2005 Paper 7 Question 6

Specification and Verification I

(*a*) State and explain Hoare's assignment axiom for simple assignments $V:=E$, where V is a variable. [5 marks]

(*b*) Is Hoare's assignment axiom valid for assignments $V := E$ if the expression E can have side effects? Justify your answer. [5 marks]

(*c*) State and explain the assignment axiom for array assignments $V(E_1) := E_2$, where V is an array variable. [5 marks]

(*d*) The following alternative "forward" rule for assignments has been proposed:

$$\vdash \{P\}\ V{:=}E\ \{\exists v.\ V = E[v/V]\ \wedge\ P[v/V]\}$$

Explain informally why this rule is valid. [5 marks]