

17-355/17-655/17-819: Program Analysis

Axiomatic Semantics and Hoare-style verification

In-Class Exercises

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1. What are reasonable pre- or post- conditions for the following incomplete Hoare triples?

{ true }	x := 5	{ }
{ }	x := x + 3	{ x = y + 3 }
{ }	x := x * 2 + 3	{ x > 1 }
{ x = a }	if (x < 0) then x := -x	{ }
{ false }	x := 3	{ }
{ x < 0 }	while (x != 0) x := x - 1	{ }

2. Consider the following triples:

{ z = y + 1 }	x := z * 2	{ x = 4 }
{ y = 7 }	x := y + 3	{ x > 5 }
{ false }	x := 2 / y	{ true }
{ y < 16 }	x := 2 / y	{ x < 8 }

- a. Which of the above are valid?
- b. For which of the valid triples:
 - i. Can you write a stronger postcondition? Leave the precondition unchanged, and ensure the resulting triple is still valid.
 - ii. Can you write a weaker precondition? Leave the postcondition unchanged, and ensure the resulting triple is still valid.