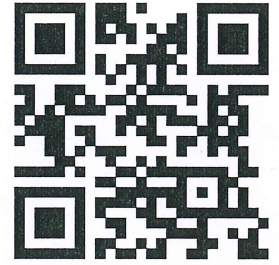**UNIVERSITY OF TORONTO**
Faculty of Arts and Science

Midterm 1
CSC165H1S

Duration: 50 minutes
Instructor(s): David Liu, Toniann Pitassi

No Aids Allowed

Name:

only 1 page

Student Number:

Please read the following guidelines carefully!

- **Please write your name on both the front and back of this exam**.

- This examination has 4 questions. There are a total of **8 pages, DOUBLE-SIDED**.

- Answer questions clearly and completely, with justifications unless explicitly asked not to.

- Unless stated otherwise, your formulas can use *only* the propositional connectives and quantifiers we have seen in class, arithmetic operators (like $+$, $\times$, and exponentiation), comparison operators (like $=$ and $>$), and the divisibility and *Prime* predicates. You may not define your own sets or predicates unless asked to do so.

- All formulas must have negations applied directly to propositional variables or predicates (e.g., $\neg Prime(n)$). You do *not* need to show your work for computing negations.

- In your proofs, you may always use definitions of predicates. You may *not* use any external facts about rates of growth, divisibility, primes, or greatest common divisor unless you prove them, or they are given to you in the question.

- You may **not** use induction for your proofs on this midterm.

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!