

UNIVERSITY OF TORONTO  
Faculty of Arts and Science

Midterm 1  
CSC165H1S

Duration: 50 minutes

Instructor(s): David Liu, Toniann Pitassi

No Aids Allowed

Name:

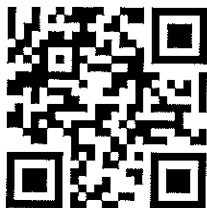
Student Number:

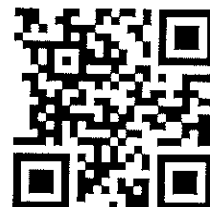
Please read the following guidelines carefully!

- 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.

Good luck!

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.





Exam 26-2

CSCI65H1S, Winter 2017

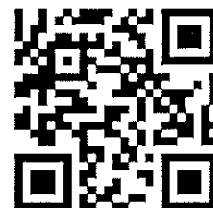
Midterm 1

1. [2 marks] Here is question 1.



2. [2 marks] Here is question 2.

3. [3 marks] Here is question 3.



Exam 26-4

CSC165H1S, Winter 2017

Midterm 1

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

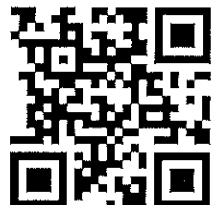
Question 4 continued...

CSC165H1S, Winter 2017

Midterm 1

Exam 26-5





Exam 26-6

OSC165HIS, Winter 2017

Midterm 1

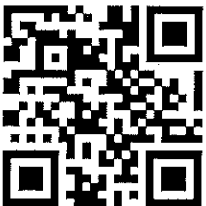
Use this page for rough work. If you want work on this page to be marked, please indicate this clearly at the location of the original question.

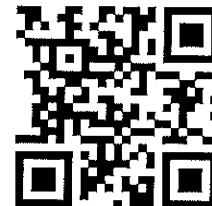
Use this page for rough work. If you want work on this page to be marked, please indicate this clearly at the location of the original question.

CSC165H1S, Winter 2017

Midterm 1

Exam 26-7





Exam 26-8

CSC165HIS, Winter 2017

Midterm 1

Name:

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