

CSCI 301 M5 Homework

Bo Sullivan

May 8, 2020

Collaboration statement: By submitting this assignment, I am attesting that this homework is in full compliance with the course's <https://www.instructure.com/courses/1340003/pages/academic-dishonesty-guidelines> Homework Collaboration Policy and with all the other relevant academic honesty policies of the course and university. I discussed this homework with no one and wrote this solution without input from anyone else.

1. The sets are not equal because $A * B \neq B * A$ in regards to Cartesian Product. Cartesian Product returns a set of ordered pairs, which could be thought of as coordinates. $(0, 1) \neq (1, 0)$.
2. They would not be equal as once again, Cartesian Product returns an ordered pair. The first ordered pair from the left hand side of sets would be $((0, a), x)$ whereas the first ordered triple from the right hand side of sets would be $(0, a, x)$. So the right returns an ordered triple where the left hand side returns ordered pairs.
3. $\{(1, a), (1, b), (1, c), (1, d), (2, a), (2, b), (2, c), (2, d)\}$.
4. $\mathcal{P}(\{x, y, z\}) = \{\emptyset, \{x\}, \{y\}, \{z\}, \{x, y\}, \{x, z\}, \{y, z\}, \{x, y, z\}\}$.
5.
 - (a) $C \cup D = \{0, 1, 2, 3, 4, 5, 7, 8\}$.
 - (b) $(C \cup E) \cap F = \{6, 8\}$
 - (c) $D \cup E - C = \{5, 6, 7, 8, 9\}$
 - (d) $E \cup E = \{0, 2, 4, 6, 8\}$
6.
 - (a)
 - i. True
 - ii. False
 - iii. False
 - iv. True
 - v. False
 - (b)
 - i. Not Reflexive
 - ii. Is Irreflexive
 - iii. Not Symmetric
 - iv. Is Anti-Symmetric
 - v. Not Transitive
 - vi. Not Total
7.
 - (a) 16
 - (b) 15
 - (c) 16
 - (d) 15
 - (e) 16
8.
 - (a) 4

- (b) 1
 - (c) 2
 - (d) 1
 - (e) 2
9. (a) *greater*
 (b) *greaterOrEqual*
 (c) *lessOrGreater*
 (d) *equal*
10. (a) To give reflexive closure, we must include $(a, a), (b, b), (c, c)$ in our set R .
 (b) To give symmetric closure, we must include (b, a) in our set R .
 (c) To give transitive closure, we must include $(a, c), (c, a), (b, a)$ in our set R .
11. (a) *notEqual*
 (b) *lessThan*
 (c) *notEqual*
 (d) $\mathbb{Z} \times \mathbb{Z}$
12. (a) *isNephewOf*
 (b) *isSiblingOf*
 (c) *isGreatAuntOf*
 (d) *isParentOf*