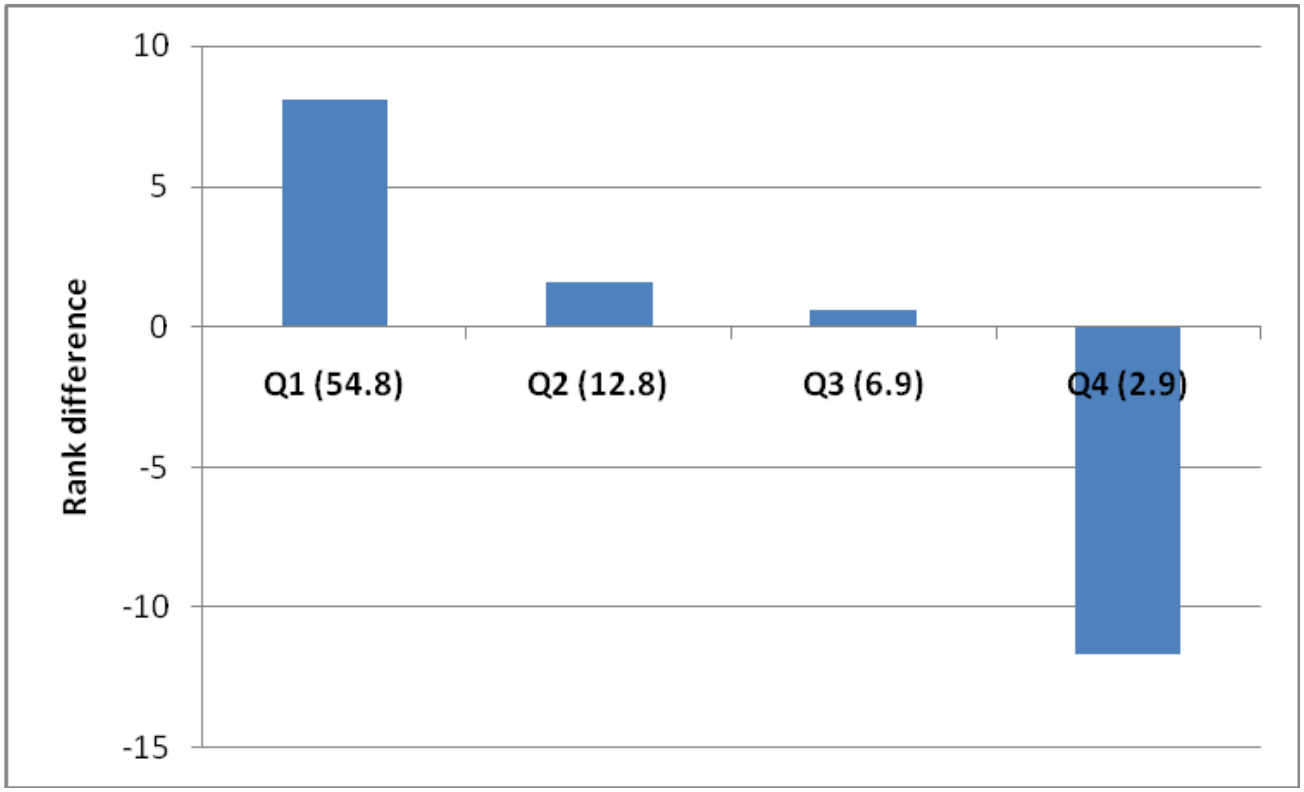
Activity linked to performance?

- Quartiles based on number of questions answered



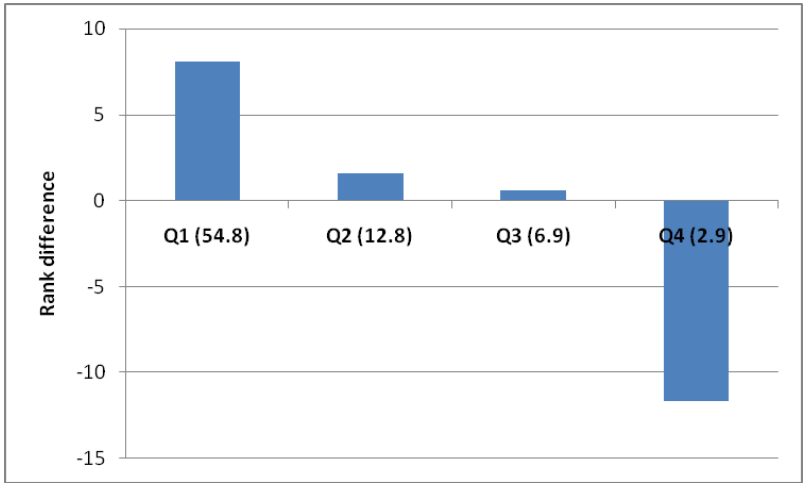
Activity linked to performance?

- Change in rank from CSE 8A to CSE 8B
  - (mean number of questions answered)



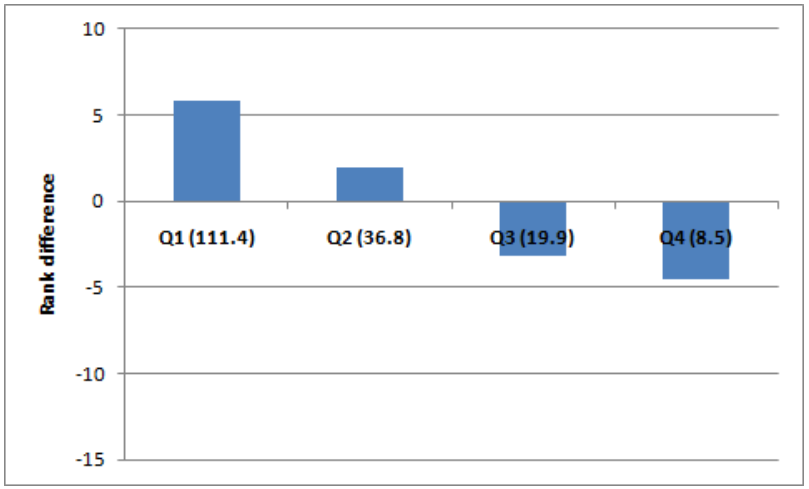
Activity linked to performance?

- Replicated the following term



Winter 2009 (n=73)

The highest performing students in the pre-requisite course were most active



Spring 2009 (n=53)

The lowest performing students in the pre-requisite course were most active

Future research

- Multi-institutional collaborative student learning

Reach

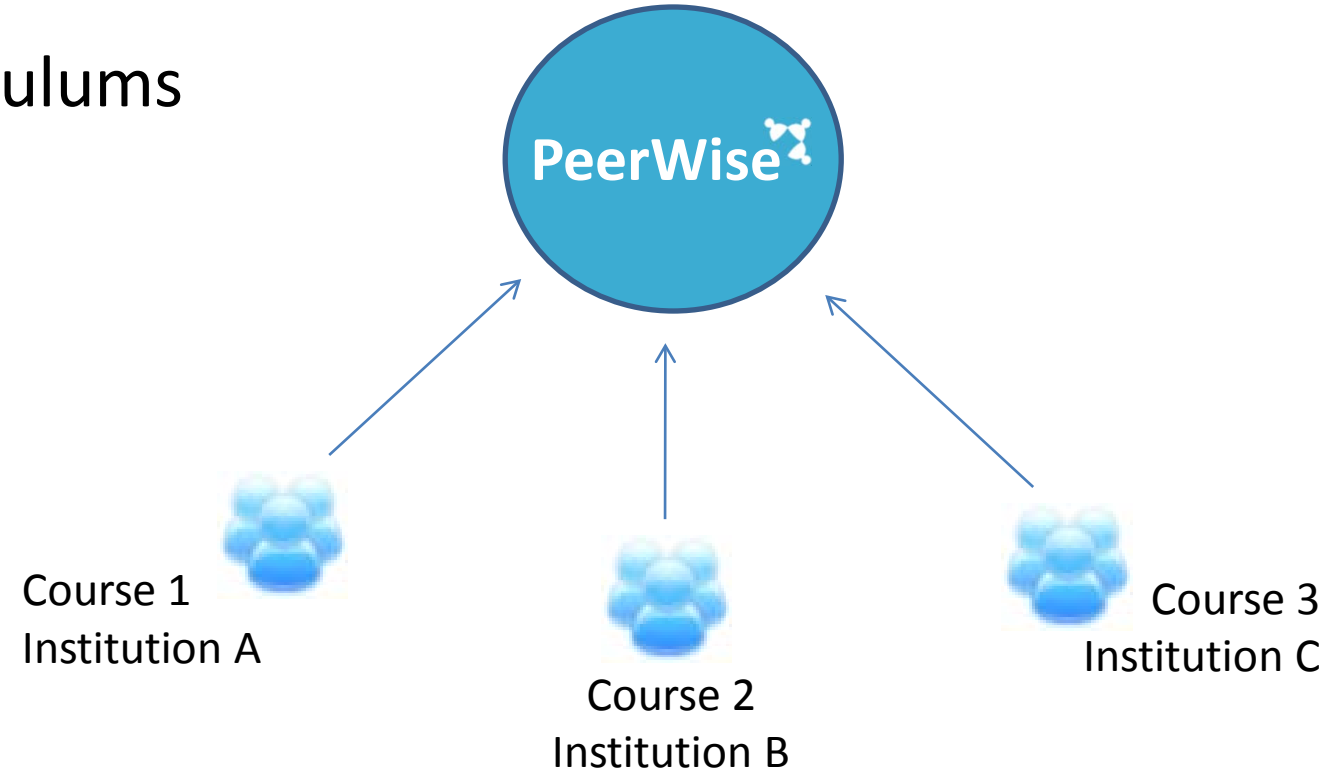
- Summer School 2007
  - 1 institution
  - 1 course
  - 18 students contributed
  - 98 questions were written
  - 865 answers were submitted

Reach

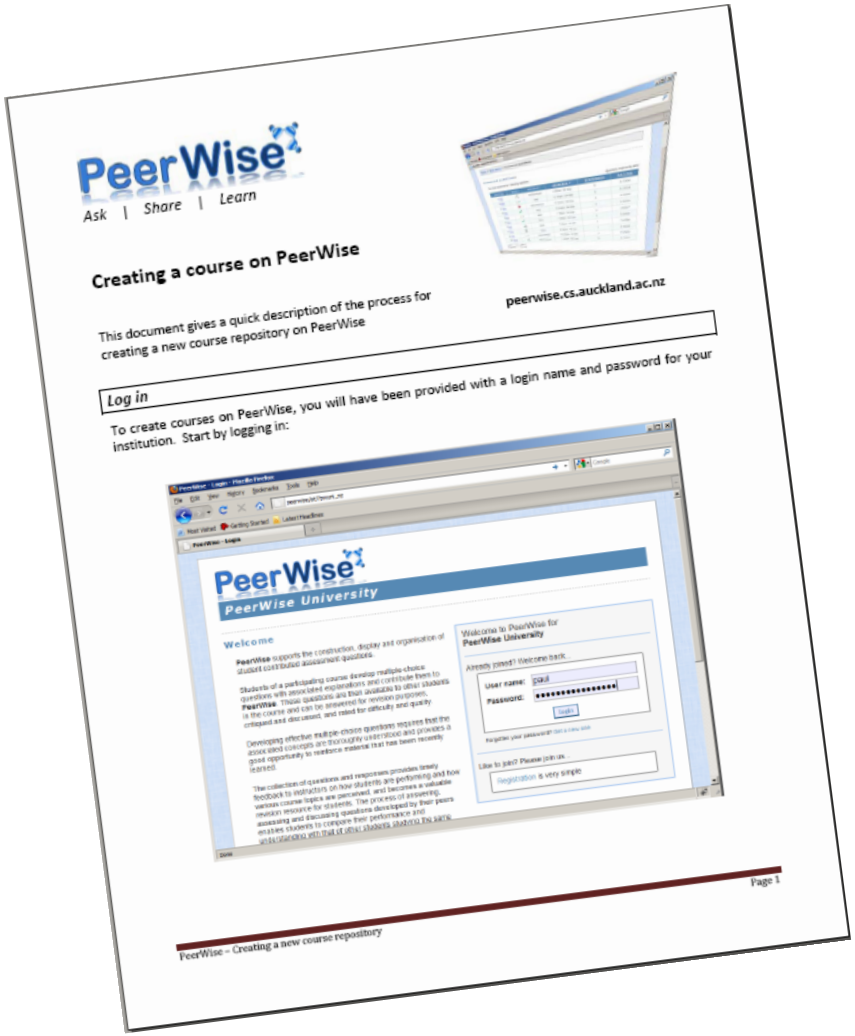
- Since 2007
  - 45 institutions
  - 260 courses
  - 20661 students have contributed
  - 57324 questions have been written
  - 1527574 answers have been submitted

Multi-institutional collaboration

- Challenges
  - Calendars
  - Curriculums



Creating a new PeerWise course



PeerWise

Ask | Share | Learn

Creating a course on PeerWise

peerwise.cs.auckland.ac.nz

This document gives a quick description of the process for creating a new course repository on PeerWise

Log in

To create courses on PeerWise, you will have been provided with a login name and password for your institution. Start by logging in:

PeerWise

PeerWise University

Welcome

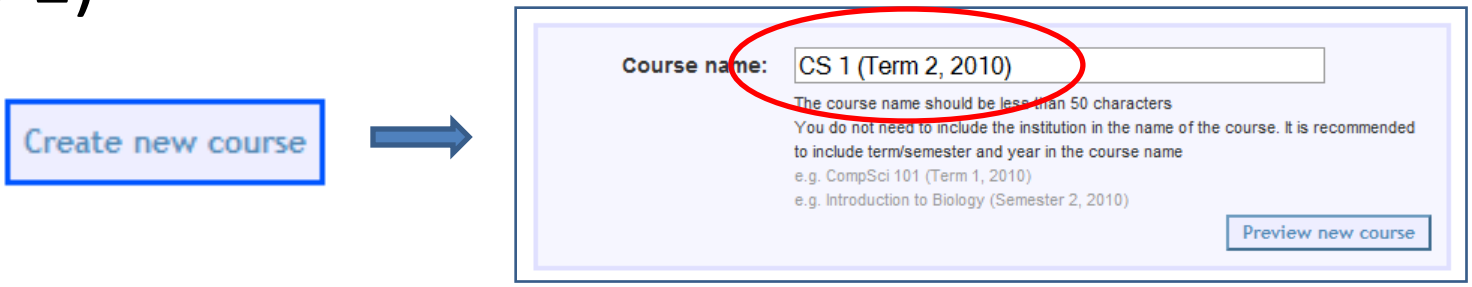
Page 1

PeerWise – Creating a new course repository

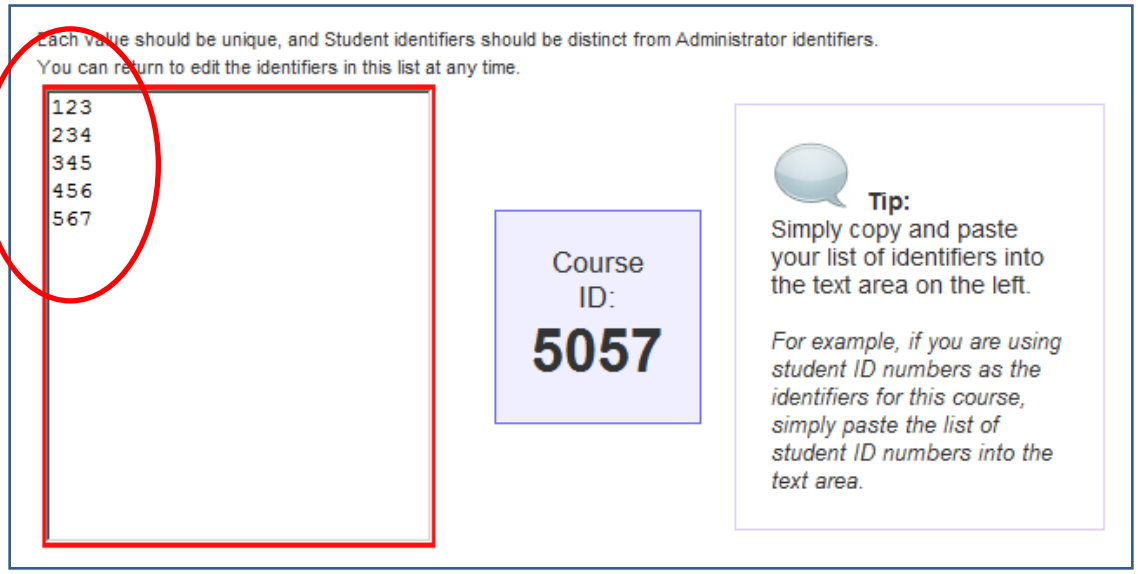
Creating a new PeerWise course

Creating a new PeerWise course

- Step 1)



- Step 2)



Thank you

- Any questions?
  - Now
  - Later

Paul Denny

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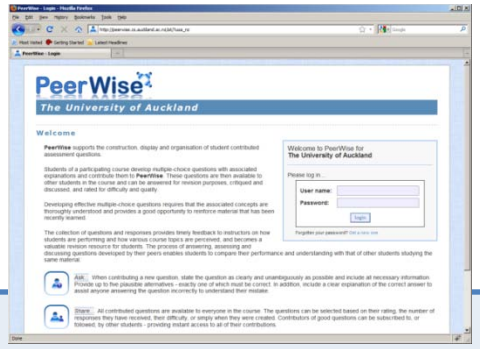
Department of Computer Science

The University of Auckland



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