MODULE NAME:	MODULE CODE:
OPEN-SOURCE CODING (INTERMEDIATE)	OPSC7312

ASSESSMENT TYPE: POE (PAPER)

TOTAL MARK ALLOCATION: 300 MARKS

TOTAL HOURS: A minimum of 45 HOURS is suggested to complete this assessment.

By submitting this assignment, you acknowledge that you have read and understood all the rules as per the terms in the registration contract, in particular the assignment and assessment rules in The IIE Assessment Strategy and Policy (IIE009), the intellectual integrity and plagiarism rules in the Intellectual Integrity Policy (IIE023), as well as any rules and regulations published in the student portal.

INSTRUCTIONS:

1. ***No material may be copied from original sources, even if referenced correctly, unless it is a direct quote indicated with quotation marks. No more than 10% of the assignment may consist of direct quotes.***
2. ***Make a copy of your assignment before handing it in.***
3. *Assignments must be typed unless otherwise specified.*
4. *All work must be adequately and correctly referenced.*
5. *Begin each section on a new page.*
6. *Follow all instructions on the assignment cover sheet.*
7. *This is a group assignment.*

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Referencing Rubric

Providing evidence based on valid and referenced academic sources is a fundamental educational principle and the cornerstone of high-quality academic work. Hence, The IIE considers it essential to develop the referencing skills of our students in our commitment to achieve high academic standards. Part of achieving these high standards is referencing in a way that is consistent, technically correct and congruent. This is not plagiarism, which is handled differently.

Poor quality formatting in your referencing will result in a penalty **of a maximum of ten percent being deducted from the percentage awarded**, according to the following guidelines. Please note, however, that **evidence of plagiarism in the form of copied or uncited work (not referenced), absent reference lists, or exceptionally poor referencing, may result in action being taken in accordance with The IIE's Intellectual Integrity Policy (0023)**.

Markers are required to provide feedback to students by indicating **(circling/underlining) the information that best describes the student's work.**

Minor technical referencing errors: 5% deduction from the overall percentage – the student's work contains **five or more errors** listed in the minor errors column in the table below.

Major technical referencing errors: 10% deduction from the overall percentage – the student's work contains **five or more errors** listed in the major errors column in the table below**.**

If both minor and major errors are indicated, then 10% only (and not 5% or 15%) is deducted from the overall percentage. The examples provided below are not exhaustive but are provided to illustrate the error

Required: **Technically correct referencing style**	**Minor errors in technical correctness of referencing style** **Deduct 5% from percentage awarded**	**Major errors in technical correctness of referencing style** **Deduct 10% from percentage awarded**
Consistency • The same referencing format has been used for all in-text references and in the bibliography/reference list.	Minor inconsistencies. • The referencing style is generally consistent, but there are one or two changes in the format of in-text referencing and/or in the bibliography. • For example, page numbers for direct quotes (in-text) have been provided for one source, but not in another instance. Two book chapters (bibliography) have been referenced in the bibliography in two different formats.	Major inconsistencies. • Poor and inconsistent referencing style used in-text and/or in the bibliography/ reference list. • Multiple formats for the same type of referencing have been used. • For example, the format for direct quotes (in-text) and/or book chapters (bibliography/ reference list) is different across multiple instances.
Technical correctness Referencing format is technically correct throughout the submission. Position of the reference: a reference is directly associated with every concept or idea. For example, quotation marks, page numbers, years, etc. are applied correctly, sources in the bibliography/reference list are correctly presented.	**Generally, technically correct with some minor errors.** • The correct referencing format has been consistently used, but there are one or two errors. • Concepts and ideas are typically referenced, but a reference is missing from one small section of the work. • Position of the references: references are only given at the beginning or end of every paragraph. • For example, the student has incorrectly presented direct quotes (in-text) and/or book chapters (bibliography/reference list).	**Technically incorrect.** • The referencing format is incorrect. • Concepts and ideas are typically referenced, but a reference is missing from small sections of the work. • Position of the references: references are only given at the beginning or end of large sections of work. • For example, incorrect author information is provided, no year of publication is provided, quotation marks and/or page numbers for direct quotes missing, page numbers are provided for paraphrased material, the incorrect punctuation is used (in-text); the bibliography/reference list is not in alphabetical order, the incorrect format for a book chapter/journal article is used, information is missing e.g. no place of publication had been provided (bibliography); repeated sources on the reference list.
Congruence between in-text referencing and bibliography/ reference list • All sources are accurately reflected and are all accurately included in the bibliography/ reference list.	**Generally, congruence between the in-text referencing and the bibliography/ reference list with one or two errors.** • There is largely a match between the sources presented in-text and the bibliography. • For example, a source appears in the text, but not in the bibliography/ reference list or vice versa.	**A lack of congruence between the in-text referencing and the bibliography.** • No relationship/several incongruencies between the in-text referencing and the bibliography/reference list. • For example, sources are included in-text, but not in the bibliography and vice versa, a link, rather than the actual reference is provided in the bibliography.
In summary: the recording of references is accurate and complete.	In summary, at least **80%** of the sources are correctly reflected and included in a reference list.	In summary, at least **60%** of the sources are incorrectly reflected and/or not included in reference list.

Overall Feedback about the consistency, technical correctness and congruence between in-text referencing and bibliography:

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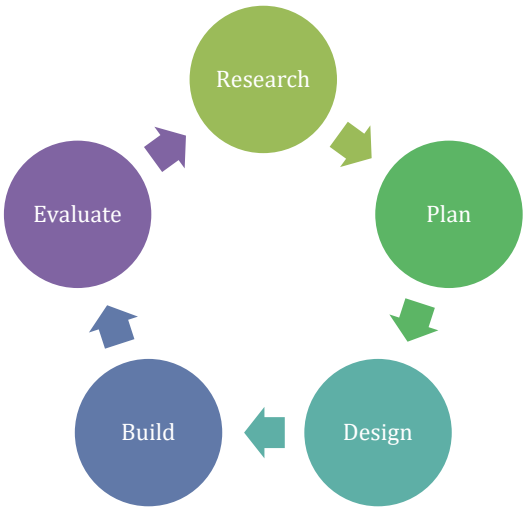
Portfolio of Evidence (PoE) — Background

This portfolio of evidence comprises of 2 tasks and the finalisation of your POE, each of which takes you through the process of conceptualising, designing, and building a mobile application.

You and your team members are going to create a basic **local landmark guide app**. The app must assist a user in finding local landmarks, for example statues, parks, interesting graffiti etc. The app must also provide the user with directions as to the shortest route to get to a chosen landmark. This information must also be displayed in a visually appealing manner (for example an interactive map) and use the **GPS** to track the user's position.

Finally, the app will need to be prepared so that it can be published on the **Google Play Store**.

To be able to create the app you and your team will need to use all the techniques you learnt during this course as well as doing your own research on how to complete some of the tasks required of you. It is also critical that you approach the project in a methodical and planned manner. For this reason, the project will follow a Research – Plan – Design – Build – Evaluate cycle:



This POE will run for one full cycle. After one full cycle you can always restart the process to further refine your app.

The different phases of the cycle will be related to the different tasks as follows:

Task 1: Research, Planning and Design

Task 2: Build

Final POE: Build and Evaluate

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Instructions

Each of the below tasks builds on top of each another. Be sure to complete or update one part before moving onto the next task. Each task will be individually assessed by your lecturer, and feedback for each task will be provided.

The exact features, design and layout of your app is up to you, but each app must be able to complete the **at least** following tasks:

- The user must be able to **register** using the app. This registration information must be stored in an online, hosted authentication service.
- The user must be able to **login** to the app using a username and password. This information must be retrieved from the online authentication service.
- The user must be able to change their **settings** (which should be stored in an online, hosted database) including but not limited to the following:
    - Toggle between using the metric system (kilometres) or using the imperial system (miles)
    - Preferred type of landmark (for example historical, modern, popular)
- The user must be able to **view nearby landmarks on a map** (use a webservice to obtain this information). The map component must be embedded in the app.
- The app must **display landmarks filtered** according to the preferred type of landmark based on the setting chosen by the user.
- The app must display the **user's current position** on the map.
- The user must be able **select a landmark** on the map to get information regarding the landmark including directions to the landmark.
- The app must then be able to **calculate the best route** between your current location and the landmark. (You can create this algorithm yourself or obtain this information from a webservice.)
- The app must display the **estimated time and distance** to the destination.
- The app must display the distance to the destination in **kilometres** or **miles**, depending on the setting chosen by the user.
- The app must also display this route **visually** (on the embedded map).
- The user must be able to store a **list of favourite landmarks** which gets saved to the database.

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These features are the **minimum** that's required. Your app also needs to work logically and be easy to use. Speak to your lecturer about how best your app can implement all these features.

Task 1 (Marks: 100)

This task is composed of two sections, weighted equally:

- Research
- Planning and design

Research (Marks: 50)

LU 1 to 2

For this task you are required to research **three** existing apps, that showcase local landmarks, that are available on the Android Operating system. You will need to present your findings in the form of an **infographic poster** with the following sections:

- Introduction
- Research on each mapping app including:
  - Overview of the app
  - Strengths and Weakness of the app
  - How you think the app was implemented based on your knowledge of Android Studio App development
  - Screenshots of the app
- A comparison of all three apps
- A list of the best features of all the apps that you want to use in your final app
- Conclusion
- References

The information **must be submitted in the form of an infographic poster**, so focus on presenting all the relevant information in a **visual way**.

Make sure you **reference** correctly for this task. Referencing is still just as important, even though the information is presented in a visual format. You may choose to provide the **list of references** in a **separate document** for the sake of readability.

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Planning and Design (Marks: 50)

LU 1 to 2

For this task you will need to fully design your mapping app. The purpose of this task is to ensure you know exactly what you need to build and how you will build it before you start with task 2. You will need to present you design as a typed PDF document (1000 to 1500 words) with the following sections:

- Introduction
- A brief **overview** of the app, including a **name** for the app, an initial **icon design**, and a **description** of the **innovative features** that you are planning to include.
- A **detailed list** of the **requirements** for the app. The requirements must include all the minimum requirements from this document, but you must elaborate on each of those requirements rather than just copying them. And remember to add your own features that you want to include, for example gamification. The requirements must be detailed enough for someone else to be able to build your app by just reading this document!
- **User interface design** including a **mockup** for **each screen**, a **description** of the purpose of the screen, and a **diagram** showing how the user navigates between the various screens.
- Detailed listing of the **data** that the app needs to capture from the user and store, including data types.
- **Project plan** detailing deadlines and milestones for the project, in the format of a **Gantt chart**. Break down the tasks into **smaller tasks** than just "implement the prototype". Include some time for testing and bug fixing.
- Conclusion
- References

Maximum Word Count: 1500

Submit the following:

- **Infographic** in PDF format (with optionally a **separate references document**, also as a PDF)
- **Planning and design document** in PDF format

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Task 2 — App Prototype Development (Marks: 100)

LU 1 to 4

For this task you will need to build a **fully working prototype**. This prototype needs to include all the features listed in the **instructions** section of this document but based on your own design and user interface layout. **The app must compile and run for marks to be awarded for the features of the app.**

Additional features specified in your design document can be deferred until the final POE submission. And final assets (for example images) do not need to be included in the prototype.

You must create a **demonstration video** showing the prototype running in an **emulator**. For the video, make sure that you show the app performing the following functions:

- The user must be able to **register** using the app. This registration information must be stored in an online, hosted authentication service.
- The user must be able to **login** to the app using a username and password. This information must be retrieved from the online authentication service.
- The user must be able to change their **settings** (which should be stored in an online, hosted database) including but not limited to the following:
    - Toggle between using the metric system (kilometres) or using the imperial system (miles)
    - Preferred type of landmark (for example historical, modern, popular)
- The user must be able to **view nearby landmarks on a map** (use a webservice to obtain this information). The map component must be embedded in the app.
- The app must **display landmarks filtered** according to the preferred type of landmark based on the setting chosen by the user.
- The app must display the **user's current position** on the map.
- The user must be able **select a landmark** on the map to get information regarding the landmark including directions to the landmark.
- The app must then be able to **calculate the best route** between your current location and the landmark. (You can create this algorithm yourself or obtain this information from a webservice.)
- The app must display the **estimated time and distance** to the destination.

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- The app must display the distance to the destination in **kilometres** or **miles**, depending on the setting chosen by the user.
- The app must also display this route **visually** (on the embedded map).
- The user must be able to store a **list of favourite landmarks** which gets saved to the database.

The **demonstration video** must effectively demonstrate all the features of the app and be fully **professional**. The video must include a **voice over** explaining what you are showing. The video must also show what data is stored in the **online hosted authentication service** and **database**.

The app must have a user **friendly** and **appropriate user interface**, that is able to handle **invalid inputs** made by the user without crashing. The app must be working with only **minor bugs** and errors.

Submit the following:

- A **zipped copy** of your **source code**.
- **Demonstration video**.

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POE — Final Asset Development, Additions, Tweaking and Final Submission (Marks: 100)

The final app needs to run on a **mobile phone** and not an emulator. This means that you need to **plan well in advance** to record the required video on a mobile phone if you don't own an Android phone yourself.

For this submission, the app should be fully working app without errors, that has been updated based on the **feedback** your lecturer has provided you throughout the course. The app will need to **connect** to a **hosted** database and authentication services, so ensure that you have access to the database **before** you submit your app. **The app must compile and run for marks to be awarded for the features of the app.**

In addition to the features specified by this document, you must have:

- **Your own features** as described in your design document.
- An **app icon** and final **image assets**.

The app will also need to be **ready** to be **published** on the **Google Play Store. Bonus marks** will be awarded if your app is approved for publication on the Google Play Store. Make sure that you plan so that you can upload the app a few days before the deadline to the Google Play Store, to allow for the Google Play Store approval process that can take some time.

You must create a **demonstration video** that effectively demonstrates all the features of the app running on a **mobile phone** and it must be fully **professional**. The video must include a **voice over** explaining what you are showing, and it must show that the data is **stored online**.

Tip: OBS (Open Broadcaster Software) is free and open-source software that allows great flexibility for adding audio to a video recorded with a screen recorder on your phone!

Update your **research** and **design documents** according to the feedback that you received in task 1, as well as to reflect your app as implemented.

Submit the following:

- Zipped copy of the **source code.**
- Updated research and design **documents.**
- **Demonstration video.**

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- **Release notes** (can be a text file) that lists all the updates that have been made to the app since the prototype.
- Evidence of **preparation for publication**: signed APK, screenshots, as well as a screenshot of the app uploaded on the Google Play Console and/or published on the Google Play Store if applicable.

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Appendix A

Assessment Sheet (Marking Rubric)

Please note: Tear off this section and **attach** it to your work when you submit it.

MODULE NAME:	**MODULE CODE:**
OPEN SOURCE CODING (INTERMEDIATE)	**OPSC7312**

STUDENT NAME:
STUDENT NUMBER:

RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Research: Introduction	**5** An excellent introduction that explains the purpose of the research and the sections included in the infographic.	**3—4** Acceptable and links to the rest of the infographic, but does not explain the purpose of the research.	**0—2** No introduction included or introduction does not link to the rest of the infographic.	

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RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Research: App one research	**8—10** Excellent, comprehensive information clearly differentiating between the strengths and weaknesses and clearly describing how features were implemented. Presented as an infographic.	**5—7** All sections included, but more details could be added to some of the sections.	**0—4** Not included, or sections missing, or limited details are provided in each section.	
Research: App two research	**8—10** Excellent, comprehensive information clearly differentiating between the strengths and weaknesses and clearly describing how features were implemented. Presented as an infographic.	**5—7** All sections included, but more details could be added to some of the sections.	**0—4** Not included, or sections missing, or limited details are provided in each section. Or information not presented as an infographic.	

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RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Research: App three research	**8—10** Excellent, comprehensive information clearly differentiating between the strengths and weaknesses and clearly describing how features were implemented. Presented as an infographic.	**5—7** All sections included, but more details could be added to some of the sections.	**0—4** Not included, or sections missing, or limited details are provided in each section. Or information not presented as an infographic.	
Research: Comparison	**8—10** An excellent, comprehensive comparison that shows all the differences and similarities at a glance.	**5—7** Comparison in a visual format with a good number of similarities and differences.	**0—4** No comparison included, or comparison in a visual format but only includes either differences or similarities.	

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RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Research: Conclusion	**5** An excellent conclusion that links to the rest of the infographic and to the design document.	**3—4** Acceptable and links to the rest of the infographic.	**0—2** No conclusion included or conclusion doesn't link to the rest of the infographic.	
Research References: Subtract marks for incorrect referencing in the research document, according to the referencing rubric.				
Planning and Design: Detailed list of requirements	**8—10** An excellently detailed list of features that describes all the features including the student's own from research in detail.	**5—7** Required features as well as the student's own requirements included, but needs more detail in places.	**0—4** No requirements included or required features are missing or no additional features included.	

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RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Design: Link back to concepts learned via the research section	**8—10** Excellent and full description of how the research links to the design decisions.	**5—7** Acceptable but does not fully explain the link between the app and concepts learned from research.	**0—4** No information included the links the concepts from the research document to the design.	
Planning and Design: User interface design	**8—10** Excellent mockups together with descriptions and a diagram explaining navigation.	**5—7** Mockups and descriptions included but not diagram showing navigation.	**0—4** No design included or only descriptions with no mockups.	
Planning and Design: Data listing	**8—10** Full listing of data with full detail including data types and explanations of why the data is necessary.	**5—7** Listing of data with limited detail.	**0—4** Not included or very limited detail.	

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RUBRIC 1 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 1, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Planning and Design: Project Plan	**8—10** Logical and fully detailed with no errors.	**5—7** Logical with minor errors.	**0—4** Not included or not logical.	
TASK 1 SUBTOTAL				**/100**

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RUBRIC 2 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 2, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Apps runs in emulator	**8—10** App runs without errors.	**5—7** App runs with some errors or crashes.	**0—4** App does not run at all (crashes on start-up) or does not compile.	
Feature: Registration using an online authentication service. Password should not be stored in clear text in a database.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: Login using the online authentication service.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: User can change settings that gets persisted in a hosted database and loaded when the app is restarted.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 2 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 2, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: User can view nearby landmarks on a map embedded in the app.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: The landmarks that are displayed are correctly filtered according to the preferred landmark setting.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: The user's current location is correctly displayed on the map.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: A landmark can be selected, and information as well as navigation options are shown when selected.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 2 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 2, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: The app must be able to calculate the best route to a landmark.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: When navigating, the app must display the estimated time and distance to the destination.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: The app must change between kilometres and miles depending on the settings.	**4—5** Feature excellently implemented,	**2—3** Feature working mostly with some bugs**,**	**0—1** Feature not implemented or very buggy, or the app does not compile.	
Feature: The app must visually display the calculated route on the map.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs**.**	**0—1** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 2 — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of Task 2, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: The user must be able to save a list of favourite landmarks, which must get loaded again when the app is restarted.	**4—5** Feature excellently implemented.	**2—3** Feature working mostly with some bugs.	**0—1** Feature not implemented or very buggy, or the app does not compile.	
User interface	**16—20** Excellent and user-friendly design.	**7—15** Somewhat user friendly with some mistakes in the design.	**0—6** Not user friendly, confused, and illogical.	
Demonstration video	**8—10** Fully professional video showing all the required features in detail.	**5—7** Not completely professional but all features demonstrated.	**0—4** Informal and unprepared, or not showing all the features or no voice over included, or no demonstration video included.	
TASK 2 SUBTOTAL				**/100**

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RUBRIC 3 (POE) — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Apps runs on mobile phone	**8—10** App runs without errors.	**5—7** App runs with some errors or crashes.	**0—4** App does not run at all (crashes on start-up) or does not compile.	
Feature: Registration using an online authentication service. Password should not be stored in clear text in a database.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: Login using the online authentication service.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: User can change settings that gets persisted in a hosted database and loaded when the app is restarted.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 3 (POE) — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: User can view nearby landmarks on a map embedded in the app.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs**.**	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: The landmarks that are displayed are correctly filtered according to the preferred landmark setting.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: The user's current location is correctly displayed on the map.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: A landmark can be selected, and information as well as navigation options are shown when selected.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 3 (POE) — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: The app must be able to calculate the best route to a landmark.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: When navigating, the app must display the estimated time and distance to the destination.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: The app must change between kilometres and miles depending on the settings.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: The app must visually display the calculated route on the map.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	

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RUBRIC 3 (POE) — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Feature: The user must be able to save a list of favourite landmarks, which must get loaded again when the app is restarted.	**2** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: Student defined feature 1	**2—3** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
Feature: Student defined feature 2	**2—3** Feature excellently implemented.	**1** Feature working mostly with some bugs.	**0** Feature not implemented or very buggy, or the app does not compile.	
User interface	**8—10** Excellent and user-friendly design with final images and an app icon included.	**5—7** Somewhat user friendly with one or two mistakes in the design.	**0—4** Not user friendly, confused and illogical.	

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RUBRIC 3 (POE) — SKELETON OUTLINE	Levels of Achievement			Feedback
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Demonstration video	**8—10** Fully professional video showing all the required features in detail.	**5—7** Not completely professional but all features demonstrated.	**0—4** Informal and unprepared, or not showing all the features or no voice over included, or no demonstration video included.	
Update based on feedback	**16—20** All feedback has been excellently addressed and well documented in the release notes.	**8—15** Some updates have been made and documented in the release notes.	**0—7** No updates have been made or only very minor updates. Or no release notes included.	
Connectivity to services and database	**8—10** Online connection with no interruptions, and the settings and data are stored online.	**5—7** Only connected to a server on a local machine and/or a local database.	**0—4** No connectivity to any outside systems.	

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RUBRIC 3 (POE) — SKELETON OUTLINE	**Levels of Achievement**			**Feedback**
In order to be awarded full marks for these elements of the POE, students need to have:	**Excellent**	**Good**	**Developing**	
	Score Ranges Per Level (½ marks possible)			
Preparation for publishing	**8—10** Could be published online as is, with all the required artifacts included.	**5—7** Could be published online as is, with some artifacts that could be improved (for example screenshots).	**0—4** Does not follow Play Store guidelines and cannot be published, or no evidence of preparation submitted.	
Bonus: Published on the Google Play Store	[5] App has been uploaded on the Google Play Store and was approved for publishing.	[3] App has been uploaded on the Google Play Store, but has not yet been approved for publishing.	[0] App has not been published on the Google Play Store.	
POE SUBTOTAL				**/100**

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