

8 Hoare Logic (MOM)

Use notation from logic (\forall , \exists , etc.) in your answers to the questions below.

- (a) Define the semantics of the partial correctness Hoare triple, $\{P\} C \{Q\}$. Briefly explain this definition. [3 marks]
- (b) Define the semantics of the total correctness Hoare triple, $[P] C [Q]$. Explain what is ‘total’ about total correctness. [3 marks]
- (c) State an inference rule for partial correctness Hoare Logic that is not sound in total correctness Hoare Logic. Explain your choice. [3 marks]
- (d) State and briefly explain the semantics of the separation logic Hoare triple. Point out at least two differences between $\{P\} C \{Q\}$ in traditional Hoare logic and separation logic. [5 marks]
- (e) Carefully state an inference rule that is part of separation logic but not present in traditional Hoare logic. [3 marks]
- (f) Point out at least two aspects in which the semantics of Hoare logic or separation logic do not reflect the semantics of real programming languages. [3 marks]