

## No Aids Allowed

[illegible]

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

- 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  $\Theta(n)$ ”).

Good luck!

Question	Grade	Out of
Q1		5
Q2		5
Q3		5
<b>Total</b>		15



test-auto-parse-1-2

CSC165H1S , Winter 2019

Midterm 1, Version 2

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*.

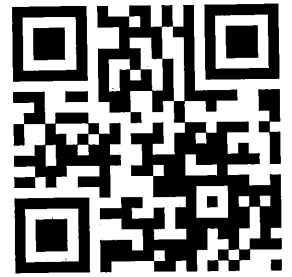


1. [5 marks] Question 1.



test-auto-parse-1-4

2. [5 marks] Question 2.



3. [5 marks] Question 3.



test-auto-parse-1-6

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*.