

2 Programming in C and C++ (AVSM)

In this question, you may use short fragments of C or C++ code to complement your answer, where appropriate. Give a brief explanation of the following aspects of C and C++:

- (a) The differences between C pointers and C++ references. [*Hint*: Consider issues of syntax, initialisation, mutation and safety in your answer.] [5 marks]
- (b) How C and C++ object files may be safely linked with each other, and the limitations in doing so for some C++ features. [5 marks]
- (c) The difference between implementation-defined behaviour and unspecified behaviour in the C standard, and an example of each sort of behaviour. Also briefly discuss why these loosely specified behaviours exist in the C standard instead of being strictly defined. [5 marks]
- (d) The role of a debugger such as LLVM's `lldb` in locating bugs in C code, including the use of breakpoints and watchpoints in an interactive debugger and how symbol tables are useful. [5 marks]