

7 Mobile and Sensor Systems (CM)

NewZee Natural Reserve is experimenting with mobile and sensing technology to track the behaviour of its animals and the movement of its customers. The Reserve is located in an area of generally good cellular coverage. The Kiwi Paradise is a special enclosure 10km square, within the reserve, where kiwi birds are bred and kept. The enclosure is in the most remote part of the reserve and cellular connectivity is not present in the area. Kiwi birds are non-flying birds, slightly bigger than chickens.

- (a) Describe the hardware details of a system of your choice to monitor the interactions and mobility of the kiwi birds in the Kiwi Paradise enclosure. State all your assumptions. [4 marks]
- (b) Describe the software (MAC and Routing) aspects of the system defined in answer (a) as well as the energy consumption implications. [7 marks]
- (c) Kiwi birds are threatened by non-flying predators (such as possums). Describe an extension to your system which is able to detect the intrusion of the predators in the enclosure and raise alerts. Justify your choice. [5 marks]
- (d) The reserve would like to monitor the movement and behaviour of the customers on its grounds. As indicated above, apart from the Kiwi Paradise enclosure, the reserve is under good cellular coverage. Describe how the customers' smart phones can be used to understand customers' behaviour in the reserve (excluding the Kiwi Paradise enclosure). [4 marks]