

1999 Paper 8 Question 2

Specification and Verification I

Give an example of P , C and Q such that $\vdash \{P\} C \{Q\}$ but it is not the case that $\vdash [P] C [Q]$. Justify your answer. [5 marks]

Explain how to translate the partial correctness specification shown below into higher-order logic.

$$\{X = x \wedge Y = y\} \text{TEMP} := X; X := Y; Y := \text{TEMP} \{X = y \wedge Y = x\}$$

[5 marks]

Write down and justify an example of a correctly annotated specification $\{P\} C \{Q\}$ such that $\vdash \{P\} C \{Q\}$ but the verification conditions are not true. Comment on the significance of your example. [5 marks]

Define the meaning of the notation $[P, Q]$. Write down the WHILE-law of refinement and justify it with respect to the WHILE-rule for Floyd–Hoare logic. [5 marks]