representation: base conversion; signed integers

COSC 208, Introduction to Computer Systems, 2021-09-10

Warm-up

Q1: *List the powers of two from 2^0 through 2^10*

Q2: *Convert `0b100111` to decimal*

🛑 Stop here after completing the warm-up; if you have extra time please **skip ahead** to the extra practice.

Hexadecimal (i.e., base 16)

Convert these hexadecimal numbers to decimal (i.e., base 10):

Q3: `0x9`

Q4: `0xB`

Q5: `0xF`

Q6: `0x11`

Q7: `0x248`

Binary <-> Hex Conversion

Convert these binary numbers to hexadecimal:

Q8: `0b1010`

Q9: `0b1111`

Q10: `0b11001100`

Q11: `0b11100111`

Convert these hexadecimal numbers to binary:

Q12: `0x5`

Q13: `0x8`

Q14: `0xB`

Q15: `0x37`

Decimal -> Binary Conversion

Convert these decimal numbers to binary:

Q16: `10`

Q17: `15`

Q18: `42`

Q19: `192`

Signed integers

Express these decimal numbers using 8-bit two's complement:

Q20: `13`

Q21: `-128`

Q22: `-64`

Q23: `-1`

Q24: `-13`

Q25: `127`

Extra practice

Convert these binary numbers to decimal:

Q26: `0b1111`

Q27: `0b10100`

Q28: `0b101000`

Convert these hexadecimal numbers to decimal:

Q29: `0xC`

Q30: `0x18`

Q31: `0x30`

Write the following functions:

Q32: `abbreviate`*: takes a string and modifies the string in place to include only the first letter of each word. For example,* `"Talk To You Later"` *is converted to* `TTYL`.

Q33: `check_password`*: takes a string and returns 1 if the string is at least 8 characters long and contains at least one uppercase letter, at least one lowercase letter, and at least one digit. Otherwise, the function returns 0. You may want to use the functions* `isupper`, `islower`, *and* `isdigit`*. They take a character as a parameter and return 1 if the character is an uppercase letter, lowercase letter, or digit, respectively; otherwise, they return 0.*

Worksheet created by Professor Aaron Gember-Jacobson