

Activity: Weakest Preconditions

(Do this as homework for Mon Nov 9)

A. Why?

- The weakest precondition function describes the most general precondition under which a program is correct.

B. Outcomes

By the end of the activity you should

- Know how to calculate the wp or wlp of loop-free programs.

C. Find wp and wlp

For loop-free programs, wp and wlp are the same, so below I'll just use wp .

1. Answer the following:

- (a) What is $wp(x := x+1, x < n)$?
- (b) What is $wp(y := y-1, y > k)$?
- (c) What is $wp(i := 0; s := i, s = sum(0, i))$?

2. Answer the following:

- (a) What is $wp(lt := m, lt < rt)$?
- (b) What is $wp(rt := m, lt < rt)$?
- (c) What is $wp(\mathbf{if} B \mathbf{then} lt := m \mathbf{else} rt := m \mathbf{fi}, lt < rt)$?

3. Answer the following:

- (a) What is $wp(a := a-b, a \geq 0 \wedge b \geq 0)$?
- (b) What is $wp(b := b-a, a \geq 0 \wedge b \geq 0)$?
- (c) What is $wp(\mathbf{if} b \geq a \mathbf{then} a := a-b \mathbf{else} b := b-a \mathbf{fi}, a \geq 0 \wedge b \geq 0)$?