

2011 Paper 9 Question 11

Temporal Logic and Model Checking

- (a) Explain the difference between static and dynamic methods for property checking. Is LTL or CTL a better property language for dynamic checking? Justify your answer. [4 marks]
- (b) Outline an algorithm for model checking LTL properties of the form $\mathbf{G} \mathbf{p}$, where \mathbf{p} is an atomic property. [4 marks]
- (c) What is the difference between explicit state and symbolic model checking? [4 marks]
- (d) Who is the person credited with introducing temporal logic as a property specification language? What were the main contributions of Clarke & Emerson, and of McMillan, to model checking? Why were they significant? [4 marks]
- (e) Briefly explain the terms *Boolean layer*, *Temporal layer*, *Verification layer* and *Modelling layer* in connection with PSL. [4 marks]