DUBLIN INSTITUTE OF TECHNOLOGY

DT228/3 BSc. (Honours) Degree in Computer Science

DT8900/1 International Pre Masters for MSc in Computing

WINTER EXAMINATIONS 2017/2018

MOBILE SOFTWARE DEVELOPMENT [CMPU3026]

DR. SUSAN MCKEEVER
DR. DEIRDRE LILLIS
MR.PATRICK CLARKE

FRIDAY 19TH JANUARY 2.00 P.M. – 4.00 P.M.

TWO HOURS

INSTRUCTIONS TO CANDIDATES

QUESTION 1 IS COMPULSORY.

ANSWER QUESTION 1 AND TWO OF THE REMAINING THREE QUESTIONS.

QUESTION 1 CARRIES 50 MARKS. ALL OTHER QUESTIONS CARY 25 MARKS EACH.

Q1. **(a)** Write the XML code for the *row layout* required for the list shown in Figure 1.

(10 marks)

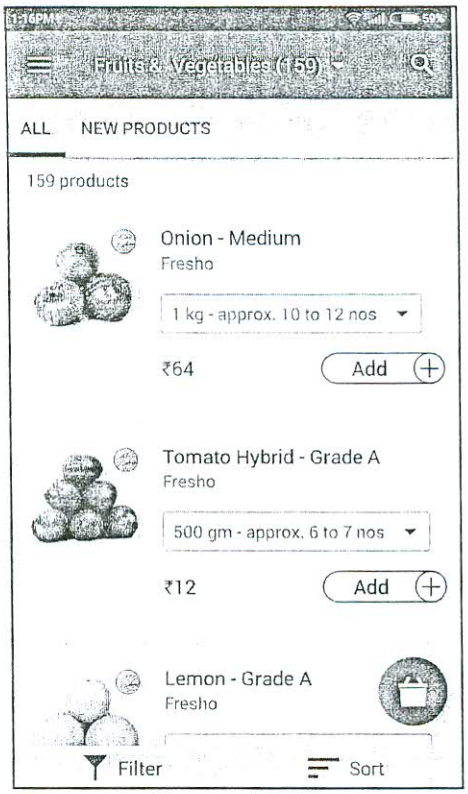

Figure 1 List

(b) Android uses *resources* for static information. Describe the following:

(i) Two examples of how resources (held in the `res` directory) can be used to simplify software maintenance. (5 marks)

(ii) How resources play a part in making Android compliant with Model-View-Controller principles. (5 marks)

(10 marks)

(c) Explain the use of *custom* adapters in Android list development. In your own words, explain how to *implement* a custom adapter based on using an array as the data source.

(10 marks)

(d) Answer, with explanation, the following questions about the code in Figure 2:

(i) Pick out an example of *casting* and explain its use. (4 marks)

(ii) What class does the `inflate()` method belong to? (line 25) (3 marks)

(iii) Why are the brackets <> used? (line 18) (3 marks)

(iv) How would you change the code in order to *encapsulate* the attributes of the `MyFragment` class? (3 marks)

(v) What class does the setAdapter() method belong to? (line 31) (3 marks)

(vi) What do *static* and *final* mean as used in line 5? (4 marks)

(Q1(d) 20 marks)

```
1 public class MyFragment extends Fragment
2 {
3    ThingsAdapter adapter;
4    FragmentActivity listener;
5    static final maxCount = 2;
6
7
8   public void onAttach(Context context) {
9        super.onAttach(context);
10        if (context instanceof Activity){
11            this.listener = (FragmentActivity) context;
12       }
13   }
14
15
16   public void onCreate(Bundle savedInstanceState) {
17       super.onCreate(savedInstanceState);
18        ArrayList<Thing> things = new ArrayList<Thing>();
19        adapter = new ThingsAdapter(getActivity(), things);
20    }
21
22
23    public View onCreateView(LayoutInflater inflater, ViewGroup parent,
24   Bundle savedInstanceState) {
25        return inflater.inflate(R.layout.fragment_some, parent, false);
26    }
27
28
29    public void onViewCreated(View view, Bundle savedInstanceState) {
30        ListView lv = (ListView) view.findViewById(R.id.lvSome);
31        lv.setAdapter(adapter);
32    }
33
34 }
```

Figure 2: Sample code

Q2. (a) Explain what choices you would recommend for *persistent data storage* for the following app:

The Sports News app will be used to share sports commentary from people attending sports events. Users will use the app to contribute sports updates in real time if they are at a sports event or to read sports comments supplied by other users. Users can choose which particular sports they want highlighted in their news feed and notifications.

(10 marks)

(b) The Sports News app described in Q2(a) will be developed as a native Android app. Explain how a developer can investigate the audience size when deciding what target API and device sizes to cater for in the app.

(5 marks)

(c) If version 2 of the Sports News app is now being released, how does the developer trigger an update of the database on the phone when Version 2 of the app is downloaded?

(5 marks)

(d) Explain the purpose of *content providers* in Android.

(5 marks)

(Q2 25 marks)

Q3. **(a)** Explain the following:

(i) The purpose of and differences between *AsynchTask* and *Intent Service.*

(5 marks)

(ii) The support for the *Model View Controller* architecture in Android.

(5 Marks)

(b) A developer opens a new blank activity in Android Studio. Answer the following:

(i) When the new activity class is created in Android Studio, it extends AppCompatActivity. What is the AppCompatActivity class? (5 marks)

(ii) The developer wants to use the activity to manage a list, so would prefer to use ListActivity as the super class. How will the use of ListActivity as a super class change their activity code, over the use of AppCompatActivity as a super class?

(5 Marks)

(c) Explain how Android lifecycle methods, such as `onPause()` and `onResume()` can be used to make an app run more efficiently.

(5 marks)

Q4. **(a)** Explain, mentioning any advantages, how nested classes can be used to implement the following in Android.

(i) Implementation of listener functionality for user interface components, such as button click responses; (5 marks)

(ii) Custom adapter classes for lists. (5 marks)

(10 marks)

(b) Explain the steps involved in setting up Location *tracking* and *responses* to location changes in an Android app.

(10 marks)

(c) Explain five factors to be considered when choosing to develop a mobile app as a native app (e.g using Android) versus a hybrid app (e.g. using PhoneGap).

(5 marks)