**Q1:** Discuss, with examples, how the problem of maintaining coherence of cached data manifests itself in the following processing environments:

1. Single-processor systems
2. Multiprocessor systems
3. Distributed systems

**Answer:**

1. *In Single-processor systems, the memory needs to be updated when a processor issues updates to cached values.*
2. *In Multiprocessor systems, different processors might be caching the same memory location in its local caches. When updates are made, the other cached locations need to be invalidated or updated.*
3. *In distributed systems, consistency of cached memory values is not an issue. However, consistency problems might arise when a client caches file data.*

**Q2:** Describe some of the challenges of designing operating systems for mobile devices compared with designing operating systems for traditional PCs?

**Answer:**

* *Mobile devices may have limited memory. If so, the size of the kernel might be limited, and this might limit the features it can offer. In addition, the kernel might need to be more concerned with the allocation of memory to processes than it would in a general-purpose system.*
* *Power consumption is an important issue with battery-powered devices, so the kernel would need to control power usage by processes and I/O devices.*
* *A mobile device will probably have a slower or less-sophisticated CPU than a desktop or server machine. That means a mobile OS might need to be more concerned with the efficient allocation of CPU-cycles among processes than the OS of a larger system.*