Course analysis

General information

This document provides the course analysis about the master degree course

Introduction to Signal Theory EQ 1210 and Signal Theory EQ 1220

given in the first period 2016. The course responsible was Tobias Oechtering, Communication Theory, EES, KTH. Email: oech@kth.se, tel.: 08 790 8462. The course "Introduction to Signal Theory" covers the first 2/3 of the course "Signal Theory." Further, the requirements to pass the project and the difficulty of the exam are lower. The tutorials and projects were given/guided by the teaching assistants Marie Maros and Sina Molavipour.

Course organization:

- 12 x 2h lectures
- 12 x 2h tutorial given in two groups with group work
    - 5 voluntary group solutions can be handed in
- 5 voluntary reflective questions essays
- 1 knowledge diagnostic test
- Two mandatory take home project assignments
- One written exam and a re-exam, each 5h.

Requirements:

- Passed project assignments (PRO1: 1cu, PRO2: 1cu) , grading: passed/failed
- Exam (TEN: 5.5cu), grading: A-F
    - Exam consists of two parts:
        - Part A: Questions, graded pass/fail,
        - Part B: Problem solving, graded only if part A passed and graded A-F

Material:

- Lecture notes: "Signal theory" by P. Händel, R. Ottoson, H. Hjalmarsson, and M. Jansson.
- Collection of problems in Signal Theory
- Old exams available at the course homepage
- The KTH table of signal processing formulas (in English)
- Two project assignments (made available online during the class)
- Report templates in Word & Latex
- 5 reflective question sets for reading assignment
- 1 knowledge diagnostic test
- 4 lectures where clicker were used for student feedback
- Lecture slides
- Solutions from suggested tutorial problems
- Recapitulations and solutions of tutorial problems on course wiki

Statistics

- 42 students registered for the course EQ1220
  from programs: TTLSM, TIVNM DMTE, TEBSM INPF, TSCRM, and exchange students
- 0 students registered for the course EQ1210

All students have to do two homework project assignments which are allowed to be done in groups of at most two. The students have the opportunity to revise their project report after a first evaluation of the project report.

Project 1:

- 2 passed and 39 failed in the 1st round and 38 passed and 1 failed in the 2nd round.

Project 2:

- 3 passed and 36 failed in the 1st round and 36 passed in the 2nd round.

Exam written on Oct 28th, 2016, 8:00-13:00: Results see *Section Exam results*

Re-exam written on Dec 21st, 2016, 8:00-13:00

Course history and development

This was the sixth time that I gave this course after 2011, I did not do any major change on the covered course topics, but I slightly revised and updated the slides from last year, in particular adding and revising some clicker questions.

We updated the material to work on their weaknesses identified in the diagnostic test. Otherwise, we kept the course material, course book, problem collection, project assignments, diagnostic test, and reflective questions on the reading assignments of the previous year. We kept the style of the tutorial and exam as well as the incentive for students to provide feedback of the previous year. We revised and added clicker questions. We updated the course page on KTH social, which was used again by a few students to post questions. Additionally, we updated the grading sheet for the projects, which helped to improve the quality of the report. We added two basic linear algebra questions to the diagnostic test.

We continued to revise the style of the problems in the exam. We kept the idea of having a 'guided problem beyond the course book' where we test if students are able to apply the concepts and methods taught in the course to derive new result with strong guidance. Additionally, we formulated problems in a more engineering problem context. Previously, most problems directly asked to apply certain analytical methods, which focused on the competence how to apply the methods. The focus of the new type requires students more to identify what method is appropriate to solve the problem.

We kept the responsibility matrix to have a clear distribution of responsibilities, assignments and deadlines of the tasks in the teaching team. The responsibilities were discussed and distributed before the course in an early course planning meeting. Both TAs followed the plan, but more exchange among TAs would have been desired. Both TAs participated in a Canvas workshop to prepare for the transition of the course page.

Course feedback and discussion

The questions and the answers can be found in *Appendix Course Evaluation Results* using survey tool *artologik*. Again, the generation of report takes unreasonable much time, but I do not think that the standard questions in KTH social are a good alternative. We additionally collected feedback after the exam. Both responses are attached below. Further, the teacher collected feedback from the TAs.

The feedback from the students shows that most of the students are happy with the tutorial style, reading assignments, projects, bonus point system, diagnostic test, clickers and lectures. Overall, the course is well appreciated and does not require major changes. However, the following minor suggested changes have potential to improve the course:

- Continue to look for opportunities to reduce derivations and spend more time on teaching the concepts, e.g. by adding more clicker questions.
- Some students felt that tutorials were too dense. I think the current density is reasonable – I however will remind students that they can prepare at home for the tutorial problems. Perhaps a better time management in the tutorial will help
- The course had again conflicts with the course ME2072, which is mandatory for EIT students. I informed the program coordinator and I will again ask to avoid such conflicts in the schedule. The conflicts with the embedded systems course were due to general scheduling difficulties.
- The number of students in a group should be between 3 or 4 if the total number of groups allows. Weak students have problems to participate in larger groups.

The exam results this year were not good. One reason is that students in the EIT program (TIVNM DMTE) had to go for an EIT event to France and wrote the exam remotely under very bad conditions. All six students failed. This issue has been discussed with the EIT program coordinator. However, the results also showed that students had difficulties with the new problem style. To learn more about reasons for their difficulties we did another survey after the exam expecting angry responses. The response was constructive and insightful. Here are our conclusions from the survey:

- As suspected, many students put significant time in "practicing" solving problems using old exams and tutorials. To avoid that students only learn solving routines, we will continue with the new style of problems, communicate this shift and improve the teaching for this purpose.
- Some students underestimate the difficulty of the exam problems although old exams are available. Discuss earlier old exam problems in the tutorial so that the expectations are clear.
- One conclusion for the bad result was that students were overloaded. This insight was forwarded to the program coordinator. Perhaps the Digital Communication courses should be shifted back to period 2 or it should be taught in two periods.
- Students agree that the exam targeted for the understanding and not calculations made the exam difficult. This was the goal of the change, but we perhaps have to make our expectations clearer.
- The problems were always ordered according to the chronology of the lecture. It seems that this makes some students insecure. Already in the re-exam the problems were sorted according to difficulty starting with the easiest problem first which seem to help.
- The formulation (instructions, notation) of the problems created some problems. Extra care and effort has to be taken to avoid this.

A standing problem is the large variety of the background of the students. I strongly believe that the diagnostic test helps students to become aware of the expected background and perhaps the material helped some students to catch up. It also showed that this year the background of the students was worse than in the previous year, which might also partially explain the worse exam result. It will be interesting to see if this correlation can be identified also in future. As in the years before, for a few students the pace of the course is too fast and the difficulty too tough (2). For most students the difficulty of the course is Ok (18) or tough (14) and a few students consider the difficulty of the course to be easy (3). I will continue to look for more teaching ideas to help those students who have problems/insufficient background knowledge.

Ideas for future course development

The following actions are suggested based on the experiences from the teacher team and the response from the students as well as from previous years:

- The quality of formative feedback on the project reports should be equally good for both projects.
- More small examples and possibly in-class experiments/simulations should be looked for.
- Look for more additional reading or topics beyond for the interested student.
- Continue with the new style of exam problems and communicate this clearly so that the expectations are clear.
- Revise/look for tutorial problems with an engineering context.
- Discuss exam problems earlier in the tutorial session so that the expectations become clear.
- Improve the time-management in the tutorial where needed.
- Due to minor problems while reporting results to STEX, which caused disproportional extra work, we need to implement a control mechanism – add TA duty in the responsibility matrix.
- Make the TAs work more collaboratively – help and check each other to improve the quality of teaching while keeping an even workload.
- Consider to organize optional drop-in sessions where students can work together, e.g., book the floor 8 meeting room for some days from 4-6pm where the students can jointly prepare questions in the first 30min and then the TA(s) come and answer them for all.

Overall evaluation

I believe that the course is on a very good level and very well appreciated. However, the shift in the exam problem style revealed that several students do not study for a deep understanding of the concept. I still believe that course provides a very good basis, since teachers of following courses do not identify issues, but the slight shift of the focus in the exam needs to be communicated more clearly in future and we should adapt the teaching where possible.
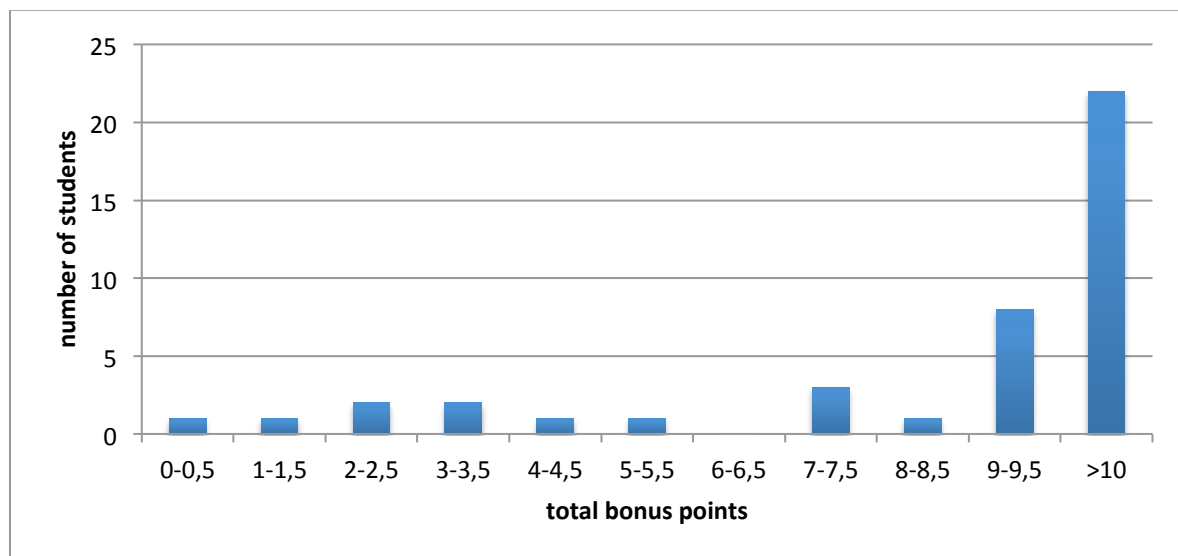
Bonus points statistics

5 bonus points from 5 reading assignments +

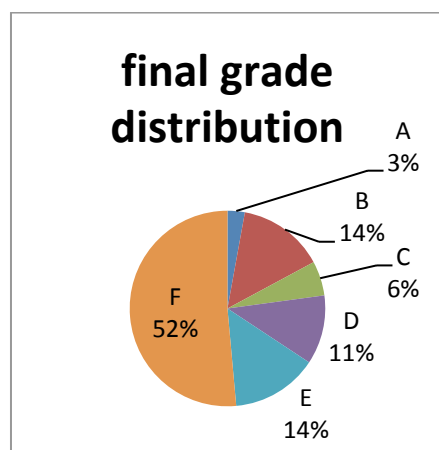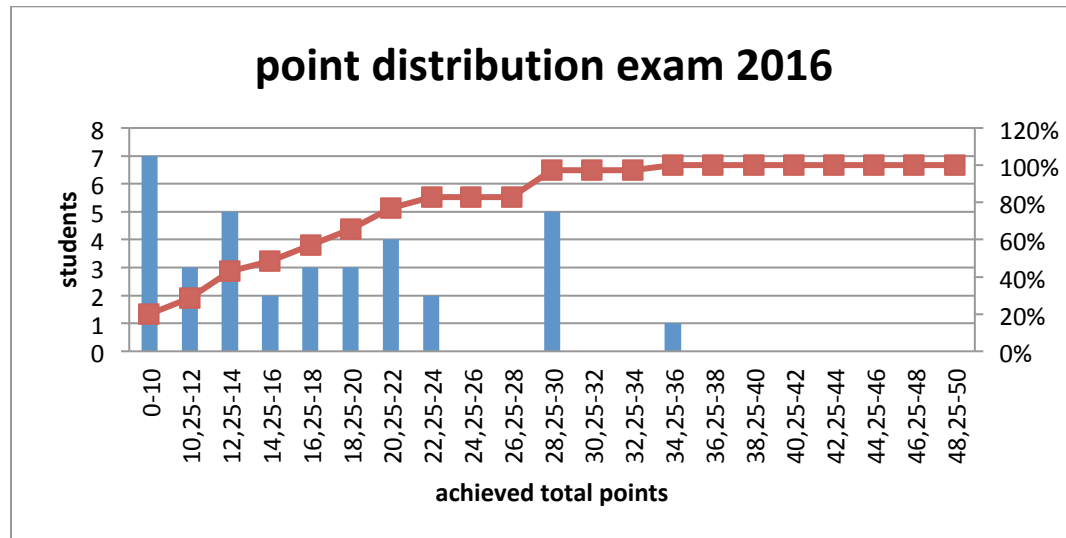5 bonus points from 5 tutorials +

1 bonus point from the diagnostic test

Bonus points count for part A of the exam where 8 points were required. 41 students participated in obtaining bonus points, 31 obtained more than 8 points.
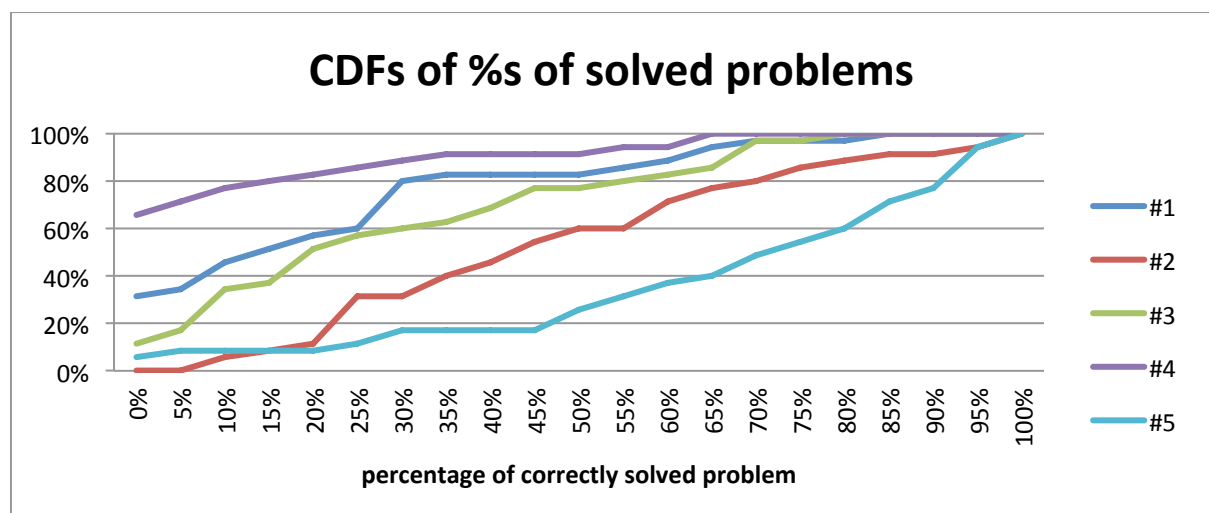
Statistics exam results
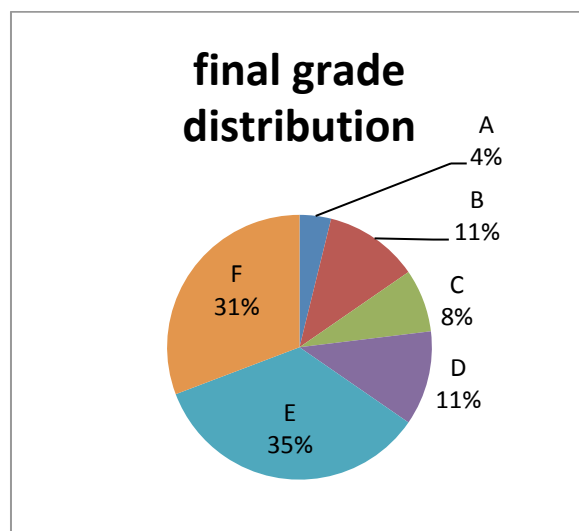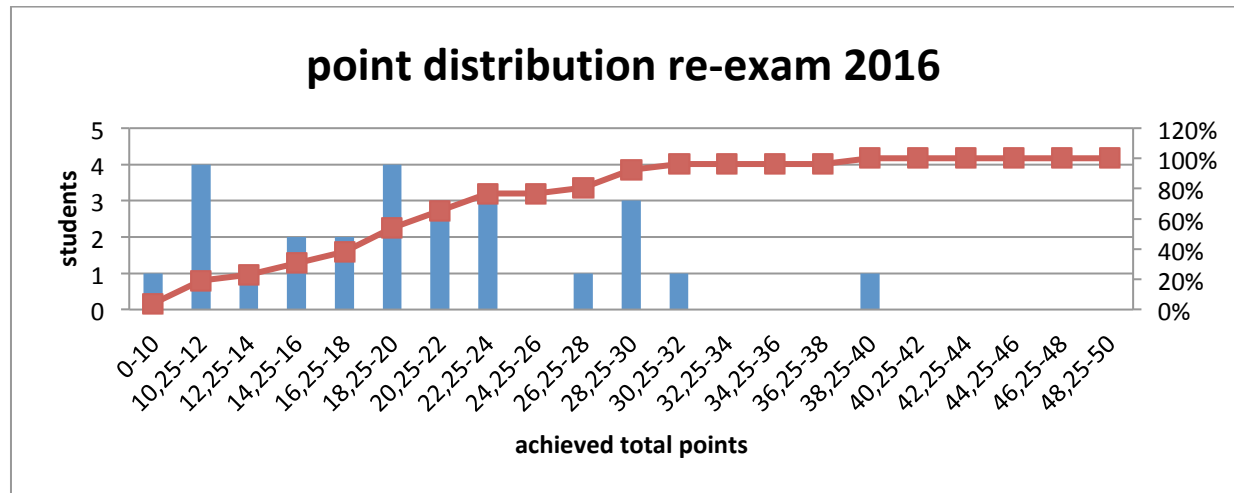
Exam 2016-10-28

Number of students EQ1220: 35

point distribution exam 2016

final grade distribution

Grade	Points	Number of Students
A	32,5-50	1
B	28,5-32,25	5
C	23-28,25	2
D	20,75-22,75	4
E	20,25-20,55	0
FX	15,5-19,75	9
F	0-15,25	15

CDFs of %s of solved problems

Re-Exam 2016-12-21

Number of students EQ1220: 26

point distribution re-exam 2016

final grade distribution

Grade	Points	Number of Students
A	36,25-50	1
B	29,75-36	3
C	26,25-29,5	2
D	23,25-26	3
E	20,25-23	2
FX	16,5-20	7
F	0-16,25	8
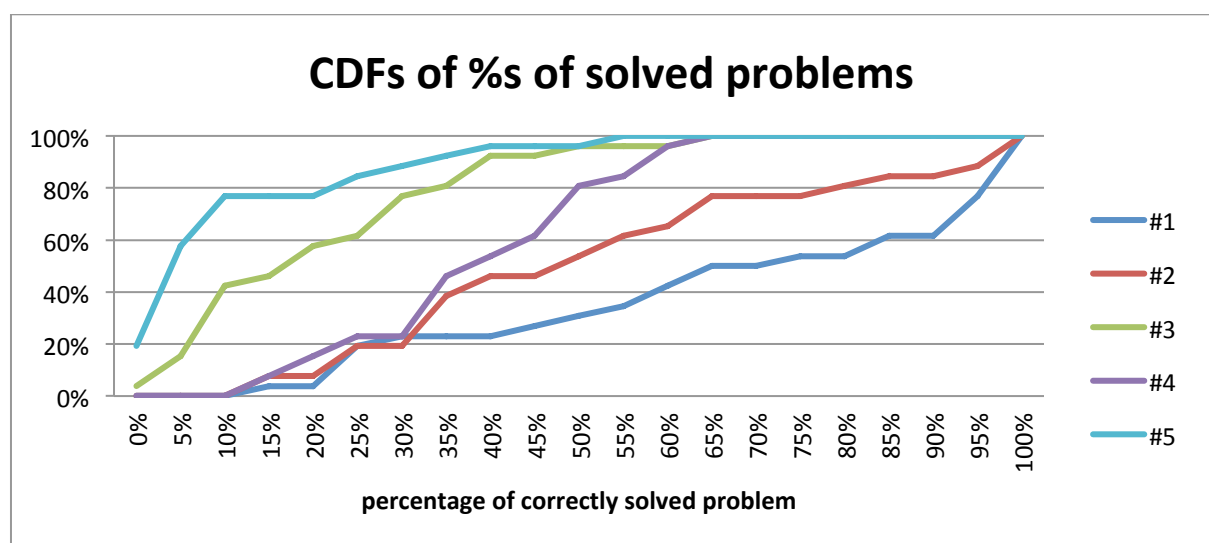
CDFs of %s of solved problems

Did the learning activities help you to reach the course goals (mostly learn new concepts and methods in signal theory)?

Did the learning activities help you to reach the course goals (mostly learn new concepts and methods in signal theory)?	Number of Responses
very much	10 (27.0%)
pretty much	22 (59.5%)
so and so	5 (13.5%)
only a little	0 (0.0%)
not at all	0 (0.0%)
Total	37 (100.0%)

Did the learning activities help you to reach the course goals (mostly learn new concepts and methods in signal theory)?
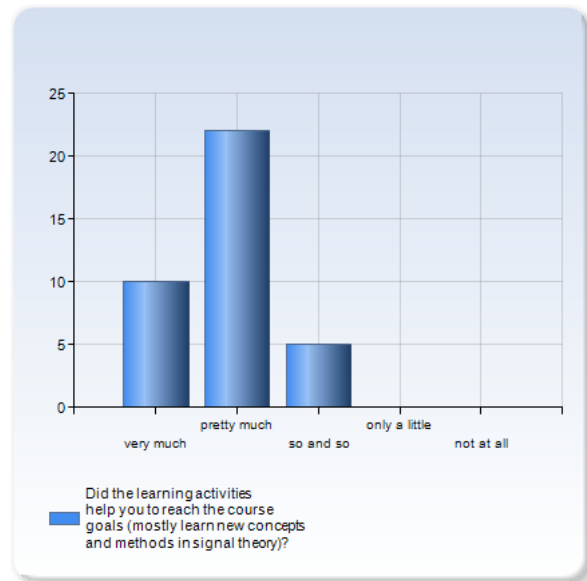
Please feel free to add a comment.
There could be more stress on "practical work" such as projects.

Threshold concepts are core concepts that once understood, transform perception of a given subject. What threshold concept(s) did you learn in the course?

| Threshold concepts are core concepts that once understood, transform perception of a given subject. What threshold concept(s) did you learn in the course? |
| --- |
| autocorrelation |
| Ergodicity |
| parameter estimation theory, filtering theory |
| ergodicity and stationarity |
| stochastic process, random variable, power spectrum |
| Ergodicity |
| random process, WSS, sampling |
| It was a review of many lectures i took in my bachelors |
| How to apply the basic principle of expected value operator in order to proceed with all other concepts. |
| filtering |
| being able to understand how to solve problems |
| Stochastic process, ergodicity, estimation theory, filtering, PAM, reconstruction and other mathematical functions. |
| Stochastic processes - Mean, Autocorrelation and power spectrum; LTI systems; Estimation; Optimal filtering; Sampling and Reconstruction |
| Probability distribution function and probability density function of stochastic process, mean, variance , auto-correlation function, cross correlation and power spectrum of random variables, ergodicity of stationary process, Fourier transform of continuous, discrete signals and stochastic process, estimation theory, optimal filtering by MMSE estimator and Wiener filter, sampling and pulse amplitude modulation of stochastic process and reconstruction of stochastic process. |
| stochastic process,ergocity,filtering |
| ergodic process, ARMA process, estimation theory |
| Stationarity, Ergodicity |
| Basics of stochastic processes |
| Stochastic process |
| Basics of signal theory, correlation, filtering, sampling |
| Stochastic Signals, Estimation |
| Properties of Random process and how it is characterised for signals |
| stochasitic signal/ergodicity/optimal filtering/samping |
| Proper understanding of signal theory...A strong base |
| Stochastic processes,power spectrum, filtering |
| ergodicity, estimation theory, filtering |
| autocorrelation |

How useful in learning the concepts were the lectures?

How useful in learning the concepts were the lectures?	Number of Responses
useful	24 (64.9%)
partially useful	11 (29.7%)
useless	2 (5.4%)
did not attend	0 (0.0%)
Total	37 (100.0%)
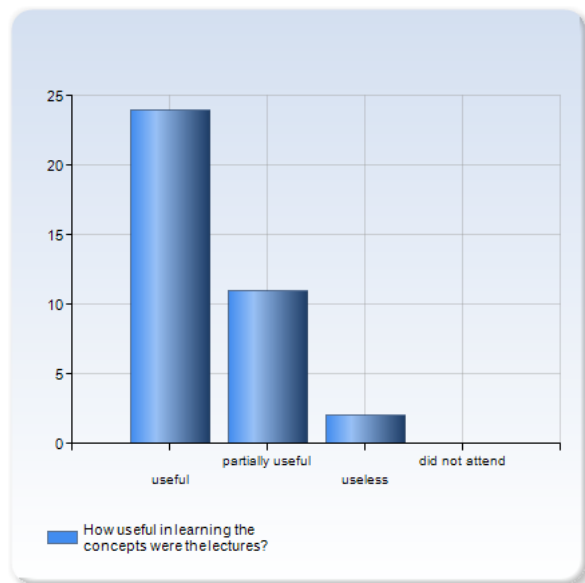
Please feel free to add a comment.
It is useful to learn the theory and how we can reach a a conclusion, but the tutorials were more useful at learning how to apply the theory (this is their purpose after all)
their are mostly proofs of the formulas but I think that an explanation of the concept was mostly missing
Sometimes we went fast on some principles and so it appeared hard to clarify them
I liked the interaction/quizzes
They do not add different content to the written course book.
Proofs could have been included in the slides also.
a bit more time could have been used for discussion of the general concepts, but all in all the lectures were good

How many lectures did you miss?

How many lectures did you miss?	Number of Responses
0	5 (16.7%)
1	17 (56.7%)
2	3 (10.0%)
3	2 (6.7%)
4	0 (0.0%)
5	1 (3.3%)
6	0 (0.0%)
7	0 (0.0%)
8	0 (0.0%)
9	1 (3.3%)
10	0 (0.0%)
11	1 (3.3%)
12	0 (0.0%)
Total	30 (100.0%)
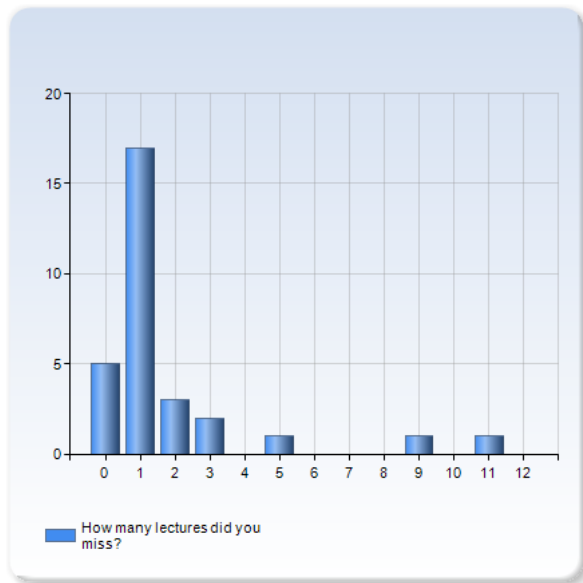
The teacher wants students to be active in the lecture. What activities help most to keep you engaged? Please answer from the learning efficiency point of view and not only fun. Multiple answers are possible

| The teacher wants students to be active in the lecture. **What activities help most to keep you engaged?** Please answer from the **learning efficiency point of view** and not only fun. Multiple answers are possible	Number of Responses
Open discussion when the teacher asks students and the answer is developed jointly.	14 (37.8%)
Questions where the students use clickers for their feedback.	30 (81.1%)
Questions where you have discussions with your neighbor before open discussion.	13 (35.1%)
Questions where you have discussions with your neighbor before using clickers.	22 (59.5%)
Short derivations and problems solving done in class by the students.	13 (35.1%)
Lecturing using slides.	9 (24.3%)
Lecturing using the board.	17 (45.9%)
If other, please specify	1 (2.7%)
Total	119 (321.6%)
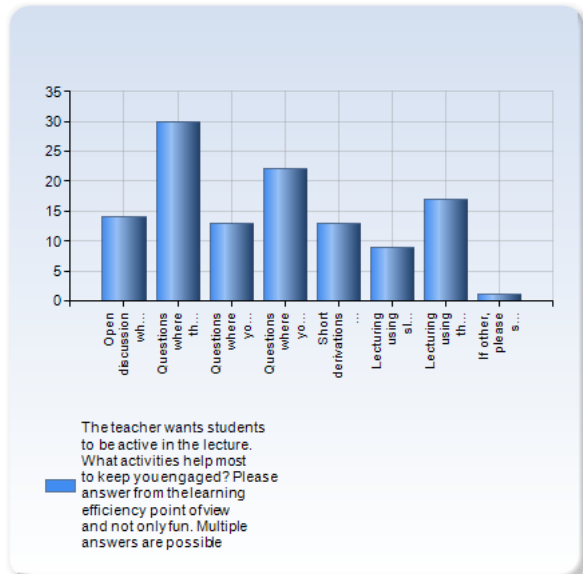
If other, please specify

problemsolving done commonly in the lectures

Please feel free to add a comment.

i think there was a good balance between the use of board and slides.

The teacher thinks that using clickers takes much time in class. How efficient was the learning experience for you?

The teacher thinks that using clickers takes much time in class. How efficient was the learning experience for you?	Number of Responses
Clicker questions and discussions provide the best learning experience and are always worth the time.	8 (21.6%)
If clickers are used with good questions and adequate discussions, the learning experience is worth the time effort.	26 (70.3%)
Other teaching activities provide similar understanding and are more efficient.	0 (0.0%)
Clicker questions and discussions are not worth the time.	2 (5.4%)
I missed the lectures where clickers were used.	1 (2.7%)
If other, please specify	0 (0.0%)
Total	37 (100.0%)
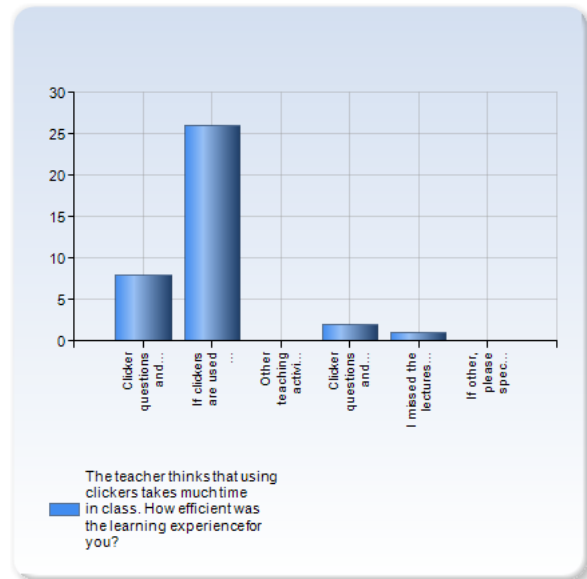
Please feel free to add a comment.

I think clickers were a very good way to reinforce the concepts of the previous lecture.

A review session only with clicker questions would be more useful if time is a constraint.

Did the diagnotic test help yourself to assess your own pre-knowledge?

Did the diagnotic test help yourself to assess your own pre-knowledge?	Number of Responses
very much	4 (10.8%)
pretty much	16 (43.2%)
so and so	11 (29.7%)
only a little	5 (13.5%)
not at all	1 (2.7%)
did not do	0 (0.0%)
Total	37 (100.0%)

Did the diagnotictest help yourself to assess your own pre-knowledge?
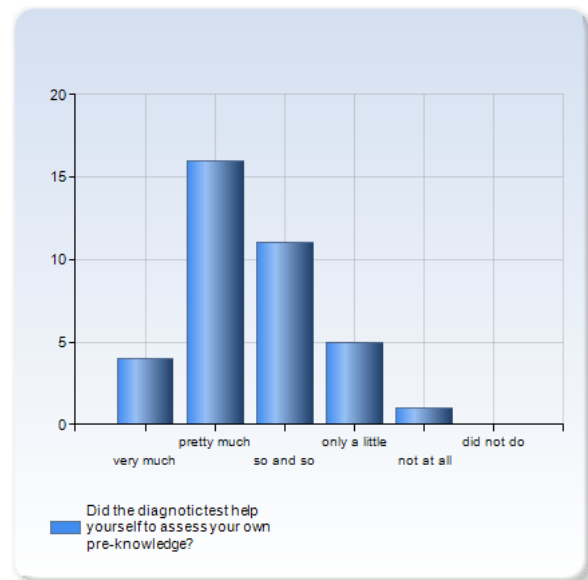
Please provide any comment regarding the diagnostic test.
But it would be good to get a correction, or at least the answers one provided so that it is easier to compare with the solution. I mean so that you can see directly how good you were.
Individual feedback after the diagnostic test would be more helpful.

Were the reflective questions useful for your preparation?

Were the reflective questions useful for your preparation?	Number of Responses
useful	22 (59.5%)
partially useful	14 (37.8%)
useless	0 (0.0%)
did not do	1 (2.7%)
Total	37 (100.0%)

Were the reflective questions useful for your preparation?
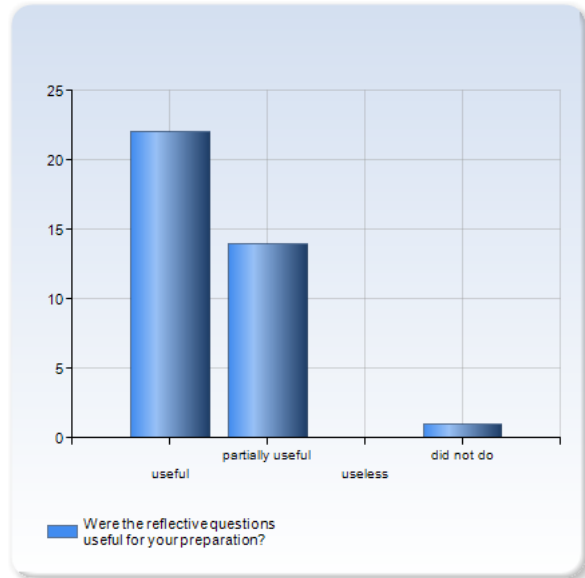
Please feel free to add a comment.

not sure which were the reflective questions

Time was a constraint. Reflective questions (for me) were rushed through because other subjects demanded an equal or greater amount of time.

How useful in learning the methods were the tutorials?

How useful in learning the methods were the tutorials?	Number of Responses
useful	28 (75.7%)
partially useful	9 (24.3%)
useless	0 (0.0%)
did not attend	0 (0.0%)
Total	37 (100.0%)
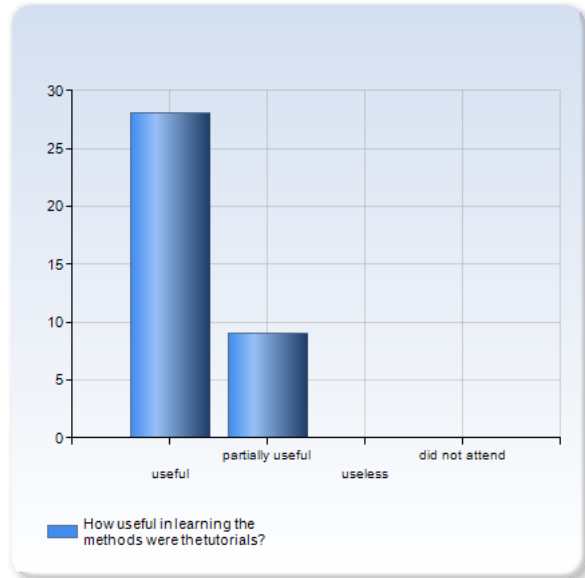
Please feel free to add a comment.

We don't have much time to think on the exercises, only a few minutes then there is the correction on the board.

In my home university they forced us to think for a long time on the exercises before providing the solutions, and I think this method is way better than the one used here.

I felt like the tutorials were going too fast for me to understand everything.

there was too many problems in many tutorials, you didn't have adequate time to solve them in the group and the solutions were always rushed because of lack of time

How many tutorials did you miss?

How many tutorials did you miss?	Number of Responses
0	1 (4.5%)
1	6 (27.3%)
2	7 (31.8%)
3	2 (9.1%)
4	3 (13.6%)
5	0 (0.0%)
6	0 (0.0%)
7	1 (4.5%)
8	0 (0.0%)
9	1 (4.5%)
10	1 (4.5%)
11	0 (0.0%)
12	0 (0.0%)
Total	22 (100.0%)
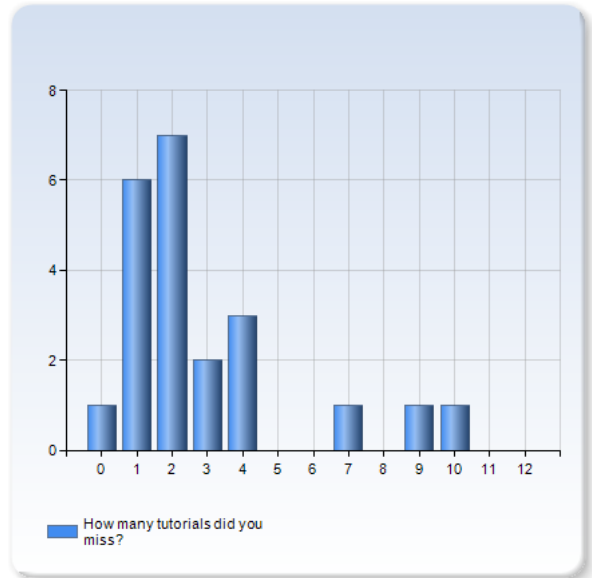
What do you think about the tutorial style having a brief repetition, group work, and solution presentation?

What do you think about the tutorial style having a brief repetition, group work, and solution presentation?	Number of Responses
Good idea, well carried out by the TAs.	24 (64.9%)
Good idea, but some TAs did not follow the concept.	5 (13.5%)
Good idea, but I would prefer to work alone.	3 (8.1%)
I do not like the concept and prefer solution presentation only.	1 (2.7%)
I do not like the concept and prefer group work only.	1 (2.7%)
If other, please specify	3 (8.1%)
Total	37 (100.0%)
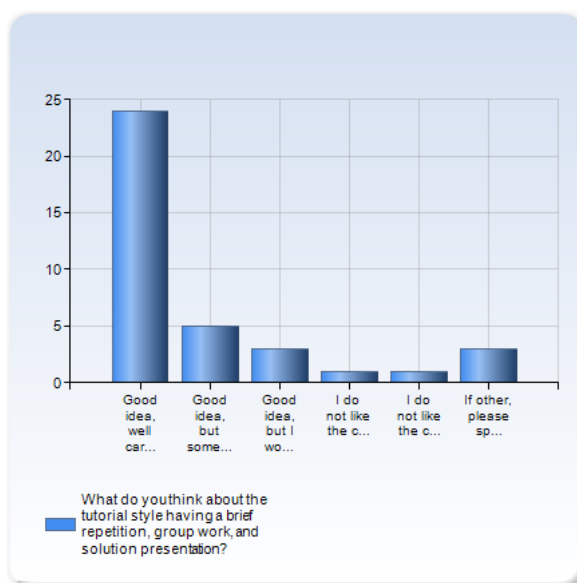
If other, please specify
don't do a solution presentation.
group work is awesome but it always waste a lot of time, I think students should be required to prepare for problems before and give TA more time for solution presentation
the idea was good, but the were too many problems for the provided time

Please feel free to add a comment.
Both TAs did a very good job at explaining and helping us solve the problems
I preferred the Marie tutorials as the explanation of the solution was more clear.
One TA was really good, but the other one was too stressed and was just rushing for nothing
The repetition was too short (sometimes hectic) to be meaningful. When working on the exercises, I usually considered the book/formula collection only. Also, there often was not enough time to deal with the exercises in full

What in your opinion have you learned from project 1? (multiple answers possible)

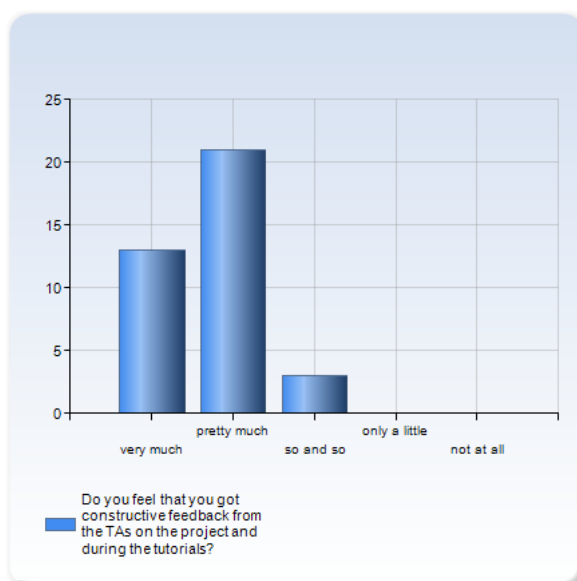| What in your opinion have you learned from project 1? (multiple answers possible)	Number of Responses
A deeper understanding of the course material.	27 (73.0%)
Writing a technical report.	18 (48.6%)
Getting more familiar with Matlab.	25 (67.6%)
Learning to work in a group.	6 (16.2%)
nothing	0 (0.0%)
Total	76 (205.4%)
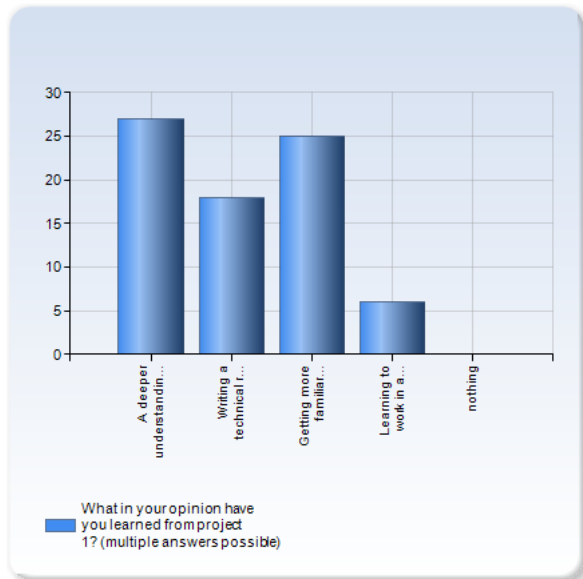
How many hours of work did you spend in project 1?

How many hours of work did you spend in project 1?	Number of Responses
0 - 6	0 (0.0%)
7 - 13	12 (32.4%)
14 - 20	9 (24.3%)
21 - 27	8 (21.6%)
28 - 34	4 (10.8%)
35 - 41	4 (10.8%)
42 - 48	0 (0.0%)
49 - 55	0 (0.0%)
56 - 62	0 (0.0%)
63 - 69	0 (0.0%)
Total	37 (100.0%)
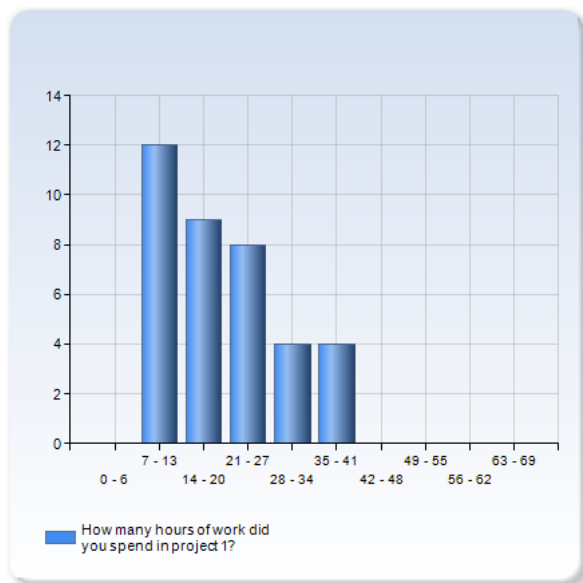
What in your opinion have you learned from project 2? (multiple answers possible)

What in your opinion have you learned from project 2? (multiple answers possible)	Number of Responses
A deeper understanding of the course material.	31 (83.8%)
Writing a technical report.	12 (32.4%)
Getting more familiar with Matlab.	19 (51.4%)
Learning to work in a group.	8 (21.6%)
nothing	3 (8.1%)
Total	73 (197.3%)
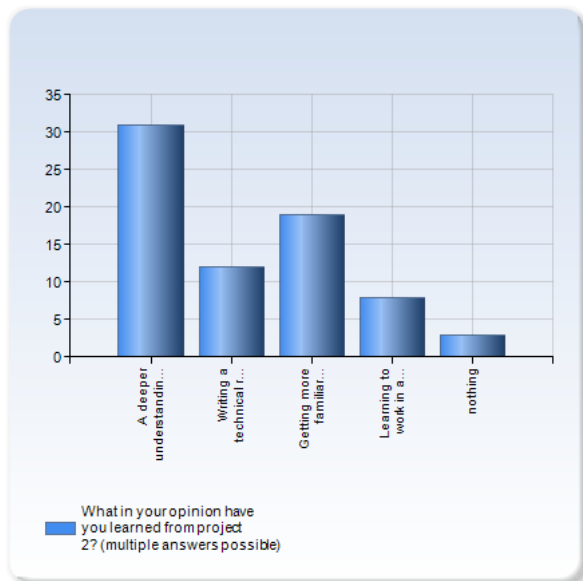
Please feel free to add a comment.
The information for project two was not sufficent or clear to me. Maybe the next time one could be more specific.

How many hours of work did you spend in project 2?

How many hours of work did you spend in project 2?	Number of Responses
0 - 6	3 (8.1%)
7 - 13	7 (18.9%)
14 - 20	13 (35.1%)
21 - 27	7 (18.9%)
28 - 34	2 (5.4%)
35 - 41	3 (8.1%)
42 - 48	1 (2.7%)
49 - 55	1 (2.7%)
56 - 62	0 (0.0%)
63 - 69	0 (0.0%)
Total	37 (100.0%)
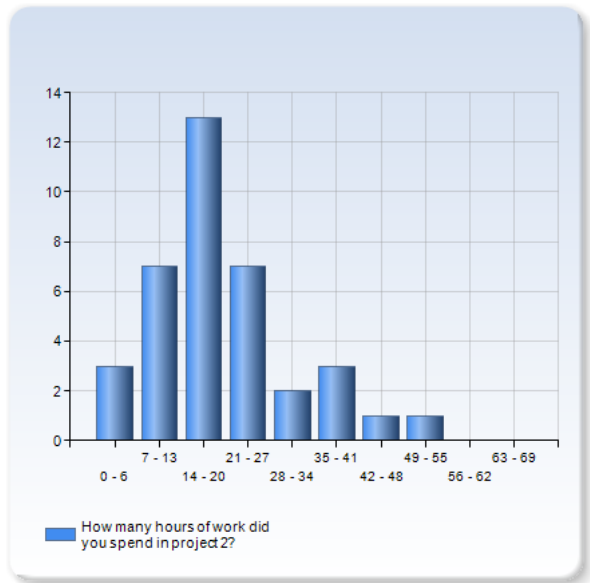
Do you feel that you got constructive feedback from the TAs on the project and during the tutorials?

Do you feel that you got constructive feedback from the TAs on the project and during the tutorials?	Number of Responses
very much	13 (35.1%)
pretty much	21 (56.8%)
so and so	3 (8.1%)
only a little	0 (0.0%)
not at all	0 (0.0%)
Total	37 (100.0%)

Did the bonus points increase your motivation to participate?

Did the bonus points increase your motivation to participate?	Number of Responses
In both, lecture & tutorial.	30 (81.1%)
In lectures only.	2 (5.4%)
In tutorials only.	3 (8.1%)
No additional motivation.	2 (5.4%)
Total	37 (100.0%)
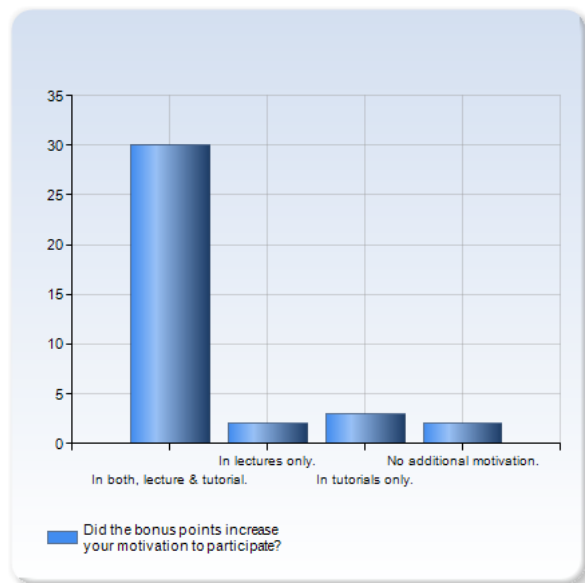
Please feel free to add a comment.

Learning the methods to solve problems (=tutorials) is very useful even without bonus points. Still some motivation included, especially Fridays at 8am

i believe that is a very good idea.

And to read the book. (But that in turn made me participate less in lectures as I thought I already knew everything)

How would you rate the level of difficulty of the course?

How would you rate the level of difficulty of the course?	Number of Responses
too easy	0 (0.0%)
easy	3 (8.1%)
ok	18 (48.6%)
tough	14 (37.8%)
too tough	2 (5.4%)
Total	37 (100.0%)
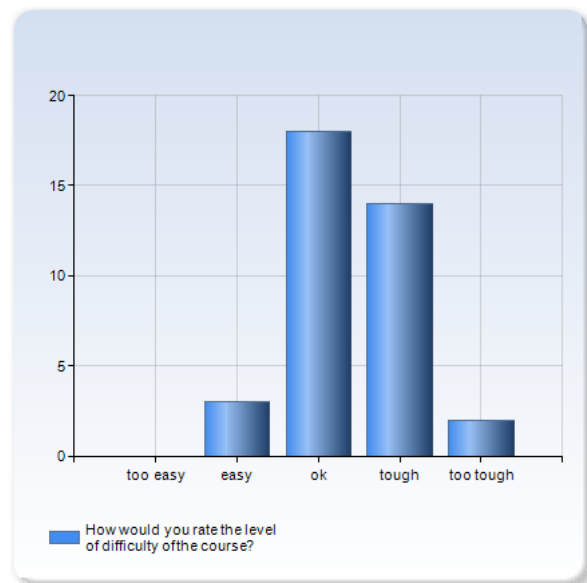
How can the course be improved?

| How can the course be improved? |
|---|
| TA may have better control of the time arrangement. |
| adding few more assignments other than projects |
| everything's fine in this course. very well organized, like the reading assignment and tutorial |
| concreter examples during the lectures, similar to the one we have in the tutorial |
| Good enough :D |
| i would have liked to have this course (or at least a reduced one) as a pre-sessional course instead of my English course i took in August. |
| One of the TAs was better than the other in time management and explaining the concepts. It should be good if sometimes there were only one tutorial group with both TAs so that they learn from each other. |
| Explanations on the board are very useful ! |
| add more tutorials |
| Although its theory, introducing some practical concepts might help, in my opinion. |
| Scheduling the lecture and tutorial on the same day whenever needed |
| The course can be improved by including matlab session. |
| feedback form students |
| Stretching the course in 2 periods |
| More practical examples. How some theoretical concepts are used in practice. |
| More explanation of hard stuff from the book that just weren't explained during the course... |
| Less boring maybe or more practical uses |
| like Reading assignment before lecture, we can have problem solving assignment before some tutorial |
| I hope more exercise could be taught on tutorial, and it's really a nice experience to have this course. |
| review of all the chapters should mention some important points |
| though we have less time for tutorials, more questions are to be discussed in tutorials. Instead of two projects, One single project involving all the concepts can be given where students can work with three in team. That would be more proffessional. |
| Could distribute the topics into few more lectures |
| That would not be necessary. |
| at the beginning you should be more clear about what you are going to teach this lecture |

Did the course schedule conflict with other courses (simultaneous classes, etc)?

Did the course schedule conflict with other courses (simultaneous classes, etc)?	Number of Responses
Yes	8 (21.6%)
No	29 (78.4%)
Total	37 (100.0%)
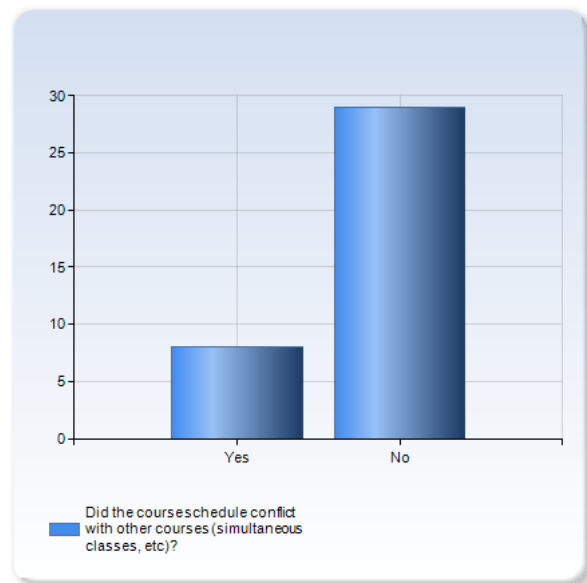
If yes, please provide the name of course (course code) and the frequency of collision.
ME2072. There was simultaneous classes twice. And the other course is in Kista Campus.
2 times in the period with ME2072 (Entrepreneurship for Engineers)
Missed some lectures of my minor since I was attending ST lectures because this course seems more difficult than the other.
IL2206, twice a week
Entrepreneurship of Engineer; almost two weeks a time
ME2072
IL2206 Embedded systems

Please feel free to add any other comment?

Please feel free to add any other comment?
favorite course in this period
I think it would be great if KTH offered a similar course as a pre-sessional course in August. Specially for people who are retaking their studies after some years. I personally found it very difficult to catch up with the Digital Communications Course and think it would have been great if I would have had this course before.
The formula derivations in class were really useful and I think it is good to continue doing this but explaining a little more in tricky parts.
Thank you
Thank you!
The lectures could have been scheduled in before noon.
I learned the deeper theoretical and practical knowledge by lectures, tutorials and projects of signal theory.
All TA teachers was very kind throughout the whole course, which was really nice.
Good work done by the professor and TA. Course was well explained with interest.
Thanks for providing signal theory in this period, though it's a difficult, I got deeper understand of the course, and wish myself good luck in exams.
I seriously liked the course....I personally want to thanks the TAs as they were very free to discuss and this made all the tutorials lively session.
Had a great experience in studying and working with groups.

Study habit

Question 1: Please give a percentage estimate of the time you use each resource to study for the final exam:

1. Lecture material.

1. Lecture material.	Number of Responses
0 - 3	1 (3.8%)
4 - 7	5 (19.2%)
8 - 11	9 (34.6%)
12 - 15	1 (3.8%)
16 - 19	0 (0.0%)
20 - 23	8 (30.8%)
24 - 27	0 (0.0%)
28 - 31	2 (7.7%)
32 - 35	0 (0.0%)
36 - 39	0 (0.0%)
Total	26 (100.0%)
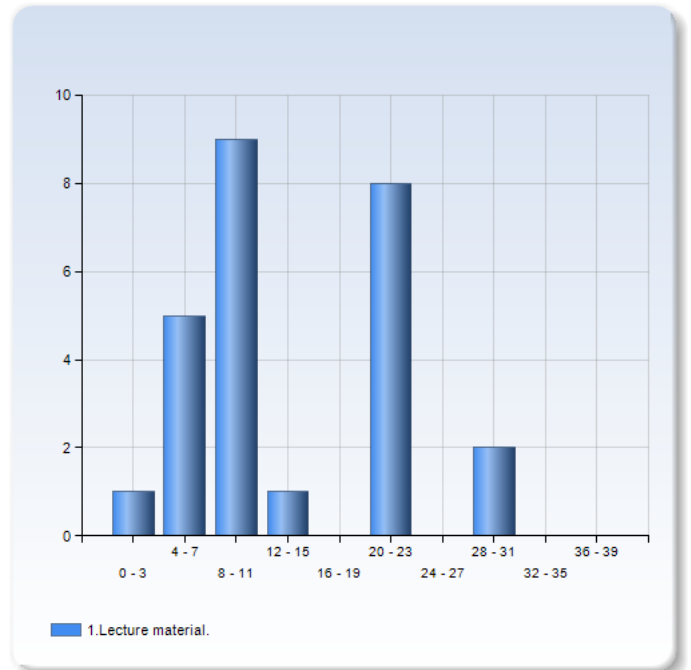
2. Course literature.

2. Course literature.	Number of Responses
0 - 9	4 (14.8%)
10 - 19	7 (25.9%)
20 - 29	6 (22.2%)
30 - 39	6 (22.2%)
40 - 49	2 (7.4%)
50 - 59	0 (0.0%)
60 - 69	1 (3.7%)
70 - 79	0 (0.0%)
80 - 89	0 (0.0%)
90 - 99	1 (3.7%)
Total	27 (100.0%)
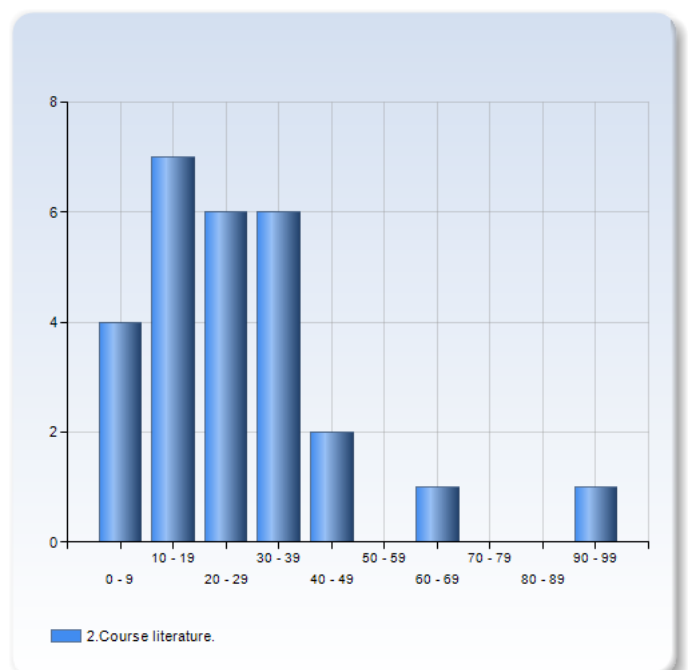
3. Tutorial exercises.

3. Tutorial exercises.	Number of Responses
0 - 8	1 (3.7%)
9 - 17	4 (14.8%)
18 - 26	4 (14.8%)
27 - 35	11 (40.7%)
36 - 44	3 (11.1%)
45 - 53	3 (11.1%)
54 - 62	0 (0.0%)
63 - 71	0 (0.0%)
72 - 80	1 (3.7%)
81 - 89	0 (0.0%)
Total	27 (100.0%)
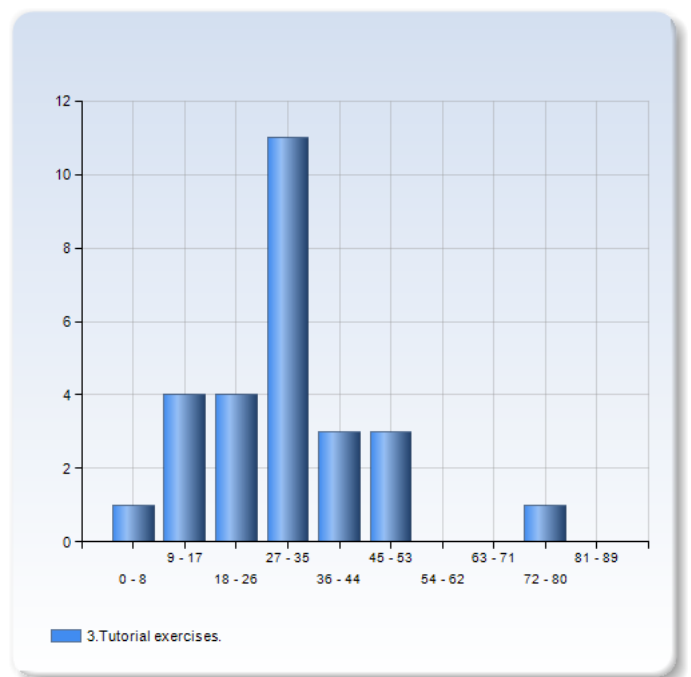
4. Other exercises in the collection.

4. Other exercises in the collection.	Number of Responses
0 - 2	6 (25.0%)
3 - 5	2 (8.3%)
6 - 8	0 (0.0%)
9 - 11	10 (41.7%)
12 - 14	0 (0.0%)
15 - 17	2 (8.3%)
18 - 20	3 (12.5%)
21 - 23	0 (0.0%)
24 - 26	1 (4.2%)
27 - 29	0 (0.0%)
Total	24 (100.0%)
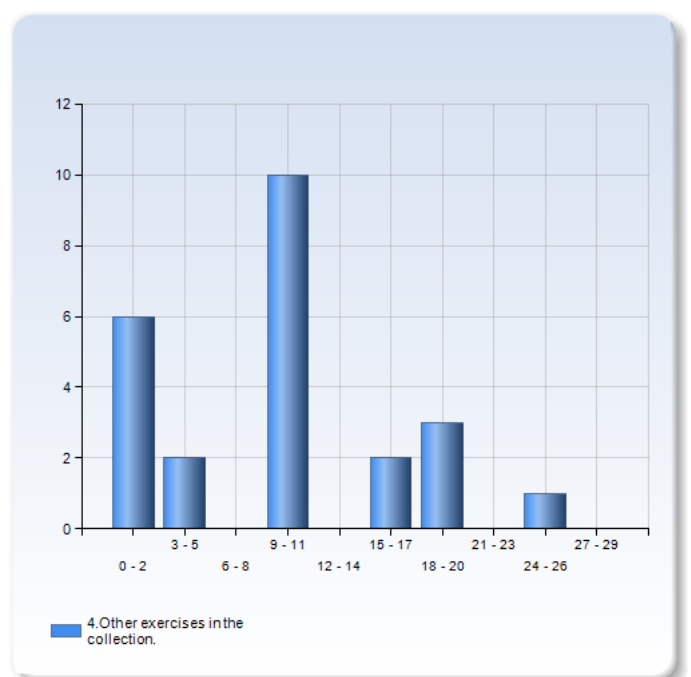
5. Previous exams.

5. Previous exams.	Number of Responses
2 - 10	4 (15.4%)
11 - 19	2 (7.7%)
20 - 28	6 (23.1%)
29 - 37	5 (19.2%)
38 - 46	7 (26.9%)
47 - 55	0 (0.0%)
56 - 64	0 (0.0%)
65 - 73	1 (3.8%)
74 - 82	0 (0.0%)
83 - 91	1 (3.8%)
Total	26 (100.0%)
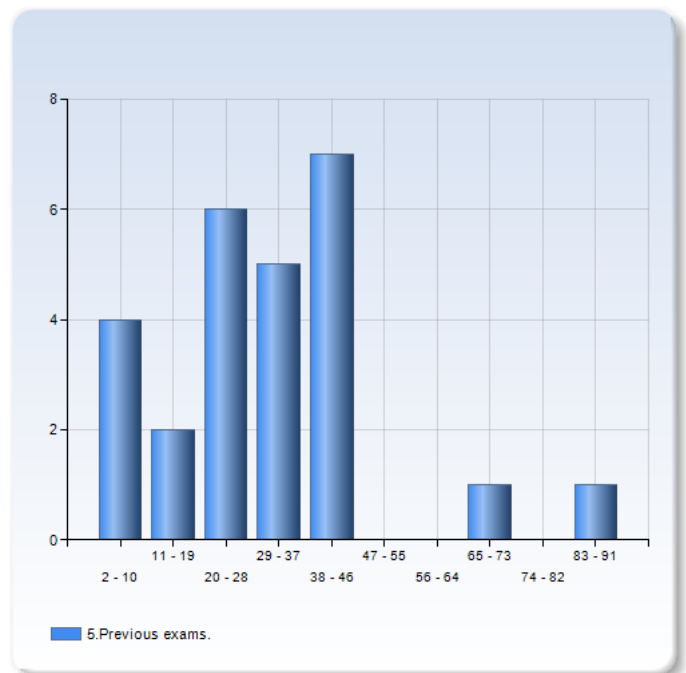
6. Others. Please write:

i think that the exercice from the tutorial were maybe too easy compare to the problem in the exams. It was really surprising when i did the first old exam during my preparation and all other student that i spoked too were feeling the same way.
So in my opinion the problem from the tutorial should be harder, especially if the TAs are here to explain.

Couldn't focus enough on studying because of personal reasons.

Monson Hayes's "Stat. signal processing" is quite a good peace of text

Study habit

Question 2: This years exam was less similar to previous years' exams than usual. If you saw that all exams are very different from each other, how would you change the time distribution you answered in the previous question?

Study habit Question 2: This years exam was less similar to previous years' exams than usual. If you saw that all exams are very different from each other, how would you change the time distribution you answered in the previous question?	Number of Responses
1. I would not change anything.	5 (19.2%)
2. I would spend more time trying to understand the concepts by reading the course literature and asking the teacher and teacher assistants.	15 (57.7%)
3. I would increase the time I spend solving exercises from the collection.	5 (19.2%)
4. I would spend more time with previous years' exams.	1 (3.8%)
Total	26 (100.0%)
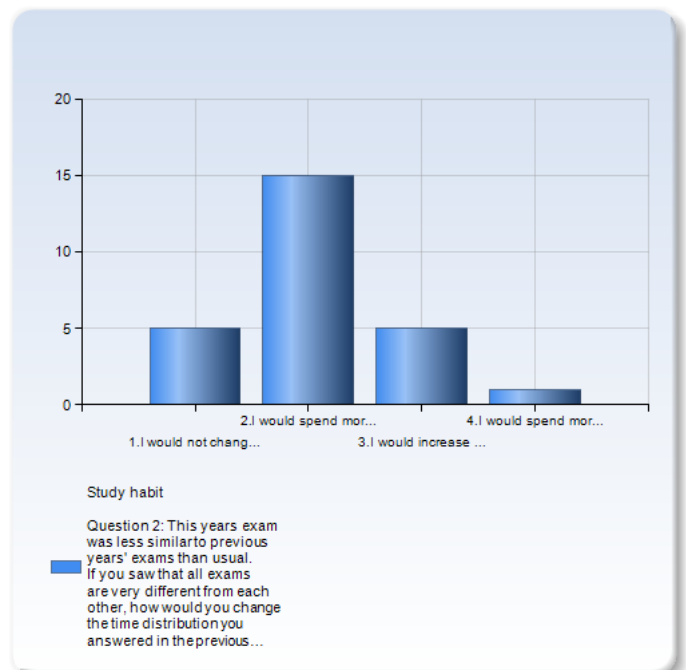
I really don't know, I'm sure that I comprehend the concepts covered in the course but this exam was for me mostly an evaluation of other topics apart from the ones covered in the course material and tutorials.

I would spend less time trying to do the previous exams.

Also, it should be valuable to try to solve the problems that requires deeper understanding of the course contents, not just the easy problems in the tutorial.

The problem for me is I think I understand the basic concept, but then when facing a bit advanced problem, I find difficult to solve the problem.

Yes! I think the most important reason of the worse result is that this years exam was less similar to previous years' exams than usual. So it is crucial to understand the concepts and apply them flexibly.

Even after the exam I would not have known what to learn else because it had nothing to do with what we did in the exercises.

I believe some questions required some knowledge from other courses.

The taste to mathematical thinking should be developed, and ability to solve non-standart math problems even not directly related to the course content. Don't know how it is possible to achieve within less than 2 months. Moreover, it is usually the first serious exam for MSc newcomers who often do not have that background of KTH students finishing their study or even did not studied in good european universities.

I would spend more time trying to understand by reading the course literature and lecture material.

Study habit:

Question 3: *When studying for the exam I...* Mark the sentence(s) that represent your thoughts the best:

Study habit:

Question 3: *When studying for the exam I...* Mark the sentence(s) that represent your thoughts the best:	Number of Responses
1. I study all topics. I want to have an overall understanding of the course.	13 (48.1%)
2. Use previous years' exams. I make sure I have an understand of the topics that appear in all exams.	13 (48.1%)
3. I just make sure I am capable of solving previous years' exams.	1 (3.7%)
4. I leave out topics I think will not appear.	0 (0.0%)
Total	27 (100.0%)

Study habit:

Question 3: When studying for the exam I... Mark the sentence(s) that represent your thoughts the best:
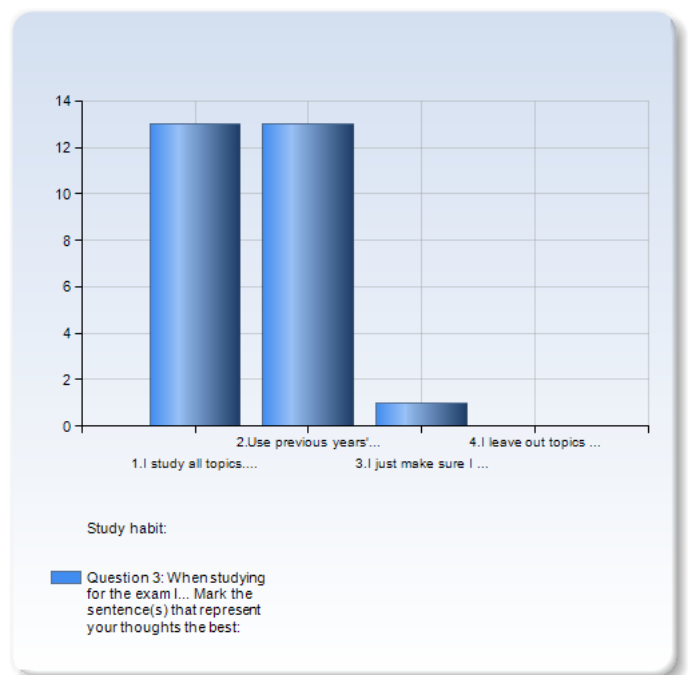
5. Others. Please write:

I also re-do the tutorial problems, and try to solve the problem without being dependent to the solution

After going through all the course and most of the exercice, i was focused on old year exams because as i said the shape of the exercice was totally different from the tutorial and it was pretty frightening

Studied from previous exams and the exercises from the tutorials.

Of course, practise should closeley be connected with theory, and actually for us, young future engineers, theoretical consideration is motivated by practical needs. That's why almost all the students around me and I personally looked for previous exams, and from there we decide which topics (AND TYPES OF PROBLEMS) are more important, and which are less. What is more, all understand that it's impossible to know well all the topics of the course within such a short course.

Solving exam:

When in the exam I...

Solving exam: *When in the exam I...*	Number of Responses
1. Solve the problems in the order I encounter them: 1 to 5 skipping the ones I get very stuck with.	13 (50.0%)
2. Read the exam and identify the exercises I find are easy and start with those.	12 (46.2%)
3. Read the exam and identify the exercises I find are difficult and start with those.	0 (0.0%)
4. Would require the point distribution within each problem to decide if it is worth investing the time.	1 (3.8%)
Total	26 (100.0%)
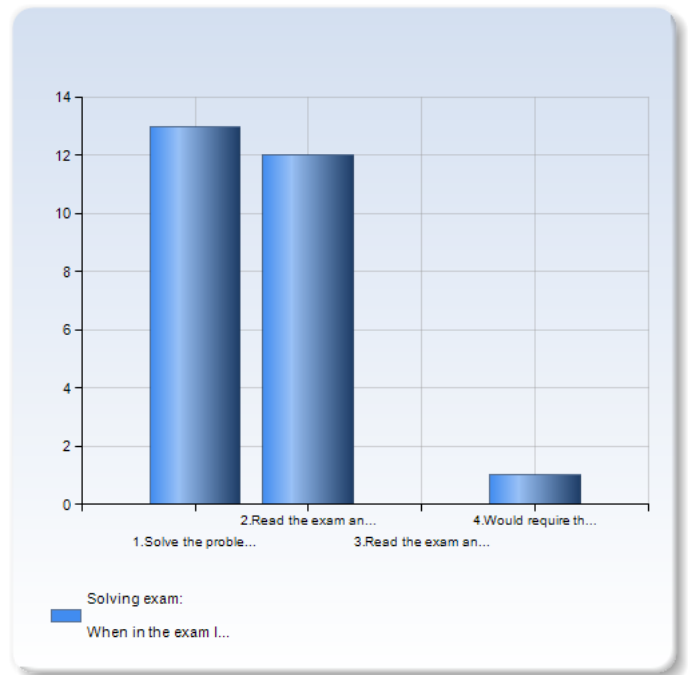
5. Others. Please write:

Actually I spent more than one hour on the first question and realized that I shouldn't keep going. And then I identified the exercises I found are easy and started with those.

Regarding exam:

Question 1: Reasons that hindered you for a proper preparation:

Travel within the preparation period.

Travel within the preparation period.	Number of Responses
Very much agree	1 (3.7%)
Agree	6 (22.2%)
Neutral	7 (25.9%)
Disagree	2 (7.4%)
Very much disagree	11 (40.7%)
Total	27 (100.0%)
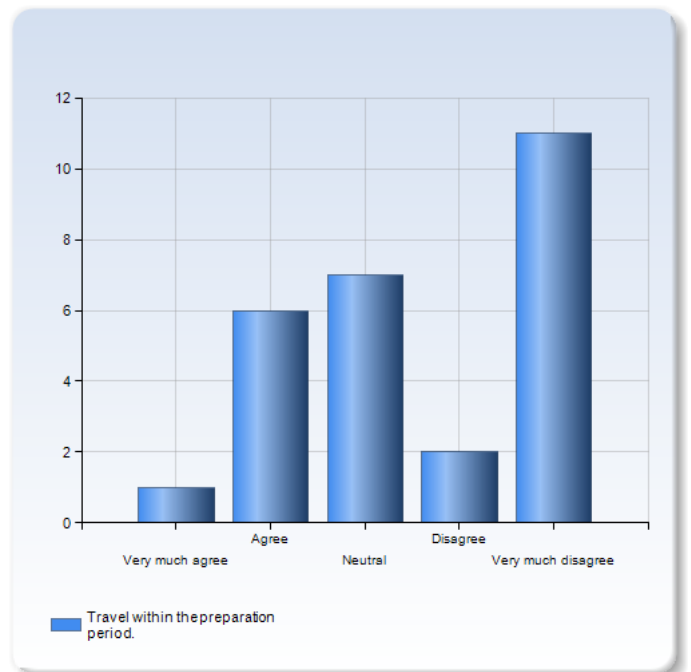
Dense exam schedule.

Dense exam schedule.	Number of Responses
Very much agree	3 (11.1%)
Agree	5 (18.5%)
Neutral	6 (22.2%)
Disagree	5 (18.5%)
Very much disagree	8 (29.6%)
Total	27 (100.0%)
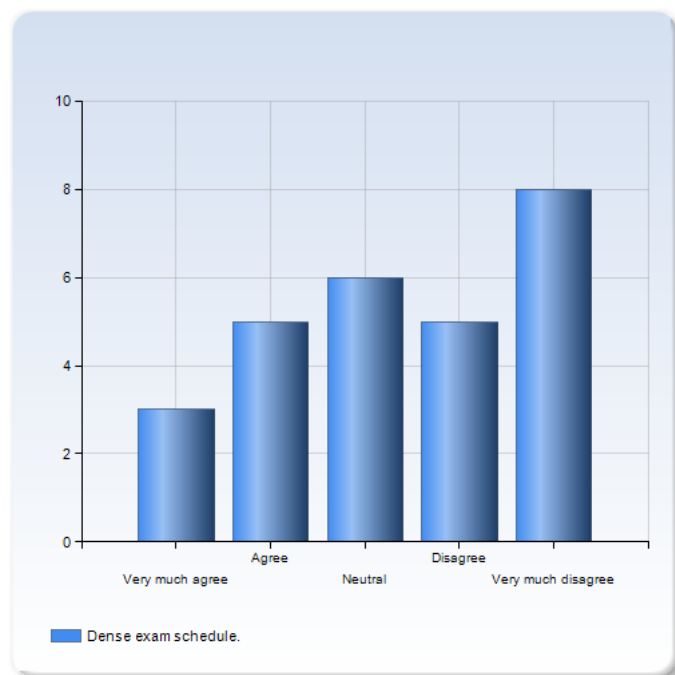
Overloaded with other works.

Overloaded with other works.	Number of Responses
Very much agree	1 (3.7%)
Agree	13 (48.1%)
Neutral	5 (18.5%)
Disagree	3 (11.1%)
Very much disagree	5 (18.5%)
Total	27 (100.0%)
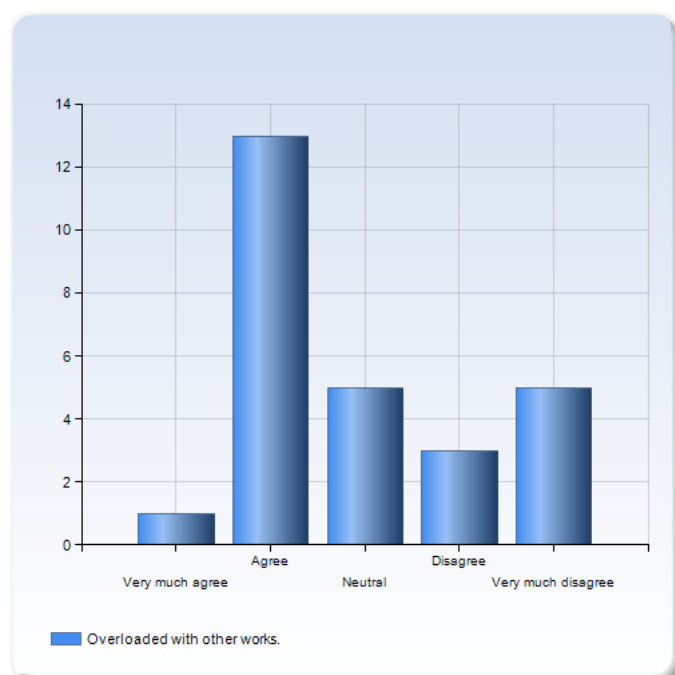
Signal theory had lower priority than other courses.

Signal theory had lower priority than other courses.	Number of Responses
Very much agree	0 (0.0%)
Agree	3 (11.1%)
Neutral	3 (11.1%)
Disagree	9 (33.3%)
Very much disagree	12 (44.4%)
Total	27 (100.0%)
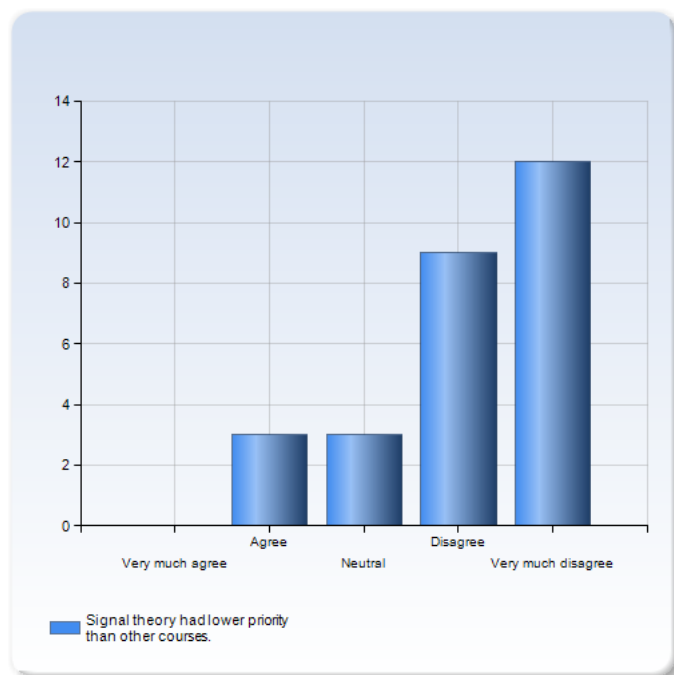
Underestimating the course exam.

Underestimating the course exam.	Number of Responses
Very much agree	4 (14.8%)
Agree	11 (40.7%)
Neutral	6 (22.2%)
Disagree	1 (3.7%)
Very much disagree	5 (18.5%)
Total	27 (100.0%)
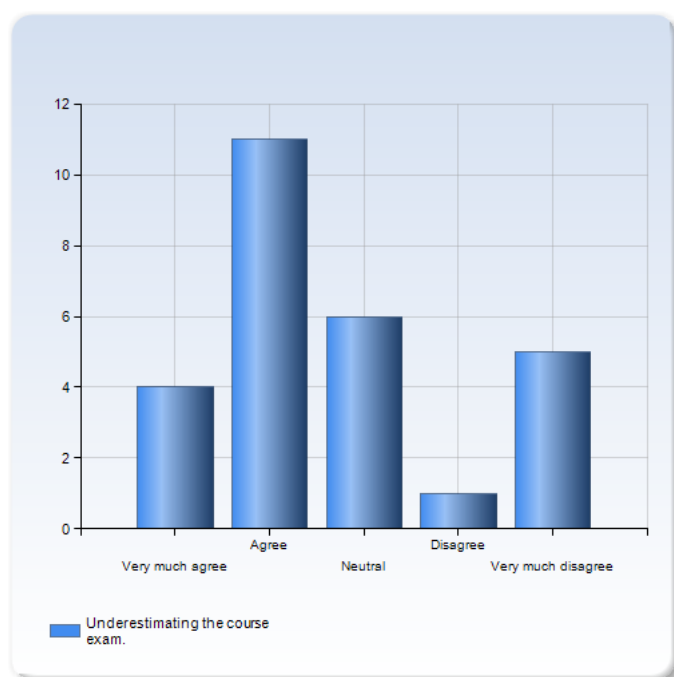
Regarding exam:

Question 2:*I think the exam tested...* Select your level of agreement/disagreement with the following statements:

1. The concepts given during the course. The exam required a deep understanding of the course material.

1. The concepts given during the course. The exam required a deep understanding of the course material.	Number of Responses
Very much agree	10 (38.5%)
Agree	10 (38.5%)
Neutral	3 (11.5%)
Disagree	1 (3.8%)
Very much disagree	2 (7.7%)
Total	26 (100.0%)
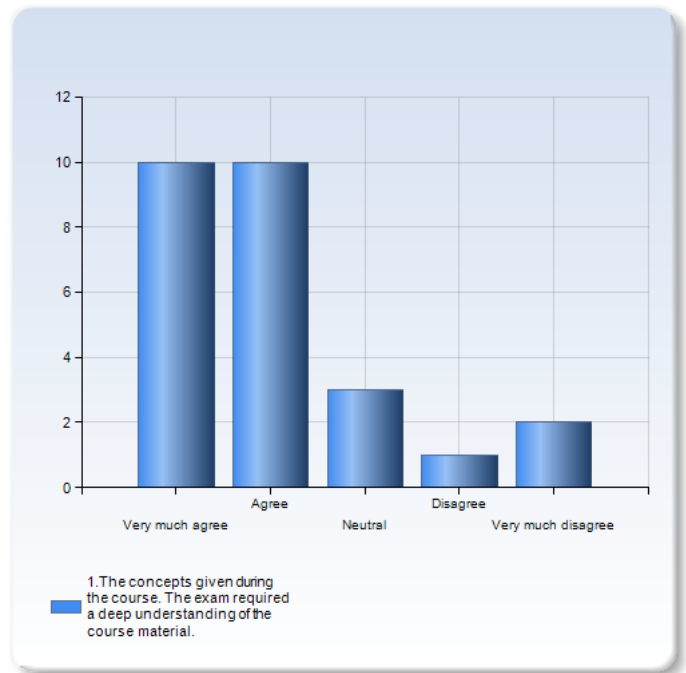
2. Computing ability. The exam mainly tested if one could carry out large derivations correctly.

2. Computing ability. The exam mainly tested if one could carry out large derivations correctly.	Number of Responses
Very much agree	5 (19.2%)
Agree	5 (19.2%)
Neutral	9 (34.6%)
Disagree	5 (19.2%)
Very much disagree	2 (7.7%)
Total	26 (100.0%)
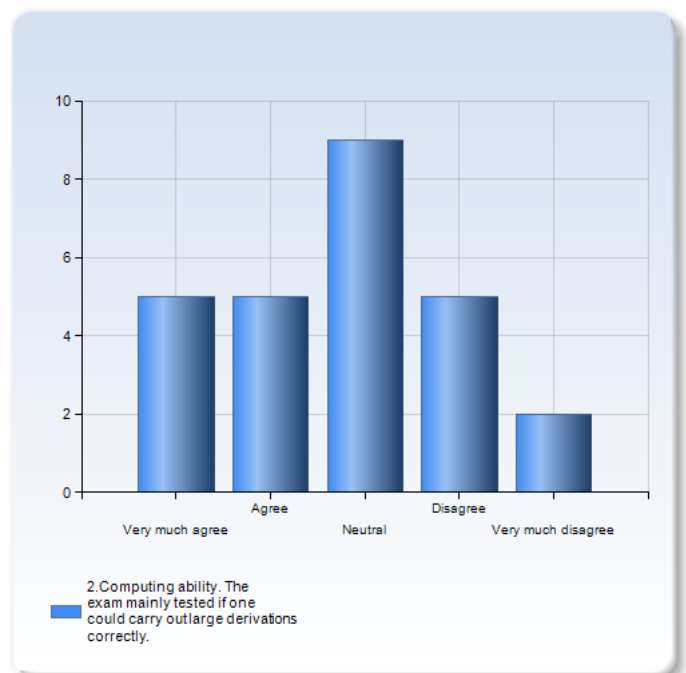
3. The ability of applying the mathematical tools of the course to simple engineering problems.

3. The ability of applying the mathematical tools of the course to simple engineering problems.	Number of Responses
Very much agree	3 (11.5%)
Agree	9 (34.6%)
Neutral	8 (30.8%)
Disagree	4 (15.4%)
Very much disagree	2 (7.7%)
Total	26 (100.0%)

3.The ability of applying the mathematical tools of the course to simple engineering problems.
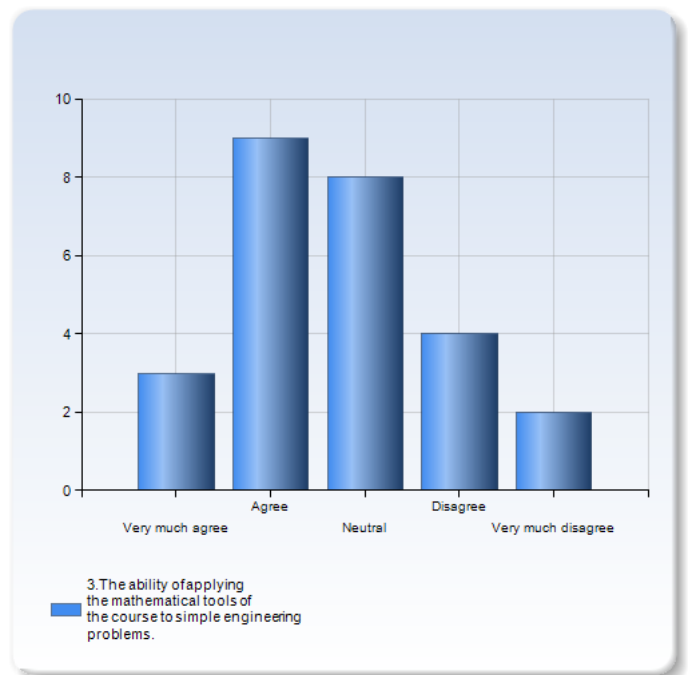
4. Memory. The exam tested if one could remember properties and definitions.

4. Memory. The exam tested if one could remember properties and definitions.	Number of Responses
Very much agree	0 (0.0%)
Agree	3 (11.5%)
Neutral	8 (30.8%)
Disagree	11 (42.3%)
Very much disagree	4 (15.4%)
Total	26 (100.0%)

4.Memory. The exam tested if one could remember properties and definitions.
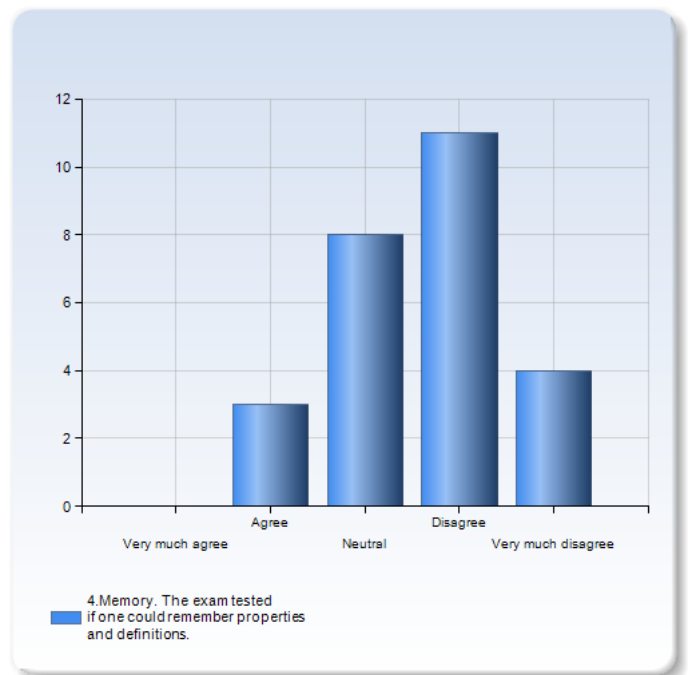
5. The exam did not test anything relevant.

5. The exam did not test anything relevant.	Number of Responses
Very much agree	3 (11.5%)
Agree	3 (11.5%)
Neutral	6 (23.1%)
Disagree	11 (42.3%)
Very much disagree	3 (11.5%)
Total	26 (100.0%)
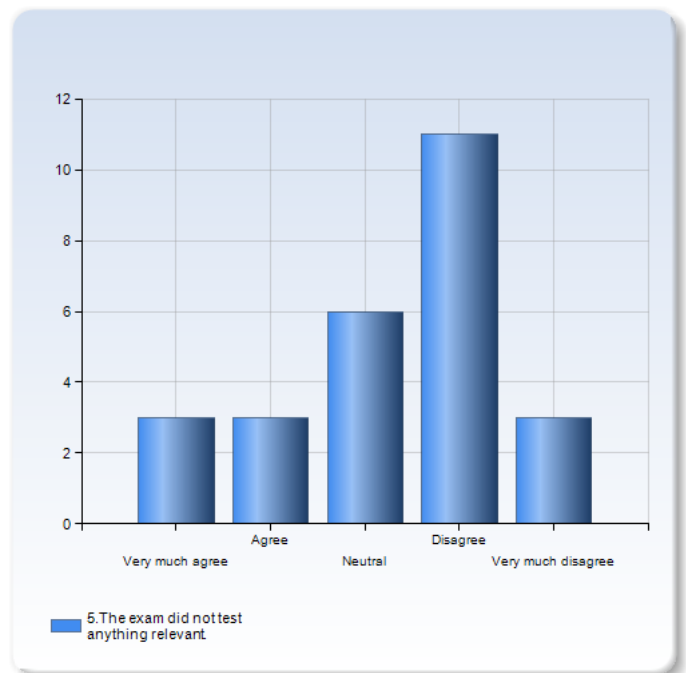
6. Others. Please write:
But in my opinion, for poin 3, the problem in the exam was not simple engineering problem
I think the exam is really wired this year, as the difficulty level is obviously higher than before, and there's hint for almost every problem, that is to say every problem there are something students might don't know, how dare you say all the knowledge are covered in lecture? For example the first problem, we mostly discuss about Gaussion distribution in lecture and exercise class but what you put in exam is Poisson distribution, of course you can say that it should also be mastered, but from my personal perspective, final exam of a course should test how students master the things they learned, instead of whether their ability of understanding your hint and application.
The exam was one step above the classes, tutorials, literature and other exams.
Some exercices were completely of topics?! Some things we didn't even encounter during the course...
There was one question that was a main part of the course, question 5.
Question 4 required knowledge from other courses. In the tutorials exercises were not as complicated as Question 1.
I think, the exam tested the certain level of mathematical and theoretical maturity as well as non-standart thinking within the context of signal theory. Some problems required application of studied during the course concepts, and concepts from other related disciplines to simple engineering problems. However, the latter together with ability to think in a non-standard fashion and apply related knowledge from other disciplines is a specific skill that MUST be trained separately, and which requires a serious pedagogical consideration. This has not be done during the course. Partially, since the practical part of the course (excercises) were consisted only from mostly simple standard problems. Moreover, it is a common illusion of experienced PhD students and teachers who develop university courses that studens will quickly aquire their level of understanding (even concerning the simple problems) speed of absorbing the knowledge, and broad knowledge of related concepts from other close disciplines, while for them it was a result of years of research work and personal development. The choice of course literature is also not so obvious. The "Signal Theory" book by Handel et al is often hard to follow and suffers from lack of clarity and did not touch topics whiare actually needed in real engineering practice!. In contrast, in many leading european technical universities like in the Netherlands (TU Eindhoiwen or Delft, don't reemeber exactly) when reading the similar course, the "Statistical signal processing" by Monson Hayes is used. Since it is a world wide accepted classics given in a good understndable way, also providing examples of MATLAB code (we also have 2 MATLAB projects within a course, aren't we).

Regarding exam:

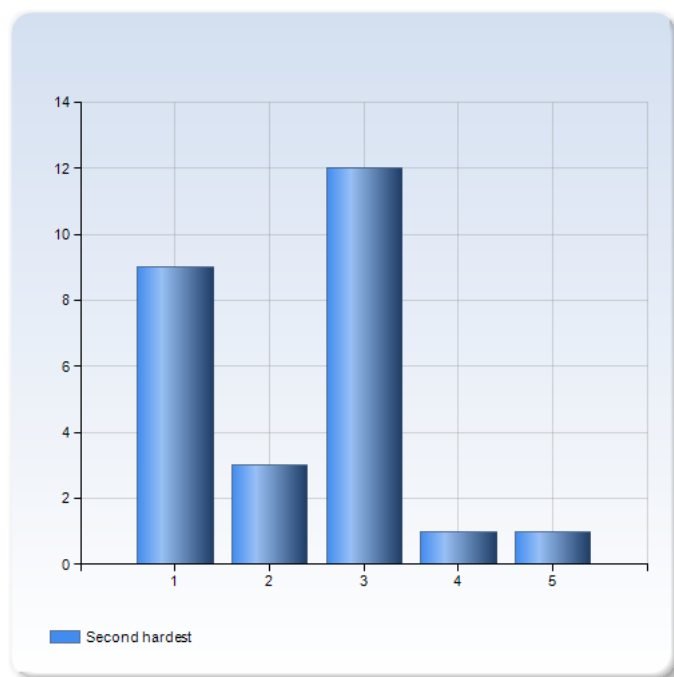## Question 3: Evaluate how tough were problems of the exam:

Hardest	Number of Responses
1	5 (18.5%)
2	0 (0.0%)
3	2 (7.4%)
4	20 (74.1%)
5	0 (0.0%)
Total	27 (100.0%)
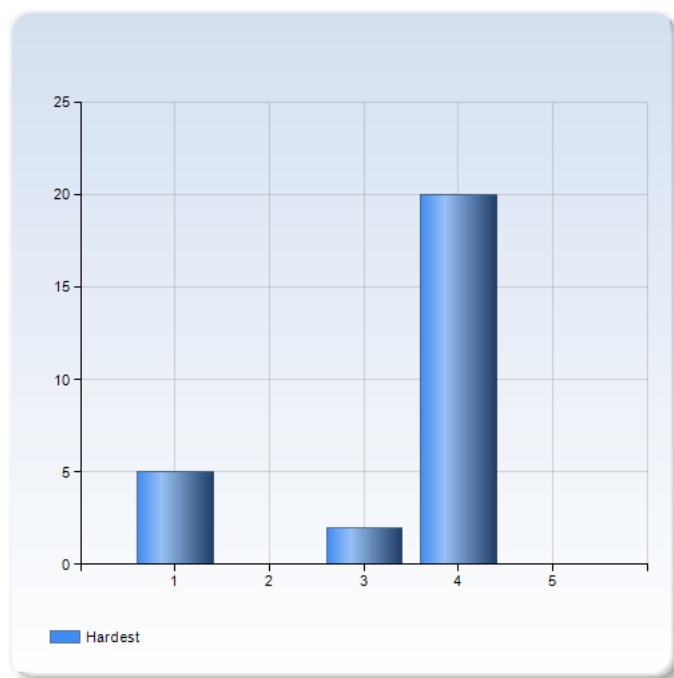
Hardest

Second hardest

Second hardest	Number of Responses
1	9 (34.6%)
2	3 (11.5%)
3	12 (46.2%)
4	1 (3.8%)
5	1 (3.8%)
Total	26 (100.0%)

Medium

Medium	Number of Responses
1	7 (26.9%)
2	4 (15.4%)
3	8 (30.8%)
4	2 (7.7%)
5	5 (19.2%)
Total	26 (100.0%)
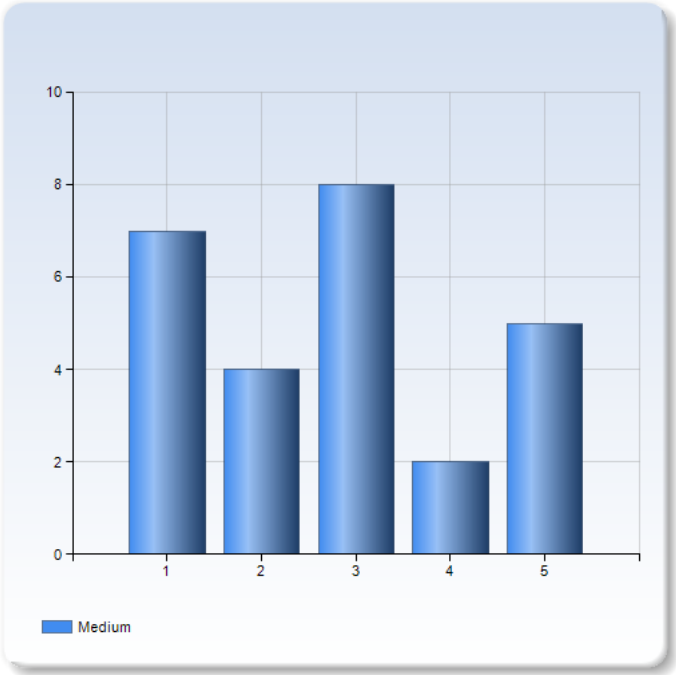
Second easiest

Second easiest	Number of Responses
1	2 (7.7%)
2	16 (61.5%)
3	3 (11.5%)
4	2 (7.7%)
5	3 (11.5%)
Total	26 (100.0%)
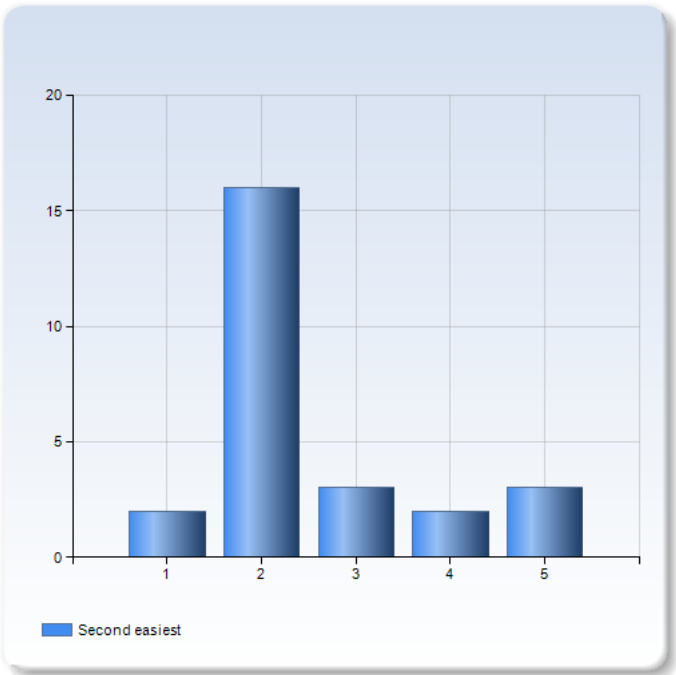
Easiest

Easiest	Number of Responses
1	3 (11.5%)
2	5 (19.2%)
3	1 (3.8%)
4	0 (0.0%)
5	17 (65.4%)
Total	26 (100.0%)
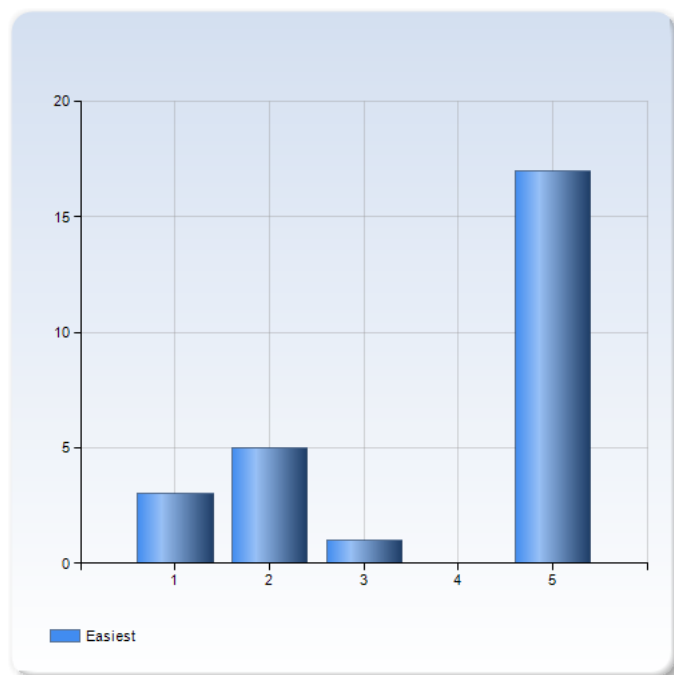
Regarding exam:

Question 4:*Regarding the exam's solutions I...* Mark the sentence that represents your thoughts the best:

Regarding exam:

Question 4:*Regarding the exam's solutions I...* Mark the sentence that represents your thoughts the best:	Number of Responses
1. Have not looked at them nor do I intend do.	2 (8.0%)
2. Have not looked at them yet.	10 (40.0%)
3. Have read and understood them.	8 (32.0%)
4. Have solved the exam with the aid of the solutions.	2 (8.0%)
5. Do not understand them.	3 (12.0%)
Total	25 (100.0%)
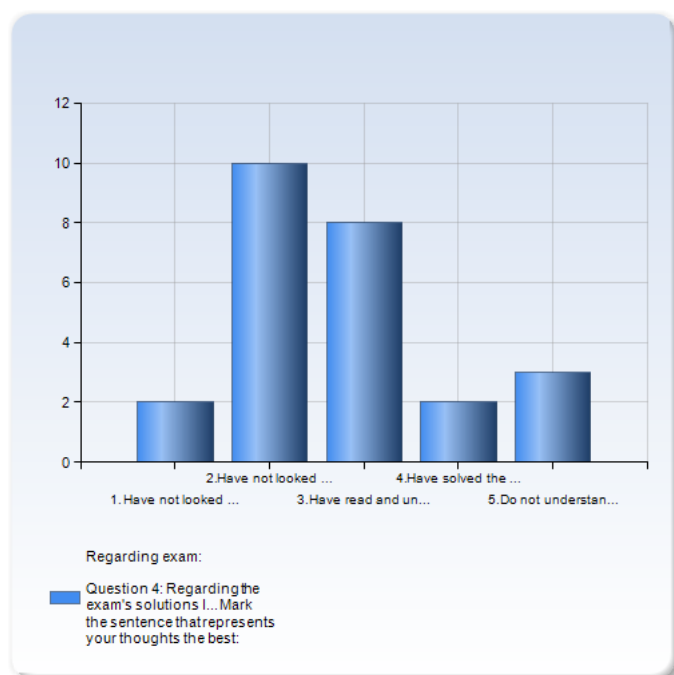
6. Others. Please write:

Have read and partially understood them

Have looked at them but haven't had the time to actually understand them

doesn't make sense to check the solutions without having my exact answer

I was planning to look at them when studying for the re-exam

Looking at them.

Regarding exam:

Question 5: Answer only if you have looked at the solutions. Select your level of agreement /disagreement with the following statements:

1. The exam was hard but did not require computations.

1. The exam was hard but did not require computations.	Number of Responses
Very much agree	2 (12.5%)
Agree	6 (37.5%)
Neutral	4 (25.0%)
Disagree	4 (25.0%)
Very much disagree	0 (0.0%)
Total	16 (100.0%)
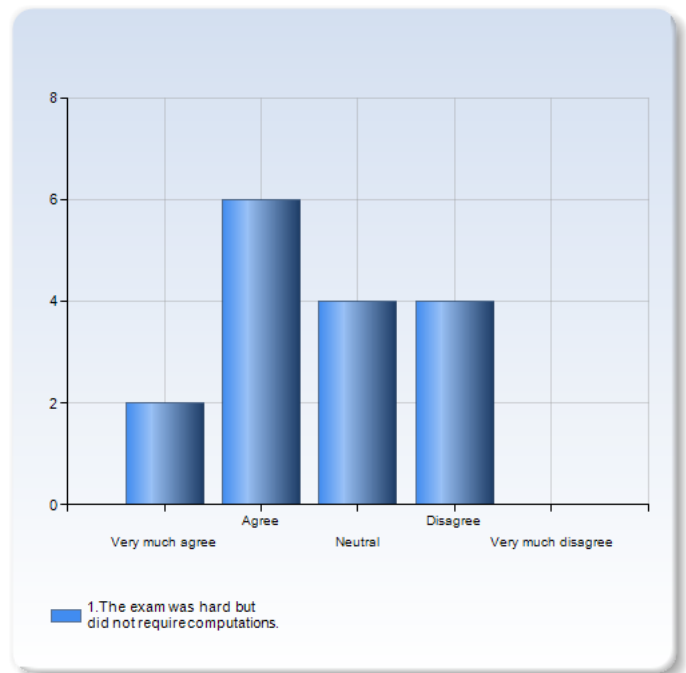
2. The exam was not hard if the concepts are well understood.

2. The exam was not hard if the concepts are well understood.	Number of Responses
Very much agree	2 (12.5%)
Agree	0 (0.0%)
Neutral	3 (18.8%)
Disagree	5 (31.3%)
Very much disagree	6 (37.5%)
Total	16 (100.0%)
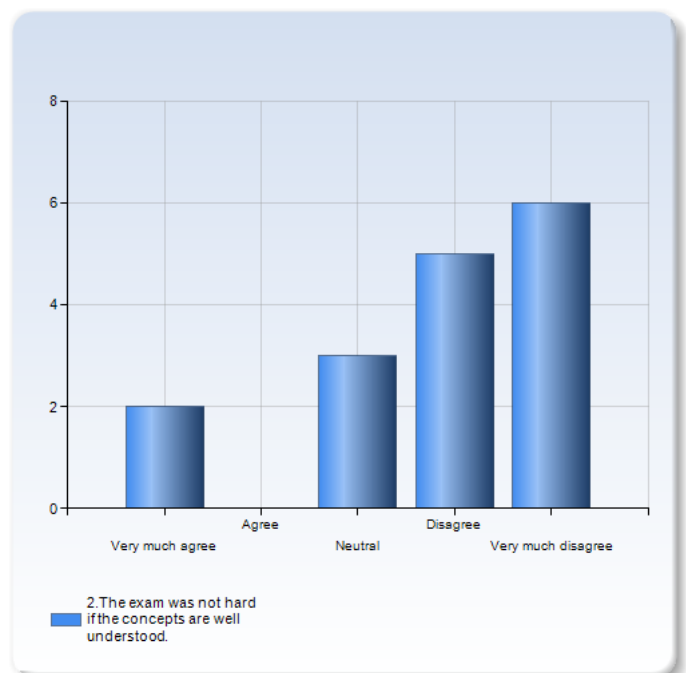
3. Looked hard but was not.

3. Looked hard but was not.	Number of Responses
Very much agree	0 (0.0%)
Agree	2 (12.5%)
Neutral	1 (6.3%)
Disagree	4 (25.0%)
Very much disagree	9 (56.3%)
Total	16 (100.0%)
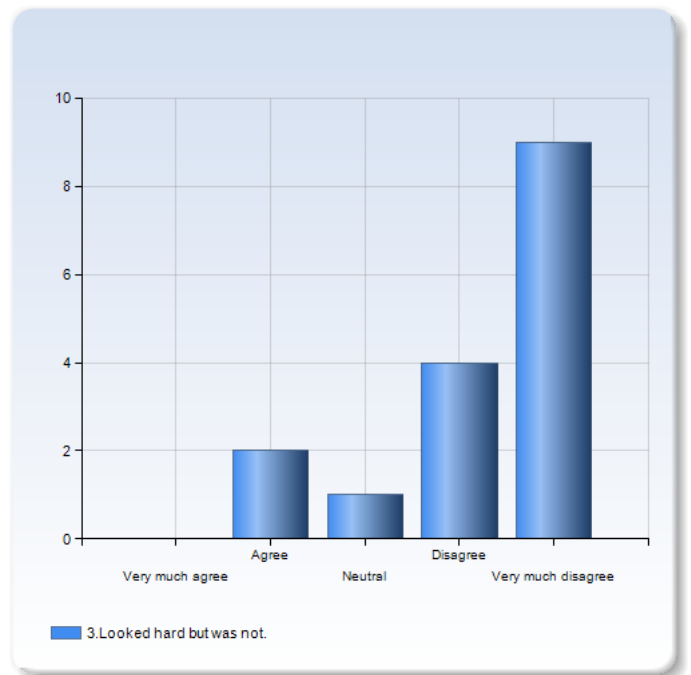
4. Was hard and required a lot of computations.

4. Was hard and required a lot of computations.	Number of Responses
Very much agree	2 (12.5%)
Agree	6 (37.5%)
Neutral	4 (25.0%)
Disagree	4 (25.0%)
Very much disagree	0 (0.0%)
Total	16 (100.0%)
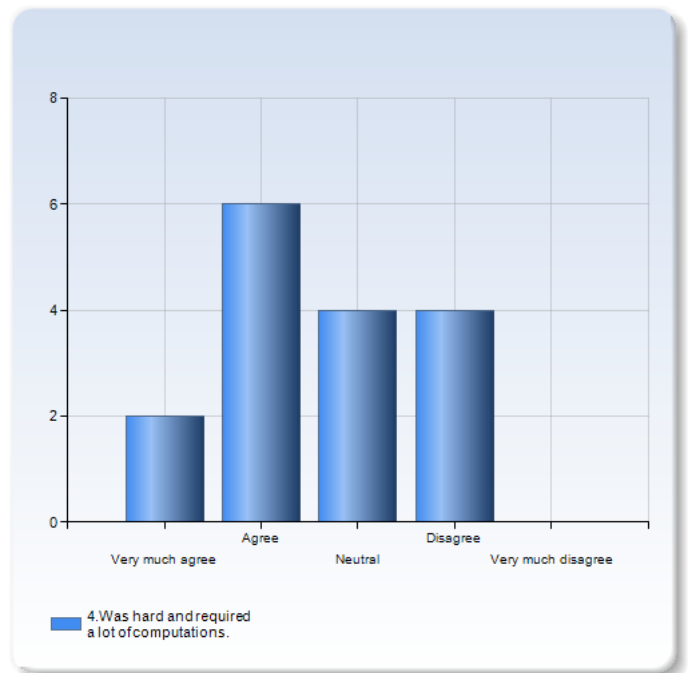
5. Was completely unreasonable considering the course.

5. Was completely unreasonable considering the course.	Number of Responses
Very much agree	7 (43.8%)
Agree	3 (18.8%)
Neutral	2 (12.5%)
Disagree	3 (18.8%)
Very much disagree	1 (6.3%)
Total	16 (100.0%)
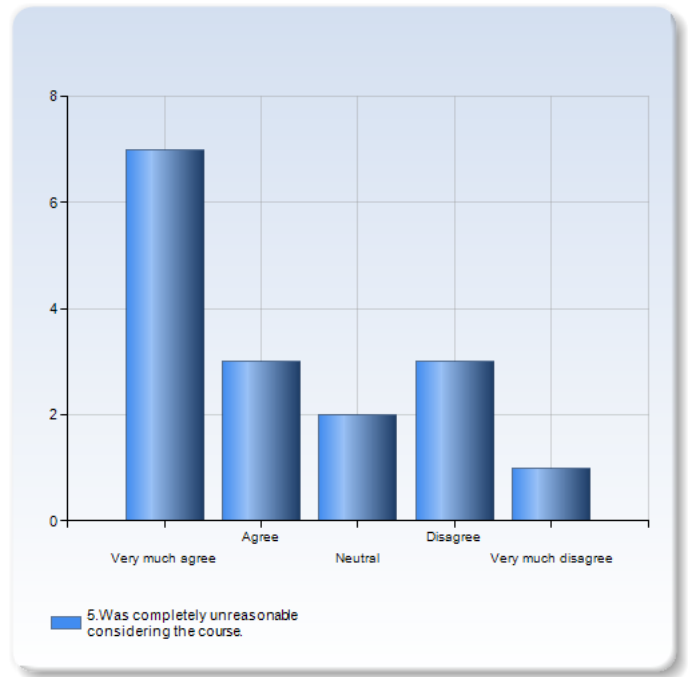
6. Others. Please write:

I understand it is good that the exam is different from other years. Actually the exam was interesting and challenging. I just think that it was too much. I couldn't even read one exercise (and I had to do part A...). I think it's good to do a difficult exam, and a long exam. But both hard and long, specially considering that the other years exams, the tutorials, everything was easy is not reasonable. If the exam had one less problem it would be difficult but reasonable. Or just improve the difficulty of the tutorials. I also have to say the corrections in the marks were like removing one of the problems so I'm happy with the course.

Problem 1

Question 1: Problem 1 tested basic probability required to compute a general MMSE estimator. *I found Problem 1 hard because...*

1. I did not find it hard.

1. I did not find it hard.	Number of Responses
Very much agree	0 (0.0%)
Agree	1 (4.0%)
Neutral	4 (16.0%)
Disagree	10 (40.0%)
Very much disagree	10 (40.0%)
Total	25 (100.0%)
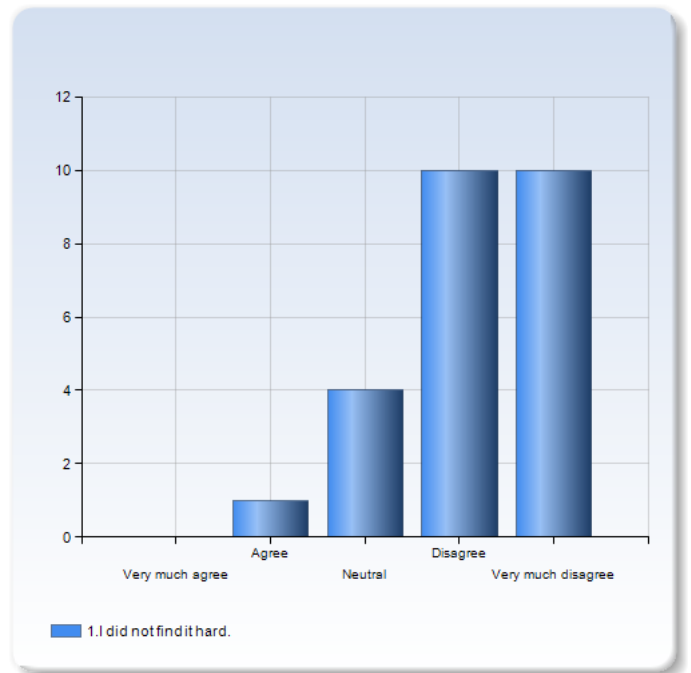
2. The instructions were not clear.

2. The instructions were not clear.	Number of Responses
Very much agree	3 (12.0%)
Agree	10 (40.0%)
Neutral	7 (28.0%)
Disagree	4 (16.0%)
Very much disagree	1 (4.0%)
Total	25 (100.0%)
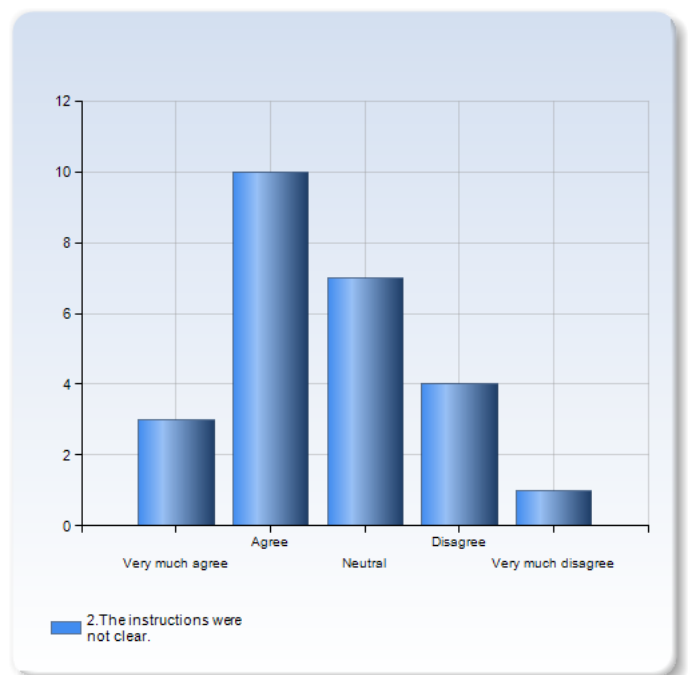
3. The notation was confusing.

3. The notation was confusing.	Number of Responses
Very much agree	2 (8.0%)
Agree	11 (44.0%)
Neutral	6 (24.0%)
Disagree	5 (20.0%)
Very much disagree	1 (4.0%)
Total	25 (100.0%)
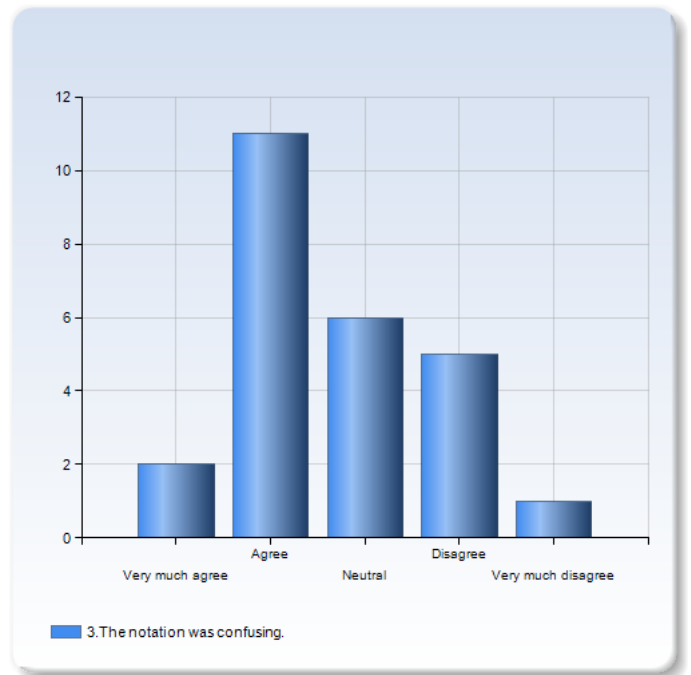
4. I had difficulties expressing mathematically what the exercise wanted me to compute.

4. I had difficulties expressing mathematically what the exercise wanted me to compute.	Number of Responses
Very much agree	4 (16.0%)
Agree	14 (56.0%)
Neutral	2 (8.0%)
Disagree	3 (12.0%)
Very much disagree	2 (8.0%)
Total	25 (100.0%)
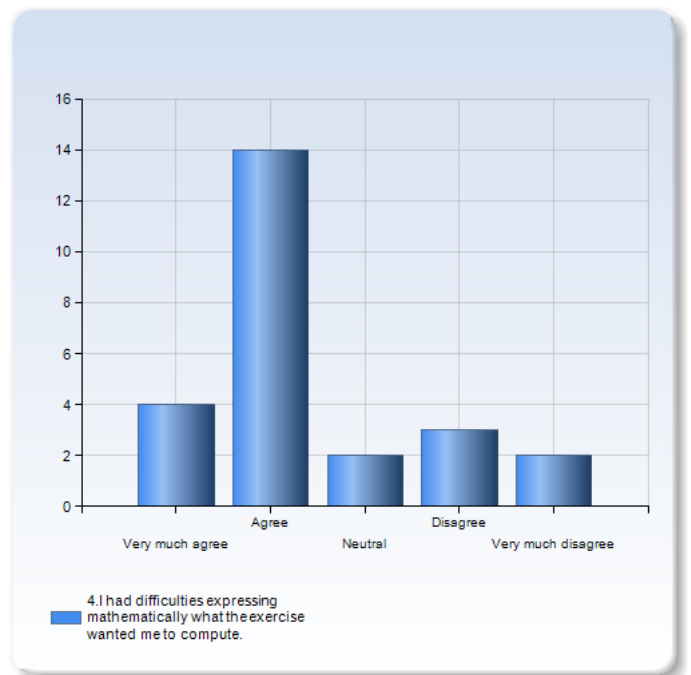
5. There is no exercise similar to it in the collection nor the previous exams.

5. There is no exercise similar to it in the collection nor the previous exams.	Number of Responses
Very much agree	10 (41.7%)
Agree	8 (33.3%)
Neutral	4 (16.7%)
Disagree	1 (4.2%)
Very much disagree	1 (4.2%)
Total	24 (100.0%)
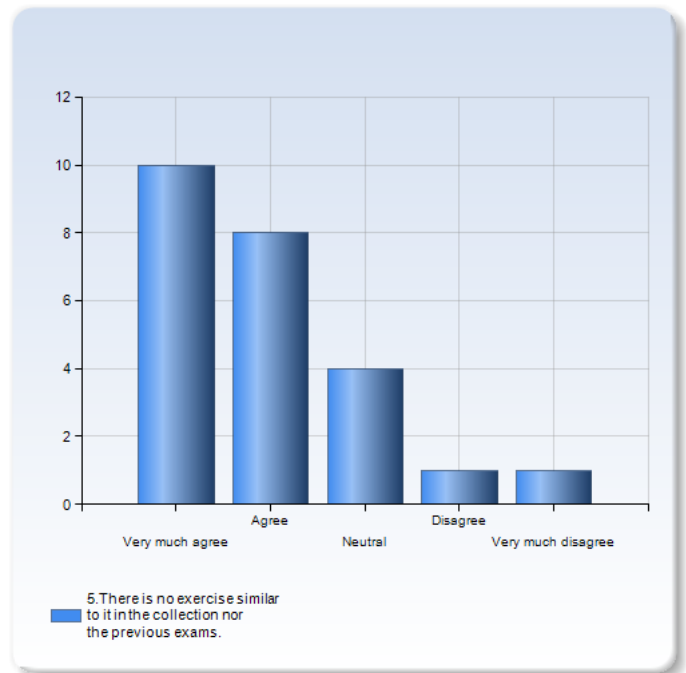
6. I do not understand the notion of conditional expectation (n)or conditional probability.

6. I do not understand the notion of conditional expectation (n)or conditional probability.	Number of Responses
Very much agree	1 (4.0%)
Agree	6 (24.0%)
Neutral	7 (28.0%)
Disagree	8 (32.0%)
Very much disagree	3 (12.0%)
Total	25 (100.0%)
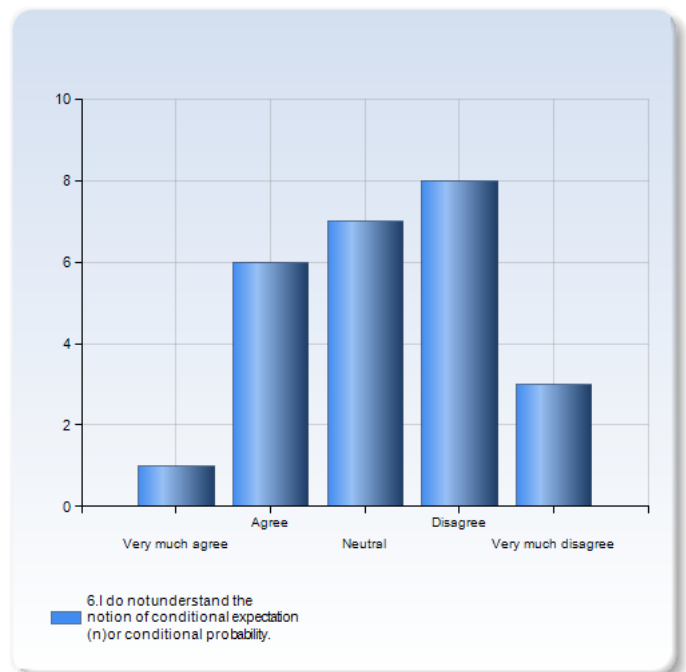
7. I did not attempt to solve it. Please write why:

7. I did not attempt to solve it. Please write why:	Number of Responses
Very much agree	2 (11.1%)
Agree	0 (0.0%)
Neutral	2 (11.1%)
Disagree	5 (27.8%)
Very much disagree	9 (50.0%)
Total	18 (100.0%)
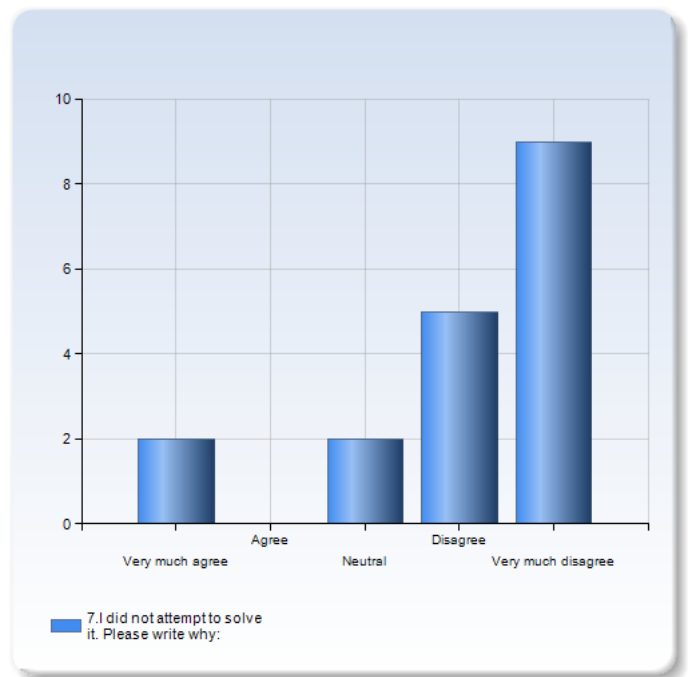
Comments
don't know how can I start
No similar exercice during tutorials
we are not familiar with Poisson distribution, neither the properties of it. Besides, I know every word in the questions, but don't really understand what it want us to do
It was difficult but good. The problem: I spent 2 hours to do it.
Would have been better if we solved few problems in poison distribution in the tutorials
This a nice problem for exam on EP2200 "Queuing Theory and Teletraffic Systems" course at KTH.
+ A lot of text, the problem could be expressed in a much concise way. It leads to unclarity and requres time to understand formulations and questions.

Problem 2

I found problem 2 hard because... **Select your level of agreement/disagreement with the following statements:**

1. I did not find it hard.

1. I did not find it hard.	Number of Responses
Very much agree	0 (0.0%)
Agree	5 (20.8%)
Neutral	9 (37.5%)
Disagree	7 (29.2%)
Very much disagree	3 (12.5%)
Total	24 (100.0%)
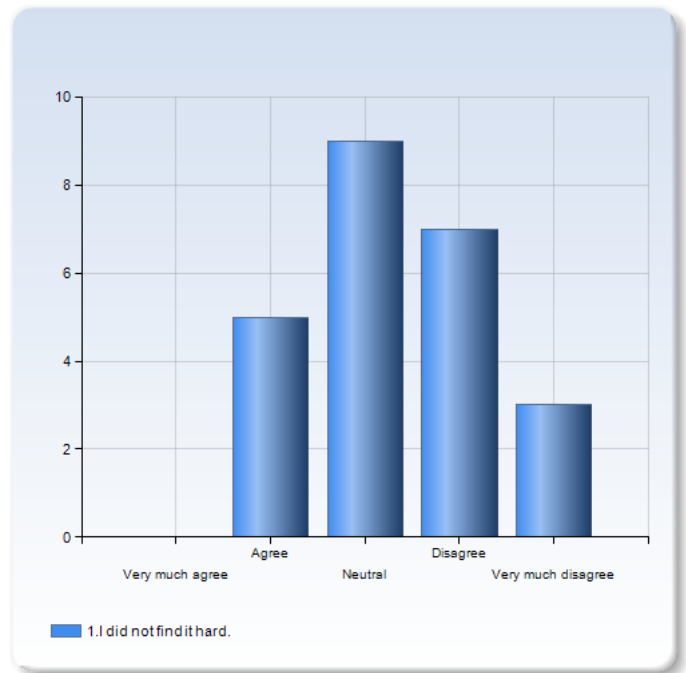
2. The instructions were not clear.

2. The instructions were not clear.	Number of Responses
Very much agree	0 (0.0%)
Agree	1 (4.8%)
Neutral	4 (19.0%)
Disagree	12 (57.1%)
Very much disagree	4 (19.0%)
Total	21 (100.0%)
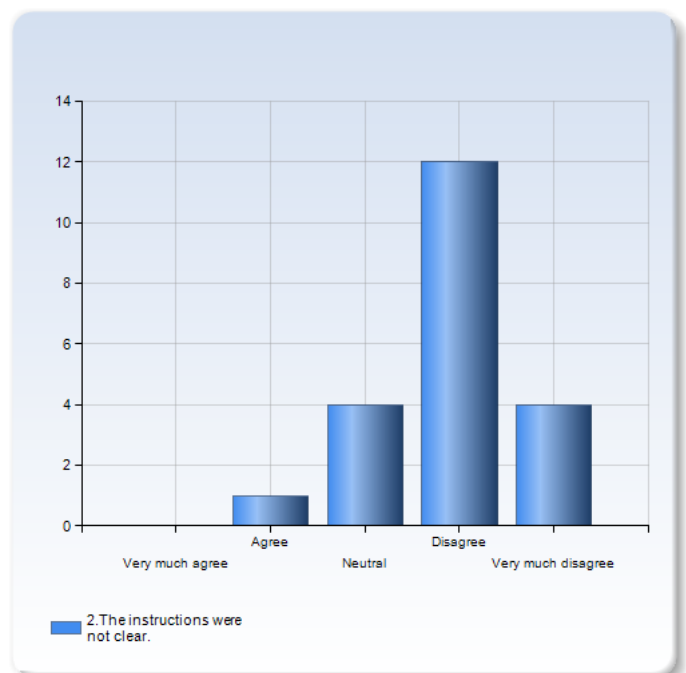
3. Working with the step function was not expected.

3. Working with the step function was not expected.	Number of Responses
Very much agree	1 (4.8%)
Agree	5 (23.8%)
Neutral	9 (42.9%)
Disagree	5 (23.8%)
Very much disagree	1 (4.8%)
Total	21 (100.0%)
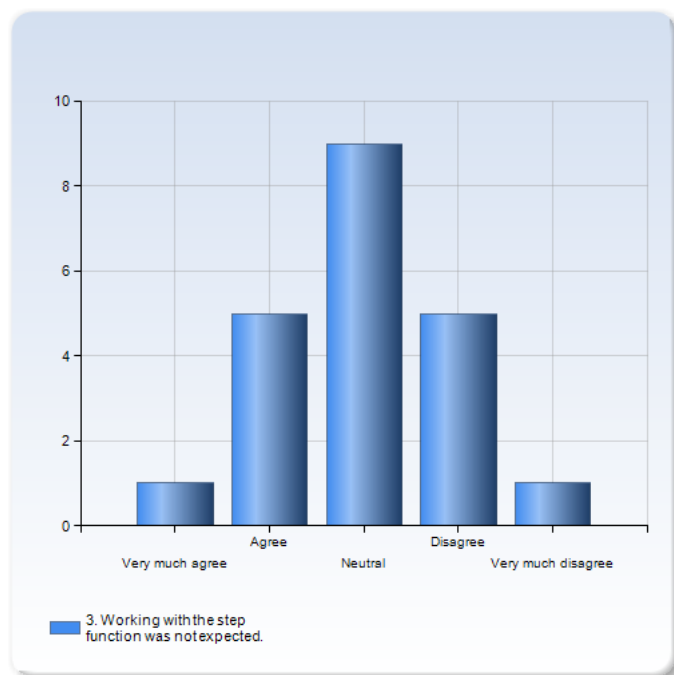
4. Applying Cauchy-Schwarz inequality was difficult.

4. Applying Cauchy-Schwarz inequality was difficult.	Number of Responses
Very much agree	4 (18.2%)
Agree	10 (45.5%)
Neutral	6 (27.3%)
Disagree	2 (9.1%)
Very much disagree	0 (0.0%)
Total	22 (100.0%)
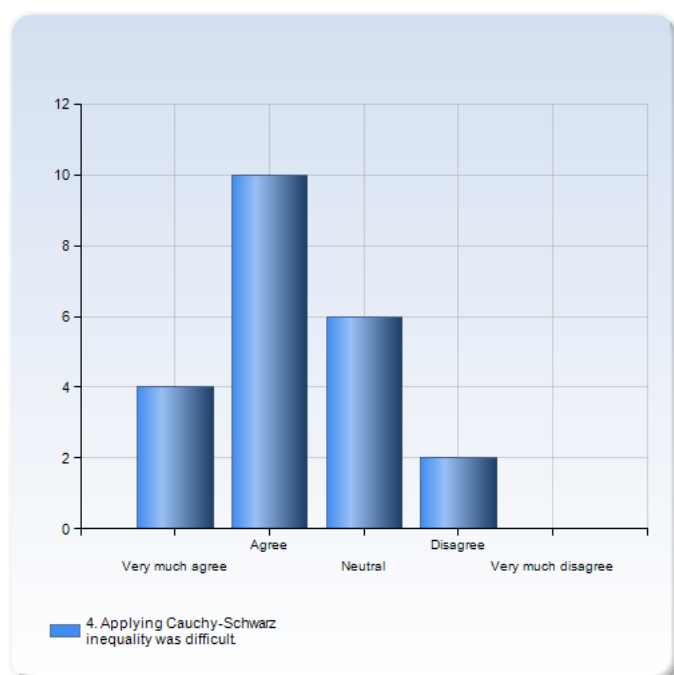
5. I did not know how to enforce the optimality conditions for the MMSE estimators.

5. I did not know how to enforce the optimality conditions for the MMSE estimators.	Number of Responses
Very much agree	1 (4.3%)
Agree	9 (39.1%)
Neutral	5 (21.7%)
Disagree	4 (17.4%)
Very much disagree	4 (17.4%)
Total	23 (100.0%)
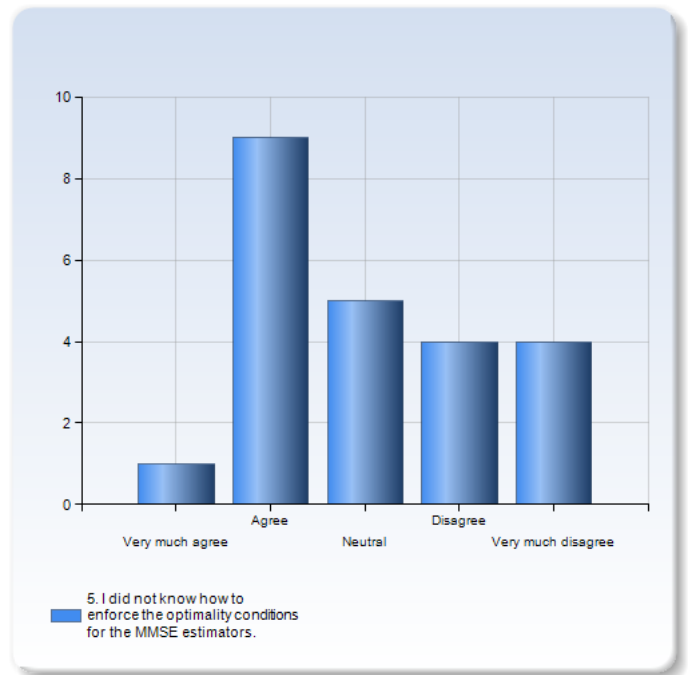
6. Others. Please write:

Joint WSS was not stressed during the course. Part (a) required a math savvy to understand how exactly to integrate the step function in such a simple task.

Problem 3

Problem 3 tested MMSE/Linear Prediction and AR processes. *I found Problem 3 hard because...*Select your level of agreement/disagreement with the following statements:

1. I did not find it hard.

1. I did not find it hard.	Number of Responses
Very much agree	0 (0.0%)
Agree	1 (4.2%)
Neutral	5 (20.8%)
Disagree	13 (54.2%)
Very much disagree	5 (20.8%)
Total	24 (100.0%)
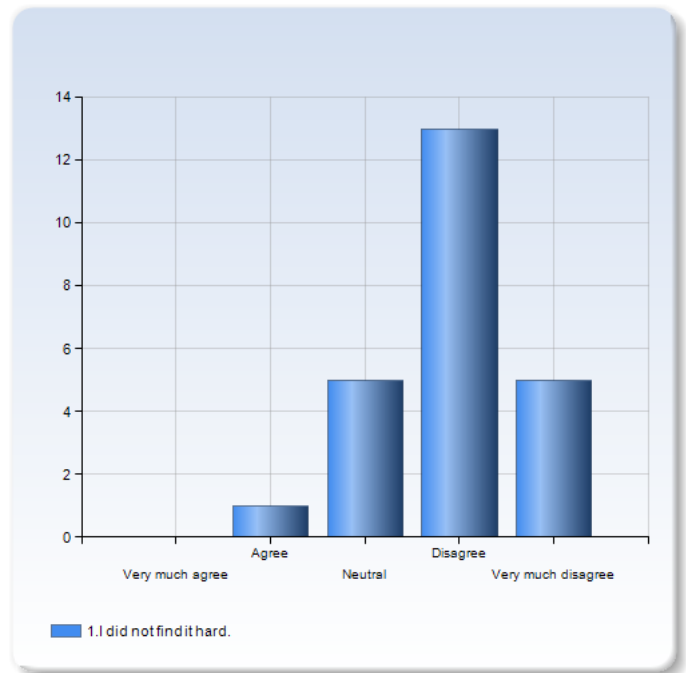
2. The instructions were not clear.

2. The instructions were not clear.	Number of Responses
Very much agree	1 (4.2%)
Agree	6 (25.0%)
Neutral	10 (41.7%)
Disagree	7 (29.2%)
Very much disagree	0 (0.0%)
Total	24 (100.0%)
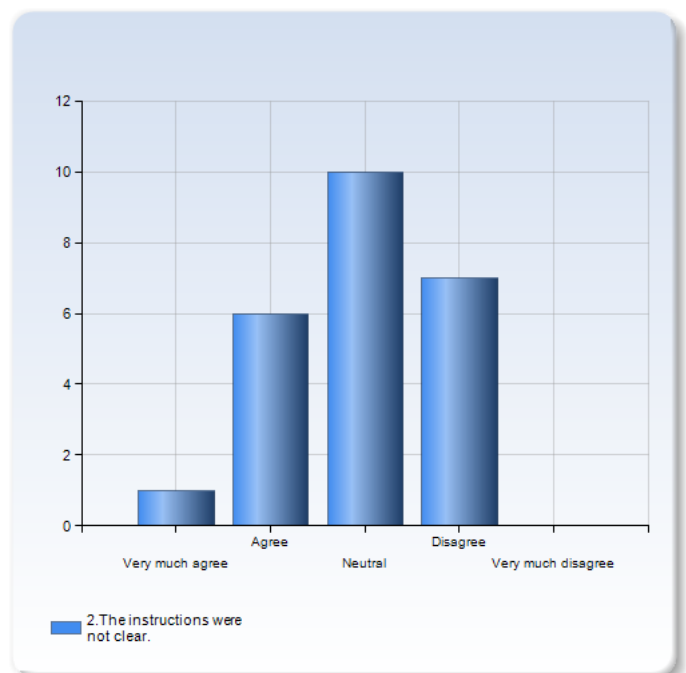
3. The definition y(n) = x(2n) confused me when attempting to solve the exercise.

3. The definition y(n) = x(2n) confused me when attempting to solve the exercise.	Number of Responses
Very much agree	3 (12.0%)
Agree	11 (44.0%)
Neutral	2 (8.0%)
Disagree	6 (24.0%)
Very much disagree	3 (12.0%)
Total	25 (100.0%)
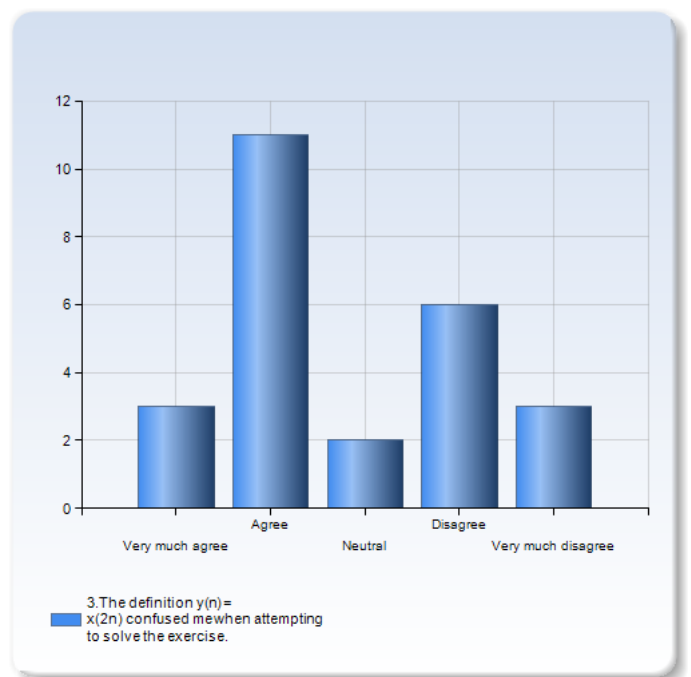
4. I did not study MMSE/Linear Prediction (n)or AR processes.

4. I did not study MMSE/Linear Prediction (n)or AR processes.	Number of Responses
Very much agree	0 (0.0%)
Agree	1 (4.3%)
Neutral	3 (13.0%)
Disagree	11 (47.8%)
Very much disagree	8 (34.8%)
Total	23 (100.0%)
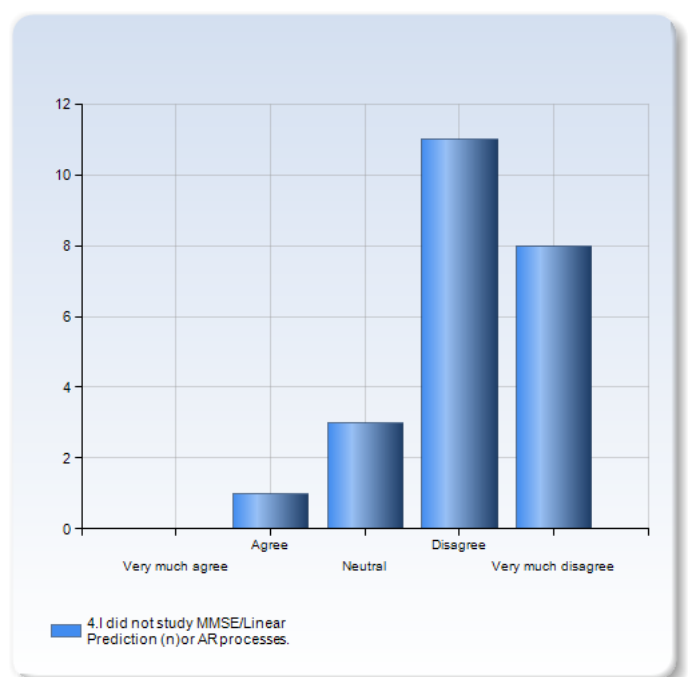
5. I was unaware I could use formulas from the course book.

5. I was unaware I could use formulas from the course book.	Number of Responses
Very much agree	1 (4.3%)
Agree	4 (17.4%)
Neutral	3 (13.0%)
Disagree	8 (34.8%)
Very much disagree	7 (30.4%)
Total	23 (100.0%)
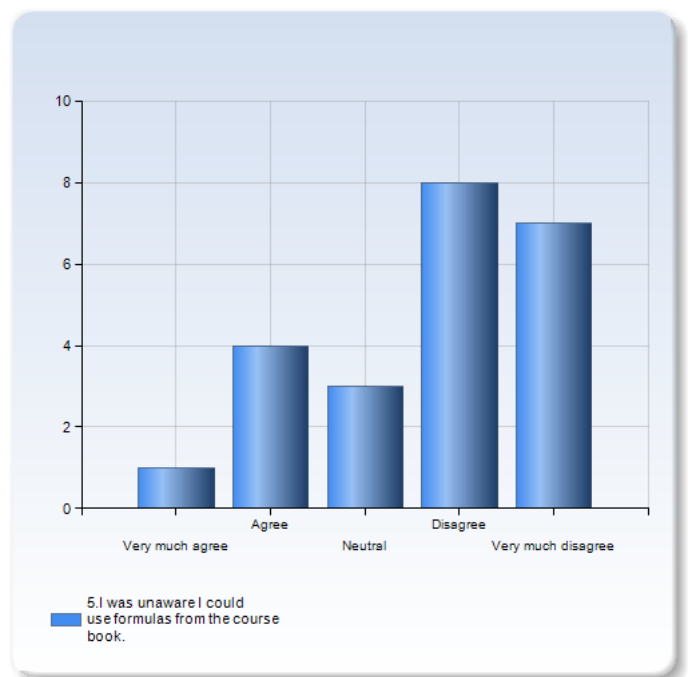
6. I am not familiar with poles and zeros.

6. I am not familiar with poles and zeros.	Number of Responses
Very much agree	3 (12.5%)
Agree	4 (16.7%)
Neutral	7 (29.2%)
Disagree	9 (37.5%)
Very much disagree	1 (4.2%)
Total	24 (100.0%)
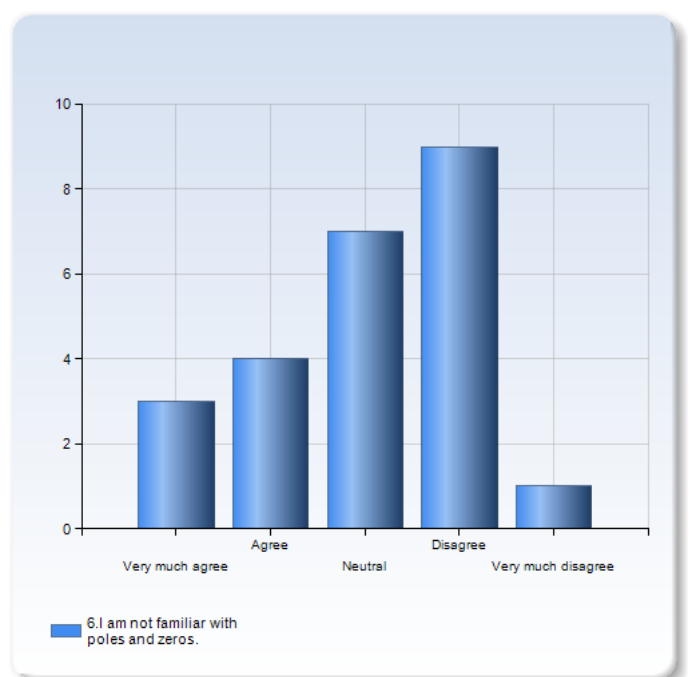
7. I did not attempt to solve it. Please write why:

| 7. I did not attempt to solve it. Please write why:	Number of Responses
Very much agree	0 (0.0%)
Agree	0 (0.0%)
Neutral	1 (7.1%)
Disagree	6 (42.9%)
Very much disagree	7 (50.0%)
Total	14 (100.0%)
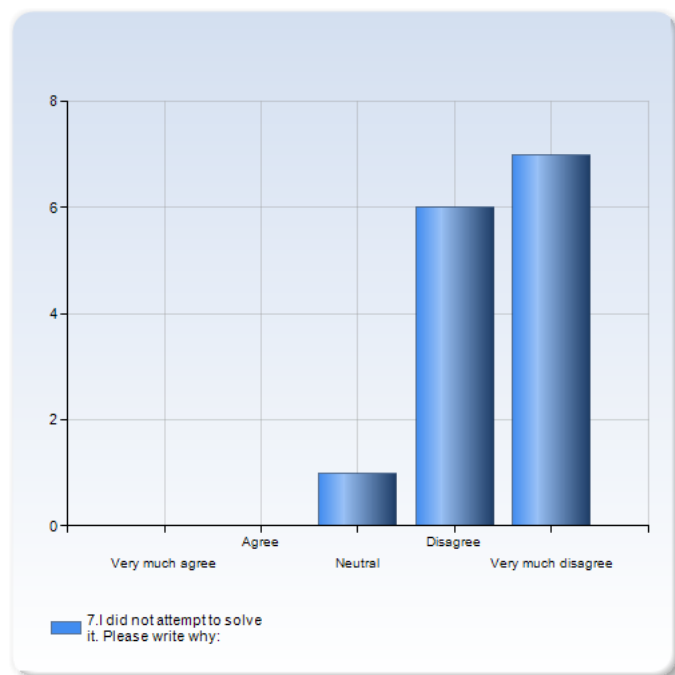
8. Others. Please write:

Got confused with the notations.

Problem 4

Question 1: Answer only if you did NOT attempt to solve Problem 4. *I did not attempt to solve problem 4 because...* **Select your level of agreement/disagreement with the following statements:**
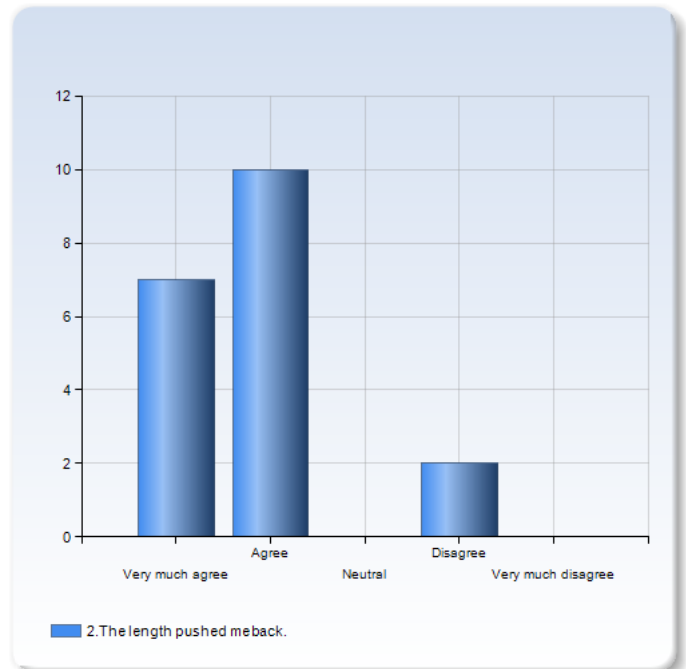
1. Lack of time.

1. Lack of time.	Number of Responses
Very much agree	7 (38.9%)
Agree	6 (33.3%)
Neutral	2 (11.1%)
Disagree	3 (16.7%)
Very much disagree	0 (0.0%)
Total	18 (100.0%)
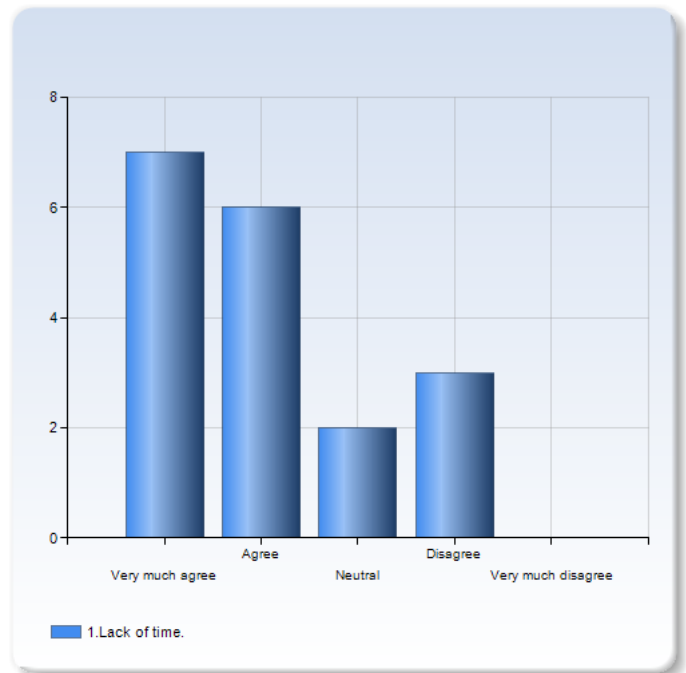
2. The length pushed me back.

2. The length pushed me back.	Number of Responses
Very much agree	7 (36.8%)
Agree	10 (52.6%)
Neutral	0 (0.0%)
Disagree	2 (10.5%)
Very much disagree	0 (0.0%)
Total	19 (100.0%)

3. It looked too non-standard.

3. It looked too non-standard.	Number of Responses
Very much agree	9 (52.9%)
Agree	5 (29.4%)
Neutral	1 (5.9%)
Disagree	1 (5.9%)
Very much disagree	1 (5.9%)
Total	17 (100.0%)
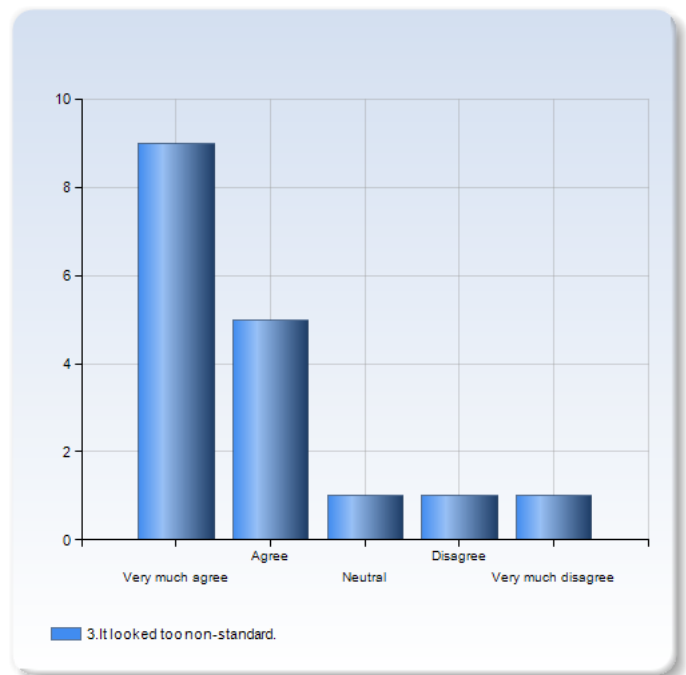
4. The fact that it did not sound familiar when I read it made me assume I would not manage to solve it.

4. The fact that it did not sound familiar when I read it made me assume I would not manage to solve it.	Number of Responses
Very much agree	5 (27.8%)
Agree	8 (44.4%)
Neutral	1 (5.6%)
Disagree	2 (11.1%)
Very much disagree	2 (11.1%)
Total	18 (100.0%)
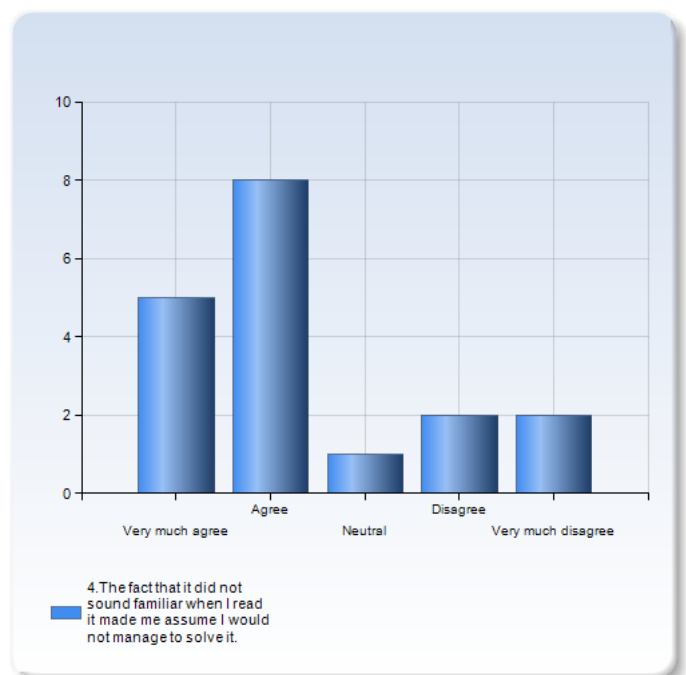
5. Others. Please write:

I was stuck solving the first three exercises that did not have enough time to even read this one

This one is so difficult to understand what we really need to do, we cannot connect this questions with the concepts in the lecture.

Problem 4

Question 2: Answer only if you ATTEMPTED to solve Problem 4. *I found Problem 4 hard because...* Select your level of agreement/disagreement with the following statements:
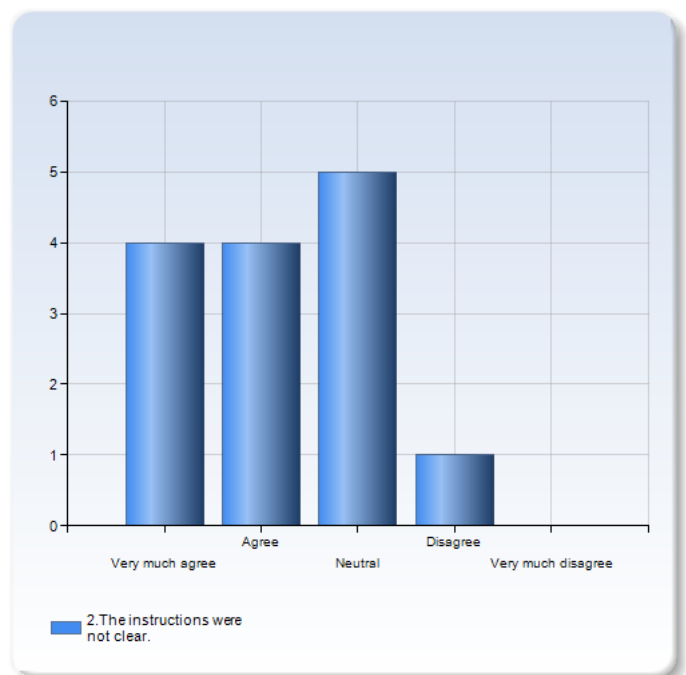
1. I did not find it hard.

1. I did not find it hard.	Number of Responses
Very much agree	0 (0.0%)
Agree	0 (0.0%)
Neutral	1 (7.1%)
Disagree	4 (28.6%)
Very much disagree	9 (64.3%)
Total	14 (100.0%)
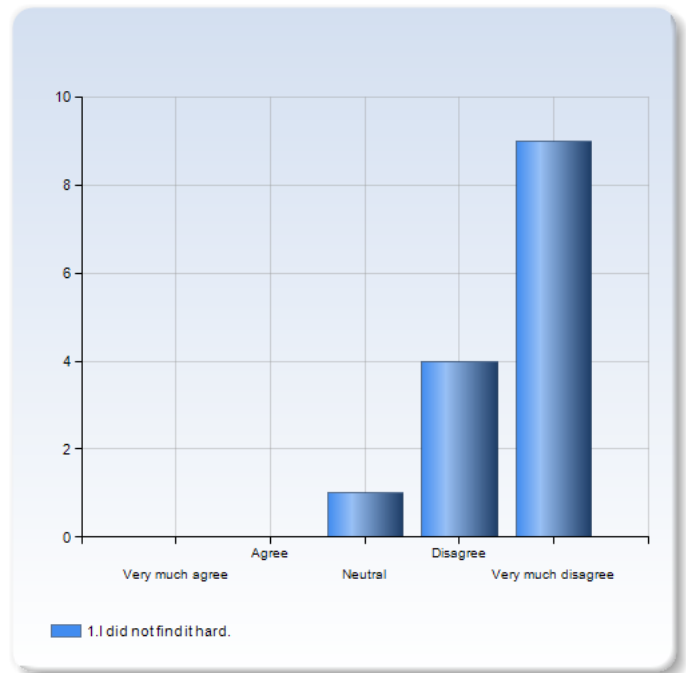
2. The instructions were not clear.

2. The instructions were not clear.	Number of Responses
Very much agree	4 (28.6%)
Agree	4 (28.6%)
Neutral	5 (35.7%)
Disagree	1 (7.1%)
Very much disagree	0 (0.0%)
Total	14 (100.0%)

3. The notation was confusing.

| 3. The notation was confusing.	Number of Responses
Very much agree	4 (28.6%)
Agree	7 (50.0%)
Neutral	3 (21.4%)
Disagree	0 (0.0%)
Very much disagree	0 (0.0%)
Total	14 (100.0%)
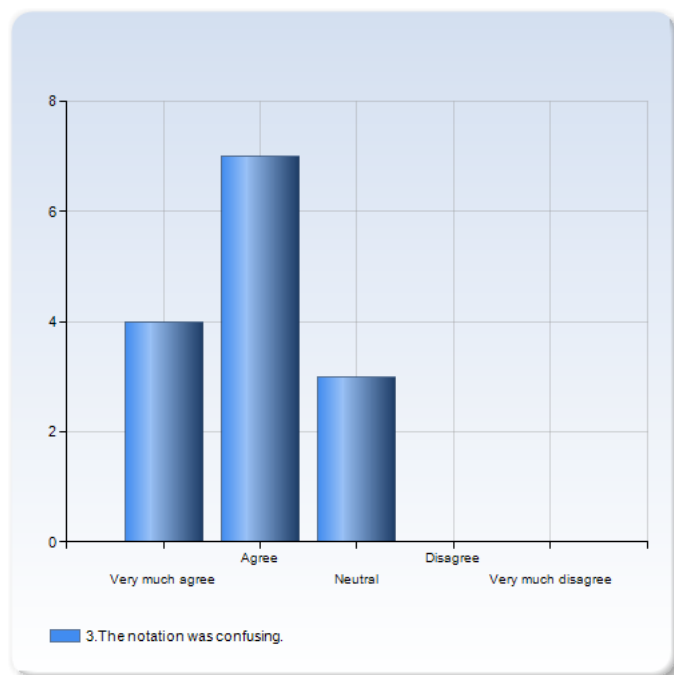
4. I did not understand relevant terms used in the exercise.

| 4. I did not understand relevant terms used in the exercise.	Number of Responses
Very much agree	2 (15.4%)
Agree	7 (53.8%)
Neutral	4 (30.8%)
Disagree	0 (0.0%)
Very much disagree	0 (0.0%)
Total	13 (100.0%)
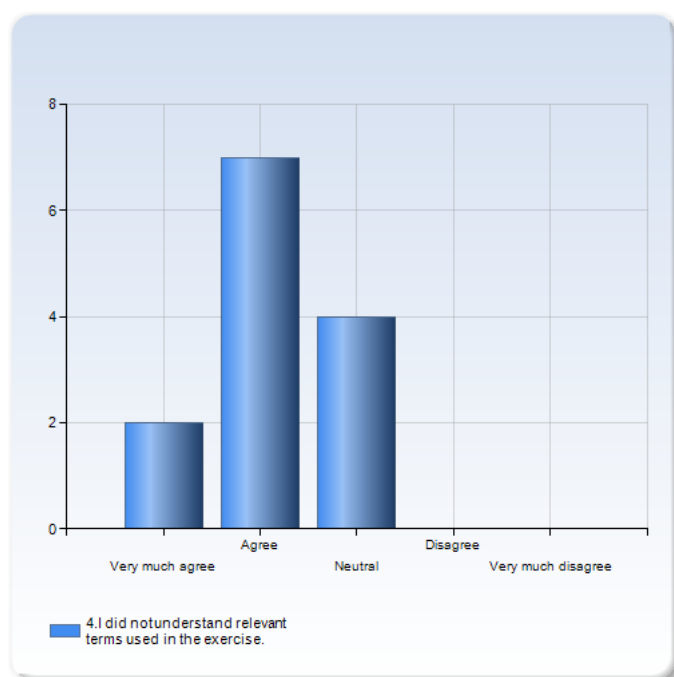
5. I did not recall some of the following notions: power, correlation and periodogram.

| 5. I did not recall some of the following notions: power, correlation and periodogram.	Number of Responses
Very much agree	1 (7.7%)
Agree	0 (0.0%)
Neutral	5 (38.5%)
Disagree	6 (46.2%)
Very much disagree	1 (7.7%)
Total	13 (100.0%)
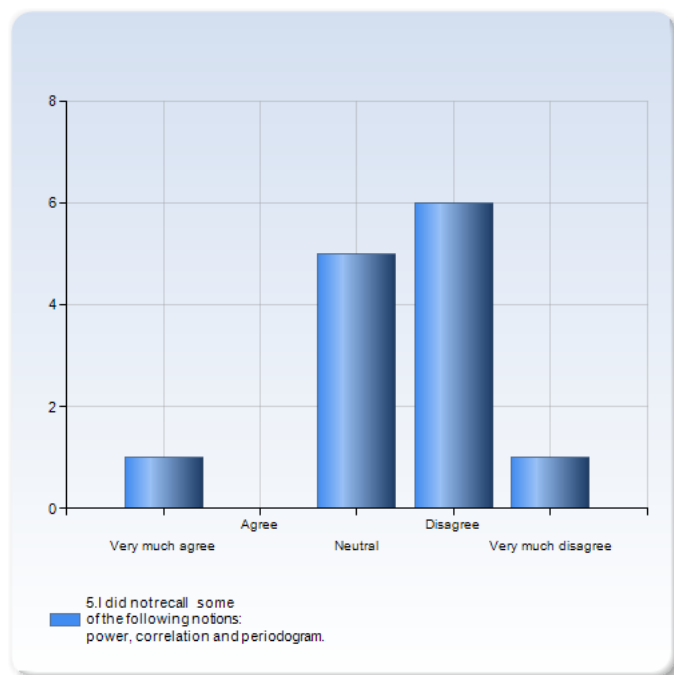
6. I was intimidated by the notion of deriving a new estimator.

6. I was intimidated by the notion of deriving a new estimator.	Number of Responses
Very much agree	1 (7.7%)
Agree	5 (38.5%)
Neutral	3 (23.1%)
Disagree	3 (23.1%)
Very much disagree	1 (7.7%)
Total	13 (100.0%)
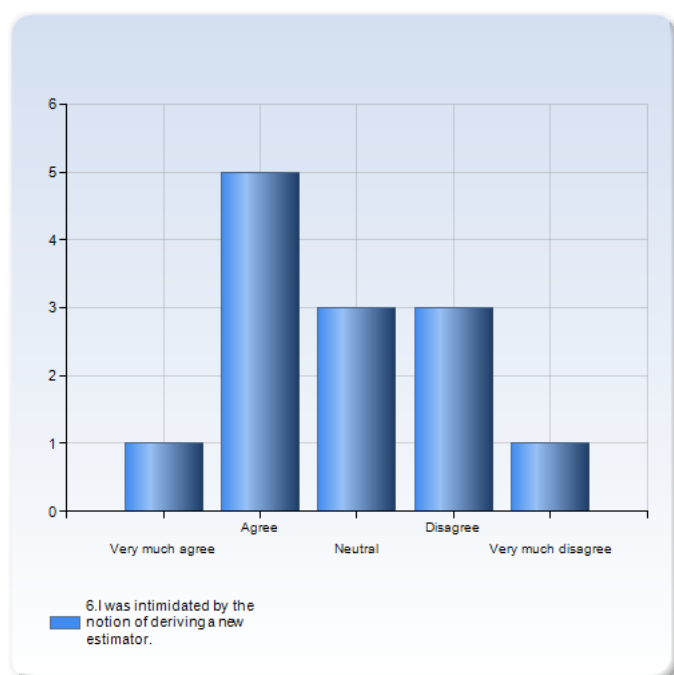
7. After failing with the first section(s) I gave up.

| 7. After failing with the first section(s) I gave up.	Number of Responses
Very much agree	4 (30.8%)
Agree	3 (23.1%)
Neutral	3 (23.1%)
Disagree	2 (15.4%)
Very much disagree	1 (7.7%)
Total	13 (100.0%)
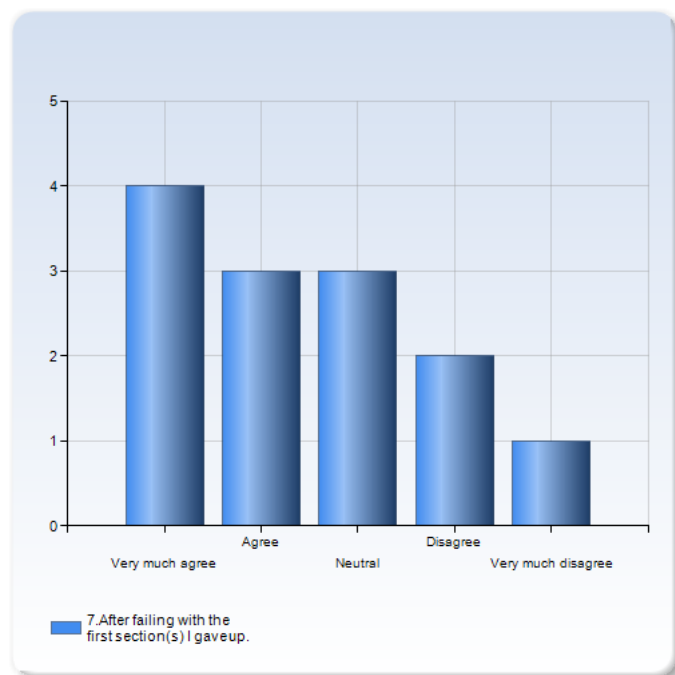
8. Others. Please write:

Difficult to solve, since never solved any questions in this method

Problem 5

I found Problem 5 hard because... **Select your level of agreement/disagreement with the following statements:**
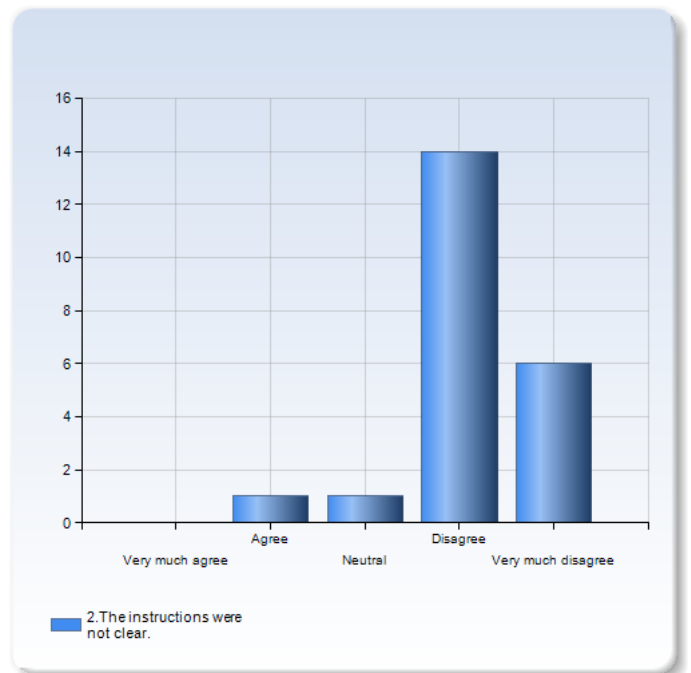
1. I did not find it hard.

1. I did not find it hard.	Number of Responses
Very much agree	4 (16.0%)
Agree	7 (28.0%)
Neutral	11 (44.0%)
Disagree	2 (8.0%)
Very much disagree	1 (4.0%)
Total	25 (100.0%)
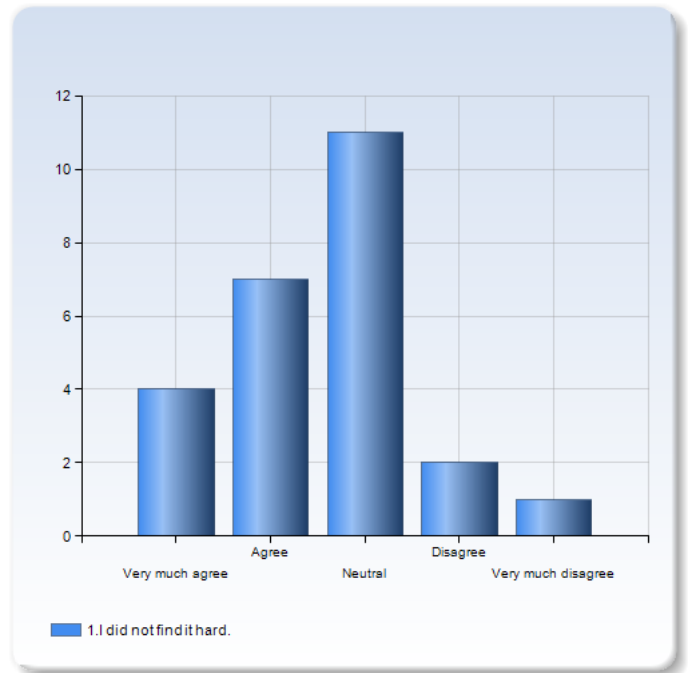
2. The instructions were not clear.

| 2. The instructions were not clear.	Number of Responses
Very much agree	0 (0.0%)
Agree	1 (4.5%)
Neutral	1 (4.5%)
Disagree	14 (63.6%)
Very much disagree	6 (27.3%)
Total	22 (100.0%)

3. I did not check previous years' exams.

3. I did not check previous years' exams.	Number of Responses
Very much agree	0 (0.0%)
Agree	2 (9.1%)
Neutral	3 (13.6%)
Disagree	11 (50.0%)
Very much disagree	6 (27.3%)
Total	22 (100.0%)
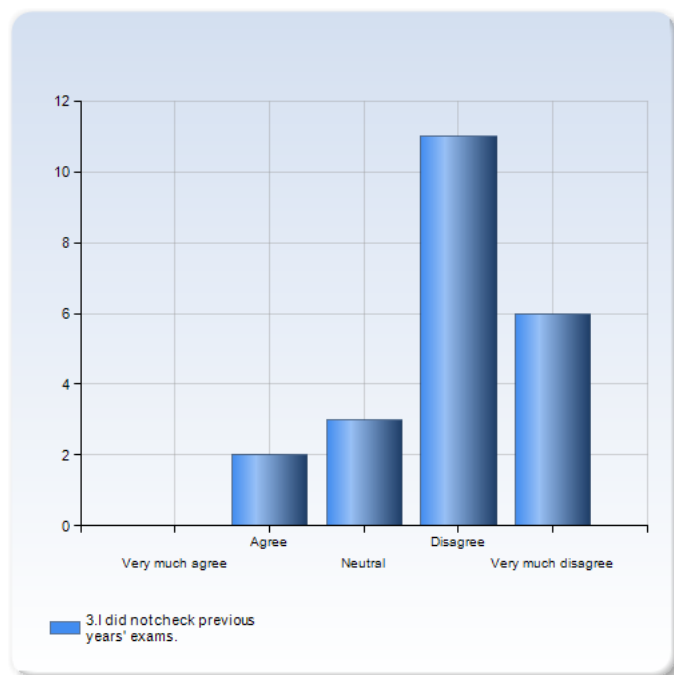
## 4. The addition of noise made deriving the output difficult.

4. The addition of noise made deriving the output difficult.	Number of Responses
Very much agree	0 (0.0%)
Agree	6 (27.3%)
Neutral	5 (22.7%)
Disagree	6 (27.3%)
Very much disagree	5 (22.7%)
Total	22 (100.0%)
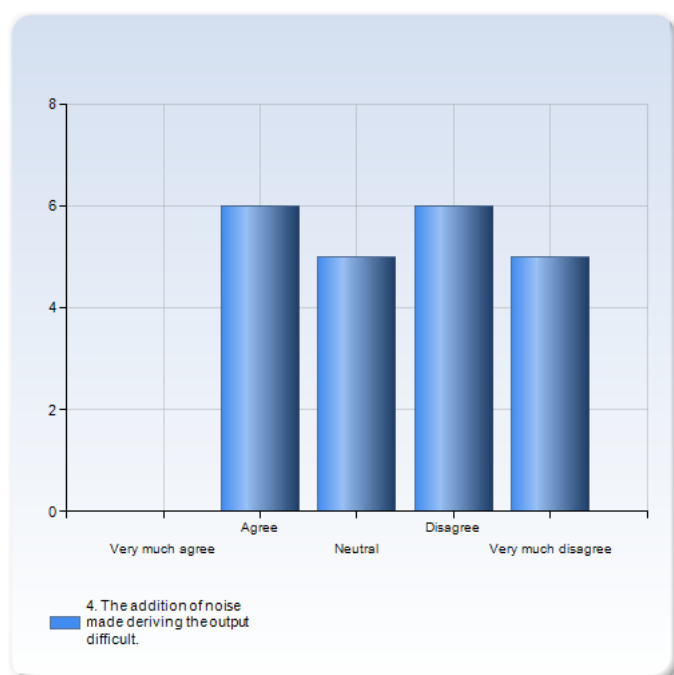
5. We have not done enough similar exercises in the tutorial sessions.

5. We have not done enough similar exercises in the tutorial sessions.	Number of Responses
Very much agree	2 (8.7%)
Agree	3 (13.0%)
Neutral	4 (17.4%)
Disagree	7 (30.4%)
Very much disagree	7 (30.4%)
Total	23 (100.0%)
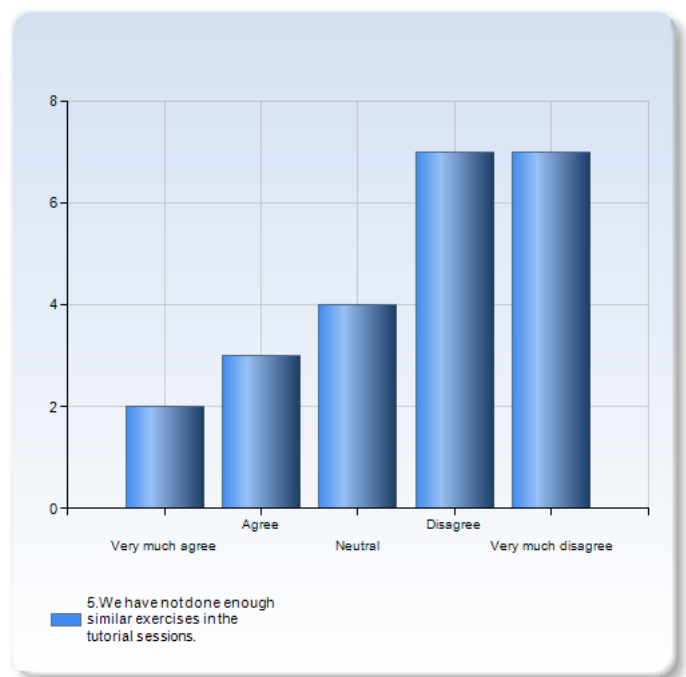
6. Others. Please write:

I was stuck solving the first three exercises that did not have enough time to even read this one

I solve the problems with the order I meet them, so when I did this problem I have already decided to take the re-exam, also I don't have enough time for it. Besides, I'm really not in the mood to do it when I'm not sure about all the problems before.According to old exams, Sampling is the last and most difficult one, but for this year, it's the easiest one, though I did it wrong, but if I have enough time I am able to solve it.

The problem 5 was similar to what we did study during the course. That is why, to my knowledge, students were more or less successful with it.

Overall, this edition of exam could be much useful and fruitful in a form of a home exam, where a student have enough time to think about the problems in calm non-stressful environment; propose its own creative solution, and to present and discuss it with the teacher who would give a short feedback. Btw, such a form is used for example in Stanford in some mathematical courses.

Part A in a form of yes/no answers does not work, because some formulations look odd, unclear and even contradicting. Or a student should give a full short written answer to see his or her reasoning and therefore to introduce more flexible grading, or absolutely another design of this part should be developed. Moreover, in certain academical communities this testing approach is proved as a bad practice.