

Name \_\_\_\_\_

## CS200 - Midterm

1. This exam is closed book. It must be entirely your individual work. You may not consult any texts, notes, internet, or any other humans or robots.
2. You have 3 hours to take the exam.
3. You have 3 hours 30 minutes from the time you pick up your exam from the box on my office door to the time you should slide it under my door. You should sign in the time that you pick up and drop off the exam on the sheet on my door.
4. You may use extra scratch paper, but if you turn in additional paper please make sure it is clear what is scratch work and what is your solution.
5. Exams are available starting Wednesday, March 14 at 11:05, and the latest you should turn an exam in is Friday, March. 16 at 6pm.
6. I will post times when I will be in my office to answer questions on the Announcements section of the website. I suggest taking the exam at a time that overlaps with my availability, in case you have questions.

### **Honor Code Statement and Signature:**

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Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

## Truth Conditions for Connectives

- $P \wedge Q$  is true when both  $P$  and  $Q$  are true
- $P \vee Q$  is true when  $P$  or  $Q$  or both are true.
- $P \rightarrow Q$  is true when  $P$  is false or  $Q$  is true or both.
- $P \leftrightarrow Q$  is true when  $P$  and  $Q$  are both true, or both false.
- $\neg P$  is true when  $P$  is false.

## Set Theory Notation

- $\{, \}$  We use these **braces** to enclose the elements of a set. So  $\{1, 2, 3\}$  is the set containing 1, 2, and 3.
- $:$   $\{x : x > 2\}$  is the set of all  $x$  **such that**  $x$  is greater than 2.
- $\in$   $2 \in \{1, 2, 3\}$  asserts that 2 is an **element of** the set  $\{1, 2, 3\}$ .
- $\notin$   $4 \notin \{1, 2, 3\}$  because 4 is **not an element of** the set  $\{1, 2, 3\}$ .
- $\subseteq$   $A \subseteq B$  asserts that  $A$  is a **subset of**  $B$ : every element of  $A$  is also an element of  $B$ .
- $\subset$   $A \subset B$  asserts that  $A$  is a **proper subset of**  $B$ : every element of  $A$  is also an element of  $B$ , but  $A \neq B$ .
- $\cap$   $A \cap B$  is the **intersection of  $A$  and  $B$** : the set containing all elements which are elements of both  $A$  and  $B$ .
- $\cup$   $A \cup B$  is the **union of  $A$  and  $B$** : is the set containing all elements which are elements of  $A$  or  $B$  or both.
- $\times$   $A \times B$  is the **Cartesian product of  $A$  and  $B$** : the set of all ordered pairs  $(a, b)$  with  $a \in A$  and  $b \in B$ .
- $\setminus$   $A \setminus B$  is  $A$  **set-minus**  $B$ : the set containing all elements of  $A$  which are not elements of  $B$ .
- $\overline{A}$  The **complement of  $A$**  is the set of everything which is not an element of  $A$ .
- $|A|$  The **cardinality (or size) of  $A$**  is the number of elements in  $A$ .