

CS23 Assignment Three

CJ Bridgman-Ford
cj.ikaika@gmail.com

April 4, 2024

1 Is $(1, 2, 3, 4) = (1, 2, 4, 3)$?

No. Unlike sets, the order of elements in a tuple matters.

2 Which of the following are equivalent:

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

$\{a, b, c\}$ is equivalent to $\{b, c, a\}$. All other tuples and sets are inequivalent due to differences in structure or order of elements.

3 Let $A = \{2, 3, 4\}$ and $B = \{6, 8, 10\}$ and define a relation R from A to B as follows: For every $(x, y) \in A \times B$, $(x, y) \in R$ means that $\frac{y}{x}$ is an integer.

a. Is $4R6$? Is $4R8$? Is $(3, 8) \in R$? Is $(2, 10) \in R$?

$\frac{6}{4} = 1.5$ is not an integer. Therefore, $4R6$ is not true. $\frac{8}{4} = 2$ is an integer. Therefore, $4R8$ is true. $\frac{8}{3}$ is not an integer. Therefore, $(3, 8) \in R$ is not true. $\frac{10}{2} = 5$ is an integer. Therefore, $(2, 10) \in R$ is true.

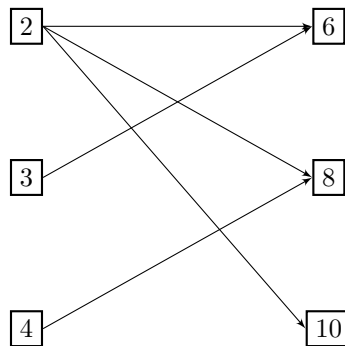
b. Write R as a set of ordered pairs.

$R = \{(2, 6), (2, 8), (2, 10), (3, 6), (4, 8)\}$.

c. Write the domain and co-domain of R .

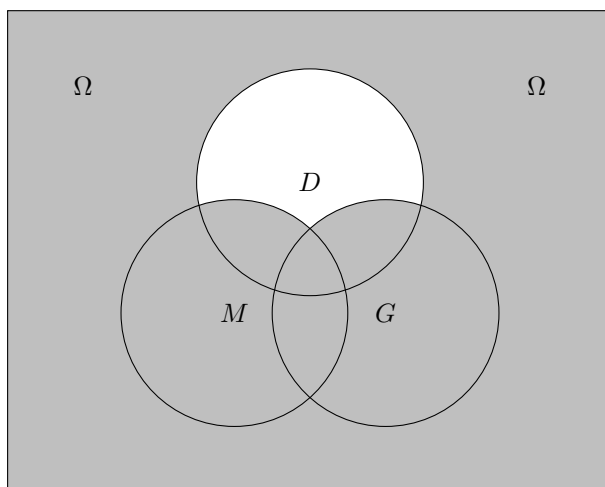
The domain of R is A and the co-domain is B .

d. Draw an arrow diagram for R .

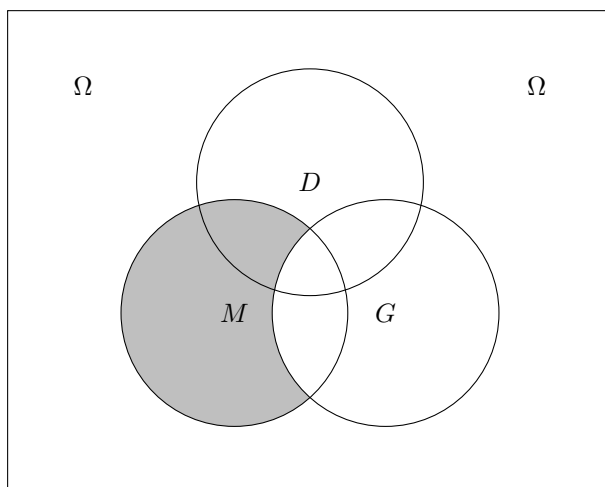


4 Given that Ω = all students in university, D = day students, M = mathematics majors, and G = graduate students, draw a venn diagram for this situation and copy it once for each of the given problems. Shade the following sets.

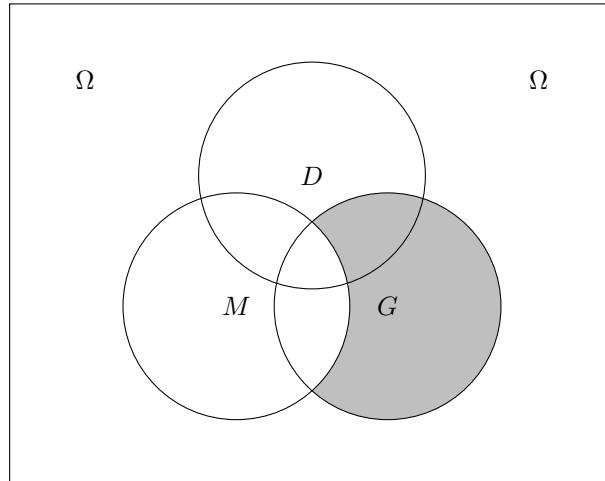
a. Evening and online students:



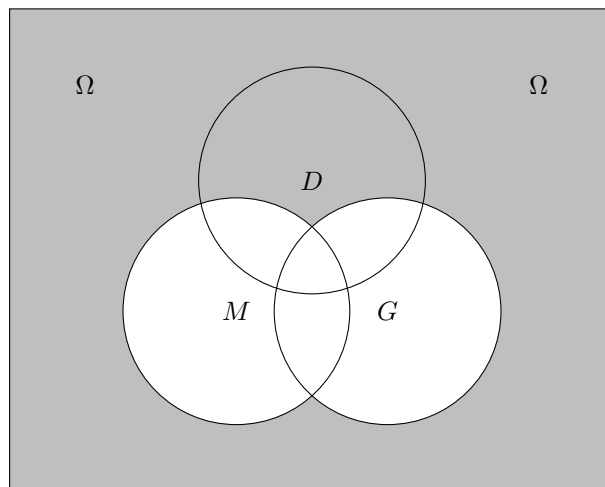
b. Undergraduate mathematics majors:



c. Non-math graduate students:



d. Non-math undergraduate students:



- 5 Two faces of a six sided dice are painted red, two are painted green and two are painted blue. The dice is rolled three times and the colors are recorded.
- a. List the 27 possible outcomes in the format RGB (1st, 2nd, 3rd roll).
RRR, RRG, RGB