COMPUTER SCIENCE TRIPOS Part II – 2014 – Paper 9

7   Mobile and Sensor Systems (CM)

(*a*) (*i*) Compare the infrastructure-based and infrastructure-less modalities of the Wi-Fi (802.11) standard. [2 marks]

(*ii*) Design an efficient infrastructure-less system that displays the slides of a lecture to the tablets (such as iPads, etc.) of the students. The slides are initially stored only on the lecturer's laptop. Describe briefly the architecture of the system, focussing on the communication aspects. [4 marks]

(*iii*) Introduce and describe an efficient mechanism for allowing students to add annotations and comments to the slides during the lecture. The annotations should also propagate on all students' copies. [4 marks]

(*b*) (*i*) Define the principles of "participatory sensing" and describe an example of it. [2 marks]

(*ii*) Discuss an application using the smartphone's microphone as a sensor and the issues related to performance and device constraints. [4 marks]

(*iii*) Assume that you have to build an application that periodically collects data from the phone's accelerometer sensor and uses this information to classify user activities. The result of the classification is then sent to a back-end server. You should assume that the classifiers run on the phone. Describe the strategies you would adopt in order to reduce the energy consumption. [4 marks]