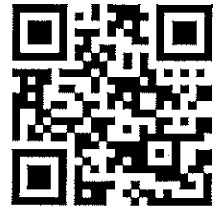


UNIVERSITY OF TORONTO
Faculty of Arts and Science

Midterm 1
CSC165H1S

Duration: 50 minutes
Instructor(s): David Liu, Toniann Pitassi
No Aids Allowed



Exam 40-1

Name:

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., $\neg \text{Prime}(n)$). 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

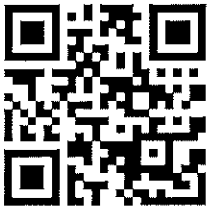
How much you've learned.

We **WANT** to give you the credit

That you've earned.

A number does not define you.

Good luck!

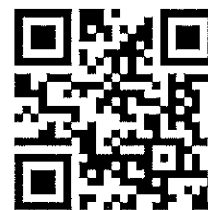


Exam 40-2

CSC165H1S , Winter 2017

Midterm 1

1. [2 marks] Here is question 1.



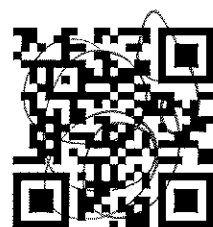
Exam 40-3

CSC165H1S , Winter 2017

Midterm 1

2. [2 marks] Here is question 2.

3. [3 marks] Here is question 3.

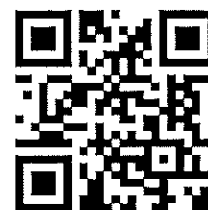


Exam 40-4

CSCI65HIS, Winter 2017

Midterm 1

4. [4 marks] Here is a multi-page question.



Exam 40-5

CSC165H1S , Winter 2017

Midterm 1

Question 4 continued...



Exam 40-6

CSC165H1S , Winter 2017

Midterm 1

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.*



Exam 40-7

CSC165H1S , Winter 2017

Midterm 1

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.*



Exam 40-8

CSC165H1S , Winter 2017

Midterm 1

Name:

| Question | Grade | Out of |
|--------------|-------|--------|
| Q1 | | 2 |
| Q2 | | 2 |
| Q3 | | 3 |
| Q4 | | 4 |
| Total | | 11 |