Week 10 - ReadMe

This extension of Week 9 analyzes Dafny programs, detects loops, and synthesizes Boolean DNF invariants of the form:

```
(phi11 && phi12 && ...) || (phi21 && phi22 && ...) || ...
```

which are expressive enough to handle loops whose invariants follow different conditional paths.

(1) If Week 9's Boolean mode is available, the tool automatically generates Boolean DNF invariant templates, solves for each disjunct separately, merges results into a canonical DNF expression, normalizes clauses with `&&` and `||` .

Even if the underlying solver produces linear invariants, the tool forces a DNF representation.

(2) The tool handles Loops that behave differently across iterations by collecting all candidate base invariants, splitting them into disjoint conjunctions, OR-ing these conjunctions into a unified DNF invariant, exposing each disjunct explicitly as a separate "case".

Example

Input

```
method Toggle()
{
    var i := 0;
    var x := 0;
    var y := 0;
    var flip := 0;

    while (i < 4)
      invariant (-flip <= 0 && -i <= 0 && -x <= 0)
            || (-flip <= 0 && -i <= 0 && -x <= 0)
```

```
    {
        if (flip == 0) {
            x := x + 1;
            y := y + 2;
            flip := 1;
        } else {
            x := x + 2;
            y := y + 1;
            flip := 0;
        }
        i := i + 1;
    }
}
```

Terminal output

```
[week10 auto-verify] Synthesized invariants:
    (-flip <= 0 && -i <= 0 && -x <= 0) || (-flip <= 0 && -i <= 0 && -x <= 0)
[week10 auto-verify] Wrote instrumented file to week10\disjunctivebool_ou
t.dfy
[week10 auto-verify] Running: dafny week10\disjunctivebool_out.dfy

Dafny program verifier finished with 1 verified, 0 errors
```