



About

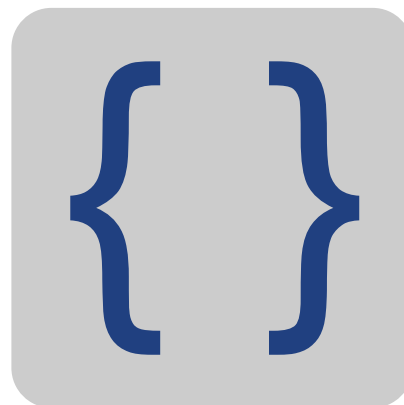
Homework is due one week after being assigned. It should be ready to turn-in at the beginning of lecture.

If you cannot turn-in your work in class, then you may submit your homework at Riverside Hall 3018 instead, but you must time-stamp and write "Cook CSc 28" across the top of your submission.

Set Notation

For the following set definitions, list all the items in the set.

1. $A = \{ x \mid x \text{ is a letter in "Rick and Morty"} \}$
2. $B = \{ x \mid x \text{ is a consonant and } x \in A \}$ // $A = \text{Question \#1}$
3. $C = \{ x \mid x \in \mathbb{Z} \text{ and } 30 \leq x < 42 \}$
4. $D = \{ 3x \mid x \in \mathbb{N} \text{ and } x < 6 \}$



Set Operators

Given the following sets:

$$\begin{aligned} U &= \{ 1, 2, 3, \dots, 9 \} \\ A &= \{ 1, 4, 6, 8 \} \\ B &= \{ 3, 6, 9 \} \\ C &= \{ 1, 3, 5, 7, 9 \} \end{aligned}$$

Find the following:

1. $A \cap B$
2. $A \cap C$
3. $B \cup C$
4. A'
5. $C - B$
6. $(A \cup B) - C$

Venn Diagrams

Star Fleet Command (Star Trek) is having a sale of used shuttlecraft. A survey was taken on **25** shuttlecraft. Three different options were counted: phaser weapons, food replicators, and built-in navigation. The following information was gathered

- 19 have phasers weapons (W)
- 17 have food replicators (F)
- 15 have navigation (N)

Also...

- 13 have N and W
- 10 have F and N
- 12 have W and F
- 8 have all three options

Using a Venn Diagram to figure out the following:

1. How many only have W
2. How many only have N
3. How many only have F
4. How many have F and W, but not N
5. How many have N and F, but not W
6. Only one of the options
7. None of these options

Floating Point Numbers

1. Encode the number **37.75** (37 and 3/4) to a single-precision (32 bit) floating point. Write down its binary representation. You don't have to convert to hex, but please put spaces either between each byte or each field. Show your work.
2. What is **01000010101010110100000000000000** when interpreted as a floating point number? Show your work.
3. What is **01111111100010000000000000000001** when interpreted as a floating point number? Show your work.

Bit Vectors

Convert the following into bit vectors and then solve the questions below. Keep the result in bit-vector form.

$$U = \{ 1, 2, 3, \dots 8 \}$$

$$A = \{ 1, 4, 6, 8 \}$$

$$B = \{ 1, 6, 7 \}$$

Find the following:

1. $A \cap B$
2. $A \cup B$
3. A'
4. $A - B$