MSc in Advanced Computer Science - Examination Conventions 2022/23

Examination conventions are the formal record of the specific assessment standards for the course or courses to which they apply. They set out how examined work will be marked and how the resulting marks will be used to arrive at a final result and classification of an award.

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

MSc in Advanced Computer Science

1. Rubrics

The following Computer Science subjects are going to be examined by a written exam in Trinity Term:

- Combinatorial Optimisation
- Computational Game Theory
- Computer Security
- Knowledge Representation & Reasoning
- Machine Learning
- Principles of Programming Languages
- Probabilistic Model Checking
- Probability and Computing
- Quantum Information

You will have three hours to complete each exam. The requirements for each exam will be listed on the front of the question booklet and you should answer all questions. All exams have a total of 100 marks available.

If there is some reason why you need to have alternative examination arrangements, please get in touch with your college.

All other courses will be examined by a mini-project.

Rubrics for Mini-Projects

There is a total of 100 marks available, and you should attempt all parts. The requirements for each exam will be listed on the front of the question booklet

Some papers have specific requirements. Please find them below.

Advanced Security:

There are four questions of equal weight. Attempt all questions.

Please answer only the questions asked. No extra credit can be gained by writing any more, giving examples where none was requested, or repeating the same answer in different words.

Concurrent Algorithms and Data Structures

It is recommended that you write no more than ten pages. You should write enough to explain your implementations and reasoning, but unnecessarily verbose answers will be penalised.

You may make use of classes in theox.cadspackages, or the Java or Scala APIs. If you adapt code from here or elsewhere you should acknowledge the source. Likewise, if you use ideas from elsewhere (other than the lecture notes) you should acknowledge your sources.

Please submit a zip-file containing your write-up as a pdf-file, "cads〈candidate-number〉.pdf and a folder "Code〈candidate-number〉" with the complete code files for testing purposes. Your pdf-submission should be self-contained, i.e., code sections you refer to in your write-up should be contained in the write-up.

Computational Learning Theory:

* You have to submit the assignment electronically as a single pdf file and it must be typeset. Scanned copies of handwritten work are not permitted; only for illustrative figures you may draw by hand and embed the picture in your typed solutions. The font size (except in figures and references) must be at least 11 point. Your assignment should use A4 paper format with all margins at least 2cm. All your work (except for references) should fit in 10 pages. A standard latex template will be posted on the course website and you are encouraged to use this as your starting point. You are advised to spend time revising and simplifying your solutions to make them brief.

* You may use any results in the lecture notes, problem sheets, or the two books, An Introduction to Computational Learning Theory and Foundations of Machine Learning, directly, with citation, but without reproving them. Any statement that is not a direct citation needs to be justified, unless the assignment explicitly says that you may use a result without justification.

* You are not allowed to discuss this exam with anybody. Once you have opened this exam, you are not allowed to search for material related to this assignment online. You are only permitted to use the course materials posted on the course website, the two textbooks mentioned above, and standard texts on probability, linear algebra, etc. if you need to look up basic results. Any suspected violation of the instructions will be taken seriously and promptly reported to the examiners for further investigation.

Database Systems Implementation:

The submitted zip file will contain complete code solving the problem in the assignment. During marking, this code will be compiled and the correctness of the solution will be assessed. Students will be penalised accordingly if the code cannot be compiled successfully.

2 Marking

2.1 Marking scheme for written papers

For most Computer Science papers, model solutions are provided. Each script is marked by an examiner or assessor and is checked independently to ensure that all parts have been marked and the marks and part-marks have been correctly totaled and recorded. Essay-type questions without a model solution will be double marked.

100-70	Distinction	A very good answer that is structured, innovative and comprehensive
69-65	Merit	A good answer that includes major points and their significance
64-50	Pass	An answer where good progress has been made but missing some important aspects.
<50	Fail	49-40 A weak answer that omits several major points <40 A very poor answer that fails to address considerable areas of the question

Individualised consideration based on a candidate's Mitigating Circumstances Notice to Examiners will be taken into consideration at the exam board stage.

2.2 Mini-Projects

Qualitative Descriptors for Mini-Projects

Distinction

(70–100): The candidate has demonstrated an excellent understanding of almost all of the material covered with a commensurate quality of presentation and has completed almost all of the assignment satisfactorily, further subdivided by:

90–100 The candidate has shown considerable originality and insight going well beyond the straightforward completion of the task set.

80–89 The work submitted shows a near-perfect completion of the task at hand, but does not meet the additional requirements above, or does but has some defects in presentation.

70–79 The work submitted is of a generally high order, but may have minor errors in content and/or deficiencies in presentation.
Merit (65-69): The candidate has demonstrated a good or very good understanding of much of the material, and has completed most of the assignment satisfactorily, without showing the level of excellence expected of the above USM range.
Pass (64-50): The candidate has demonstrated an adequate understanding of the material and an adequate ability to apply their understanding, without showing the level of understanding expected of the above USM range.
Fail (below 50) (49-40)**:** The work submitted, while sufficient in quantity, suffers from sufficient defects to show a lack of adequate understanding or ability to apply results. 30–39 The candidate, while attempting a significant part of the mini-project, has displayed a very limited knowledge or understanding at the level required. 0–29 The candidate has either attempted only a fragment of a mini-project or has shown an inadequate grasp of basic material

2.3 Computer Science Project

Each project report will be blind marked by at least two markers, excluding the supervisor. Each marker will independently write a brief report on the dissertation, giving careful consideration to context, contribution, competence, criticism and clarity. Each marker will independently suggest an overall mark, in accordance with the standard Computer Science project marking scheme. The markers will then agree on a final mark, and write a brief report on how they arrived at this mark. Where the markers cannot agree on a mark, a third reader should be used to moderate.

Please note that any revision(s) made to the approved project title must be submitted to the MSc Supervisory Committee for approval in advance of the submission date.
Projects are marked on a scale from 0 to 100.

Distinction

90–100: The candidate shows remarkable ability and extraordinary insights. Dissertations in this band will be worthy of publication in a highest-ranking conference or journal.

80–89: The candidate shows outstanding problem-solving skills and outstanding knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.

70–79: The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.

Merit

65–69: The candidate shows very good problem-solving skills, and very good knowledge of much of the material over a wide range of topics.

Pass

60–64: The candidate shows good problem-solving skills, and good knowledge of much of the material over a wide range of topics.

50–59: The candidate shows basic problem solving skills and adequate knowledge of most of the material.

Fail

40–49: The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.

30–39: The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.

0–29: The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

To arrive at these marks, the examiners and assessors are asked to consider the following factors:

- *Context:* The dissertation should demonstrate, as far as is relevant, a good understanding of the context in which the work was undertaken. It should be evident that the student understood both the problem and the problem domain, and that the choice of approach was informed and intelligent. The examiners would like to be convinced that the student has a good general knowledge of the field.

- *Competence*: The student should demonstrate, in the text of the dissertation that they are able to apply the ideas and the techniques that they have studied. The examiners will look for evidence of understanding, and appropriate application of techniques. They would like to be convinced that the student has shown competence in investigating the chosen topic.

- *Contribution*: The dissertation should have some value in itself. This may arise in different ways: the dissertation may present a fresh application, an extension to a theory, a new solution, or a new approach to a problem. The value will depend upon the extent of achievement: the nature of the application, the utility of the extension, the elegance of the solution, or the coherence of the approach.

- *Critical Evaluation*: The dissertation should provide appropriate critical assessment of the work that has been done and the process of doing it.

- *Presentation*: If the dissertation is to succeed as a demonstration of knowledge and understanding, and if the examiners are to be convinced of the competence of the student, a certain degree of clarity and organisation is required. Part of the value of the dissertation lies in its accessibility: if it is to make a worthwhile contribution, then it must be readable for another member of the cohort that's taken a similar schedule of courses whilst also maintaining sufficient detail to document the work and support assessments made. For these reasons, and because clarity of exposition may in itself reflect a greater degree of effort and understanding, the examiners would like to be convinced that the dissertation is presented in a lucid and scholarly manner.

The report must not exceed 30,000 words plus 30 pages of additional material. The word count may exclude any table of contents, all mathematical equations and symbols, diagrams, tables and the bibliography. The associated source code is neither included in the word count nor the 30-page limit of additional material. However any preface, footnotes, and appendices must be included. The cover sheet must include a statement as to the word length, and of the method by which the figure was reached. Project assessors may deduct marks for any failure to meet these conditions.

3 Moderation and classification

The Examiners translate the raw marks on each paper into University Standardised Marks (USMs) out of 100.

Agreed final marks for individual papers will be expressed using the following scale:

70-100	Distinction
69-65	Merit
64-50	Pass
49-0	Fail

4 Scaling

For written examination papers, the Examiners may choose to scale marks where in their academic judgement:

a) a paper was more difficult or easy than in previous years; and/or
b) an optional paper was more or less difficult than other optional papers taken by students in a particular year; and/or
c) a paper has generated a spread of marks which are not a fair reflection of student performance on the University's standard scale for the expression of agreed final marks, i.e. the marks do not reflect the qualitative marks descriptors.

Such scaling is used to ensure that candidates are not advantaged or disadvantaged by any of these situations. In each case, examiners will establish if they have sufficient evidence for scaling. Scaling will only be considered and undertaken after moderation of a paper has been completed.

If it is decided that it is appropriate to use scaling, the examiners will review a sample of papers either side of the classification borderlines to ensure that the outcome of scaling is consistent with academic views of what constitutes an appropriate performance within each class.

Detailed information about why scaling was necessary and how it was applied will be included in the Examiners' report and the algorithms used will be published for the information of all examiners and students.

5 Penalties

5.1 Short-weight convention and departure from rubric

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.
Where a candidate has failed to answer a compulsory question, or failed to answer the required number of questions in different sections, the complete script will be marked and the issue flagged. The board of examiners will consider all such cases so that consistent penalties are applied.

Where a candidate fails to comply with the relevant rubric, the examiners, if they agree to proceed with the examination of the work, may reduce the mark by up to 10 marks.

5.2 Penalties for non-attendance

Failure to attend an examination, except when prevented by illness or other urgent cause and approved by the Proctors, will result in the failure of the assessment. The mark for any resit of the assessment will be capped at a pass.

5.2 Penalties for non-submission

Failure to submit a mini-project, project report or open-book examination script, except when prevented by illness or other urgent cause and approved by the Proctors, will result in the failure of the assessment. The mark for any resit of the assessment will be capped at a pass.

5.3 Penalties for late or non-submission of mini-projects and project reports

The scale of penalties agreed by the board of examiners in relation to late submission of assessed items (i.e. practical and project reports) is set out below. Details of the circumstances in which such penalties might apply can be found in the Examination Regulations (Regulations for the Conduct of University Examinations, Part 14.)

The Examiners may apply a penalty for late submission of mini-projects and project dissertations.

Lateness	Cumulative penalty
Up to 12 hours	10 marks
12 – 48 hours	20 marks
48 – 72 hours	30 marks
72 – 96 hours	40 marks
96 hours – 14 days	50 marks
More than 14 calendar days after the notice of non-submission	Fail

Penalties will only be applied after the work has been marked and the Exam Board has checked whether there are any valid reasons for late submission. All deducted marks are USMs.

Failure to submit a required element of assessment will result in the failure of the assessment. The mark for any resit of the assessment will be capped at a pass.

5.5 Penalties for over-length work and departure from approved titles or subject-matter

Where a candidate submits a dissertation which exceeds the word limit prescribed above in 2.3, the examiners, if they agree to proceed with the examination of the work, may reduce the mark by up to one class (i.e. from a Distinction to a Merit, or its equivalent). Similarly, if a candidate submits a mini-project which exceeds the word or page limit indicated in

the relevant rubric, the examiners, if they agree to proceed with the examination of the work, may reduce the mark by up to one class (i.e. from a Distinction to a Merit, or its equivalent)

Where a candidate submits such a dissertation, the title or subject matter of which differs from that which was approved by the supervisory body concerned, the examiners, if they agree to proceed with the examination of the work, may similarly reduce the mark by up to one class (or its equivalent).

5.6 Penalties for plagiarism

Candidates must avoid plagiarism in all submitted work. Plagiarism includes the deliberate or inadvertent lack of acknowledgement of the words or ideas of others, paraphrasing, collusion, inaccurate citation, failure to acknowledge assistance, or use of material written by professional agencies or other persons. Candidates are advised to consult Appendix A of the General Course Handbook, the University's online guide and complete the online course in avoiding plagiarism. It is permissible to include material from a source such as a textbook, an academic paper or the Internet provided a clear reference to the source is included. There is no need to give a reference to material taken from lecture notes.

Assessors should mark work on its academic merit. Depending on their severity, cases of suspected plagiarism may be referred to the Proctors for investigation or may be dealt with by the board of examiners. If dealt with by the board of examiners (i.e. if material under review is less than 10% of the whole) as a case of poor academic practice, the examiners may deduct up to 10% of the marks available for the assessment. Where the consequence of the marks deduction would result in failure of the assessment and of the programme the case must be referred to the Proctors.

If a student has previously had marks deducted for poor academic practice or has been referred to the Proctors for suspected plagiarism the case must always be referred to the Proctors.

In addition, the most serious cases of poor academic practice should also always be referred to the Proctors.

While it is not permissible to submit work which has been submitted, either partially or in full, either for your current Honour School or qualification, or for another Honour School or qualification of this University, or for a qualification at any other institution, it is permissible to use work that has been written during the course of your studies (e.g. collections, tutorial essays).

6 Treatment of practicals

Practicals play no part in the classification, provided that candidates achieve a pass mark for their practical work. Candidates who do not achieve a pass mark for their practical work may, at the discretion of the Examiners, be deemed to have failed the examination.

Reports on practicals are marked by the demonstrating staff as each practical has been 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 Examiners' responsibility to determine what credit is given for each piece of practical work. The marks given by the demonstrating staff will serve as a guide, using the table below.

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.

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 will be converted to numbers using the following scale:

S+	100
S	70
S-	30

The borderlines for passing the practicals are 50 for a Pass and 70 for a Distinction.

7 Progression Rules and classification conventions

7.1 Classification bands

Distinction	100-70
Merit	69-65
Pass	64-50
Fail	<49

7.2 Progression and Resits

A candidate who has failed to reach a satisfactory standard in the dissertation will be permitted to resubmit a dissertation, not later than one year after the initial attempt. The resubmitted dissertation must be on the same topic as the original submission.

8 Vivas

The Examiners have the right to require any student to attend for an oral examination. The oral examination is usually intended for candidates who are borderline failure or borderline distinction on all aspects of the project.

A candidate who obtains the required passes in mini-projects/written examinations, and who achieves a pass in the project dissertation, is normally dispensed from attending a viva.

All vivas will be held remotely.

9 Final outcome rules

Candidates are required to

- submit mini-projects (coursework assignments)/written examinations on six courses,.
- submit a project dissertation which must demonstrate an appreciation of the role of methods studied in the course, and
- attend an examination viva voce, unless individually dispensed by the examiners.

To satisfy the Examiners, a candidate must

- attain an average of ≥ 50 (pass) in mini-projects/written examination in their best six courses, and
- attain a pass in the project dissertation, and
- pursue an adequate course of practical work and achieve an overall pass in practicals, unless studying only courses without a practical component

The mini-projects, written examinations and dissertations are allocated University Standardised Marks (USMs) out of 100; a USM of 50 and above is a pass.

A candidate who achieves an Average USM of ≥ 70 in their best six courses and a USM of at least 70 in their dissertation may be awarded a Distinction. Distinctions may be awarded only at the first attempt.

A candidate who does not achieve a Distinction, but achieves an average USM of at least 65 in their best six courses, and a USM of at least 65 in their dissertation, may be awarded a Merit. Merits may be awarded only at the first attempt.

<u>The overall average (taught courses and dissertation) USM is calculated as follows:</u>

The marks for the six optional papers will be added up and divided by 6. This number will be multiplied by 60.

The mark for the dissertation will be multiplied by 40.

The results of these two operations will be added up and divided by 100.

The average USM is rounded to the nearest integer, with fractions of exactly half a mark being rounded up.

This overall average USM is not used to calculate the final outcome of the degree.

10 Mitigating circumstances notices to examiners

A candidate's final outcome will first be considered using the classification rules/final outcome rules as described above in section 6. The exam board will then consider any further information they have on individual circumstances.

Where a candidate or candidates have made a submission, under Part 13 of the Regulations for Conduct of University Examinations, that unforeseen circumstances may have had an impact on their performance in an examination, a subset of the board (the 'Mitigating Circumstances Panel') will meet to discuss the individual applications and band the seriousness of each application on a scale of 1-3 with 1 indicating minor impact, 2 indicating moderate impact, and 3 indicating very serious impact. The Panel will evaluate, on the basis of the information provided to it, the relevance of the circumstances to examinations and assessment, and the strength of the evidence provided in support. Examiners will also note whether all or a subset of papers were affected, being aware that it is possible for circumstances to have different levels of impact on different papers. The banding information will be used at the final board of examiners meeting to decide whether and how to adjust a candidate's results. Further information on the procedure is provided in the *Examination and Assessment Framework, Annex E* and information for students is provided at https://www.ox.ac.uk/students/academic/exams/problems-completing-your-assessment

11 Prizes

Three prizes, each of the value of £200, may be awarded:

- one for best performance in the taught part of the examination,
- one for best project, and
- the Richard Bird Prize for the dissertation that best presents a piece of software, an algorithm, or a mathematical theory pertaining to program construction.

If dissertations of sufficient merit are not submitted, the award may be withheld.

Examiners

The Examination Board consists of the following Examiners and External Examiner:

Prof. Paul Goldberg (Chair)

Prof. Rahul Santhanam
Dr Hanno Nickau
Prof. Bartek Kiln
Prof. Alfonso Bueno-Orovio

Prof. Carmine Ventre (External)

Candidates should not under any circumstances seek to make contact with individual internal or external examiners.