Data, Logic, and Computing

ECS 17 (Winter 2026)

Patrice Koehl
koehl@cs.ucdavis.edu

January 9, 2026

Homework 2

Exercise 1

- What is the binary representation of the hexadecimal 7C?

- What is the hexadecimal representation of the binary number 1110101?

- How many bits are there in 22 bytes?

- What is the largest unsigned integer that can be stored on one byte?

Exercise 2

- Let A be the binary number 1110110 and B the binary number 11100010; find the binary number C that satisfies $A + C = B$.

- Let A be the hexadecimal number #3FF and B the hexadecimal number #F4F; find the hexadecimal number C that satisfies $A + C = B$.

- Let A be the hexadecimal number #3EF and B the binary number 10000000000; find the hexadecimal number C that satisfies $A + C = B$.

- Let A be the binary number 1000000000 and B the hexadecimal number #227; find the binary number C that satisfies $A + C = B$.

Exercise 3

We are on the island of knights and knaves . You meet three residents, Alex, Bill, and Claudia who make the following statements:

Alex says: "Bill is a knave and Claudia is a knight"
Bill says: "Claudia is a knight and Alex is a knight"
Claudia says: "I like cookies"

Does Claudia really like cookies?

Exercise 4

A very special island is inhabited only by knights and knaves. Knights always tell the truth, and knaves always lie. You meet three inhabitants: Alex, John and Sally. Alex says, "At least one of the following is true: that Sally is a knave or that I am a knight." John says, "Alex could claim that I am a knave." Sally claims, "Neither Alex nor John are knights." Can you find who is a knight and who is a knave?

Exercise 5

We are on the island of knights and knaves . You meet two residents, Alex, Bill who make the following statements:

Alex says: "One of us, and only one of us, is a knight"

Bill says: "Only a knave would say that Alex is a knave"

Can you find out what Alex and Bill are?