

2 Programming in C and C++ (djg11)

- (a) Arrays in C are accessed using square bracket notation.
- (i) What are the advantages and disadvantages of array bounds checking?
 - (ii) Define with examples an array access and a pointer de-reference in the C language explaining the underlying equivalents.
 - (iii) State all similarities between array access and pointer dereference and comment on interactions with possible bounds checks.

[5 marks]

- (b) What advantage is gained from allowing a given C program to vary in execution behaviour from one computer architecture to another? Give three common example variations. What is the disadvantage of variation? [5 marks]
- (c) Give two ways in which C++ templates differ from Java Generics, other than mere syntactic differences. [4 marks]
- (d) Giving a suitable example, explain the effect in C++ of qualifying a member function (method) with `virtual`. [3 marks]
- (e) Recode the following Java code in C++. Minor syntactic errors will not be penalised.

```
class Foo
{   final int[] v; final int s;
    public Foo(int n) { s = n; v = new int[n]; }
    // In Java garbage collection de-allocates arrays
    // appearing in no-longer-used instances of Foo.
    // In C++ an alternative solution is required.
}
```

[3 marks]