3 Object-Oriented Programming (rkh23)

(a) Explain the effect of the access modifiers public, protected, private, or default (no modifier) in Java. [4 marks]

(b) Consider the statement “public state of a Java class should be final and static”

(i) Explain why this is considered good programming practice. [4 marks]

(ii) Give one example of a member variable that should not be declared public, even if final and static. [3 marks]

(c) Consider a language identical to Java except that all class member variables are private. Class methods can still be public, protected, private, or default. The rationale for this change is that access can be provided via methods and so this simplifies the language. Compare and contrast this approach with the Java approach. [4 marks]

(d) The Python programming language does not have explicit private access modifiers in its classes. Instead all variables and methods are public and a convention is used whereby names prefixed with an underscore are to be considered hidden despite there being no enforcement of this by the compiler. Compare this to Java’s explicit access modifier approach. [5 marks]