Specification and Verification I

(a) What is the difference between partial and total correctness? Illustrate your answer using the WHILE-Rule. [4 marks]

(b) What are derived rules? Give an example of a derived rule, together with its derivation. [4 marks]

(c) If \{P\} C \{Q\} is a theorem of Hoare logic and if C is correctly annotated then will the verification conditions necessarily be provable? Justify your answer. [4 marks]

(d) Would a Java program that translates Hoare formulae to semantically equivalent higher-order logic formulae be a deep embedding or a shallow embedding? Justify your answer. [4 marks]

(e) Describe the meaning of the dynamic logic formulae \([c]q\) and \(<c>q\). For deterministic commands, describe how partial and total Hoare logic correctness specifications can be formulated in terms of dynamic logic. [4 marks]