Wicked errors consist of illegal derefferencing.

Evil errors consist of illegal use of `delete` or `delete []`.

Slightly Naughty errors consist of failing to delete allocated storage. Other slightly naughty errors are

1. failing to initialize pointer variables
2. constructing illegal addresses
3. comparing (</<=/>) pointers that don't point at the same array.

ℓ- and r-values

- ℓ-to-r value conversion happens automatically all of the time.
- r-to-ℓ value conversion only happens when you use the `*`-operator.
- ℓ-values can occur on the left-hand side of assignment statements. `v`, `a[2]`, `cc[4].wet`, `p->new`, `*p`. ℓ-values are BOXES.
- r-values occur on the right-hand side of assignment statements. r-values can be put in boxes.

Arithmetic `p`, `q` are pointers; n is an integer expression.

1. `p`$+n$
2. $n+$`p`
3. `p`$-n$
4. `p`$-$`q`
5. `p`$+$`q` (ILLEGAL)
6. $n-$`p` (ILLEGAL)

These depend on `p` and `q` being the same type, and `sizeof(p)` being defined. That is, they don't work with `void*` pointers.

Software Engineering

1. Initialize pointer variables.
2. Set `delete`d pointers to `0`.
3. Make pointer variables into `private` member variables.
4. Put `new` inside constructors.
5. Put `delete` inside destructors.

Forms of `new` There are three basic forms of storage allocation:

I `new Type`
II `new Type(constructor args)`
III `new type[array_size]`

The first two require matching `delete`s. The last requires a matching `delete[]`.

Error Manifestations :

- Code that changes behaviour drastically when slight changes are made to the code, likely contains WICKED errors.
- Code that crashes at `new` or `delete` statements that appear to be correct, likely contains EVIL errors.
- Code that gradually gets slower and slower (and takes up more and more memory) contains slightly naughty errors.

`const` and pointers : `const` applies to the syntax to its left.

- `int const * ip = &i` is a pointer that cannot modify anything it points at.
- `int * const ip = &i` is a fixed pointer that can modify `i`.

Storing an `int const *` value in an `int *` box is illegal.