

INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 4
Semester	Repeat
Date of Examination	
Time of Examination	

Prog Code	BN402	Prog Title	Bachelor of Science in Computing in Information Technology	Module Code	COMP H4025
Prog Code	BN104	Prog Title	Bachelor of Science (Honours) in Computing	Module Code	COMP H4025

Module Title	Ubiquitous Computing
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Internal Examiner(s): *Dr. Simon McLoughlin*
External Examiner(s): *Mr. Michael Barrett*
Dr. Tom Lunney

Instructions to candidates:

- 1) To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.
- 2) Answer any four questions. All questions carry equal marks.

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Question 1 (25 marks)

- a) Briefly describe the area of computing known as Ubiquitous Computing. [4 marks]
- b) Describe four best Android practices when creating apps for multiple screen sizes and densities. [8 marks]
- c) What is an Android Activity? Briefly describe the Activity lifecycle. [5 marks]
- d) Write a simple Android Activity that has a ButtonView and a TextView and displays the number of times the button was clicked in the TextView. You can assume the existence of the layout. [8 marks]

Question 2 (25 marks)

- a) Describe the purpose and usage of Intents within the Android Framework. Distinguish clearly between implicit and explicit intents in your answer. Use Java code examples in your answer. [8 marks]
- b) Show using Java code how you can pass both primitive data and custom objects between Activities using Intents. [6 marks]
- c) Distinguish between a Service and an IntentService. List the steps involved in creating a service. [4 marks]
- d) What is a Pending Intent in Android? Write a simple Notification Activity that uses one (you may assume the existence of the Activity layouts). [7 marks]

Question 3 (25 marks)

- a) Explain why Bitmaps should be handled carefully in Android applications.
they use a lot of memory [4 marks]
- b) Write a Java code snippet showing how the BitmapFactory.Decode... method is used to load a smaller version of a Bitmap image into your application. You can assume the existence of a method called calculateInSampleSize(...) that calculates the size of the smaller Bitmap based on a requested size.
Load in a scaled version of a bit map [5 marks]
- c) What are the steps involved in capturing pictures and displaying a live video feed from the camera in a custom Android application. Discuss the relevant classes and methods required to achieve this. [6 marks]
- d) Briefly describe four different types of animation you might use in an Android application. [4 marks]
- e) Write a method that will crossfade two views in an Android user interface. You can assume the existence of the layout and Activity. [6 marks]

Question 4 (25 marks)

- a) Describe the main classes and interfaces (4 altogether) that are part of the Android Sensor framework. State the function of each. [8 marks]
- b) Explain the significance of the getMinDelay() method when using Sensors. [3 marks]
- c) Draw a brief sketch of the sensor coordinate system. Show the default orientation for the device in your sketch. [4 marks]
- d) Implement the onSensorChanged() event handler of the SensorListener for an accelerometer so that it returns the linear acceleration(i.e. removes the gravity component). [6 marks]
- e) What is device orientation, and how should you obtain it in an Android application. In terms of device orientation, what are roll, pitch and azimuth with respect to the device coordinate system? [4 marks]

Question 5 (25 marks)

- a) Describe the concept of a BroadcastReceiver in the Android Framework. Write a short BroadcastReceiver that registers for the System phone broadcast and logs a message when it receives one. Give the necessary XML from the application manifest also.

[11 marks]

- b) Describe four best practices for optimising the performance of your Android application.

[8 marks]

- c) Outline the steps involved in using a ThreadPool object to send operations to multiple threads.

[6 marks]