

CS/SE Individual Practical 2011/2012

Feedback on Submissions for Part 2

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1 About this document ...

Your submissions to the second part of the Individual Practical were marked anonymously following the criteria stated in the practical handout (see page 11 of that document particularly). Comments on your submissions are being retained at the request of the School's external examiners in the same way that examination script books are retained. This document is intended to serve as a guide to the marking of the submissions and explain where students lost marks. Please recall that all marks are provisional until ratified by the board of examiners.

2 Introduction

The Individual Practical represents a substantial software development project, involving many hours of work of different kinds. This year the work to be done for the CS/SE Individual Practical included creating and accessing databases, and designing, implementing, debugging, and testing Android code to assist visitors travelling to the Informatics Forum. It is likely that for many people in the class that this is one of the largest software projects which they have worked on, and that they found it challenging but also hopefully interesting and worthwhile. I hope that they also learned quite a lot in the process.

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The Individual Practical is concerned with both *Computer Science* and *Software Engineering*. The Computer Science part was found in the concepts of developing for the Android platform, separating format and application logic, and understanding the virtual device and the Android emulator and debugger. In Software Engineering one is always dealing with a set of imprecise and incomplete requirements. One challenge is to try to identify the silent, unstated requirements which were “too obvious to write down” and then try to fulfil these requirements as well. In the particular case of this practical exercise to produce an app to help visitors find the Informatics Forum one unstated requirement could be that the app should include a picture of the Forum. Not including a picture of the Forum seems like a missed opportunity. This software engineering challenge was coupled with the challenge of working with a complex “real-world” API (the Android API, using cursors, toasts, and other unfamiliar concepts) necessitating making pragmatic compromises between what would be ideal and what is practical.

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Some parts of this practical exercise are designed to test your software engineering skills particularly in the area of managing the details. Much practical software engineering requires you to do work which poses little or no technical challenge: the problem is simply that there are a lot of small details to be taken care of and unless you are methodical it is very easy to forget to address some of these details. It is particularly easy to forget these small details exactly because they are not technically interesting and they have no special value to you (and thus there is no special reason for you to remember them).

In addition to the attention to detail, another important skill to practice during long development efforts is “holding purpose”. That is, you should understand what the purpose of the development effort is and keep the development on track as it goes along. It is tempting to invent additional requirements as the project is progressing. These additional requirements may very well be more interesting than the original purpose of the development. It requires willpower to stick with the original purpose and disregard the exciting alternatives found along the way. In marking the practical exercise it became evident that in some cases people have become more excited about these additional requirements to the detriment of what was actually asked for. Examples of these includes apps where people had implemented a walking tour of Edinburgh complete with pictures of statues and sights of architectural interest.

3 Expectations

You worked on the Individual Practical throughout the entire first semester. You very likely had to learn a lot of new concepts for the practical, and spent a long time developing your

application. You wrote a lot of code and tested it. It took ages getting the emulator installed on your laptop and then it's so awfully slow when you use it. What if the mark which you have been assigned is quite a bit lower than the mark which you believe you deserved? How could this happen? You feel that you did a lot of work for the practical: why isn't your mark higher?

The first thing to note is that you *should* have done a lot of work for the practical. This is a substantial component of your degree, representing 100 hours of effort, and so it should be a lot of work. The second thing to note is that the grades on the course *were* high: the majority of students got a grade A, and the average mark for the course was 75.25%. This is higher than the expected average for a third-year course.

(Note that the unit of assessment is not Part 2 alone, it is the weighted sum of the mark for Part 1 and Part 2. If you feel that your mark for Part 2 is significantly lower than expected then calculate your final result and ask whether this is significantly lower than you expected.)

As a guideline, the relationship between completion of the practical and grades awarded is as follows.

- A submission for the Individual Practical which meets all of the requirements for the practical should expect to get a grade A, but not necessarily a high A, unless the quality of the Java code is exceptionally good, and it is well documented and complete.
- A submission for the Individual Practical which meets most of the requirements for the practical (but not all of them) should expect to get a grade B. This also applies if the submission comes with little documentation.
- A submission for the Individual Practical which meets some of the important requirements for the practical (but not most of them) should expect to get a grade C. This also applies if the submission comes with no documentation.
- A submission which fails to compile or seems to have only very limited functionality should expect to get a grade D or below.

Another way to interpret your grade is the following. If you evaluated your work to estimate a grade in the 80s or 90s then your work should really be exceptional, not just excellent. You might like to take a moment to reflect on whether you usually get marks in the 80s or 90s for your courses. If not, then you might have estimated the value of your work slightly too highly.

4 Marks

4.1 Weightings for the two parts

Part 1 of the IP was worth 25%, but was marked on a pass/fail basis. Almost everyone passed this part, and so got 25% for this. Part 2 was worth 75% of the final mark and was marked on a percentage basis. The mark which counts for the course is not the mark for Part 2 but the weighted sum of the mark for Part 1 and the mark for Part 2.

4.2 Calculating your mark

To get your final mark for the IP, multiply your mark for Part 1 by 0.25 and multiply your mark for Part 2 by 0.75, and add these together. E.g.

$$100\% \times 0.25 + 52\% \times 0.75 = 64\%$$

5 Marking

5.1 Documentation

As specified in the practical handout, all submissions should come with documentation which includes screenshots showing your app loaded and working in the Android emulator. The guidance on marking warns that submissions with insufficient documentation will lose marks here. Despite this instruction and the associated warning, many submissions came with no documentation at all. Others came with very scant documentation (typically less than one page in length and containing no screenshots, some consisting of only one or two sentences). Some documentation came with only one or two screenshots and did not show much of the functionality of the app.

At the other end of the scale, some submissions came with long reports which documented both the process of creating the app and the app itself. These contained instructions on how to install Google map keys and other configuration instructions. They had numerous screenshots, some marked-up with an image editor in order to draw attention to particular features.

5.2 Submissions with errors or static analysis warnings

The practical handout specifies that the submitted Java code will be imported into Eclipse and inspected for errors or warnings. The course lectures gave further guidance on this explaining that Eclipse could be configured to check for errors more thoroughly than using the default settings. The guidance on marking warned that submissions with errors or static analysis warnings would lose marks here. Despite this, some submissions contained Java and XML code which did not even compile and many submissions contained Java code which generated warnings. These submissions accordingly lost marks.

5.3 Running the application on the emulator

The practical handout notes that it should not be necessary to push files onto the emulator in order to have the application run. Despite this, some submissions required that files such as the database of hotels and restaurants were pushed onto the emulator before starting the app. Accordingly, these submissions lost marks here.

5.4 Evaluating the app by searching for content

The content of the app includes:

1. the full address of the Informatics Forum;
2. travel directions to the Informatics Forum from Edinburgh Waverley train station and Edinburgh airport; and
3. lists of hotels and restaurants nearby together with information about their distance from the Forum and star ratings of quality.

The practical exercise states that the app should tell visitors useful and accurate practical information. The guidance on marking specifies that submissions which have insufficient content will lose marks here.

5.4.1 The full address of the Informatics Forum

Part 2 of the Individual Practical handout states that it should be possible to find the address of the Forum using your app and informs you that the address is “Informatics Forum, 10 Crichton Street, Edinburgh, EH8 9AB”. Despite this, many submissions did not include the address of the Forum. Some included a partial address with no postcode. Some gave the address of the Appleton Tower as the address of the Forum (i.e., “11 Crichton Street, Edinburgh, EH8 9LE”). Some submissions misspelled the name of the street (as “Chrichton Street” among other things). This was an example of a small and uninteresting task as encountered in practical software engineering where the problem was not *how* to do the task but *to remember to do the task at all*. Submissions which failed to include the full address of the Forum lost marks.

5.4.2 Giving travel directions to the Informatics Forum

Almost all submissions included travel directions to the Informatics Forum. Some missed obvious opportunities to add value here such as by making telephone numbers active so that users could (for example) call for a taxi. (Recall that we are writing our app for a phone after all.) Some submissions had insufficient content here by including the numbers of only one or two taxi companies (it seems that one should be able to provide more this).

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Some submissions lost purpose here and started to include irrelevant content (such as the best plane routes to travel to Scotland) and even content which was explicitly not required (such as information about car parking and driving in the city).

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Others added value here by providing both directions to and from the train station and the airport. This might at first seem unnecessary but it is perfectly possible for someone to arrive by plane and leave by train so providing instructions in both directions is a very helpful thing to do. Others added value by providing information about travel to the bus station. Of special note were those applications which provided access to live data about buses obtained from the bus tracker website and those applications which allowed users to add in taxi companies which the app did not already know about.

5.4.3 Lists of hotels and restaurants

As already noted, the guidance on marking for this practical states that submissions which have insufficient content will lose marks. Unfortunately, many apps contained details of too few hotels and restaurants. Typically, many apps contained five hotels or fewer and a similar number of restaurants. Some just contained schematic entries of the form Restaurant 1, Restaurant 2 etc. Many submissions lost marks here: having too little data greatly lessens the value of the app.

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Data quality was also an issue here. The practical exercise specifies that useful, accurate information is required but some submissions listed as hotels shops and other things which are simply not hotels. Some submissions contained errors such as incorrect names of streets. Others included in the database restaurants such as Koi which ceased trading before this practical exercise was issued.

Some submissions lost marks here because they did not implement any way to specify distances from the Forum (5 minutes, 10 minutes etc). This was explicitly stated as a requirement

for the practical, that the app should be "centred on the Forum". In some cases this was not addressed at all. In other cases people took this requirement very seriously and provided the functionality for users to specify distances in units of one minute and then put these into the correct categories (5 minutes, 10 minutes etc).

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Some submissions lost marks here because there was no way to update the database to add or delete entries. Some submissions lost marks here because they did not provide any way to specify ratings for hotels and restaurants. In some cases it was possible to enter this information into the database but then not to see it afterwards. Good submissions here had identified a reliable source of ratings (such as the tourist board for Scotland) and had included the ratings in the database already.

5.5 Other additional features of the application

Other additional features of the application were explored and submissions with useful additional features gained marks here. Useful additional features which were implemented here included maps; filters to select hotels and restaurants by distance or by rating; or currency exchange rates including links to live data.

5.6 Evidence of good programming style

The Java source code submitted was inspected for evidence of good programming style. As indicated in the guidance on marking, submissions with insufficient logging could lose marks here and similarly for submissions with too few Java comments. Many submissions lost marks here. Some submissions contained no logging and some contained very little. Some submissions were 100% documentation free. Many submissions contained only auto generated TODO comments.

5.7 Best practice and evidence of serious engagement

Many submissions for this practical were really excellent. The best submissions seemed to take great pains to produce a satisfying user experience including serious consideration of aesthetics such as design, colours, themes, images, and fonts. There seemed to be a concerted effort to produce a consistent and clear user interface. In some cases this involved adding additional navigation to the app so that one could move through the various activities without going step-by-step through the back button. In other cases this involves consideration of accessibility issues such as use of the app by users who have imperfect sight. A small number of apps provided additional interfaces in languages others than English. In some cases apps had been tested on a range of Android platforms and sometimes on more than one physical phone. All of these seemed to be evidence of people taking the practical seriously and wanting to practice additional skills over and above what was required.

6 Closing remarks

- Recall that you are studying at what some consider to be one of the best universities in the UK. A high academic standard is expected in both coursework and examinations: you are required to work hard for high marks.
- All marks are provisional until they are ratified by the Board of Examiners so it is still possible for your mark for the Individual Practical to be changed if the Board of Examiners considers that the marking has not been carried out well.