

5 Software and Interface Design (AFB)

This question is concerned with the design of the embedded software in a device for switching audio and video streams in a lecture theatre. Correct operation of the overall system involves complex timing dependencies. For example, in this (fictional) system, the video projectors operate most reliably if the input signal is already connected when they power up, whereas the audio amplifier should only be powered up when there is no input signal present.

- (a) Create outline sketches of two different UML diagrams that would be most useful in defining and refining the key design elements of this system as described above. [8 marks]
- (b) Describe a formal specification approach that could be used to verify that individual components of the design, when combined, will exhibit the overall properties required. [6 marks]
- (c) If it becomes necessary to replace a functional component after implementation of the system is complete, describe the approach that could be taken at different points in the resulting upgrade project to ensure that the modified system continues to exhibit the desired properties. [6 marks]