



FIRST SEMESTER EXAMINATIONS 2011/12

MOBILE COMPUTING (Mock Paper)

TIME ALLOWED : Two and a Half Hours

INSTRUCTIONS TO CANDIDATES

Attempt all FOUR questions in Section A.

Attempt TWO of the three questions in Section B.

In this Mock paper we have not included any Section B questions.

If you attempt to answer more questions than the required number of questions (in any section), the marks awarded for the excess questions answered will be discarded (starting with your lowest mark).

SECTION A

Attempt all FOUR questions from this section. Section A is worth 40 marks.

1. Discuss three of the primary technological challenges that are faced in developing location-based Augmented Reality applications. Discuss the potential hazards of using such applications on a mobile device, when compared to using such systems within an indoor laboratory environment. **(10 marks)**

2. The Desktop and Mobile E-Commerce experience can differ wildly. Describe one limitation and one advantage of using a mobile device for e-commerce. **(5 marks)**

Speculate on how RFID sensors could be used to transform a mobile device into a self-pay point-of-sales device? How could a store differentiate between legitimate purchases and shoplifted goods?

(5 marks)

3. Objective-C makes use of reference counting to assist in the management of dynamically allocated memory objects. Discuss how reference counting works through the use of `retain` and `release`, and describe how these methods can result in memory being returned to the heap. **(4 marks)**

As a rule of thumb, a developer should never make use of the `dealloc` method. What is the one exception to this rule, and why? **(2 marks)**

It is often desirable for a method to dynamically allocate memory for a new object from the heap, but then return that object to the calling method (see the incomplete example code fragment below). Describe the problems associated with this, and explain how this could be overcome.

```
- (NSString *) getScoreStr {
    NSNumber *score = [[NSNumber alloc] initWithInt:4];
    NSString *rStr = [[NSString alloc]
        initWithFormat:@"Score: %@", score];
    [score release];
    return rStr;
}
```

(4 marks)

4. Assume a GSM Base Transceiver Station cell is split into 3 sectors, with each sector covered with 2 transmitter/receiver pairs. Also assume that each transmitter/receiver pair uses 1 time slot for signalling, and an additional time slot for GPRS data. Given a theoretical call profile model of 2 minutes per hour, what would be the subscriber provision for that cell? **(6 marks)**

If the demand for data increases the number of time slots needed for GPRS data from 1 to 3 time slots per transmitter/receiver pair, how many additional transmitter/receiver pairs will be needed per sector to maintain the same subscriber provision for that cell? **(4 marks)**