

## Axiomatic Semantics and Hoare-style Verification

Axiomatic semantics (or Hoare-style logic) defines the meaning of a statement in terms of its effects on assertions of truth that can be made about the associated program. A *Hoare Triple* encodes these assertions in the form  $\{P\}S\{Q\}$  where  $P$  is the precondition,  $Q$  is the postcondition, and  $S$  is a piece of code of interest. Using derivation rules for Hoare triples, we can prove that these triples hold.

1. Prove  $\{x > 1\} \ x := x+1; \ x := -x \ \{x < 0\}$ .
2. Prove that the program  $x := x+y; \ y := x-y; \ x := x-y$  swaps the values of  $x$  and  $y$ . The conclusion should be:  
 $\{x = A \wedge y = B\} \ x := x+y; \ y := x-y; \ x := x-y \ \{y = A \wedge x = B\}$