Mathematical Expression and Reasoning for Computer Science  
CSC165 – Summer 2017

Course Description

Introduction to abstraction and rigour. Informal introduction to logical notation and reasoning. Understanding, using and developing precise expressions of mathematical ideas, including definitions and theorems. Structuring proofs to improve presentation and comprehension. General problem-solving techniques. Running time analysis of iterative programs. Formal definition of Big-Oh. Diagonalization, the Halting Problem, and some reductions. Unified approaches to programming and theoretical problems.

Learning outcomes

By end of this course, students will be able to:

• Express statement and problems using precise mathematical language in new and familiar domains.
• Evaluate the correctness and style of a mathematical proof in new and familiar domains.
• Create a mathematical proof or disproof of a given statement in new and familiar domains, choosing from among different proof techniques to use.

The domains we will study in this course are:

• sets and functions
• number theory
• graphs and trees
• algorithm running time analysis

Contact Information

Each week, other than reading week June 26th–30th), we’ll meet

Lecture 0501: Tuesdays, 18:00–21:00, BA1130 (Bahen Building).
Instructor: Ilir Dema. Email: <ilir.dema@mail.utoronto.ca>.
Office hour: Tuesday 16:00–18:00, BA3219 (Bahen Building).

... for discussion and worked examples.

We will have tutorials, dedicated to problem solving, (not for marks!) every week, with the exception of first week and last week.

You are responsible for reading all announcements on the portal and on the course website; please check at least weekly.
Textbook and References

There is no required text. Instead we will be using a set of course notes as our main text for this course. You can find a free electronic copy here, or purchase a copy at the University of Toronto Bookstore (if you can’t find any copies, order a copy at the Information Desk).

Other References:


Marking Scheme

<table>
<thead>
<tr>
<th>Work</th>
<th>Due</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>One exercise</td>
<td>24 May by 11:50 p.m.</td>
<td>1%</td>
</tr>
<tr>
<td>Five Problem Sets</td>
<td>PS1, June 7-th, 11:50 p.m.</td>
<td>39%</td>
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<td></td>
<td>PS2, June 21-st, 11:50 p.m.</td>
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<td>PS3, July 12-th, 11:50 p.m.</td>
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<td>PS4, July 26-th, 11:50 p.m.</td>
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<td></td>
<td>PS5, Aug 9-th, 11:50 p.m.</td>
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<tr>
<td>One term test</td>
<td>Date TBA</td>
<td>20%</td>
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<tr>
<td></td>
<td>(during week of 26 Jun)</td>
<td></td>
</tr>
<tr>
<td>Final exam</td>
<td>some time in August</td>
<td>40%</td>
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</tbody>
</table>

Nuances: Everybody has better and worse days. We aim to give higher weight to your better work. The weights of the problem sets sum to 39%, so we will give your best two problem sets a weight of 9% each, and your other three problem sets a weight of 7% each. The weight of the term test and the final is, however, not changeable.

Please note all your assignments must be typeset using \LaTeX and compiled into a pdf. No paper submissions or electronic submissions prepared using other tools will be accepted.

In addition to the other requirements, must you achieve 40% of the marks on the final exam in order to pass this course.

Academic Integrity

It is a serious academic offense to pass off somebody else’s work as your own for credit. Be sure to give full and generous credit to any person or book (except course instructors and teaching assistants) you consult in solving assignments. If you take notes when you consult a source, quote that source in full.

If you intend to present work as your own, for credit, then you should not look at similar work by other students, in written or electronic form, since looking can easily turn into plagiarism. Don’t show your own assignments to other students. Take a couple of hours’ break after even verbal discussions of the assignment before writing it up.

Lateness, sickness, natural disasters:

We discourage late work, since we have to arrange in advance for grading it, and because we want to be able to discuss solutions soon after the problem set is due, while it is still fresh in everyone’s minds. Late problem sets will be penalized at the rate of 1% per hour up to 24 hours. No submissions will be accepted 24 hours after your work is due.
If you have special circumstances that force you to miss a deadline, please contact us immediately (usually before the work is due) and fill out either the “Request for special consideration,” or the standard medical excuse form (link on course web page) and provide all supporting documentation. We will do our best to ensure that your evaluation is not harmed by events that are not your fault.

**Email, piazza:**

Course instructors receive thousands of emails per month, which makes it hard to ensure that each piece is followed up on promptly. You should use email to instructors sparingly.

You may use piazza (see course web page) for questions and answers that don’t reveal the details of assignments. You may use piazza in “demo” mode if you do not wish them to have access to your email. Use MarkUs to request (non-test) re-marks and special consideration. Test re-marks need to be presented on paper (form on course web site), stapled to the test, to Tracy Wu in BA4208.

If you have a question that can’t be raised on piazza and is suitable for email, be sure to include “CSC165,” and something about your question, in the Subject: line.