Research Skills: homework & exercises

This document details all of the homework and exercises associated with each of the lectures. Check the course website for resources. Refer also to the course website for the dates of lectures, which are used a deadlines for the various exercises.

http://www.cl.cam.ac.uk/teaching/1011/C00/

Lecture 1: introduction to the course *and* how to read a paper

Homework

Read *Writing for Computer Science* chapter 10 "Doing Research".

Exercise 1

Deadline: the day of lecture 3.

Contribution to final grade: 5%.

[WfCS exercise 1] Read the academic paper "Extracting the essence from sets of images". This will be handed out in Lecture 1 and is available on the course website so that you can view the images at higher resolution.

Write a brief answer to each of the following questions.

a) What are the researchers trying to find out?

b) Why is the research important?

c) What things were measured?

d) What were the results?

e) What do the authors conclude and to what factors do they attribute the findings?

f) Can you accept the findings as true? Discuss any failings or shortcomings of the methods used to support the findings.

I am looking for short, factual answers to the questions. Two to four sentences should be sufficient answer for each of questions (a) to (e). Your answer to question (f) may need to be a little longer. Your whole submission should be no more than one side of A4 paper, in total.

The exercise should take three hours: reading the paper, making notes, drafting your answers, checking back to the paper, refining your answers.

Submit your page of answers to Student Administration by 4 p.m. on the day of Lecture 3.

Lecture 2: how to review a paper *and* the research process

Homework

Read *Writing for Computer Science* chapter 12 "Refereeing".

Exercise 2

Deadline: the day of lecture 5.

Contribution to final grade: 10%.

Use the same academic paper as for Exercise 1. Conduct a review in two parts. The first is **filling out the review form available from the course website**. The second part is up to one side of A4 containing free-form text with the following sections:

Summary: Please summarize the paper in 2-4 sentences and state what you consider to be the contributions of this paper to the field.

Major comments: Discuss the author's assumptions, technical approach, analysis, results, conclusions, reference, etc. Be constructive, if possible, by suggesting improvements.

Minor comments: This section contains comments on style, figures, grammar, typos, etc.

This exercise should take an hour if you made good notes for Exercise 1; it will take three hours if you need to re-read the paper.

Submit the completed review form (the first part) and the free-form text (the second part).

Lecture 3: writing—who are you writing for *and* style issues

Homework

Read *Writing for Computer Science* chapters 2 "Good style" and 3 "Style specifics".

Exercise 3

Deadline: the day of lecture 7.

Contribution to final grade: 10%.

[WfCS exercise 9] Download one of the papers listed on the course website. Summarise it in 300 words.

Your aim here is to summarise the paper, not to review it. Marks will be awarded for the quality of the summarisation (how well it represents the paper) and the quality of the writing (how well it reads). This is therefore a test both of your ability to understand someone's writing and of your own ability to write.

This should take the average student about four hours. One to two hours to read the paper. Two to three hours to draft, check, edit, and polish the summary.

Submit your summary.

Lecture 4: writing—writing the first draft *and* structuring a paper

Homework

Read *Writing for Computer Science* chapter 9 "Writing up".

Exercise 4

Deadline: the day of lecture 9.

Contribution to final grade: 5%.

Write a new 300 word piece on ***one*** of the following:

1. An article for a University magazine explaining why you chose to apply for the MPhil in Advanced Computer Science and what you hope to get out of it.
2. A proposal to a University's Applications Committee explaining what you intend to do for your PhD.
3. A description of a major project that you undertook during your previous degree.

This should take up to three hours.

Submit your 300-word piece. It will be assessed on the quality of the writing.

Lecture 5: writing—editing *and* where to publish papers

Homework

Read *Writing for Computer Science* chapter 8 "Editing".

Exercise 5

Deadline: the day of lecture 11.

Contribution to final grade: 10%.

[WfCS exercise 10] You will be given a 300-word article in lectures. Iteratively reduce the article by 30 words. Iterate seven times, producing seven new versions of the article of length 270, 240, 210, 180, 150, 120, and 90 words. In each case the word count should be within ±7 of the target. Your aim, at each step, is to preserve the information content of the piece but not necessarily the original wording. It is common for the piece to improve in the early iterations and then to become more cryptic and incomplete in the later iterations.

This should take up to three hours.

Submit all eight versions of the 300-word article with word counts. Remember to include the original article as the first of the eight, so that the marker can see where you started.

Also **submit** your assessment of which version is best and which is worst. You will receive credit for the seven edited versions and, additionally, the version that you identify as "best" will be marked for the quality of the writing.

Lecture 6: further writing

This lecture is under construction.

Exercise 6

Deadline: the day of lecture 13.

Contribution to final grade: 10%.

[WfCS exercise 12] You will be given ***two*** short pieces, written by other people. Revise each of these two pieces to improve the writing style—that is, edit for spelling, grammar, punctuation, flow, expression, clarity, and so on. Mark the changes on a paper copy, then type up the result. This should take up to two hours per piece.

You will be assessed on how well you improved the originals in terms of style, but not in terms of factual content.

Submit your revised versions and your marked-up originals. Keep a *photocopy* of the marked-up versions for yourself in order that you have your own record.

Lecture 7: guest lecture: how to write a good research paper (Simon Peyton Jones)

Homework

Browse the online resources on writing available from the course webpage.

Exercise

There is no exercise associated with this lecture.

Lectures 8–10: experiment design & statistical analysis (Peter Robinson)

Homework

Read *Writing for Computer Science* chapter 11 "Experiments" and the notes provided by the lecturer.

Exercise 7

Deadline: the Monday *after* lecture 16.

Contribution to final grade: 20%.

Download the exercise from the website. **Submit** the information requested in the exercise. Further details will be made available on the website.

Lectures 11 & 12: graphs, figures, tables, maths & algorithms

Homework

Read *Writing for Computer Science* chapters 6 "Graphs, Figures & Tables", 5 "Mathematics" and 7 "Algorithms".

Exercise 8

Deadline: the day of lecture 15.

Contribution to final grade: 10%.

Download the four data sets from the course website. Present each of the datasets in a way that best communicates useful information. Further details will be made available on the website. This should take up to three hours, including familiarising yourself with the tools.

Lectures 13–16: how to give a presentation & presentation style

Homework

Read *Writing for Computer Science* chapter 14 "Giving Presentations". Browse the online resources on presentations available from the course webpage.

Exercise 9

Deadline: the day of your presentation.

Contribution to final grade: 20%.

MPhil students: in May, you will give a presentation on your Research Project or Research Essay.

PhD students: in the Summer, you will give a presentation on your PhD first year report and PhD proposal.

Your presentation will have two purposes: to allow the Laboratory to hear about your progress and to assess how well you are able to present. The first of these attracts no marks and is for your benefit. The second of these attracts marks and you will be marked for the quality of the presentation. Your presentation should be prepared so as to be comprehensible to an intelligent computer scientist who is *not* familiar with the field of your research.

You are required to prepare and rehearse your presentation at least one week before you give it. The rehearsal should be to your project/essay/PhD supervisor and, where appropriate, to other members of the class or your research group. You should listen carefully to any feedback given at the rehearsal and revise your presentation accordingly.

In addition to giving your own paper, you will be asked to attend and assess the formal presentations of a small number of your classmates. Your attendance and the submission of your assessments will count a small proportion of your total mark.

Submit any slides and any script that you use. **Submit** your assessment of the other presentations.

Lecture number	Topic	Contact Hours	Reading (homework)	Reading Hours
1	introduction to the course and how to read a paper	1	Ch 10	1
2	how to review a paper and the research process	1	Ch 12	1
3	who are you writing for and style issues	1	Ch 2 and 3	2
4	writing the first draft and structuring a paper	1	Ch 9	1
5	editing and where to publish papers	1	Ch 8	1
6	further writing	1		0
7	guest lecture	1	online resources	1
8	experiment design	1	Ch 11	1
9	statistical analysis 1	1	lecture notes	2
10	statistical analysis 2	1	lecture notes	2
11	graphs, figures, tables, maths & algorithms 1	1	Ch 6	1
12	graphs, figures, tables, maths & algorithms 2	1	Ch 5,7	2
13	how to give a presentation	1	Ch 14	1
14	*free slot*	0		0
15	presentation style	1	online resources	1
16	example preseentations	1		0
		15		17

Exercise number	Exercise	Exercise Hours	Mark Value	Deadline
1	Read and answer questions	3	5	18-Oct
2	Referee a paper	3	10	25-Oct
3	Summarise a paper	4	10	01-Nov
4	Write a piece	3	5	08-Nov
5	Iteratively edit a piece	3	10	15-Nov
6	Edit two other contributions	4	10	22-Nov
7	Experiment and analyse	12	20	**06-Dec**
8	Graph data sets	3	10	29-Nov
9	Give presentation	13	20	**11-May** (exercise 9 may be due later for PhD students)
		48		
	Total hours & marks	80 hours	100 marks	