**GRIFFITH COLLEGE DUBLIN**

**QUALITY AND QUALIFICATIONS IRELAND**

**EXAMINATION**

**BACHELOR OF SCIENCE (HONS) IN COMPUTING SCIENCE**

**STAGE IV**

**EMERGING TECHNOLOGIES**

**Module Code: BSCH-ET**

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**Date: 6th May 2015 Time: 9.45-12.45**

**THIS PAPER CONSISTS OF FIVE QUESTIONS**

**FOUR QUESTIONS TO BE ATTEMPTED**

**ALL QUESTIONS CARRY EQUAL MARKS**

**QUESTION 1 (custom views and multitouch)**

(a) “Object creation and destruction in the onDraw() method is detrimental to performance”. Explain why this is the case and devise a general method for creating and destroying objects in a custom view. Explain why your method works.

**(8 marks)**

(b) OpenGL ES maintains a stack of 4x4 matrices for rendering purposes. Explain why this is maintained and how it affects custom view drawing. Evaluate the consequences if this matrix stack is not used during custom drawing.

**(10 marks)**

(c) “Multitouch gestures may be used to reduce the number of UI components in a custom view”. Evaluate this statement with respect to UI clutter and defend your answer with two examples.

**(7 marks)**

**Total (25 marks)**

**QUESTION 2 (dalvik and art)**

(a) Differentiate between ART and Dalvik's use of bytecode. Compare both approaches in terms of installation times, performance and battery usage.

**(8 marks)**

(b) “Early versions of Dalvik introduced the NDK for certain applications”. Justify why the NDK was needed and explain the differences between the SDK and the NDK. Are there any disadvantages to this approach? If so why?

**(8 marks)**

(c) “The open source Linux kernel was chosen to be the basis of Android OS” Defend this decision by explaining the benefits of using such a kernel as the basis of Android.

**(4 marks)**

(d) An initial decision of Dalvik was not to support swap space. Explain what swap space is and why it would be detrimental to the Android system as a whole.

**(5 marks)**

**Total (25 marks)**

**QUESTION 3 (sensors)**

(a) Android has two methods of determining the location of a device in the world. Explain how both methods work. Is it also considered a good idea to use both methods? Explain why one should devise a plan for determining when each method should be used.

**(8 marks)**

(b) “Sensor poll rates, accuracy and battery usage are all correlated”. Justify this statement and explain the different default rates that are available for sensors.

**(8 marks)**

(c) Generally when using sensors it is necessary to register and deregister interest during the lifecycle of an activity. Interpret this statement by explaining where the sensors should fit in the lifecycle. If there are any exceptions to this rule justify them.

**(9 marks)**

**Total (25 marks)**

**QUESTION 4 (design patterns)**

(a) “Android applications generally fall into one of three forms.” Compare and contrast each of these forms. Give an example of each.

**(6 marks)**

(b) “When using an action bar it is necessary to prioritise actions”. Justify this statement by explaining how the action bar works and evaluate how actions are prioritised.

**(14 marks)**

(c) Describe the concept of a heads up notification. Argue why their use should be strictly limited. And provide examples of where they can be used.

**(5 marks)**

**Total (25 marks)**

**QUESTION 5 (android programming)**

(a) You are required to implement a custom drawing operation in a custom view. You must draw 16 squares, 12 in green and 4 in red that are angled by 45 degrees. Every 4th square will be red. Construct an onDraw() method to do this drawing. You may assume you have the following variables: square\_x, square\_y which are arrays that hold the position of each square; a Rect object called r which represents the square, and two Paint objects red and green, which represent the red and green colours, respectively. Your code must make use of the matrix stack.

**(10 marks)**

(b) Write code that will initialise an array list for storing locations. It should get access to a location manager and add a listener to listen for a location update every 10 seconds. When a location is received it should be added into an array list and print the latitude and longitude as an information message in the log. You are not required to implement the unnecessary methods of the listener.

**(9 marks)**

(c) Justify why android applications should be optimised. Evaluate what a user should do if an application has poor performance and why they should do this.

**(6 marks)**

**Total (25 marks)**