University of Toronto
Faculty of Arts and Science

CSC165H1S Midterm 1, Version 2

Date: February 6, 2019 Duration: 75 minutes **Instructor(s)**: David Liu, François Pitt

No Aids Allowed

Name:

Student Number:

- This examination has **3** questions. There are a total of **6 pages, DOUBLE-SIDED**.
- All statements in predicate logic must have negations applied directly to propositional variables or predicates.
- In your proofs, you may always use definitions we have covered in this course. However, you may **not** use any external facts about these definitions unless they are given in the question.
- For algorithm analysis questions, you can jump immediately from an exact step count to an asymptotic bound without proof (e.g., write "the number of steps is $3n + \lceil \log n \rceil$, which is $\Theta(n)$").

Take a deep breath.

This is your chance to show us
how much you've learned.
We **WANT** to give you the credit
that you've earned.
A number does not define you.

Good luck!

Question	Grade	Out of
Q1		5
Q2		5
Q3		5
Total		15

Use this page for rough work. If you want work on this page to be marked, please indicate this clearly *at the location of the original question.*

1. **[5 marks]** Question 1.

2. **[5 marks]** Question 2.

3. **[5 marks]** Question 3.

Use this page for rough work. If you want work on this page to be marked, please indicate this clearly *at the location of the original question.*