Oxford University Department of Computer Science

Undergraduate Supervisory Committee

Examination Conventions: Finals, Parts A and B, 2016

This document establishes the examining conventions to be used in the following public examinations:

Final Honour School of Computer Science, Parts A and B

Final Honour School of Mathematics and Computer Science, Parts A and B

It also establishes the conventions to be used in those parts of the following public examinations that fall under the responsibility of the Examiners in Computer Science:

Final Honour School of Mathematics

Nothing contained in this document supersedes the University's regulations and policy set out in the current *Examination Regulations* and the *Notes for the Guidance of Examiners and Chairmen of Examiners* and the *Notes of Guidance on Examinations and Assessment.*

The Undergraduate Supervisory Committee of the Department of Computer Science directs that examinations for which it is responsible are conducted in accordance with these conventions. The Board of Examiners may make minor deviations from these conventions in exceptional circumstances, ideally after reference to the Undergraduate Supervisory Committee or to the Proctors.

1 Documentation

Examiners will have access to the following documents. The Chairman of Examiners will ensure that, where appropriate, External Examiners have access to these documents.

1. The current *Examination Regulations* (Grey Book).
2. The booklet, *Notes for the Guidance of Examiners and Chairmen of Examiners*, published by the Proctors' Office.
3. The Educational Policy and Standards Committee's *Notes of Guidance on Examinations and Assessment*.
4. The *Course Handbook*, including the syllabus for each lecture course.
5. The *examination papers* from the preceding two years.
6. The *Examiners' Reports* on these examinations, including the published tables of *Class Percentage Figures*.
7. The *External Examiners' reports* for the previous two years, together with the responses to these reports made by the Undergraduate Supervisory Committee.

2 Setting the papers

In setting the papers, Examiners should be guided by the style of papers set in previous years, together with the Examiners' Reports and any Specimen Questions issued by the Faculty.

Questions on each subject within a paper will normally be set and marked by the member of staff who gave the lectures on that subject in the year immediately preceding the examination, who should be appointed as Assessor.

The number of questions on each paper is specified in the *Undergraduate Course Handbook* and in the *Syllabuses and Synopses* on the departmental website (which is formally part of the Handbook).

Examiners and Assessors should attempt to set papers and assignments that do not require too much rescaling, by setting questions with an appropriate level of difficulty, and ensuring that each question has easier parts that enable middle-ranking candidates to distinguish themselves from lower-ranking candidates, as well as more demanding parts that allow high-ranking candidates to distinguish themselves in their turn.

Protocol

The following protocol should be followed for the setting of each paper:

1. Questions on each subject within the paper will be set by the Assessor.
2. The paper will be checked by an Examiner, who may consult another suitably competent member of academic staff.
3. An Examiner will produce the final draft paper.
4. The paper will be reviewed and approved by the whole examining board.

A checklist that may be given to Assessors is attached as Annexe A.

The relevant External Examiner should be consulted as soon as there is a stable draft paper; they should be provided with full, annotated solutions indicating what is considered bookwork, and with the proposed Marking Scheme. The Examiners should not finalise any paper without taking into account the comments of the External Examiners.

Model solutions and mark scheme

Assessors must be asked to provide complete model solutions, annotated so as to indicate what is considered bookwork, what has been seen before on problem sheets and what is considered to be new and unseen. Assessors must also include a draft marking scheme for the approval of the Examiners. The solution, with additional comments, should also make clear how much of the question is accessible to less strong candidates. As a guide, approximately 60% of each question should be of a straightforward nature, maybe containing a small amount of bookwork, and about 40% should be harder. All questions are marked out of 25 in Finals.

The marking scheme for each question should aim to ensure that weaker candidates can gain marks by answering the initial parts of the question, and stronger candidates can

show the depth of their understanding in answering the later parts. The marking schemes should be approved by the examining board alongside the papers. Examiners should check that questions are of a consistent difficulty within each paper and between papers, bearing in mind the following standard criteria, expressed in percentage points:

≥70	Class I	A very good answer that is structured, innovative and comprehensive
60-69	Class II(i)	A good answer that includes major points and their significance
50-59	Class II(ii)	A less than satisfactory answer that includes some major points
40-49	Class III	A weak answer that omits several major points
30-39	Pass	A very poor answer that fails to address considerable areas of the question
<30	Fail	A totally inadequate answer

A mark of zero shall be awarded for any part or parts of questions that have not been answered by a candidate, but which should have been answered.

Examiners should ensure that the checklist of Annexe A is followed.

Rubric

On 1.5-hour option or core papers, candidates may answer up to two questions from three. Object-oriented Programming is examined by written report on practical work which will count for 35% of the mark and by a 1.5 hour paper where candidates answer two questions from three, the paper will counting for 65% of the marks.

3 Marking and checking scripts

The marker for each subject will normally be the Assessor appointed to set questions on that subject.

Where questions do not have a detailed mark scheme, for example, essay-style questions, candidates' answers will be independently double marked (known as double-blind marking as neither marker sees the comments of the other).

For examinations that have a marking scheme which has been approved by the Examiners the Examiners should provide each marker with the approved mark scheme for the paper. Markers are instructed to follow the approved mark scheme, and to carry out procedures for avoiding errors in transcription of the marks. A suitable checklist is attached as Annexe B.

The Chairman must ensure that those appointed as Assessors are informed of the Examiners' timetables, and are made aware that they must be available for consultation by the Examiners until the signing of the Class/Pass Lists, and in particular during the input and checking of the marks.

Processing of marks

The Department of Computer Science provides a database system for checking and processing marks. Examiners should use this system and reports from it to ensure that the following checks are carried out:

- an independent arithmetic check of the correctness of the addition of the partial marks for each question;
- an independent check of the marks entered into the database for each candidate;

A central log is kept of the whereabouts of all scripts.

4 Moderation and classification

The critical task for Examiners will be to translate the raw marks on each paper into University Standardised Marks (USMs) out of 100. In joint schools, the marks from the two sets of Examiners are transmitted and combined using USMs.

Education Committee guidance is that scaling should be carried out so that:

(i) The percentages of candidates in each class are not substantially out of line with those in other subjects across the MPLS division.

(ii) The outcome of the final division of classes is consistent with the Examiners' evaluation of the performance of the candidates in relation to qualitative descriptors of each class.

In every case, this translation is done in the year that the paper is set and marked, and it is the USM and not the raw mark for the paper that is passed forward from the second to the third year to contribute to the final classification. In joint schools, the marks from the two sets of Examiners are similarly to be transmitted and combined using USMs.

In producing USMs, Examiners are advised to follow advice given in the Examiners' Report from the previous year, along with their own judgment. Examiners may use scaling to ensure that comparable performance in different papers leads to numerical marks that are consistent between papers, but they should avoid penalizing candidates who have performed well on papers that are perceived to have been easier than others. A quantitative description of the procedure, for each paper, for translating raw marks into USMs should be included in the Examiners' Report.

Examiners will try to ensure that the rescaling is fair to all students. They should inspect a sample of scripts. They may perform an initial mechanical rescaling, but will then consider whether this obtains fair results. The suggested rescaling method is to use a piece-wise linear function, with up to four control points corresponding to (1) the top candidate, (2) a USM of 70, (3) a USM of 50, and (4) the bottom candidate.

Examiners will apply a series of sanity checks to the proposed USMs for each paper:

- Compare the proportion of students in each class with MPLS averages;
- Consider the mean and standard deviations for each paper: a mean in the mid to high 60s, and a standard deviation of about 10 is probably appropriate;

- For each paper, compare the marks each student taking the paper with that student's average marks across all papers; this will help to identify papers that tend to be taken by above or below average students.

The Examiners should pay careful attention to what candidates have been told in the *Examination Regulations* and the *Course Handbook*, and should have regard to the percentages of candidates in each class in previous years, both in the same examination and across the University.

Evidence of recent medical problems, etc., should be considered at this stage, and USMs adjusted if appropriate. Where medical circumstances affected performance across the Part A examination, the evidence should be forwarded and considered at the classification meeting in the following year; in such circumstances, the subsequent part B classification meeting may award a higher class than indicated by the USMs, without re-adjusting the Part A USMs.

Practicals play no part in the classification, provided that candidates achieve a pass mark in both Part A and Part B. However, candidates whose overall performance on practical work is not satisfactory may be deemed to have failed the examination or may have their overall classification reduced.

The Finals examination is based on the aggregate marks from second and third year examinations. The final classification will be based on weighted mean of the USMs, with weights chosen so that options count for more than core courses, and the project counts for more still, so that the overall weight of the third year is higher than that of the second year. Computer Science options attract the same weight whether they are taken in the second year or the third year.

The weights to be assigned to each unit of assessment are as follows:

CS core course (Part A)	1½ hours	weight 10
Maths core paper A0 (Part A)	1½ hours	weight 8
Maths core paper A2 (Part A)	3 hours	weight 16
Maths options paper (Part A)	1½ hours	weight 8
Maths options papers (Part B) and all CS option papers	1½ hours	weight 15
Project (Part B)		weight 45

In Computer Science, each candidate takes four core courses (weight 40), a total of ten 1½-hour options courses (weight 150) and a project (weight 45). This makes a total weight of 235, so that the weighted mean of the marks is computed by multiplying the marks for individual courses by the weights shown above, adding them all up, then

dividing the total by 235. The result is an overall weight of 42.55% for the second year and 57.45% for the third year.

In Mathematics and Computer Science, each candidate takes four CS core courses (weight 40) and four Maths papers in Part A (weight 40 together), and a total of eight options courses (weight 120). The total weight is therefore 200, and the overall weights are 40% for the second year and 60% for the third year.

The average USM is then rounded to the nearest integer, with fractions of exactly half a mark being rounded up, and a degree class assigned according to the following table:

First class	Average at least 70 The candidate shows excellent skills in reasoning, deductive logic and problem-solving. He/she demonstrates an excellent knowledge of the material, and is able to use that innovatively in unfamiliar contexts.
Upper second class	Average at least 60 The candidate shows good or very good skills in reasoning, deductive logic and problem-solving. He/she demonstrates a good or very good knowledge of much of the material.
Lower second class	Average at least 50 The candidate shows adequate basic skills in reasoning, deductive logic and problem-solving. He/she demonstrates a sound knowledge of much of the material.
Third class	Average at least 40 The candidate shows reasonable understanding of at least part of the basic material and some skills in reasoning, deductive logic and problem-solving.
Pass degree	Average at least 30 The candidate shows some limited grasp of basic material demonstrated by the equivalent of an average of one meaningful attempt at a question on each unit of study. A stronger performance on some papers may compensate for a weaker performance on others.
Fail	Average less than 30 The candidate shows little evidence of competence in the topics examined; the work is likely to show major misunderstanding and confusion, coupled with inaccurate calculations; the answers to questions attempted are likely to be fragmentary only.

Candidates who do not obtain at least an upper second will not be allowed to progress to the fourth year, and will be required to accept classification for a BA degree.

Projects

Each project dissertation should be read by at least two assessors, including at least one examiner, but excluding the supervisor. Each assessor should independently write a brief report on the dissertation, giving careful consideration to context, contribution, competence, criticism and clarity. Each assessor should independently suggest an overall mark, in accordance with the standard Computer Science project marking scheme. This procedure is known as "double-blind" marking, since each assessor is unaware of the other's views. Where the marks differ by more than 10, a third reader should be used to obtain another independent mark.

The Examiners will then set a final USM for each project based on the information received from all assessors. This mark may be moderated in the light of the report from the project supervisor, if appropriate. The procedure used to arrive at the final USM for each project should be carefully documented by the Examiners, and made available to the external examiner.

Projects are marked on a scale from 0 to 100. However, in practice, very few projects are given a mark that is higher than 80 or lower than 50, so that the marks can be combined with marks for written papers without excessive scaling.

First class (70-80):	A complete project that addresses a well-rounded collection of relevant *concerns*, using appropriate *technology*, shows some aspects of *originality*, involves a significant amount of *analysis* or *assessment* of results, and is written up in a *clear report*.
Upper second class (60-70):	A basically complete project that achieves most of its aims, but does not address some of the appropriate concerns, or follows an obvious implementation path, or has not been thoroughly tested or assessed, or is written up in a less clear report.
Lower second class (50-60):	An incomplete project that may represent a start on a feasible plan, but leaves substantial parts still to be completed. Alternatively, a project that fails to address many of the appropriate concerns, or is far too unambitious, lacks any analysis, or is very unclear.
Third class (40-50):	A very incomplete project, perhaps with fragments only of a program, and a plan that remains vague. Alternatively, a project that shows poor understanding of the relevant area, or contains serious errors.
Marks below 40:	Marks below 40 may be awarded for very insubstantial reports indicating little serious engagement with the material.

To arrive at these marks, the assessors are asked to consider the following questions:

- **Context**: does the report show a good appreciation of the context to the work, giving suitable motivation, relevant background and appropriate references?

- **Competence**: does the report demonstrate competence in the use of appropriate techniques, tools or technology at a suitable level of expertise?

- **Contribution**: does the report show that the student has made some original contribution to the topic, designing and implementing an appropriate system?

- **Criticism**: does the report provide appropriate critical assessment and evaluation of the work that has been done, and the process of doing it?

- **Clarity**: is the report written in a way that is readable and clear for the non-specialist, but with appropriate level of detail to document the work done?

Treatment of practicals

Practicals play no part in the classification, provided that candidates achieve a pass mark. However, candidates whose overall performance on practical work is not satisfactory may, at the discretion of the Examiners, be deemed to have failed the examination or may have their classification reduced.

It is therefore necessary for the Examiners to determine which candidates have passed the practical course. In addition, a Distinction can be awarded for practical work.

Reports on practicals are marked by the demonstrating staff as each practical is completed, and the Examiners receive these marks, together with the practical reports themselves. The demonstrating staff are not appointed as Assessors for the purpose of marking practicals, and it is therefore up to the Examiners to determine what credit is given for each piece of practical work. The marks given by the demonstrating staff may be used as a guide to identify those candidates whose practical work requires close scrutiny by the Examiners.

The Examiners will give no credit for practical work that was not submitted for marking by the deadline and signed by a demonstrator, unless there are extenuating circumstances. Likewise, the demonstrators will not mark work that is late, unless there are extenuating circumstances. Work submitted late for a good reason, such as illness, may be submitted through the student's tutor.

The following numerical procedure is suggested for processing the marks. Each practical is marked on a scale S+, S, S- that is explained in the Course Handbook These marks should first be converted to numbers using the following scale:

S+	100
S	60
S-	20

Next, take a mean of the practical marks for each paper or option. Finally, take a weighted mean of the marks for each paper offered by the candidate. The weights given to papers may be adjusted to take into account variations in the amount and difficulty of practical work. The borderlines of 40 for a Pass and 70 for a Distinction should be used.

The group design exercise forms an additional component of the practical course for all students in the second year. Each team must submit a group report of their team's work on this exercise. Each team member must also produce a one-page summary of their own individual contribution. The group design exercise will be marked on a scale of S+, S, Pass, Fail. These marks should be converted to a numerical mark using the following scale:

S+	100
S	60
Pass	40
Fail	20

The group design exercise counts for one third of each student's overall practical mark, and the practicals associated with taught courses for two thirds of their overall mark. Students must pass the group design exercise in order to pass the practical component in Part A.

Examiners will want to make their own assessment of the amount and quality of practical work submitted by a candidate before taking the drastic step of failing the candidate solely because of inadequate practical work. Different candidates will have chosen different options, and consequently will have submitted differing amounts of practical work. In awarding distinctions, the Examiners may take into account the number of courses for which a candidate has completed practical work.

A practical mark (Pass/Fail/Distinction) should be assigned and reported in the results of Part A. Please note that it is necessary for candidates to pass both the practical course for Part A and the practical course for Part B.

Late submission or failure to submit coursework

Under the provisions permitted by the regulations, late submission of coursework (i.e. project reports) where there are no extenuating circumstances may result in the following penalties:

Lateness (where the deadline is Monday at 12pm, noon)		Cumulative penalty
Up to 4 hours	i.e. up to Monday 4pm	1%
4 - 24 hours	i.e. up to Tues 12 noon	10%
24 – 48 hours	i.e. up to Weds 12 noon	20%
48 – 72 hours	i.e. up to Thurs 12 noon	30%
72 – 96 hours	i.e. up to Fri 12 noon	40%
96 – 101 hours	i.e. up to Fri 5pm	50%

Where permission for late submission has been granted by the Proctors (under clause (1) of para. 16.8, page 46), no penalty will be imposed.

5 Communication with candidates

The Chairman of Examiners should write to candidates, reminding them of the general form and procedure for the examination. Notices to candidates from recent years are commended as examples to follow.

6 After the examination

It will be helpful if Examiners will ensure that:

- Full Marking Schemes are deposited (after the examination is complete) in the Examiners' files, kept in the Departmental Office.
- LaTeX source files for the papers (incorporating any corrections) are kept for the electronic archive.

7 External Examiner

The External Examiner for the following degrees, for 2015-16, will be Professor Frank Wolter, Professor of Logic and Computation, University of Liverpool, UK.

Final Honour School of Computer Science, Parts A and B

Final Honour School of Mathematics and Computer Science, Parts A and B

Annexe A: Checklist for setting papers.

1. Is the question on the syllabus, as defined by the Course Handbook?
2. Is the question technically correct?
3. Is the notation and terminology standard or obvious? If not, is it defined within the question? Is it unambiguous?
4. Is it clear what may be assumed, what detail is required, and what would constitute a complete answer, particularly in longer questions?
5. For Prelims, is the question of a straightforward character? For Finals, does it avoid unnecessary complexity?
6. Will the form of presentation be familiar to candidates?
7. Has an easy start been provided?
8. Could a second-class or third-class candidate gain marks by doing the easy part of the exam question, even if he or she could not finish it?
9. Can the question be done by stronger candidates in the appropriate time? (Finals questions are expected to be slightly longer than Mods questions.)
10. Has a reasonably detailed marking scheme been provided, giving an indication as to the allocation of the marks for different aspects and indicating which parts are to be bookwork, which are similar to class exercises, and which are new?
11. Does the question avoid using over-complicated language and making cultural assumptions?
12. Are the questions as a whole fairly spread across the syllabus?
13. Are the questions as a whole of comparable standard to other questions this year and in recent years (taking into account comments in the Examiners' reports)?
14. Are the questions as a whole of a similar general nature to questions in previous years (taking into account comments in the Examiners' reports)?

Annexe B: Checklist for marking

1. The Examiners have seen and approved the marking schemes, and markers must use these consistently. However, it may become clear while marking that the allocation of marks should be changed. In this case, the marker should ensure that the modified scheme is applied consistently to all candidates' scripts, and the Examiners should be informed.
2. Each script is checked for the completeness of marking, and the Examiners review at least some of the scripts during the classification process. Markers are therefore asked to make it clear on each script how many marks have been awarded for each part of a question, and to circle the total mark for each question on the script. They are also asked to indicate with some mark that they have read each page of the script.
3. Markers may, if they wish, write remarks about the quality of the answers, and note for the Examiners any defect in the argument. However, please note that any comments (i.e. single words or collections of words) on scripts are disclosable under the Data Protection Act. Markers may record part marks, ticks and crosses (for example to denote objective correctness or otherwise), and lines to indicate that portions of a script have been read, on the script itself. However, this must only be done in the left-hand margin of the script so that the record can be covered up if remarking is required. This non-verbal information is not disclosable. In subjects where single-marking is allowed, it is important that on every page of a script is drawn a line in the left-hand margin to indicate that the examiner has read it even if no marks are accumulated.
4. The marks awarded for each question should be shown on the cover sheet and entered on the pre-printed mark sheet supplied. Markers should distinguish on the mark sheet between an attempt that is awarded no marks ('0') and a question that is not attempted ('—').
5. The supplied mark sheets should tally exactly with the scripts from the examination, taking into account blank cover sheets from candidates who have attempted no questions. Misdirected scripts should be returned immediately, and extra scripts should be marked and drawn to the attention of the Examiners.
6. Markers should keep a copy of the completed mark sheet.
7. Markers should send to the Examiners a brief report on the performance of candidates on each question and on the subject overall. This report will be used in the classification process and in compiling the Examiners' report.