

# Assignment 8

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**Due on Dec 13 before lecture.**

**Please bring a hardcopy of your solutions to lecture. Or submit a hardcopy of your solutions to Paul Darga before lecture.**

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## Problem 1 (10 Points)

Recall the verification conditions for some simple commands discussed in class:

$VC(\text{skip}, B) =$	$B$
$VC(c1; c2, B) =$	$VC(c1, VC(c2, B))$
$VC(x:=e, B) =$	$B[x \rightarrow e]$
$VC(\text{if } b \text{ then } c1 \text{ else } c2, B) =$	$(b \Rightarrow VC(c1, B)) \wedge (\neg b \Rightarrow VC(c2, B))$
$VC(\text{while}_I b \text{ do } c, B) =$	$I \wedge (\forall x_1..x_n. I \Rightarrow (b \Rightarrow VC(c, I) \wedge \neg b \Rightarrow B)), \text{ where } x_1..x_n \text{ are variables modified in } c$

Find an appropriate loop invariant and prove the partial correctness assertion for the following program, using the verification condition rules discussed in class shown above.

$\{a=1, b=i\} \text{ while } (b \neq 0) \text{ do } (b := b - 1; a := 2 \times a) \{a=2^i\}$

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