PeerWise and Contributing Student Pedagogy

John Hamer
with Paul Denny and Andrew Luxton-Reilly
Department of Computer Science
University of Auckland

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Introduction

Contributing Student Pedagogy

- Students create and share learning resources; e.g. notes, visualisations, instructional videos, quiz questions, reading lists
- Web-based collaboration tool (e.g. wiki) used to store work-in-progress and share course material
- Peer feedback and evaluation
- Related theories: flexible learning (Collis), constructivism, community of practice (Wenger), ZPD (Vygotsky)

What is PeerWise?

- An online bank of multiple choice questions
- All content is student generated

Your question

Which of the following C expressions does **NOT** evaluate to 7?

Alternatives

OPTION	ALTERNATIVE
A	`1 + 2 * 3`
B	`(int)(6.6 + 0.5)`
C	`(int)6.6 + (int)0.5`
D	`7 % 10`
E	`15 / 2`

Features

Not just questions and answers

- explanations

Explanation

You provided the following explanation relating to this question:

Expression (C) evaluates to 6, not 7. The reason for this is that the cast to an int truncates the fractional part of the number, so:

```
   (int)6.6 + (int)0.5
=> 6 + 0
=> 6
```

All of the other expressions do evaluate to 7:

In (A), the multiplication is performed first, giving 1 + 6 = 7
In (B), the expression 6.6 + 0.5 evaluates to 7.1, which is then cast to (int) giving 7
In (D), when you divide 7 by 10, the answer is 0 and there is 7 remainder
In (E), 15 / 2 gives the int value 7 because both operands are ints.

Features

Not just questions and answers

- explanations
- responses

Alternatives

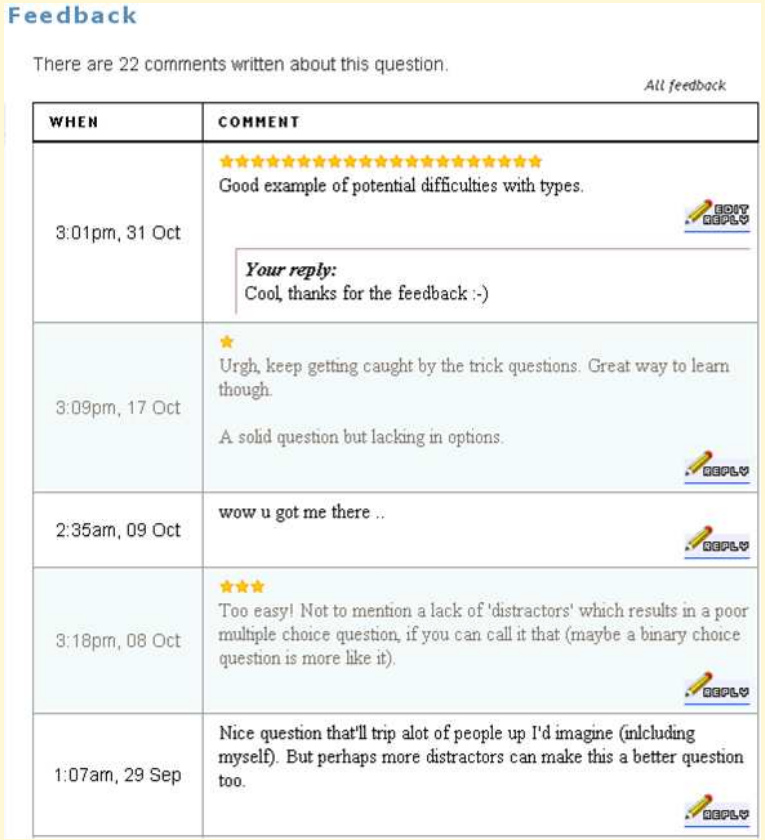
*You suggested **C** is the correct option*

OPTION	ALTERNATIVE	RESPONSES
A	`1 + 2 * 3`	3 (2.42%)
B	`(int)(6.6 + 0.5)`	5 (4.03%)
C	`(int)6.6 + (int)0.5`	70 (56.45%)
D	`7 % 10`	22 (17.74%)
E	`15 / 2`	24 (19.35%)

Features

Not just questions and answers

- explanations
- responses
- discussion threads



Feedback

There are 22 comments written about this question.

All feedback

WHEN	COMMENT
3:01pm, 31 Oct	★★★★★★★★★★★★★★★★★★★★★★ Good example of potential difficulties with types. EDIT REPLY ***Your reply:*** Cool, thanks for the feedback :-)
3:09pm, 17 Oct	★ Urgh, keep getting caught by the trick questions. Great way to learn though. A solid question but lacking in options. REPLY
2:35am, 09 Oct	wow u got me there .. REPLY
3:18pm, 08 Oct	★★★ Too easy! Not to mention a lack of 'distractors' which results in a poor multiple choice question, if you can call it that (maybe a binary choice question is more like it). REPLY
1:07am, 29 Sep	Nice question that'll trip alot of people up I'd imagine (inlcluding myself). But perhaps more distractors can make this a better question too. REPLY

Features

Not just questions and answers

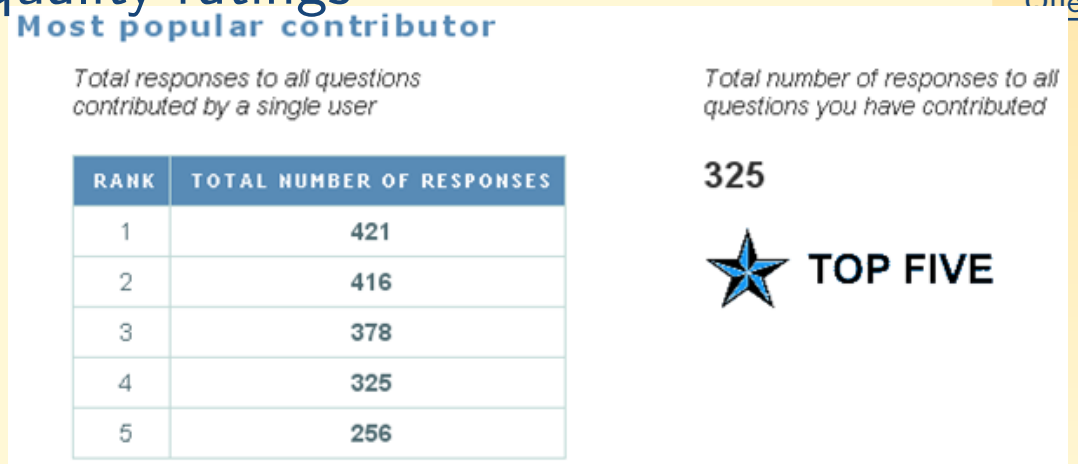
- explanations
- responses
- discussion threads
- difficulty and quality ratings

DIFFICULTY
easy/medium
easy/medium
medium
medium
medium
easy
medium/hard
medium/hard
easy/medium
easy

Features

Not just questions and answers

- explanations
- responses
- discussion threads
- difficulty and quality ratings
- leader-boards



RANK	TOTAL NUMBER OF RESPONSES
1	421
2	416
3	378
4	325
5	256

Learning

- Designing a question
  - focuses attention on learning outcomes
  - encourages reflection on course material
- Choosing distractors
  - misconceptions are considered
  - promotes deep understanding
- Writing explanations
  - students express understanding in their own words

Learning

- Answering questions
  - useful practice / revision
  - reinforces learning
- Evaluating quality
  - requires critical analysis
- Providing feedback
  - encourages peer dialogue around learning

Learning

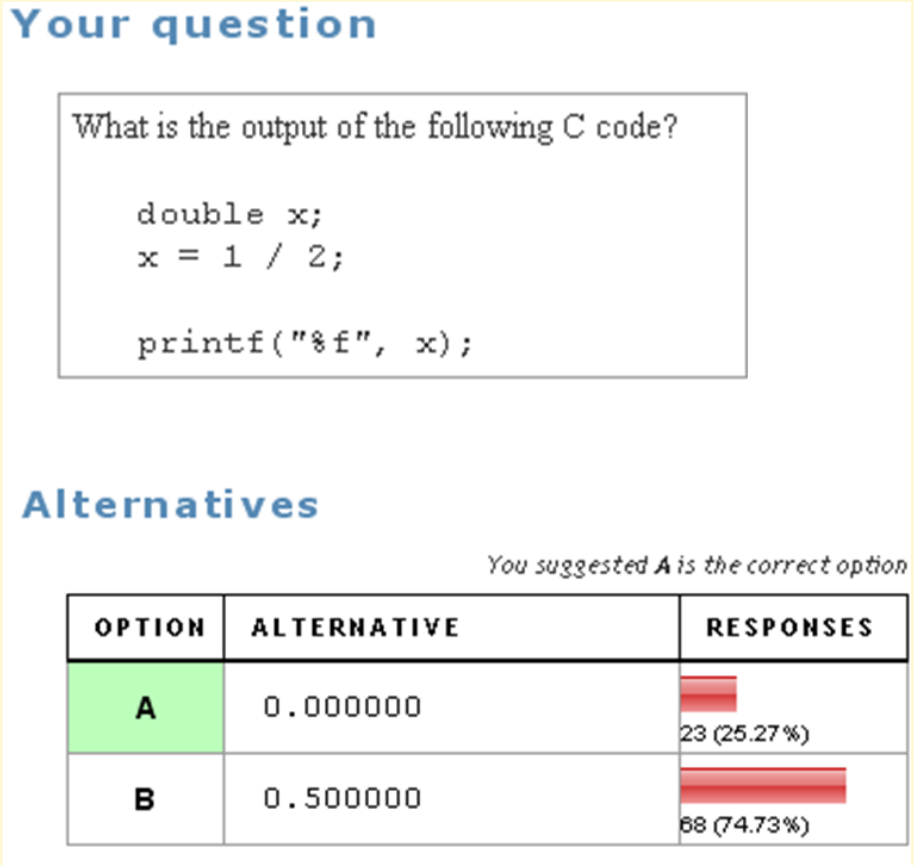
Probably setting up my multi-choice question. This was pretty hard given that i had to think of the possible wrong solutions students would fall for and required a lot of thinking from me, which in the end was a lot of help because i was just about able to answer any question that was on the same topic as my question.
That was the biggest learning experience for me!
— OE4/205

For instructors

- Large question bank developed at low cost
  - ENGGEN 131 (introductory programming course)
  - 570 students
  - 1,700 questions
  - 35,000 responses
  - Sept 9th – Nov 1st
- Can be used as a basis for exam questions

For instructors

- assists staff in identifying weaknesses
- reveals how well students are engaging with certain topics



Your question

What is the output of the following C code?

```
double x;
x = 1 / 2;

printf("%f", x);
```

Alternatives

*You suggested **A** is the correct option*

OPTION	ALTERNATIVE	RESPONSES
A	0.000000	23 (25.27%)
B	0.500000	68 (74.73%)

Results

Courses

- Five courses used PeerWise in 2007
- Varied in: coursework marks awarded for the activity (Worth), questions to write and answer, use of MCQs in exam and tests, and whether the PeerWise authors taught the course.

Course	Worth	Write	Answer	Exam	PW taught?
CS101	2%	2	10	Both	Yes
CS111	1%	2	2	None	Yes
CS105	2%	2	10	None	No
CS220	1%	2	10	Both	No
EG131	7%	2	20	Exam	Yes

Overall use

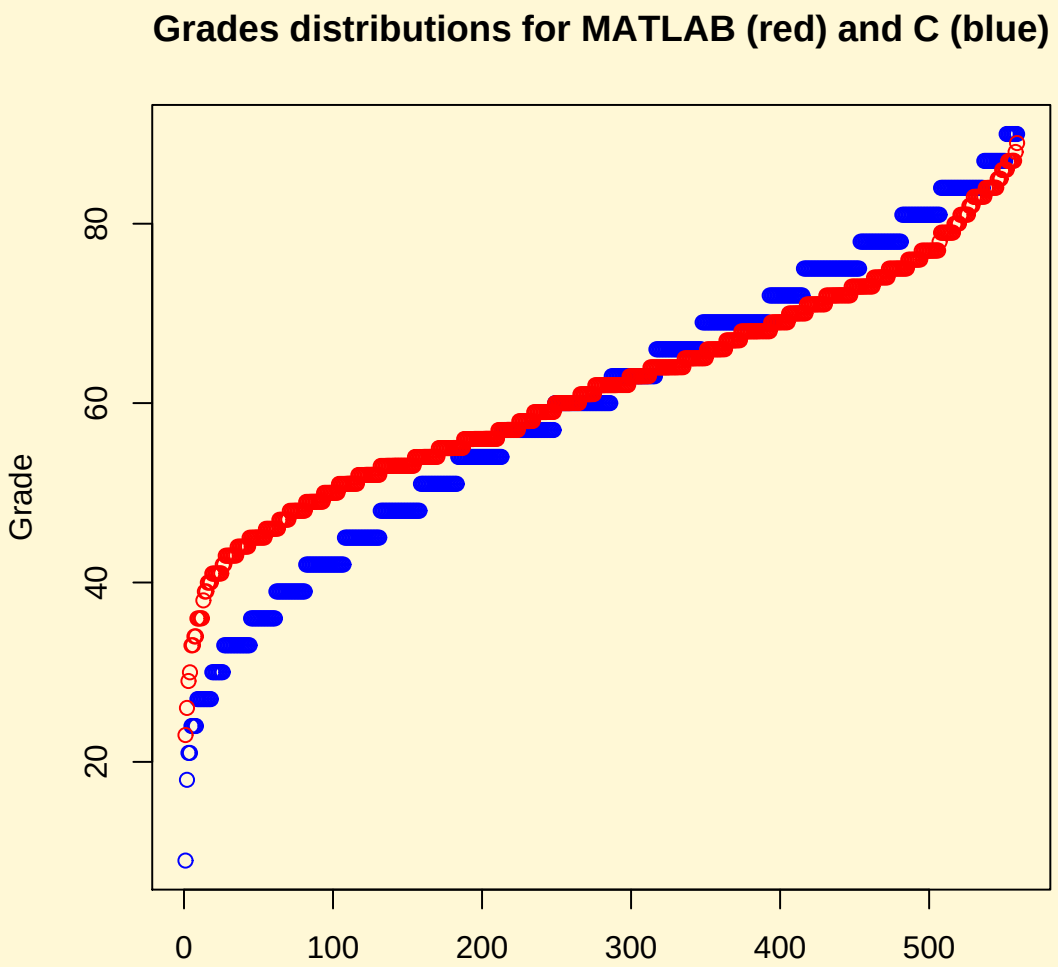
Course	Mean Questions	Mean Answers	Mean Comments
CS101	2.9/2	37.5/10	13.5
CS111	1.9/2	60.7/2	5.0
CS105	2.4/2	47.0/10	9.2
CS220	1.6/2	36.0/10	7.2
EG131	3.0/2	62.6/20	19.1

ENGGEN 131

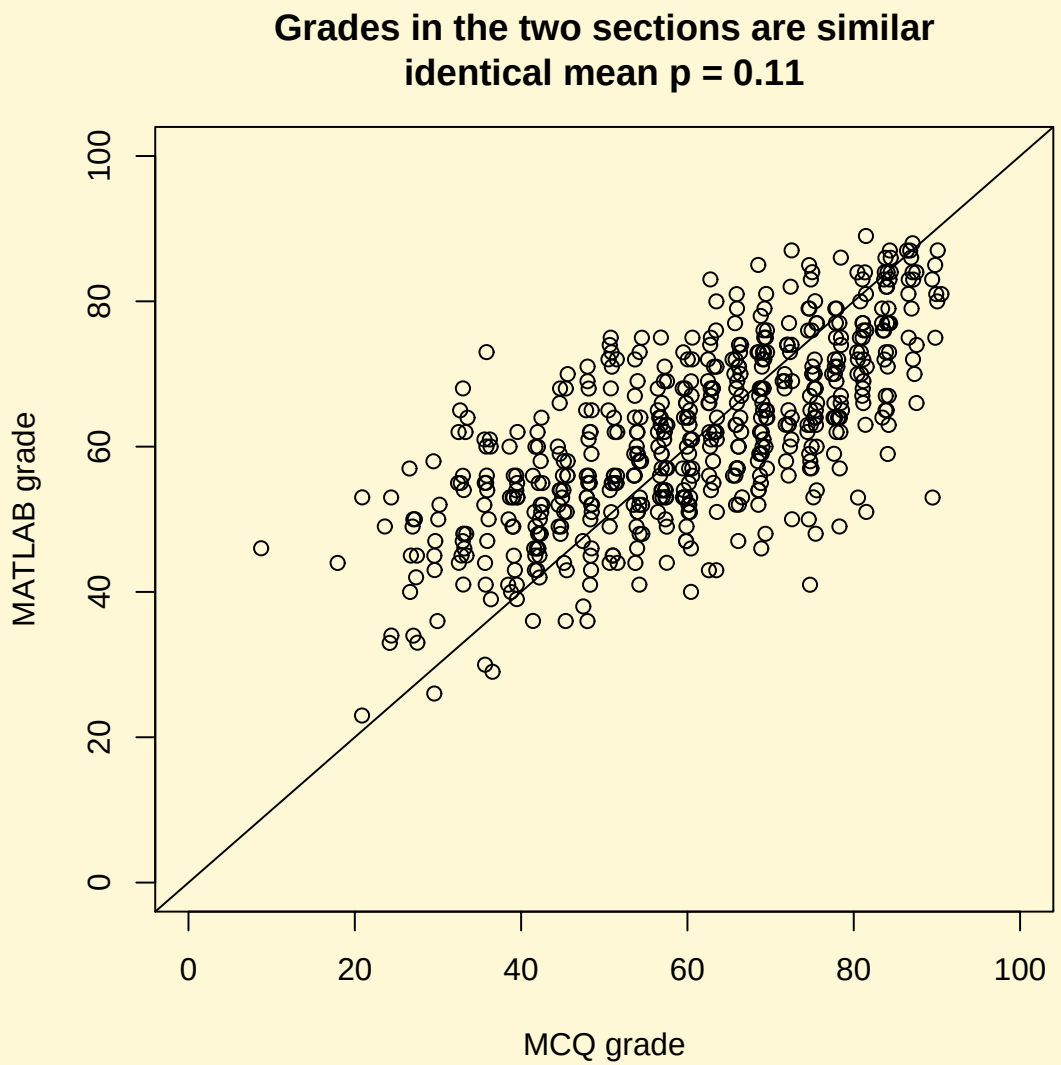
Course details

- Compulsory for all first-year engineering students
- Two independent 6-week sections: MATLAB, C
- PeerWise introduced only in the C section
- MCQs in C section of the exam
- Collected individual data on: number of questions written (Qs); questions answered (As); length of comments (NC); average comment length (AvgC); MCQ (i.e. C programming) mark; MATLAB mark

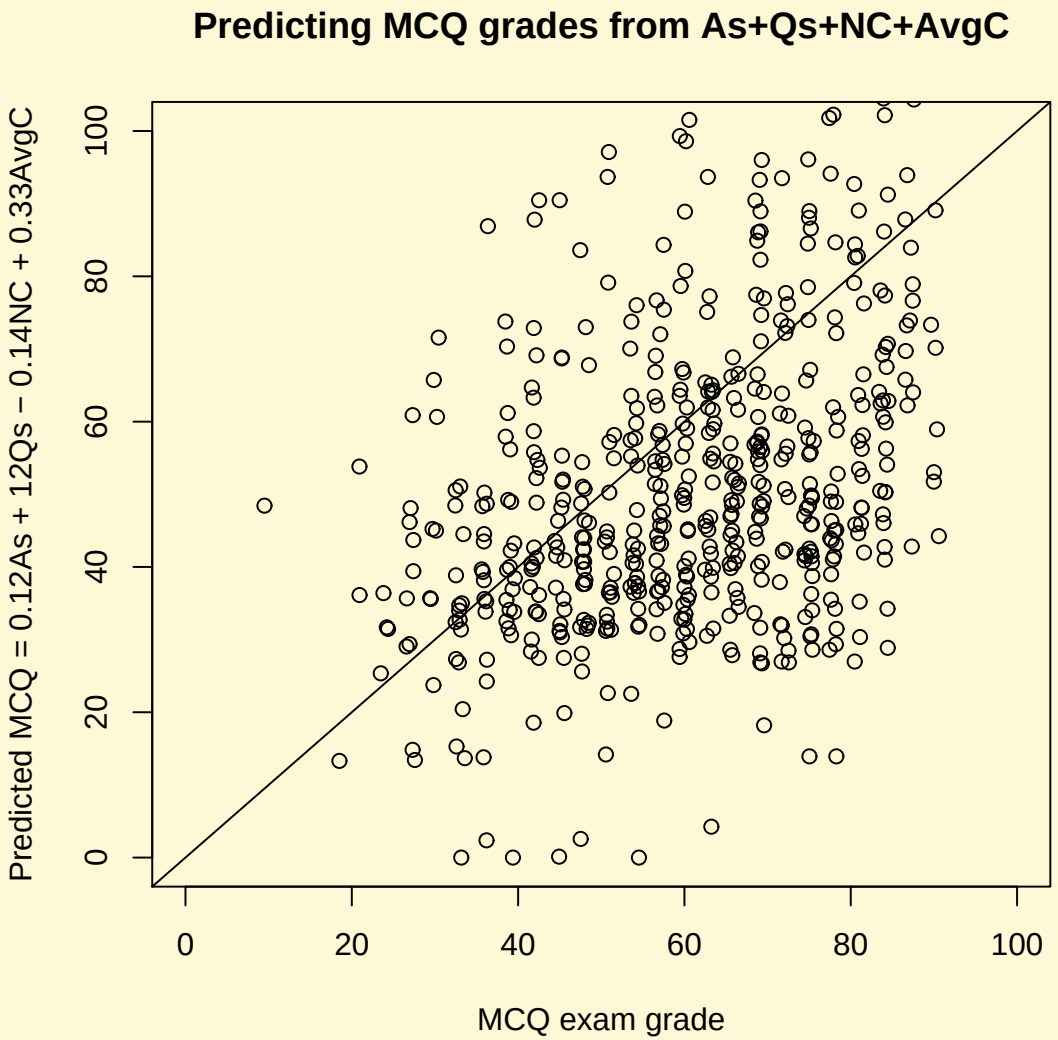
Grade distributions for MATLAB and C



C vrs. MATLAB



Linear regression model for participation



Observations

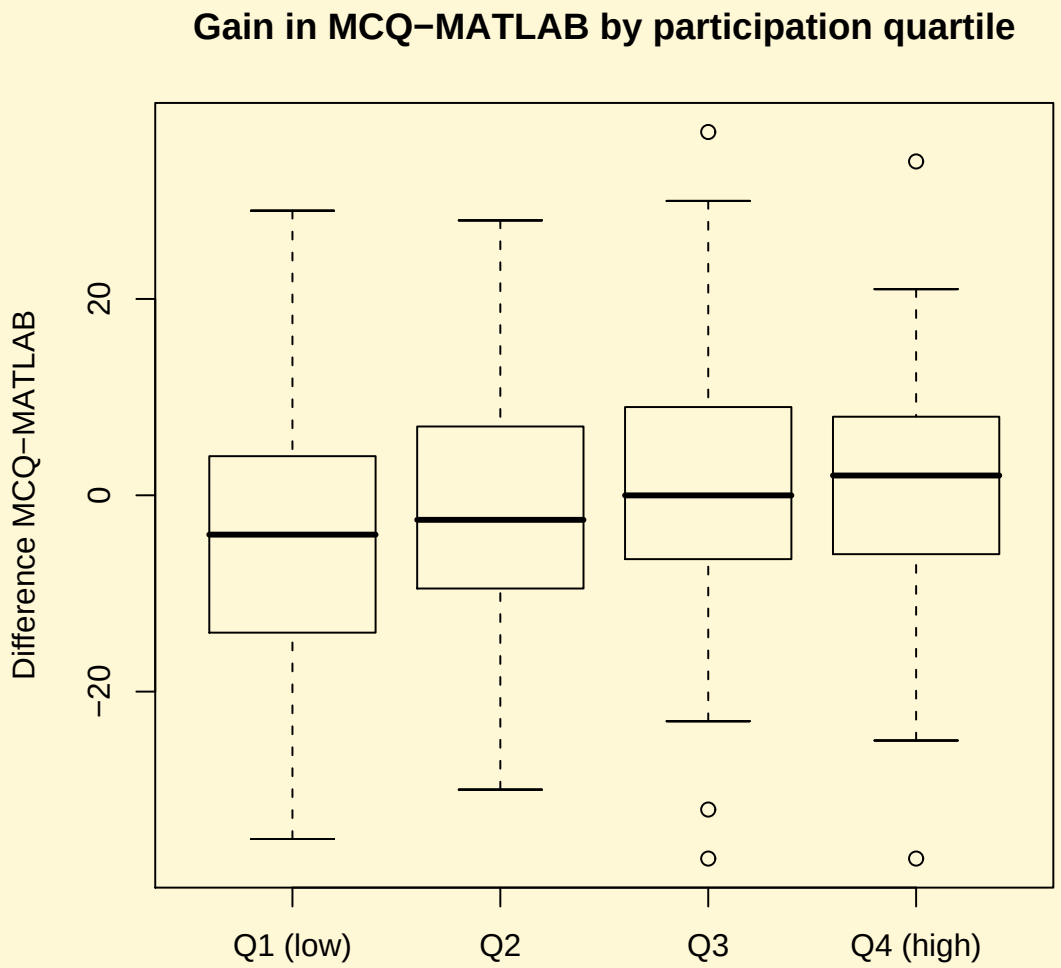
- The linear regression model came up with the prediction

$$\mathrm{MCQ} = 0.125\mathrm{As} + 12.05\mathrm{Qs} - 0.14\mathrm{NC} + 0.33\mathrm{AvgC}$$

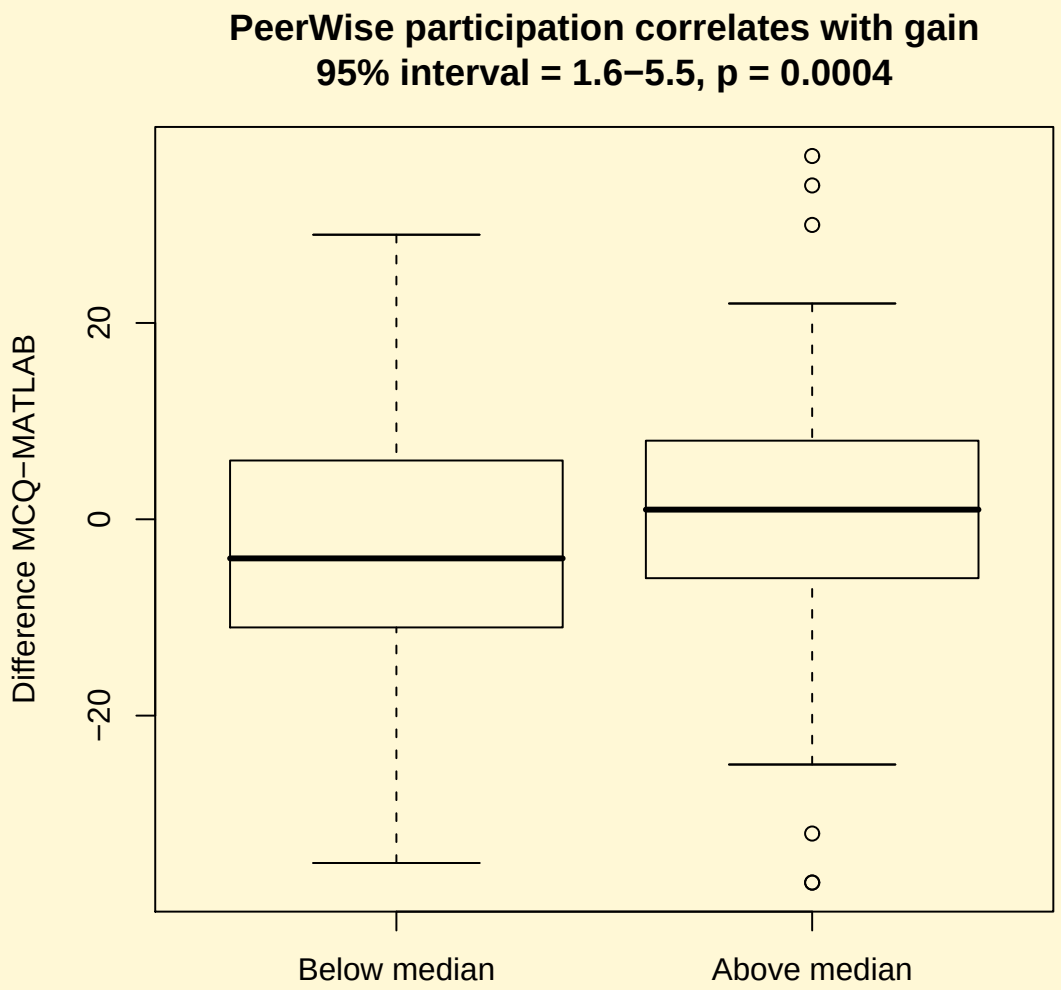
- The largest contribution comes from Qs, then AvgC, followed by As and (negligibly) NC. The ratios for an average student are: $31 : 16 : 8 : -3$

- Writing questions is the single most significant predictor of exam performance, followed by the average length of comments.

C-MATLAB gain by quartile

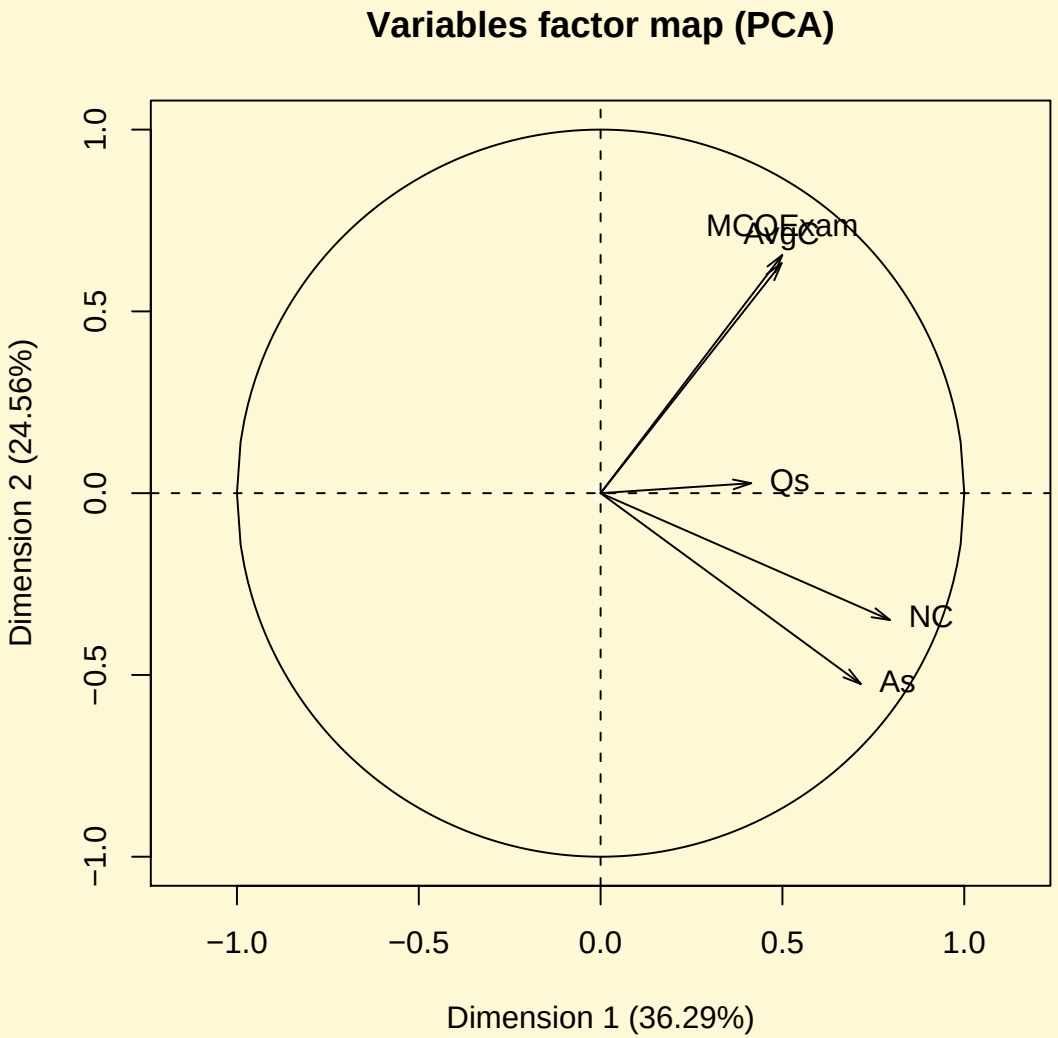


High/low participation C-MATLAB gain

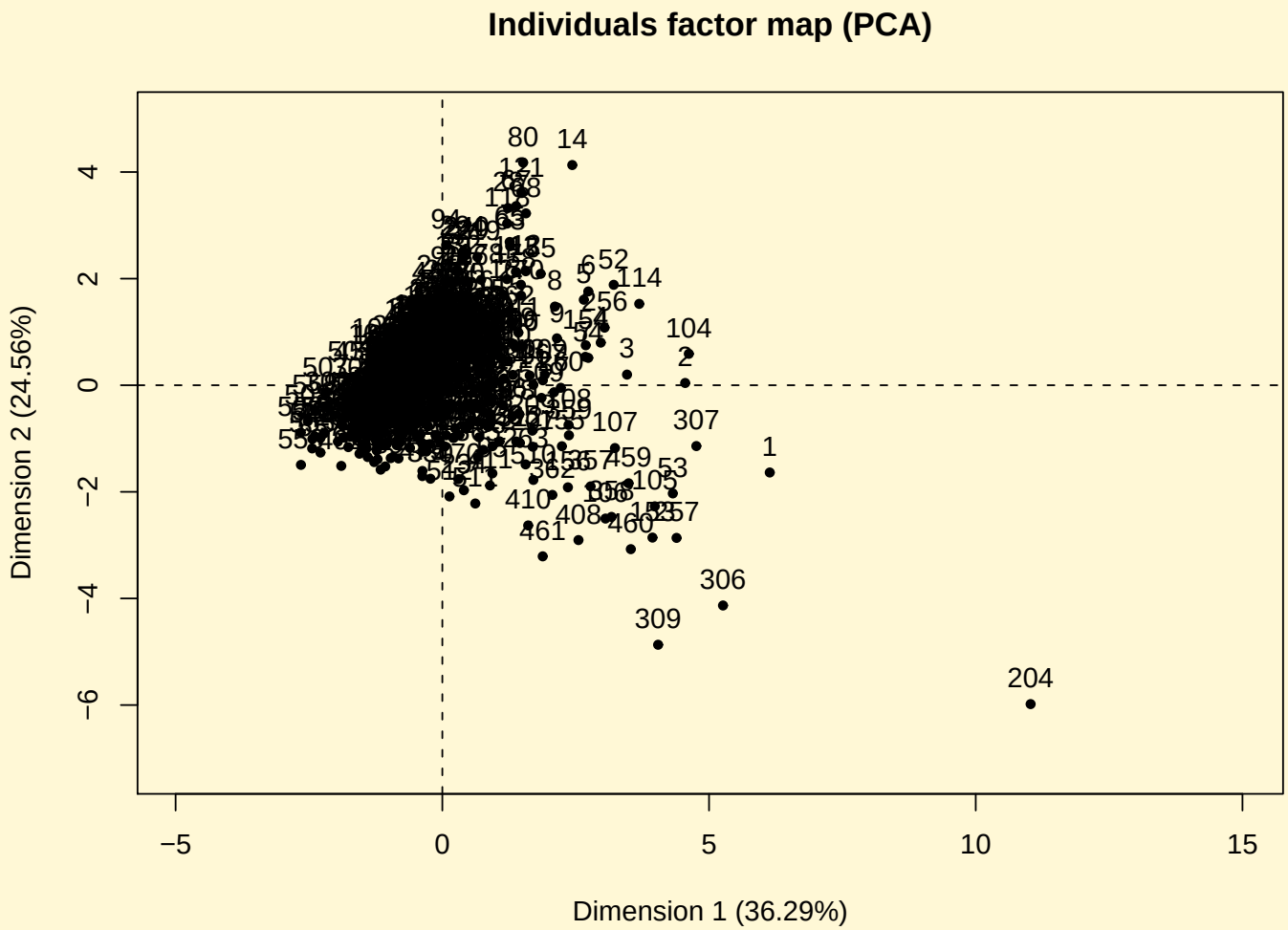


PCA

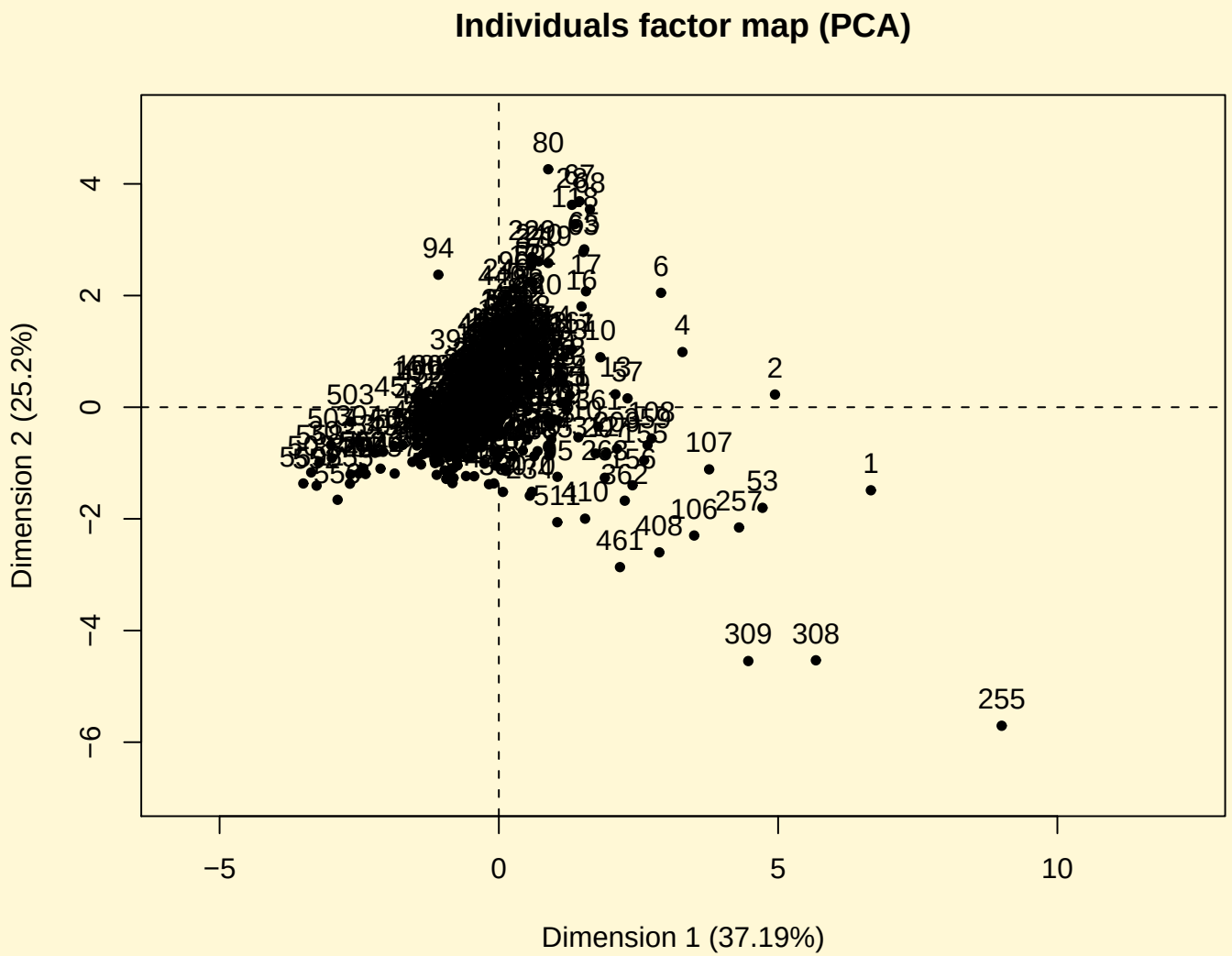
Factor map, all data



Individuals, all data



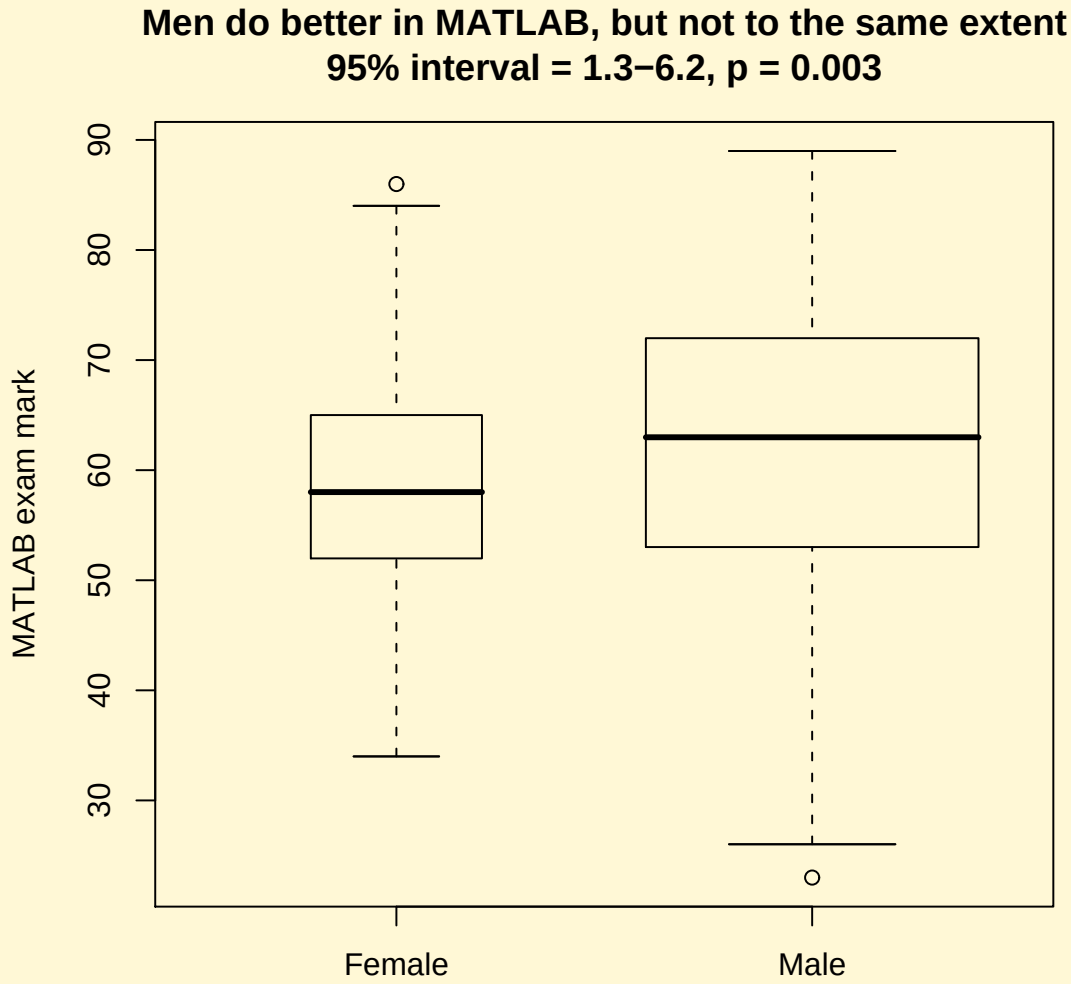
Individuals, minimum Qs



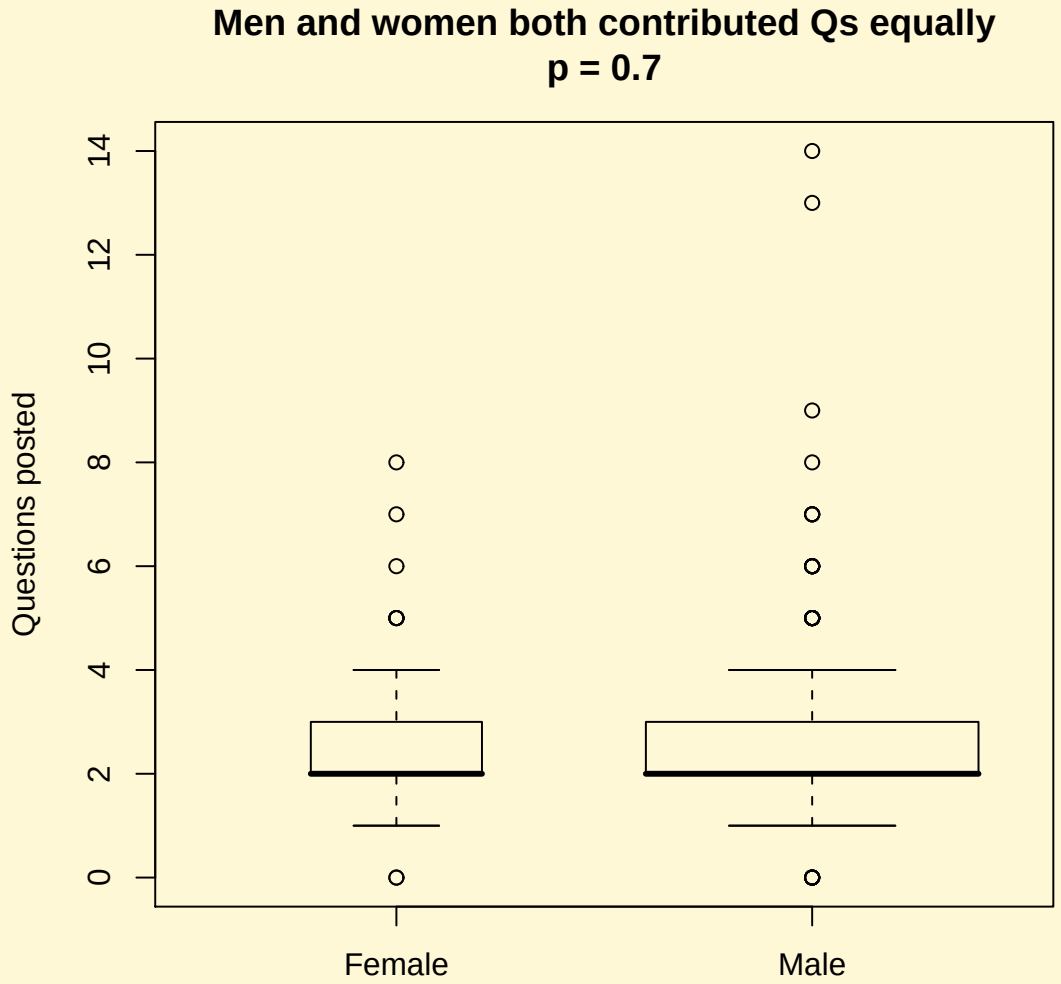
Gender data

Males slightly outperform females

Males slightly outperform females



No gender difference in PeerWise participation



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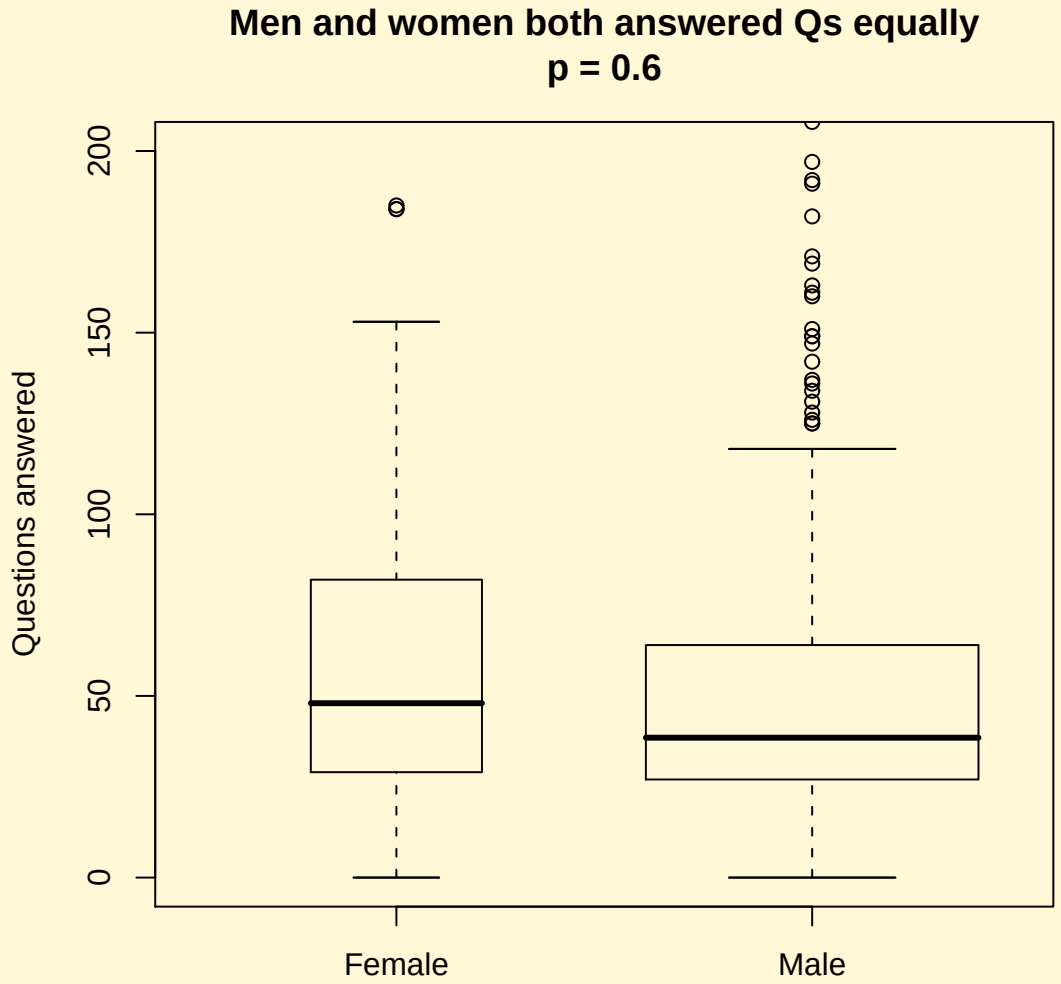

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Questions?