



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA





PeerWise Participation

Supporting students in a multiple choice environment

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Biology 112: Unicellular Life

The principles of cellular and molecular biology using mainly bacterial examples.

Course topics:

- Bacterial cell structure and function
- Genetics
- Metabolism

Enrolment:

- 6 lecture sections of 280 students (3 per term).
- Two terms of 800 students per term.

Biology 112: Unicellular Life

Course Structure

Grading:

- Exams = 80% of the grade [2 midterms, 1 final exam]
- Participation marks = 20% of the grade.
- Exams consist of multiple choice questions.

Participation marks :

Pre-class reading assignments quizzes

Online

Group writing activities [Inventions & Investigations]

In class

“Thinking questions” by i►clicker

In class

PeerWise website-student authored questions

Online

What is PeerWise?

"PeerWise supports students in the creation, sharing, evaluation and discussion of assessment questions."

- Create, answer and comment on multiple choice questions.
- Creates a database of questions for the course.
- Learn by answering other questions and providing feedback.
- Freely available through University of Auckland, New Zealand
- Easy set up, accessibility for instructors and students.

<http://peerwise.cs.auckland.ac.nz/>

Contact: Paul Denny , Dept of Computer Sciences



Why Use PeerWise?

For Students

- Writing & evaluating questions promotes deep, reflective thinking.
- Actively contributing to their learning outside class.
- Easily accessible.

For Instructors

- Facilitates learning activities for large number of students.
- Minimal set up and administration.
- Easy data collection & marking for participation.
- Great ideas for exams questions.

How did we use PeerWise in 2010 - 2011?

Prior to an exam, students had to:

- Create 1 multiple choice question.
- Answer and provide feedback on 2 multiple choice questions created by other students.
- Repeated 3 times in a term for each exam.

Grading:

= 3% of their total grade:

- For each exam =0.5% for creating 1 question, 0.5% for answering 2 questions.
- No extra points for creating or answering more questions.

Writing Questions

The screenshot shows a web browser window with the PeerWise interface. The browser's address bar shows the URL <http://peerwise.cs.auckland.ac.nz/course/main.php>. The PeerWise logo is at the top left, followed by a blue header bar with the text "BIOL 112 2010W Term 1". Below the header is a navigation breadcrumb: "Home | Main menu > Your questions > Post new question". On the right side of the page, it says "You are logged in as kshea Logout".

The main section is titled "Write question". Below the title is a text box with a rich text editor toolbar. The toolbar includes buttons for bold (B), italic (I), underline (U), strikethrough (x), subscript (x⁴), list (bulleted and numbered), link, font family, background color, text color, and a font size dropdown. The text area below the toolbar is empty.

Below the "Write question" section is the "Alternatives" section. It contains a paragraph of instructions: "Write up to five alternative answers for the question you have written above. Make sure each alternative is distinct, and of course, you must ensure that **exactly one** of the alternatives is the correct answer to your question. You may choose to define fewer than five alternatives (by simply leaving some of the text areas empty), but you must at least provide two alternatives. You **must indicate** which of the alternatives is the correct answer to your question by selecting the letter to the left of the alternative."

At the bottom of the page, there is a list of alternatives. The first alternative is shown as a large grey box with the letter "A" in the top left corner and a green "Select" button below it. The rest of the alternative list is obscured by the Windows taskbar.

The Windows taskbar at the bottom shows the system tray with the date and time: "8:52 AM 13/06/2011". The system tray also includes icons for network, volume, and help.

Question Topics

PeerWise - New question - Windows Internet Explorer

http://peerwise.cs.auckland.ac.nz/course/main.php

Convert Select

PeerWise - New question

Explanation

You should provide an explanation for your answer. This explanation will only be shown to people **after** they have selected what they think is the answer to your question, and may help to explain to them why the alternative you have suggested is indeed the correct answer.

Topics

You may define up to FIVE topics which are relevant to this question. These topic definitions will make it easier for everyone to find questions on certain topics.

Existing topics: You can select from the current list of topics:

<input type="checkbox"/> 5 prime 3 prime	<input type="checkbox"/> Elongation	<input type="checkbox"/> Protein Types	<input type="checkbox"/> cell theory
<input type="checkbox"/> ACR	<input type="checkbox"/> Entropy	<input type="checkbox"/> Proteins	<input type="checkbox"/> chapter 3
<input type="checkbox"/> ATP	<input type="checkbox"/> Enzymes	<input type="checkbox"/> Proton Gradient	<input type="checkbox"/> chloroplasts
<input type="checkbox"/> ATP synthesis	<input type="checkbox"/> Eukaryotic Cells	<input type="checkbox"/> RNA	<input type="checkbox"/> chromosomes
<input type="checkbox"/> Acetylation	<input type="checkbox"/> Exons	<input type="checkbox"/> RNA polymerase	<input type="checkbox"/> conditional lethal
<input type="checkbox"/> Active transport	<input type="checkbox"/> Experiments	<input type="checkbox"/> Reactions	<input type="checkbox"/> conjugation
<input type="checkbox"/> Amino Acids	<input type="checkbox"/> Extrons	<input type="checkbox"/> Reading topic 6	<input type="checkbox"/> diffusion
<input type="checkbox"/> AnoxygenicPhotop	<input type="checkbox"/> Fermentation	<input type="checkbox"/> RecA	<input type="checkbox"/> ecosystems
<input type="checkbox"/> Archaea	<input type="checkbox"/> Forensics	<input type="checkbox"/> Redox	<input type="checkbox"/> endosymbiotic theory
<input type="checkbox"/> Autotrophs	<input type="checkbox"/> Gene Structure	<input type="checkbox"/> Respiration	<input type="checkbox"/> energy
<input type="checkbox"/> Bacterias	<input type="checkbox"/> Gene regulation	<input type="checkbox"/> Ribosomes	<input type="checkbox"/> eukaryotes
<input type="checkbox"/> Base pairing	<input type="checkbox"/> Genes	<input type="checkbox"/> Sulfur	<input type="checkbox"/> folding of proteins
<input type="checkbox"/> Bases	<input type="checkbox"/> Genetic Code	<input type="checkbox"/> Sulfur Cycle	<input type="checkbox"/> gel electrophoresis
<input type="checkbox"/> Biological terms	<input type="checkbox"/> Genome	<input type="checkbox"/> Telomeres	<input type="checkbox"/> gene expression
<input type="checkbox"/> Bonding	<input type="checkbox"/> Genotype	<input type="checkbox"/> Topic 1	<input type="checkbox"/> gene transfer
<input type="checkbox"/> C3 and C4 plants	<input type="checkbox"/> Glycolysis	<input type="checkbox"/> Topic 10	<input type="checkbox"/> heterotrophs
<input type="checkbox"/> Catabolism	<input type="checkbox"/> Gram negative	<input type="checkbox"/> Topic 11	<input type="checkbox"/> histones
<input type="checkbox"/> Catalysts	<input type="checkbox"/> Gram positive	<input type="checkbox"/> Topic 13	<input type="checkbox"/> lac operon
<input type="checkbox"/> Cell Composition	<input type="checkbox"/> HATS	<input type="checkbox"/> Topic 2	<input type="checkbox"/> lagging strand
<input type="checkbox"/> Cell Differences	<input type="checkbox"/> Hydrogen Bonds	<input type="checkbox"/> Topic 3	<input type="checkbox"/> mRNA Processing
<input type="checkbox"/> Cell Diversity	<input type="checkbox"/> Hydrophobic Effect	<input type="checkbox"/> Topic 4	<input type="checkbox"/> mRNA stability
<input type="checkbox"/> Cell Growth	<input type="checkbox"/> Inducer Exculsion	<input type="checkbox"/> Topic 5	<input type="checkbox"/> melting point
<input type="checkbox"/> Cell Membrane	<input type="checkbox"/> Initiation	<input type="checkbox"/> Topic 5 - Proteins	<input type="checkbox"/> metabolism
<input type="checkbox"/> Cell Wall	<input type="checkbox"/> Introns	<input type="checkbox"/> Topic 6	<input type="checkbox"/> microbial ecosystems

Done

Internet | Protected Mode: On

10:01 AM 13/06/2011

Answering Questions

Unanswered questions

You may answer any of the following questions :

Questions ordered by date

Click to view	Preview	Question created	Number of answers	Author's answer popular?	Help requests	Most recent comment	Number of comments	Difficulty rating	Overall rating
		↓	sort	sort	sort	sort	sort	sort	sort
41 >>	What are spontaneous reactions in cells?	10:59pm, 09 Dec	63	<input checked="" type="checkbox"/> YES	0	7:35pm, 10 Dec	3	easy / medium	2.43
42 >>	Two-dimensional polyacrylamide gel electrophoresis combines ...	10:58pm, 09 Dec	34	<input checked="" type="checkbox"/> YES	0	-	0	easy	2.00
43 >>	What is natural selection?	10:14pm, 09 Dec	47	<input checked="" type="checkbox"/> YES	0	9:42pm, 11 Dec	3	very easy	1.33
44 >>	What happens during reduction?	10:10pm, 09 Dec	55	<input checked="" type="checkbox"/> YES	0	5:49pm, 12 Dec	5	very easy	2.18
45 >>	During the an-oxygenic Photophosphorylation, how does the cell ...	5:14pm, 09 Dec	54	<input checked="" type="checkbox"/> YES	0	4:55pm, 10 Dec	2	easy / medium	3.25
46 >>	Whic of the following in NOT involved in regulation of RfIA in the ...	1:13pm, 09 Dec	76	<input type="checkbox"/> NO	0	4:50pm, 10 Dec	5	hard	2.68
47 >>	What is the translocation process in eukaryotic translation ...	12:14pm, 09 Dec	45	<input checked="" type="checkbox"/> YES	0	-	0	easy	2.50
48 >>	Why is the annealing of the oligonucleotide primer performed at ...	8:05pm, 08 Dec	47	<input checked="" type="checkbox"/> YES	0	9:45pm, 11 Dec	4	easy	2.90
49 >>	When glucose is reintroduced into a system which is operating on ...	1:36pm, 07 Dec	60	<input checked="" type="checkbox"/> YES	0	1:45pm, 12 Dec	7	medium / hard	2.00
50 >>	Which are characteristics of a plasmid? 1. DNA Molecule between ...	11:41am, 07 Dec	51	<input type="checkbox"/> NO	0	8:46pm, 12 Dec	3	easy / medium	1.67

<< Prev | 1-10 | 11-20 | 21-30 | 31-40 | **41-50** | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-110 | 111-120 | 121-130 | 131-140 | 141-150 | 151-160 | 161-170 | 171-180 | 181-190 | 191-200 | 201-210 | 211-220 | 221-230 | 231-240 | 241-250 | 251-260 | 261-270 | 271-280 | 281-290 | 291-300 | 301-310 | 311-320 | 321-330 | 331-340 | 341-350 | 351-360 | 361-370 | 371-380 | 381-390 | 391-400 | 401-410 | 411-420 | 421-430 | 431-440 | 441-450 | 451-460 | 461-470 | 471-480 | 481-490 | 491-500 | 501-510 | 511-520 | 521-530 | 531-540 | 541-550 | 551-560 | 561-570 | 571-580 | 581-590 | 591-600 | 601-610 | 611-620 | 621-630 | 631-640 | 641-650 | 651-660 | 661-670 | 671-680 | 681-690 | 691-700 | 701-710 | 711-720 | 721-730 | 731-740 | 741-750 | 751-760 | 761-770 | 771-780 | 781-790 | 791-800 | 801-810 | 811-820 | 821-830 | 831-840 | 841-850 | 851-860 | 861-870 | 871-880 | 881-890 | 891-900 | 901-910 | 911-920 | 921-930 | 931-940 | 941-950 | 951-960 | 961-970 | 971-980 | 981-990 | 991-1000 | 1001-1010 | 1011-1020 | 1021-1030 | 1031-1040 | 1041-1050 | 1051-1060 | 1061-1070 | 1071-1080 | 1081-1090 | 1091-1100 | 1101-1110 | 1111-1120 | 1121-1130 | 1131-1140 | 1141-1150 | 1151-1160 | 1161-1170 | 1171-1180 | 1181-1190 | 1191-1200 | 1201-1210 | 1211-1220 | 1221-1230 | 1231-1240 | 1241-1250 | 1251-1260 | 1261-1270 | 1271-1280 | 1281-1290 | 1291-1300 | 1301-1310 | 1311-1320 | 1321-1330 | 1331-1340 | 1341-1350 | 1351-1360 | 1361-1370 | 1371-1380 | 1381-1390 | 1391-1400 | 1401-1410 | 1411-1420 | 1421-1430 | 1431-1440 | 1441-1450 | 1451-1460 | 1461-1470 | 1471-1480 | 1481-1490 | 1491-1500 | 1501-1510 | 1511-1520 | 1521-1530 | 1531-1540 | 1541-1550 | 1551-1560 | 1561-1570 | 1571-1580 | 1581-1590 | 1591-1600 | 1601-1610 | 1611-1620 | 1621-1630 | 1631-1640 | 1641-1650 | 1651-1660 | 1661-1670 | 1671-1680 | 1681-1690 | 1691-1700 | 1701-1710 | 1711-1720 | 1721-1730 | 1731-1740 | 1741-1750 | 1751-1760 | 1761-1770 | 1771-1780 | 1781-1790 | 1791-1800 | 1801-1810 | 1811-1820 | 1821-1830 | 1831-1840 | 1841-1850 | 1851-1860 | 1861-1870 | 1871-1880 | 1881-1890 | 1891-1900 | 1901-1910 | 1911-1920 | 1921-1930 | 1931-1940 | 1941-1950 | 1951-1960 | 1961-1970 | 1971-1980 | 1981-1990 | 1991-2000 | 2001-2010 | 2011-2020 | 2021-2030 | 2031-2040 | 2041-2050 | 2051-2060 | 2061-2070 | 2071-2080 | 2081-2090 | 2091-2100 | 2101-2110 | 2111-2120 | 2121-2130 | 2131-2140 | 2141-2150 | 2151-2160 | 2161-2170 | 2171-2180 | 2181-2190 | 2191-2200 | 2201-2210 | 2211-2220 | 2221-2230 | 2231-2240 | 2241-2250 | 2251-2260 | 2261-2270 | 2271-2280 | 2281-2290 | 2291-2300 | 2301-2310 | 2311-2320 | 2321-2330 | 2331-2340 | 2341-2350 | 2351-2360 | 2361-2370 | 2371-2380 | 2381-2390 | 2391-2400 | 2401-2410 | 2411-2420 | 2421-2430 | 2431-2440 | 2441-2450 | 2451-2460 | 2461-2470 | 2471-2480 | 2481-2490 | 2491-2500 | 2501-2510 | 2511-2520 | 2521-2530 | 2531-2540 | 2541-2550 | 2551-2560 | 2561-2570 | 2571-2580 | 2581-2590 | 2591-2600 | 2601-2610 | 2611-2620 | 2621-2630 | 2631-2640 | 2641-2650 | 2651-2660 | 2661-2670 | 2671-2680 | 2681-2690 | 2691-2700 | 2701-2710 | 2711-2720 | 2721-2730 | 2731-2740 | 2741-2750 | 2751-2760 | 2761-2770 | 2771-2780 | 2781-2790 | 2791-2800 | 2801-2810 | 2811-2820 | 2821-2830 | 2831-2840 | 2841-2850 | 2851-2858 | Next >>

(Displaying 41 - 50 of 2858)

Topics

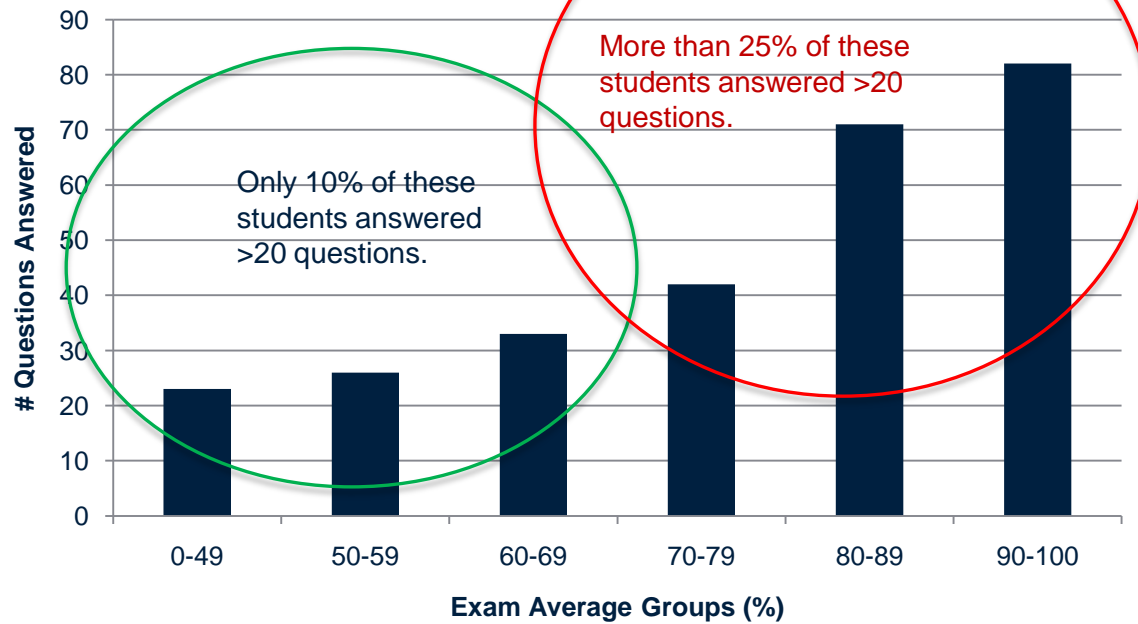
Question Data

Click	Question	Number	Author's	Help	Most	Number	Difficulty	Overall
to	created	of	answer	requests	recent	of	rating	rating
view		answers	popular?		comment	comments		
Preview	sort	sort		sort	sort	sort		sort

44 »	Given the following statements about oxygenic photophosphorylation, which are true?	9:18pm, 29 Nov	24		4:22pm, 012 Dec	4	medium / hard	2.78
590 »	Which answer is not a function or a type of RNA?	4:36pm, 23 Sep	18		0-	0	easy / medium	1.8
1185 »	Which mutation is expected to have the largest effect?	3:26pm, 03 Dec	10		0-	0	easy	3.5

Winter Session 2010 - Terms 1 & 2

Average Number of Questions Answered and Exam Grades*



*Class exam average = 67%

Results from Combined Terms – Questions Answered

# PeerWise Questions Answered	Exam Average ² (%)	% of Class
1- 20¹	65	60
21-50	68	18

¹ minimum requirement for full participation marks = 2

² exam averages $p < 0.01$

PeerWise Leaderboards

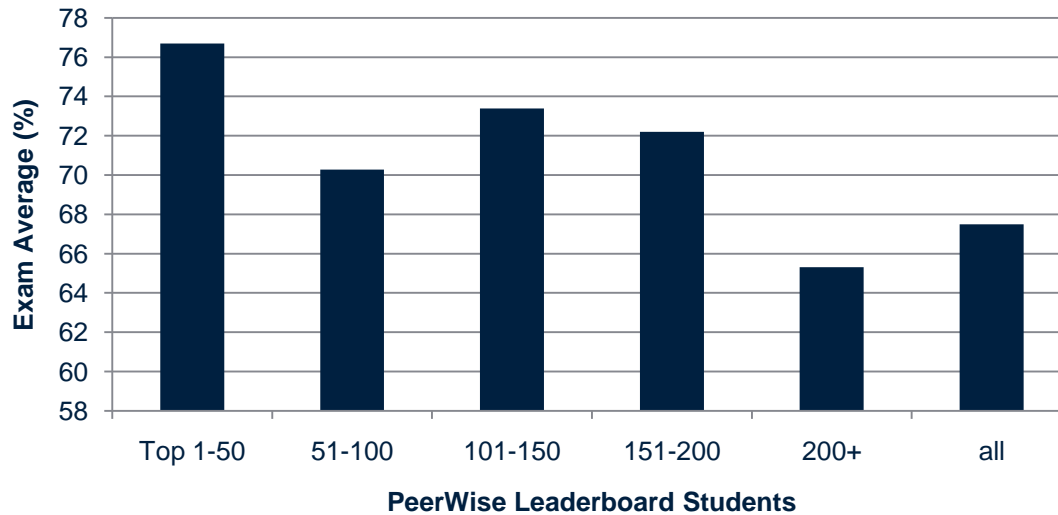
Student scores calculated by an algorithm based on:

- question authoring.
- question answering.
- question ratings by other students.

Highest scores of all students in this course		
Rank	User	Total score (components)
1	churros	5397 (87q, 9140a, 1524r)
2	predilection	4624 (432q, 3334a, 177r)
3	dl	4332 (174q, 3356a, 291r)

PeerWise Leaderboards

Exam averages for Leaderboard Students



	Statistic ^a	Probability
One-way ANOVA	F(4,709)=16.76	p<0.001
Contrasts ^a :		
“1-50” to “51-100”	t(709)=2.60	p<0.01
“1-50” to “101-150”	t(709)=1.36	p>0.05
“1-50” to “151-200”	t(709)=1.84	p>0.05
“1-50” to “200+”	t(709)=6.28	p<0.01
“51-100” to “101-150”	t(709)=1.27	p>0.05
“51-100” to “151-200”	t(709)=0.785	p>0.05
“51-100” to “200+”	t(709)=2.71	p<0.001
“101-150” to “151-200”	t(709)=0.49	p>0.05
“101-150” to “200+”	t(709)=4.54	p<0.001
“151-200” to “200+”	t(709)=0.3.84	p<0.001
^a contrast tests assumed equal variances		



PeerWise Leaderboards Results

Students Ratings	Exam Averages*	
	Term 1	Term 2
Top 200 students	71	73
All other students	65	65

**p<0.01*



Some Interesting Numbers

Out of >2800 questions posted:

- 20 = % of questions were rated as medium difficulty or higher.
- 4 = highest question rating out 5 – very few examples!
- 200 or less = # of students answering any one question.
- 10 = % of students authored greater than required number of questions (3).
- 85 = % of the class answered between 1 -100 questions.



Other Challenges and Comments

- Reviewing or marking questions not feasible in large course however our Teaching Assistants can scanned database periodically.
- Encourage students to challenge themselves and others - students felt many of the questions were too "easy".
- Provide a schedule and keep it simple.
- Balance activities with structure and free-form to encourage voluntary participation among students.
- Provide guidelines for writing multiple choice questions e.g. on learning management system.



Acknowledgements

Many thanks to...

Biology 112 Team

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Undergraduate Course Assistants

Marlo Firme
Liz Imrie
Jasmine Yadana



PeerWise

<http://peerwise.cs.auckland.ac.nz/>

PeerWise - Login - Windows Internet Explorer

http://peerwise.cs.auckland.ac.nz/st/ubc.ca

PeerWise
The University of British Columbia

Welcome

PeerWise supports students in the creation, sharing, evaluation and discussion of assessment questions.

Students of a participating course develop multiple-choice questions with associated explanations and contribute them to PeerWise. These questions are then available to other students in the course and can be answered for study purposes, critiqued and discussed, and rated for difficulty and quality.

Developing effective multiple-choice questions requires that the associated concepts are thoroughly understood and provides a good opportunity to reinforce material that has been recently learned.

The collection of questions and responses provides timely feedback to instructors on how students are performing and how various course topics are perceived, and becomes a valuable study resource for students. The process of answering, evaluating and discussing questions developed by their peers enables students to compare their performance and understanding with that of other students studying the same material.

Ask... Creating a new question requires a student to reflect on the important concepts and learning outcomes of a course. Developing effective alternatives and providing a useful explanation of the answer challenges students and helps to reinforce their understanding.

Share... All contributed questions are available to every student in the course. The questions can be filtered based on the topics that they address, their quality or difficulty ratings, the number of responses they have received, or simply when they were created. Students can also discover good questions by choosing to follow the authors of questions that they perceive to be valuable.

Learn... Answering a question provides immediate feedback to a student, including an explanation of the correct answer. All previously submitted answers are also shown, offering insight to a student about the understanding of their peers. Students are given an opportunity to evaluate the question's quality, and to take part in a discussion of the question with their peers.

PeerWise is very simple to use. It takes just a minute to create a new repository that can be accessed anywhere and anytime. PeerWise can help to establish a learning community in your class that incorporates collaborative learning and peer tutoring, and can be utilised easily alongside our existing teaching materials and course organisation.

Welcome to PeerWise for
The University of British Columbia

Already joined? Welcome back...

username:

password:

login >

Forgotten your password? Get a new one

Like to join? Please register...

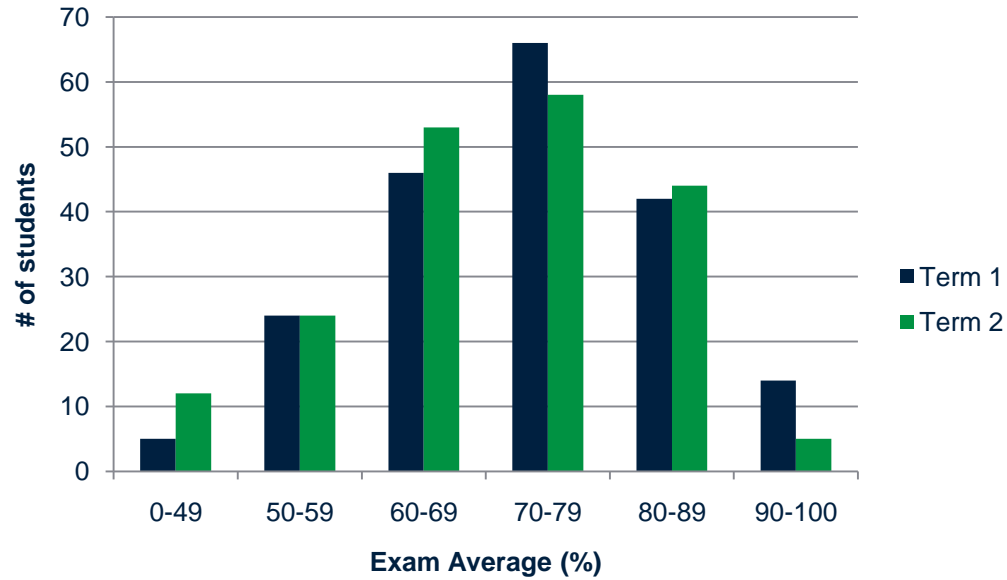
Registration is very simple

Internet | Protected Mode: On 100%

11:16 AM 28/09/2010



Distribution of Grades for Top 200 Leaderboard Students



Leaderboard Data

PeerWise “Leaderboards” Exam Averages for Term 2

