5. (a) Describe the main steps that need to be performed when calling and returning from procedures. Explain the difference between caller-saved and callee-saved registers. Why do some architectures support both approaches? [8]

(b) Class definitions in object-oriented languages are represented via class descriptors. Show the class descriptors generated by compiling the following program:

```
class A           {int x = 2;                    a = new A
                   int f () {...} }              b = new B
class B extends A {int y = 0;                    c = new C
                   int g () {...}}
class C extends B {int g () {...}}
```

Assume the language does not support multiple inheritance and uses dynamic method lookup. [8]

(c) Many languages suppport the definition and use of data structures (such as a *struct* or a *record*). Explain (informally but clearly) the type-checking aspects of introducing these user-defined structured types. You need not consider variant records or circular types. [9]