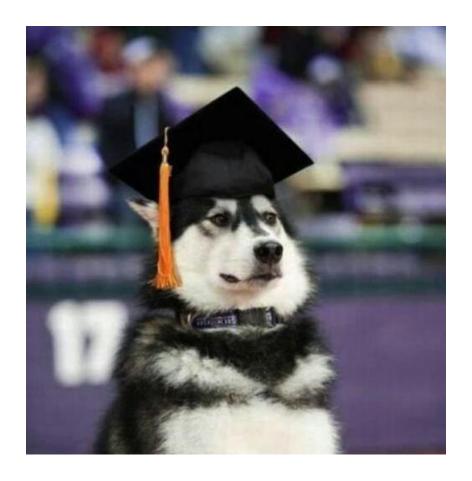# CSE 341 Final Prep

(Rough) Final Topics

- **Static vs Dynamic Typing**
  - Static types are computed at compile time
  - Dynamic types are computed at runtime
  - Type systems
- Type System **Soundness** vs. **Completeness**
  - Soundness: Reject bad programs
  - Completeness: Accept all good programs
- **Subtyping**:
  - Width (more fields; okay) vs. Depth (subtyping within fields; not sound given mutability), also Permutation, Transitivity and Reflexivity
  - Function subtyping:
    - Arguments can provide more, callers give more→ **Contravariant**
    - Results can guarantee more, callers assume less → **Covariant**
- **Mutability**
  - SML → ref; Racket → set!/set-mcar!/…; Ruby → everything
- **Ruby** (e.g. Mixins, Arrays/Blocks, Inheritance, ….)
- **Racket** (e.g. list manipulation, streams, ….)
- **SML** (e.g. structs/signatures, pattern matching, polymorphism, …)
- **Interpreters** (MUPL)

Practice Question Types

- Subtyping
- Soundness/Completeness
- Static vs Dynamic Typing
- Racket Programming
- Streams
- Interpreters/MUPL