Operators

Data form the simplest expressions, the use of operators creates larger expressions. Terminating assignment with a semicolon turns it into a statement. To create complex expressions, one must understand:

- Precedence: which operators have priority over others. Ex: `*` has precedence over `+`.
- Associativity: what happens when there are two or more operators at the same level of precedence. Ex: `5 - 5 - 5` is the same as `(5 - 5) - 5` an not `5 - (5 - 5)`.

Modifier Precedence:

1. Scope operator
2. Data access modifiers
3. Prefix operators
4. Pointer to member
5. Multiplication and Division
6. Addition and Subtraction
7. Shift operators
8. Less than / Greater than.
9. Test for Equality
10. Bitwise and Logical conjunctions
11. Conditional operator
12. Assignment operator
13. `throw` operator
14. Join operator (`,`)

Details

- The scope operator `::` has the highest precedence
- Postfix operators `lavalue++`, `lavalue--` first pass on the current value then increment / decrement
  - Postfix operator is slightly inefficient as it creates a copy of the thing being incremented.
- Prefix modifiers associate R -> L ex: `++lvalue` increments first, `&lvlaue`, the address operator takes the address of an item from memory
- Assignment operator associates R -> L, ex: `++(bigger = big = 100)` results in `bigger = 101` and `big = 100`.
- `throw` raises an exception
- join operator combines multiple operations, ex: `while(cin >> n, n > 0)`

Cast operators

- `static_cast`

  - produce value of an expression in the new data format.
  - commonly used to suppress warnings and provide clarification
- `reinterpret_cast`
  - casts from one pointer (address) expression to another
  - i.e. leaves the data at the address given unchanged and interprets that data as the given cast type.
  - used to cast `void*` pointer to more specific type and for reading or writing binary data.
- `const_cast`
  - adds or removes `const` or `volatile` attributes
- `dynamic_cast`
- C-language cast
  - syntax for old C-language cast.
  - easier to use than other casts, but casts should be self-documenting.