The University of Nottingham

SCHOOL OF COMPUTER SCIENCE

A LEVEL 4 MODULE, SPRING SEMESTER 2010–2011

MOBILE DEVICE PROGRAMMING

Time allowed ONE hour

Candidates may complete the front cover of their answer book and sign their desk card but must NOT write anything else until the start of the examination period is announced

Answer any TWO questions

Marks available for sections of questions are shown in brackets in the right-hand margin

Only silent, self-contained calculators with a single-line display are permitted in this examination.

Dictionaries are not allowed with one exception. Those whose first language is not English may use a standard translation dictionary to translate between that language and English provided that neither language is the subject of this examination. Subject specific translation dictionaries are not permitted.

No electronic devices capable of storing and retrieving text, including electronic dictionaries, may be used.

***DO NOT** turn examination paper over until instructed to do so*

1

(*a*) Mobile devices are built using a technology called '**System–on–chip**'. Briefly explain what is meant by the term '**System–on–chip**'. (5)

(*b*) Mobile Devices tend to be battery powered. Outline some of the techniques you can use to optimize your mobile app to ensure to maximise battery life. (10)

(*c*) One of the major drains on the battery of a mobile device is the 3G radio. Explain how badly written network code can cause the 3G radio to drain the battery and how you might rewrite the networking code to save battery life. (10)

2

(*a*) The three major components used in an Android app are the `Activity`, `Service`, and `ContentProvider`. Describe the role and responsibilities of each component and how they might be used in a typical Android app. (8)

(*b*) Describe the role of `Intent` objects in an Android app, and discuss how one would be used to start a new `Activity` or `Service`. (7)

(*c*) The Android system maintains a stack of `Activity` objects. Outline the lifecycle of an Android `Activity`, the methods that are called to inform it of its state and how they interact with the `Activity` stack at the different stages of their lifecycle. (10)

3

(*a*) Most modern mobile devices are based around multitouch-based interfaces. Outline some of the differences between touch-based interaction and a traditional mouse-driven GUI, and what effect this has on designing a touch-based app. (10)

(*b*) Describe, in general terms, how the Android SDK informs the program about multitouch events. Explain how you could use these events to interpret a two-finger pinch to zoom gesture on a multitouch display. You should outline the steps your program would need to take, the data it would need to store and how it would calculate the zoom factor. (15)