

# **CIT 5920 — Lecture 4: Relations and functions**

12 - 13 Sep 2024

Poll results

# Table of contents

- Quiz: Relations on Sets
- Quiz: Splitting Sets
- Survey: Sets

Quiz: Relations on Sets (1/5)

0 3 2

**Which of the following demonstrates the commutative property of set union?**  
(1/2)

$A \cup B = B \cup A$  ✓



$(A \cup B) \cup C = A \cup (B \cup C)$



$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$



$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$



$A \cap B = B \cap A$



Quiz: Relations on Sets (1/5)

0 3 2

**Which of the following demonstrates the commutative property of set union?**  
(2/2)

$$(A \cap B) \cap C = A \cap (B \cap C)$$

☐ 0 %

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

☐ 0 %

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

☐ 0 %

**Which of the following statements are true based on the associative property of sets? (Select all that apply)**

$(A \cup B) \cup C = A \cup (B \cup C)$  ✓



$(A \cap B) \cap C = A \cap (B \cap C)$  ✓



$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

☐ 0 %

$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

☐ 3 %

Quiz: Relations on Sets (3/5)

026

**If  $A = \{1,2\}$ ,  $B = \{2,3\}$ , and  $C = \{3,4\}$ , which of the following are true? (Select all that apply)**

$A \cup B = B \cup A$  ✓



$(A \cup B) \cup C = A \cup (B \cup C)$  ✓



$(A \cap B) \cap C \neq A \cap (B \cap C)$



$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$  ✓



Quiz: Relations on Sets (4/5)

035

**Which of the following statements demonstrate the commutative property? (Select all that apply)**

$A \cup B = B \cup A$  ✓



$A \cap B = B \cap A$  ✓



$(A \cup B) \cup C = C \cup (A \cup B)$  ✓



$(A \cap B) \cap C = C \cap (A \cap B)$  ✓



**Which of the following sets demonstrate the associative property? (Select all that apply)**

$(A \cup B) \cup C = A \cup (B \cup C)$  ✓



$(A \cap B) \cap C = A \cap (B \cap C)$  ✓



$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$



$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$





Quiz: Splitting Sets (1/15)

0 3 4

**If  $A = \{a, b\}$  and  $B = \{1, 2\}$ , which of the following is NOT in the Cartesian product  $A \times B$ ?**

(a, 1)

☐ 0 %

(b, 2)

☐ 0 %

(1, a) ✓

☒ 94 %

(b, 1)

☐ 6 %

Quiz: Splitting Sets (2/15)

0 3 2

**If  $A = \{1, 2\}$  and  $B = \{a, b\}$ , what is  $A \times B$ ?**

$\{(1, a), (1, b)\}$

☐ 0 %

$\{(1, a), (2, a), (1, b), (2, b)\}$  ✓

☒ 100 %

$\{(a, 1), (b, 2)\}$

☐ 0 %

$\{(2, a), (2, b)\}$

☐ 0 %

Quiz: Splitting Sets (3/15)

0 3 4

**If  $A = \{x, y\}$  and  $B = \{1, 2, 3\}$ , how many elements are in  $A \times B$ ?**

2

☐ 0 %

3

☐ 0 %

5

☐ 0 %

6 ☒

☒ 100 %

Quiz: Splitting Sets (4/15)

0 3 5

**Which of the following Cartesian products are empty?**  
(1/2)

$\{1, 2\} \times \{a, b\}$

☐ 0 %

$\{a, b\} \times \{1, 2\}$

☐ 0 %

$\{1, 2\} \times \emptyset$  ✓

☒ 97 %

$\emptyset \times \{a, b\}$  ✓

☒ 100 %

$\{a\} \times \{b\}$

☐ 0 %

Quiz: Splitting Sets (4/15)

0 3 5

**Which of the following Cartesian products are empty?**

(2/2)

$\{a\} \times \{a, b\}$

☐ 0 %

Quiz: Splitting Sets (5/15)

0 3 1

If  $A_1 = \{1\}$ ,  $A_2 = \{a, b\}$ , and  $A_3 = \{x\}$ , what is  $A_1 \times A_2 \times A_3$ ?

$\{(1, a, x), (1, b, x)\}$  ✓

 94 %

$\{(1, a), (1, b), (1, x)\}$

 3 %

$\{(a, 1, x), (b, 1, x)\}$

 3 %

$\{(1, x, a), (1, x, b)\}$

 0 %

Quiz: Splitting Sets (6/15)

0 2 9

If  $A_i$  for  $i = 1, 2, 3$  are sets such that  $|A_1| = 2$ ,  $|A_2| = 3$ , and  $|A_3| = 4$ , how many elements are in  $A_1 \times A_2 \times A_3$ ?

9

☐ 3 %

12

☐ 0 %

24 ☒

☐ 97 %

27

☐ 0 %

Quiz: Splitting Sets (7/15)

0 3 5

**If  $A_i$  for  $i = 1, 2, \dots, n$  are non-empty sets, which of the following is true about  $A_1 \times A_2 \times \dots \times A_n$ ?**

It is always non-empty. ✓



It is empty if any  $A_i$  is empty. ✓



It contains all the elements of each  $A_i$ .



It is a subset of each  $A_i$ .





Quiz: Splitting Sets (8/15)

0 3 5

**If  $A = \{a_1, a_2, a_3\}$ , which of the following represents the second element of set A?**

$a_1$

☐ 3 %

$a_2$  ✓

☒ 83 %

$a_3$

☐ 3 %

$A_2$

☐ 11 %

Quiz: Splitting Sets (9/15)

0 3 3

**Given a sequence of sets  $A_1, A_2, \dots, A_n$ , if  $A_3 = \{x, y, z\}$ , which of the following is NOT an element of  $A_3$ ?**

x

☐ 0 %

y

☐ 0 %

$A_3$  ☒

☒ 100 %

z

☐ 0 %

Quiz: Splitting Sets (10/15)

0 2 3

**If  $A = \{a_i \mid i \in \mathbb{N}\}$  represents a set where every  $a_i$  is an even number, which of the following could be  $a_5$ ?**

9

☐ 0 %

10 ✓

☒ 100 %

11

☐ 0 %

12 ✓

☒ 74 %

Quiz: Splitting Sets (11/15)

0 2 6

**If set A is partitioned into subsets B and C,  
which of the following is true?**

$B \cup C = A$  ✓



$B \cap C = \emptyset$  ✓



$B \subseteq C$

0 %

$C \subseteq B$

0 %

Quiz: Splitting Sets (12/15)

0 3 4

**Given a set  $A = \{1, 2, 3, 4, 5\}$  and its partition  $P = \{\{1, 2\}, \{3, 4\}, \{5\}\}$ , which of the following is NOT a subset in  $P$ ?**

$\{1, 2\}$

☐ 0 %

$\{3, 4\}$

☐ 3 %

$\{1, 3\}$  ☒

☐ 97 %

$\{5\}$

☐ 0 %

Quiz: Splitting Sets (13/15)

0 2 5

**If  $A$  is partitioned into  $n$  subsets, and one of the subsets is the empty set, which of the following is true?**

The partition is valid.



The partition is not valid. ✓



$A$  is the empty set.



$n$  is zero.



Quiz: Splitting Sets (14/15)

032

**The Cartesian product of two sets A and B is denoted by:**

$A + B$

☐ 0 %

$A - B$

☐ 0 %

$A \times B$  ☒

☒ 100 %

$A \div B$

☐ 0 %

Quiz: Splitting Sets (15/15)

0 2 6

**If a set  $A$  is partitioned by subsets  $A_1$ ,  $A_2$ , and  $A_3$ , which of the following is true?**

$A_1 \cap A_2 = A_3$

☐ 0 %

$A_1 \cap A_2 = \emptyset$  ☒

☒ 81 %

$A = A_1 + A_2 + A_3$

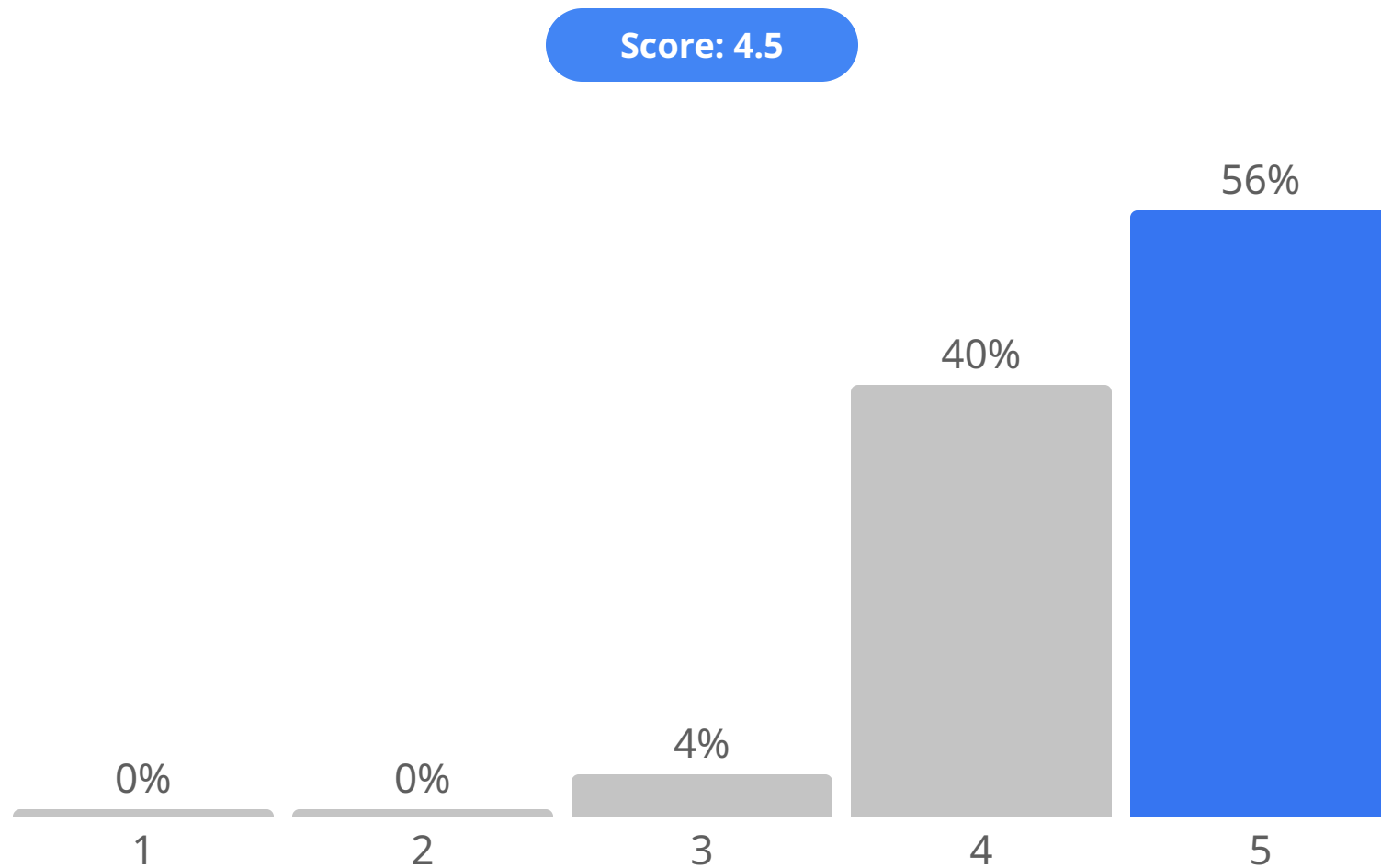
☐ 19 %

$A_1 \subseteq A_2$

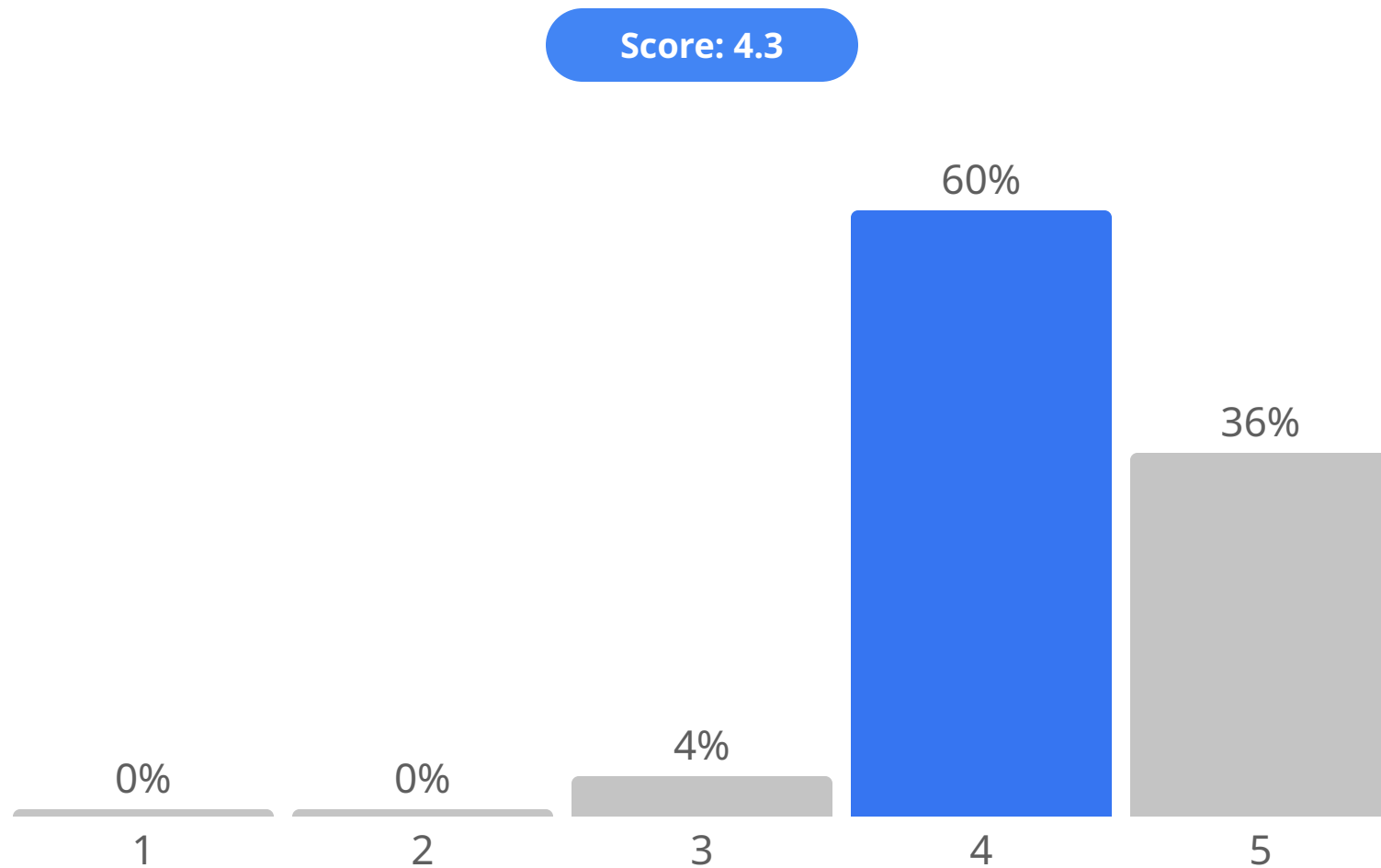
☐ 0 %



**How confident do you feel about sets (the objects themselves) and their notations?**

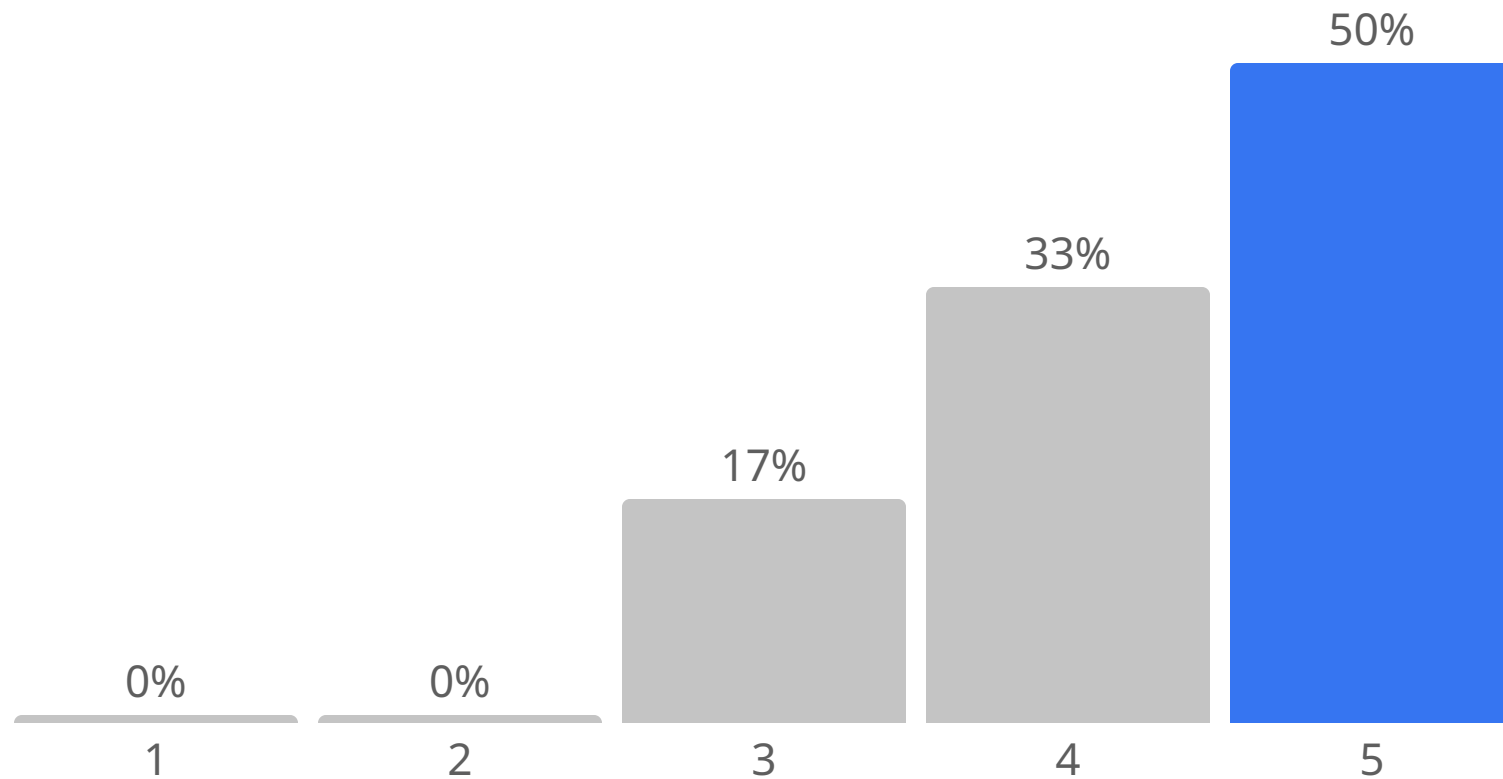


## How confident are you about set operations?



## How did you enjoy Recitation 1?

Score: 4.3



## Any comments on Recitation 1?

- Can we spam more exam questions! I feel like we can go through more Qs
- Recitation 2 was awesome!
- It seems they aren't that coordinated, and/or showed problems that we did not cover yet, and explained them in a way that was kind of confusing
- More review problems that are similar to exams and explanations of each topic
- Need guidance on how to use LaTeX