MOBILE COMPUTING

Model exam

MIEIC – 5th year **duration: 1h 45m**

1. [3.5] Many mobile applications are integrated and work together with a business information infrastructure. That sharing between mobile application and business backoffice can be done at the interface, logic, and information level.

a) For each of these sharing levels state its usefulness and possible advantages and disadvantages (of doing that share).

b) Explain how that share and integration could be done, stating the used technologies, and considering the functionalities usually present in mobile platforms.

2. [3.5] The Android platform allows that an application could be formed by several types of components, with some independence between them, but contributing to the application ultimate goal.

a) State the supported Android applications' component types and their main purpose, as a part of an application.

b) Android supports *multi-tasking* and some devices even have *multi-core* processors. What applications' component types can explore better these characteristics of Android devices? Explain how.

3. [3.0] Many mobile applications need to invoke external services, implemented using *web services* technologies.

a) State the main differences between REST and SOAP services and some of their advantages and disadvantages.

b) How can a programmer minimize the effect of those invocations, in a mobile application, in the interaction between user and application? Explain how to do that and how the application can have access to the data potentially returned by the service.

4. [4.0] An application developed by a real estate company uses *push notifications* to warn their subscriber clients when there are new properties for sale. Clients have installed a mobile application in their devices, capable of receiving the push notifications and allowing consulting the characteristics and prices of the properties for sale.

a) Suppose that the real estate company would like also to receive buying offers from the clients and, after some time, announce to the clients that made an offer, who have won and who have lost this kind of auction. Describe some method of how to implement this new functionality.

b) If there is a maximum date limit to present buying offers for properties, describe how the client application should do for each user being warned, in its device, about the expiration of the offer deadline (for instance, with 24h advance), even if the client application is not running.

5. [6.0] A car parking enterprise intends to implement a service of personalized parking (*valet parking*), using initially only one collaborator. The client, when he intends to park, gives the vehicle to the collaborator at the park entrance, who will park it at a free place. When the client returns, he tells the collaborator its license plate number. The collaborator gets the vehicle from the place where it was parked and charges the parking fee, taking into account the parking time. At the end of the day the collaborator should report the number of vehicles that have used the service, the average parking time and the total charged fees.

To efficiently implement this service, the enterprise intends to equip the collaborator with a mobile device with the appropriate software.

a) Design an application allowing this collaborator to execute efficiently the described tasks. State and schematize (using diagrams) mainly the following aspects:

- Needed information, its organization and storage;
- Main user interface screens, explaining execution and operation flow;
- Hardware infrastructure and communications, if needed;
- Application general architecture block diagram.

b) Suppose now that there will be more than one collaborator working simultaneously, and that any of them can retrieve a parked vehicle. What modifications should you introduce in your previous design, allowing to efficiently support this scenario.