The first part of the book mainly focuses on the foundations of pervasive systems with the related characteristics and research challenges, especially for the cultural heritage management problem.

The new capacities of pervasive and ubiquitous computing are defining new horizons for human creativity and connectivity. This is also because pervasive and ubiquitous computing is very often linked with other emerging technologies, such as semantic knowledge portals, objects in 3D, 2.0 and the semantic web, cloud computing, and open-source software. At the same time, there has been a rapid development in 3G and 4G networks as well as in the use of feature-rich smartphones. This means that everyone can be connected at anytime and anywhere. In the near future, the development of specific hardware as well as software will enable everyone to be in touch with everything and everywhere, thus closing the “circle of pervasiveness.” The Internet of the future promises to connect our mobile devices with everything (from the fridge in our homes to special sensors in our cars or even in our bodies), whenever and wherever we are. The Internet of the future, furthermore, will simultaneously generate and make available for everyone huge amounts of data. Scientific and technological research is proceeding so fast nowadays that often a semantic definition (e.g., pervasive and ubiquitous computing) has no time to become established by scholars before some other innovative device emerges in the market. Meanwhile sociocultural styles change and the cost of data management and acquisition is on the decrease. Cloud computing, for example, allows small firms to transfer the cost of hardware and data management to third parties (such as Google, Microsoft, etc.), which makes it possible even for them to have easy access to large amounts of information at low cost. The same is promised with the Internet of Things.

Chapter 1 analyzes and systematizes the abovementioned aspects, and, by means of some examples from the realm of cultural heritage, it shows how new technologies have radically changed cultural and economic models.
Chapter 2 introduces the main architectural issues concerning pervasive systems with the essential technological aspects involved in their implementation and deployment. The authors focus on some typical advanced data management topics that are useful prerequisites for the subsequent chapters such as relational and Not Only SQL (NoSQL) data management, real-time and main memory database management systems, big data, and data analytics.

The globally interconnected society we live in entails an increased exposure of possibly sensitive information and new risks of privacy vulnerabilities. Chapter 3 surveys the main issues related to privacy emerging in pervasive scenarios and discusses some approaches toward their solution.