

Compile-Time types:

This diagram outlines the types as they change for compile time but is not what the user sees
This is what a loop over an array would loop like

```
@Zero int i = 0;
int x = a[i];
Loop{
    @IndexHigh("a") length = a.length;
    (@IndexHigh) i++; //increment changes type
    if(i < length){
        // i is now @IndexFor("a") because bound was checked
        A[i]; // safe access
        Goto Loop;
    }
}
```

This is same with decrement, however that works with checking @indexLow against zero or -1

Here is what checking an unknown value looks like

```
@IndexTop Int i = unknown;
if(i > -1){
    // bound checked
    (@GTZero) i;
    if(i < (@IndexHigh("a")) a.length){
        // other bound checked
        (@IndexFor("a")) i;
        A[i]; // safe
    }
}
```

This works the same in the other order by using @LTLength first then refining to @IndexFor