1998 Paper 7 Question 3

Comparative Architectures

Older computer architectures often contain features that hamper high-performance implementation using modern techniques. Describe several such features, explaining how they affect implementation; describe what techniques (if any) have been developed to help overcome these difficulties. [14 marks]

The original MIPS architecture (as implemented in the R2000) relied on software interlocking of pipeline stages, thus exposing load and branch delays to the compiler which is then responsible for scheduling instructions to avoid conflicts.

Assess the pros and cons of software interlocking at the time of the introduction of the R2000. How has the situation changed for modern high-performance MIPS implementations? [6 marks]