

Sistemas de Computação Móvel e Ubíqua

2018/2019

First Test: 15/04/2019

Duration: 1:20h

Closed book test

1. Scene analysis can be used to infer the location of an entity (person or object), describe how it works and possible techniques to implement it.
2. Cricket was one of the first indoor location systems, it used two different types of transmission signals (ultrasound and radio). Briefly explain its main principles of operation, particularly why the need of two types of transmission signals.
3. What is the response time of a sensor? What factors can influence this sensor characteristic? Suggest at least a possible way to minimize its influence on a system behavior.
4. Enumerate and explain the main factors to consider when choosing a sensor to measure a distance for a given project? You can use examples to better explain and clarify your answer.
5. Give a simple definition for sensor, sensor node and sink. (You may use examples to better justify and illustrate your answer).
6. What are the main factors that influence the design of a Wireless Sensor Network (WSN).
7. A museum is interested in installing a system that allows the evaluation of which art works on exhibition are more popular among the visitors. The museum has about 20 works of art in exhibition (mostly paintings), distributed over several spaces (total area approximately 300 square meters) The system should be the least intrusive possible and should require the least possible intervention by visitors (ideal none). The maximum number of visitors at the same time at the museum never exceeds the number 30. In addition to the information on which works are most popular among visitors on each day, the museum manager must also be able to access the information (in real time) on his mobile phone regarding the number of visitors that are seeing a given art work at that moment.

Present an outline of your system proposal, describing its key software and hardware elements. Clearly define the sensors/actuators used and their control system and the communication infrastructure; also present a short but clear explanation of the infrastructure of your system and the interactions (communication) between the system's elements. Identify the main problems and restrictions/limitations of your proposal and justify your options.