COMPUTER SCIENCE TRIPOS Part II – 2014 – Paper 8

13 Topical Issues (RKH)

Retailers anticipate using Bluetooth Low Energy (BLE) beacons distributed around a store to provide location-based marketing information. The beacons regularly send their unique identifier via BLE advertisements. A smartphone that receives an identifier can then look up the related information to display.

(*a*) State and explain three optimisations in the BLE technology that would allow the beacons to operate on a single coin cell for many months or years.

[6 marks]

(*b*) If the smartphone is given a spatial map of the beacons, it can also provide customer tracking around the store.

(*i*) Explain how signal fingerprinting could be used to track customers in this context. Explain how fingerprints are formed and include an example matching metric in your answer. [4 marks]

(*ii*) Give three advantages of BLE fingerprinting over the more traditional WiFi fingerprinting. [3 marks]

(*iii*) Discuss the practical issues you would expect to see in a BLE fingerprint system for retail. [7 marks]