

# Computer Science Team Week 10

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Computer Science Team  
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# ACSL 2

We will be taking ACSL 2 on Friday. Get prepared.

- Prefix/infix/postfix
- Bit-string flicking
- LISP

# Prefix/infix/postfix

Very easy topic.

- +22
- 2+2
- 22+

**Quick practice problem:** evaluate the prefix expression  $/8 + /4 * 22 - 32$

# Bit-string flicking

Very easy topic.

- AND, NOT, OR, XOR
- LSHIFT-x, RSHIFT-x, LCIRC-x, RCIRC-x
- Order of precedence: NOT; SHIFT and CIRC; AND; XOR; and finally, OR

**Quick practice problem:** evaluate the expression  $(101110 \text{ AND NOT } 110110 \text{ OR (LSHIFT-3 } 101010))$

# LISP

Easy topic.

- SET, SETQ
- CAR, CDR, CAADDAR, REVERSE, CONS
- ADD, MULT, DIV

**Quick practice problem:** evaluate the expression (CDR '((2 (3))(4 (5 6) 7)))

<https://www.categories.acsl.org/wiki/index.php?title=LISP>

# Fun coding problems

Theme: divisibility rules!

# Problem Divide 3

**Problem Divide 3** Create a function that takes an integer  $n$  and returns whether that number is divisible by 3.

```
def div3(  
    num: int  
) bool
```

# Problem Divide 3

## Example

```
assert div3(  
    3  
) == True
```



# Problem Factors

**Problem Factors** Create a function that take a positive integer  $n$  and returns a list of its prime factors.

```
def factors(  
    n: int  
) -> list[int]
```

# Problem Factors

## Example

```
assert factors(12) = [2, 2, 3]
```

# Problem Rules

**Problem Rules** Given a divisor  $d$  and a base  $b$ , create instructions that allow a human to determine if any integer is divisible by  $d$  in base  $b$  using divisibility rules (read: don't just tell them to divide the number). There are many correct answers!

```
def rules(  
    d: int,  
    b: int  
) -> str
```

# Problem Rules

## Example

```
assert rules(  
    d: 3,  
    b: 10  
) == "Keep adding up all the digits until you're left with one  
digit. If that digit is in [0, 3, 6, 9], it is divisible."
```

# The End

Questions? Comments? Remarks?  
Considerations? Confusions?