

KF5012 Software Engineering Practice

Web path project brief

Introduction.

This is the brief for the group project assessment for KF5012 Software Engineering Practice. To fully understand this brief you will need to also read the Assessment Specification (also known as the “umbrella assessment”). That document lays out general principles, how the group-work works, and the marking schemes for the different types of mission. This document focuses on defining the technology to be used, the basic parameters of the game to be made, and specifics of the “missions” associated with this brief. When you create your team’s project proposal, you will need to choose which missions your team will be attempting, and identify which team member is responsible for which mission(s).

The Technology

You are required to create a mobile (mobile phone-friendly) website. You are free to use different scripting, style-sheet and markup languages to build the website, such as XHTML, CSS, HTML5, javascript, PHP, etc.

The Website

The website will be a small website (no more than 10 pages to see all aspects of the website) optimized for mobile devices – in fact you should see it as a website demo rather than a fully-fledged website. If you like, this may be a “clone” – a website that is very derivative of an existing website or application, but if you opt to take the mission “Advanced Mobile Website Design”, you will need to create an original and hopefully interesting idea on the website.

The Missions

As you will see, there are some **main missions** (required missions) and some **side missions** (optional missions). You will also see that some of the main missions can be replaced by **advanced missions** (which are “double missions” – roughly twice the size in effort of a single mission, and worth twice the marks). Please see the Assessment Specification for information on how many missions you need, and how these should be distributed between individual missions and group missions.

Please note, the specialist teaching for the web path focuses on building mobile website. It will give you enough to get started on most topics, but you will need to go beyond this to gain high marks. Some missions (e.g. Recommendation system) are based on skills we are not teaching you. If you choose these missions, it is assumed you either already have the skills, or are willing to spend some time developing those skills. In all missions, **going beyond expectations**, will probably involve extra study.

There are five main missions:

1. Mobile Website Design
2. Mobile Website Development (Client-side)
3. Mobile Website Development (Server-side)
4. Project Management
5. Testing and Data Protection

They are all single missions, but three of them can be replaced with double-sized “advanced” missions:

1. Advanced Mobile Website Design
2. Advanced Website Development (Client-side)
3. Advanced Website Development (Server-side)

In addition, there are four side missions – they are all single missions:

1. Recommender system
2. Payment Gateway
3. Database Access
4. Hybrid apps - partly native apps, partly web apps

Each mission defines **elements** to be completed and **qualities** that the work should display. These elements and qualities drive the marking process. In addition, each mission gives some description of what it might mean to “**go beyond expectations**” and “**show novelty or innovation**”. Once again, these phrases are ones used in the marking scheme.

There are also indications given of how the roles described in the missions will be expected to work together.

Main Mission	Design	Single	Software and Documentation
Mobile Website Design			
<p>The “Mobile Web Designer” will create a simple idea on the website to be implemented by the team. They will also create a short “Mobile Web Design Document” which outlines the details of the website in a written form. The website should be a small website of a maximum of 10 pages. This website can be a “clone” of an existing website. The website must include the following elements:</p> <ul style="list-style-type: none"> • Interaction and control – the website must be able to process user input and display results accordingly • Compatibility – the website should be optimized for popular mobile devices (e.g. smartphones, tablets) • Splitting style and layout – CSS/CSS3 should be used for adding style to the website • Enhancing the design with images/photos and colouring <p>The Mobile Web Document will be an articulation of all of the relevant parts of the design of the website, but need not be extensive. The job of the Mobile Web Design Document is to explain the website to somebody who does not use it. The qualities that the Mobile Web Design Document should display are:</p> <ul style="list-style-type: none"> • Clarity – clear use of error-free English • Communication – effective methods of communication use to get your ideas across. This means you may want to consider using pictures, diagrams, tables, bullet-points, screen-shots, maps or anything else you think would be helpful. • Brevity – the document should be short and to the point. <p>If you would like to tackle a website with more ambition and complexity, you may want to consider replacing this mission with the <i>Advanced Mobile Website Design</i> mission.</p> <p>To go beyond expectations the Mobile Web Designer can expand the website beyond the basic elements outlined here. Looking at the elements described for Advanced Mobile Website Design could give a good indication of elements which may be considered going beyond the expectations of this role.</p> <p>To show novelty or innovation the Mobile Web Designer could create a website which has a unique take on the elements here, either wholly new, or recombining them in a novel way. Note: this may be exceedingly difficult within the parameters of this single mission. If you have ambitions in this area you may want to consider taking the <i>Advanced Mobile Website Design</i> mission.</p> <p>The Mobile Web Designer will need to take direction from the Mobile Web Producer, and give instructions to the Mobile Web Developer, the Mobile Web Programmer and the Tester. They may need to work in collaboration with all other members of the team.</p>			
May be replaced by the double mission <i>Advanced Mobile Web Design</i>			

Main Mission	Technical	single	Software and Documentation
Mobile Website Programming (Client-side)			
<p>The “Mobile Web Developer (Client-side)” will be responsible for creating the mobile website, including the layout of the website. In consultation with the Mobile Web Designer, they will take responsibility for constructing the whole website. They will also create appropriate documentation of their work. The elements that need to be created are:</p> <ul style="list-style-type: none"> Validating user input – at least three inputs from the user, the input should be validated (e.g. the ‘age’ field should be an integer number) on the website Displaying the results – display the results on the website according to the user input <p>The website needs to also display these qualities:</p> <ul style="list-style-type: none"> Be of consistent appearance – with experience, the user should be able to predict interactions Consistent theme - e.g. education, commercial, technology Self-contained – the user can access all relevant parts of the website they need to Interconnected – all webpages should be linked Fits the design – the layout of the website should fit the design provided by the Mobile Web Designer <p>The Mobile Web Developer (Client-side) is also expected to produce simple documentation expressing the workings of their code. This document is expected to be useful for handing over the systems to another programmer, or for assisting maintenance or expansion of the systems. You may use any system of documentation you like, but it should be clear. If you use UML you can assume the tutors also know UML. The qualities the documentation need to display are:</p> <ul style="list-style-type: none"> Completeness Clarity – You may want to add appropriate commentary to clarify diagrammatic representations. Accuracy – the documents should accurately reflect the actual code. <p>Please note – this documentation requirement is not “design documentation” – it is acceptable to the marking team if you create the documentation after the programming. However, this does not preclude your team asking for or requiring some indication of how you intend to achieve things beforehand.</p> <p>If you intend to make your website richer in interactive elements you may want to opt for the double mission <i>Advanced Mobile Website Development (Client-side)</i> instead.</p> <p>There are many ways a Mobile Web Programmer could go beyond expectations, the additional elements and qualities described in the <i>Advanced Mobile Website Development (Client-side)</i> mission are a good place to start for ideas.</p> <p>To show novelty or innovation the Mobile Web Developer (Client-side) will need to do so in the way they program the interactivity, using novel or innovative methods</p>			

or techniques which significantly enhance the website, or streamline the development process.

The Mobile Web Developer (Client-side) will take direction from the Producer and the Mobile Web Designer, and will closely collaborate with the Mobile Web Developer (Server-side), and will give instructions to the Tester. They may need to collaborate with all other team roles.

May be replaced by the double mission *Advanced Mobile Website Development (Client-side)*

Main Mission	Technical	single	Software and Documentation
Mobile Website Programming (Server-side)			
<p>The “Mobile Web Programmer (Server-side)” will be responsible for the code that makes elements of the back-end of the website interactive to the user input. In consultation with the Mobile Web Programmer (Client-side), they will take responsibility for constructing the whole website. They will also create appropriate documentation of their work. The elements that need to be created are:</p> <ul style="list-style-type: none"> • Processing user input – process the validated input obtained from the front-end of the website • Preparing the results – prepare the results to be displayed at the front-end with an appropriate data format <p>The website needs to also display these qualities:</p> <ul style="list-style-type: none"> • Working without errors – no glitches either programmatically or logically. “It didn’t do that yesterday” will not be considered a valid claim if things go wrong in demonstration. Even if you display all of the elements above, noticeably non-working elements will have a detrimental effect on your mark. • Reasonable design – the code should be effective and clear, and should be as simple and clear in implementation as the problems permit. Clear program flow, judicious use of comments and helpful variable names are all part of this. • Fits the design – the back-end system should fit the design of the functionalities of the website <p>The Mobile Web Programmer (Server-side) is also expected to produce simple documentation expressing the workings of their code. This document is expected to be useful for handing over the systems to another programmer, or for assisting maintenance or expansion of the systems. You may use any system of documentation you like, but it should be clear. If you use UML you can assume the tutors also know UML. The qualities the documentation need to display are:</p> <ul style="list-style-type: none"> • Completeness • Clarity – You may want to add appropriate commentary to clarify diagrammatic representations. • Accuracy – the documents should accurately reflect the actual code. 			

Please note – this documentation requirement is not “design documentation” – it is acceptable to the marking team if you create the documentation after the programming. However, this does not preclude your team asking for or requiring some indication of how you intend to achieve things beforehand.

If you intend to make your website richer in interactive elements you may want to opt for the double mission *Advanced Mobile Website Development (Server-side)* instead. This may be appropriate if your team are undertaking *Advanced Mobile Website Development (Client-side)*.

There are many ways a Mobile Web Programmer could **go beyond expectations**, the additional elements and qualities described in the *Advanced Mobile Website Development (Server-side)* mission are a good place to start for ideas.

To **show novelty or innovation** the Mobile Web Programmer (Server-side) will need to do so in the way they program the interactivity, using novel or innovative methods or techniques which significantly enhance the website, or streamline the development process.

The Mobile Web Programmer (Server-side) will take direction from the Producer and the Mobile Web Designer, and will closely collaborate with the Mobile Web Developer (Client-side), and will give instructions to the Tester. They may need to collaborate with all other team roles.

May be replaced by the double mission *Advanced Mobile Website Development (Server-side)*

Main Mission	Management	single	Documentation and Documented Process
Project Management			
<p>The “Producer” will take control of the project management aspects of the project. It will be their responsibility to facilitate all other roles to do their jobs. They will need to help the team decide on the scope of the project, clearly defining the nature of the game to be produced. Alongside the other roles they will create a breakdown of tasks to be completed, and determine prioritisation of these tasks, and dependencies (e.g. Fred cannot do the mobile website programming until Julie tells him what the website is). They then need to turn these tasks into a reasonable and agreed schedule, which takes into account other commitments (e.g. other assignments), giving all roles clear tasks and deadlines. As the project progresses, the Producer will need to adapt the schedule as necessary, knowing which extra tasks can be slotted in if work goes well, and which tasks are easiest to drop if work goes badly. The Producer needs to keep a record of meetings, decisions and agreements made, and have a clear picture of progress. If need be they will be responsible for settling disputes, handling contingency for unforeseen problems and anything else that affects the effective working of the team.</p> <p>The Producer does not have the power to hire and fire like they may have in a real-world project, so to perform the role effectively they will need to not take a dictatorial</p>			

approach, (unless this is what the team as a whole agrees to). They are reliant on the co-operation of the rest of the team in order to be effective. A team with any sense will realise that co-operation with their Producer is a good route to maximising marks. It is suggested that early on in the project, the team should discuss their aspirations in terms of marks for this work, as this will help the Producer schedule and assign work appropriately.

The Producer will produce the following project management **elements**

- The original Website Proposal (due week 4)
- Team Code of Conduct
- Skills audit of the team (due week 4)
- Risk analysis
- Work breakdown, task prioritisation and task allocation
- Schedule with agreed deadlines, including initial version and ongoing revisions
- Ongoing logs of progress, problems and solutions.
- Records of communication pertaining to decisions by the group.

The **qualities** that need to be displayed in this documentation are:

- Clarity
- Completeness
- Fair and ethical treatment of team members.

There are several ways in which a Producer could **go beyond expectations**, which mostly consist of using extra techniques to assist the production process, e.g. applying SCRUM sprints, using PERT analysis to determine the critical path, or make reference to deeper learning and advice on project management.

To **show novelty or innovation** a Producer will need to develop a significant novel and beneficial process to assist the development process.

The Producer will give instruction to all other roles.

This mission is taken by all teams for all paths

Main Mission	Support	single	Documented Process
Testing and Data Protection			
<p>The “Tester” will provide a support service to all other roles, providing independent and rigorous testing approach to the ongoing project. As this role will probably have more activity late in the project, it may be sensible for this role to be taken by the same person as the Producer role (which is more front-loaded).</p> <p>The Tester will receive instructions from the other roles as they progress with work, and may be asked to test the workings of code, the functionality of systems, the accessibility of the environment, and if relevant the logic, functionality, balance and engagement of the website. Their job is to “destruction test”: to try relevant permutations and combinations and to find, highlight and document flaws and failings in the project. It is not their job to fix these problems, but to report clearly back to whoever does have the responsibility for these areas.</p> <p>The Tester is required to formulate a process whereby they log the testing requirements, devise test cases, perform the tests and report back to whoever asked for the testing.</p> <p>In addition, the Tester should also take part in developing or applying data protection approaches to protect the sensitive data (e.g. personal information) collected from the website and stored on the web server.</p> <p>The elements that the Tester needs to produce are</p> <ul style="list-style-type: none"> • A process for testing and reporting on testing • A full record of the test process in use. • Identify the needs for data protection in the website and develop or apply appropriate methods to protect sensitive data <p>The qualities that the Tester needs to show in their work are:</p> <ul style="list-style-type: none"> • Clarity of process • Clear thinking in test cases • Clear communication of test results • Timeliness in performing testing. <p>To go beyond expectations for the tester does not mean increasing the number and scope of tests. Rather, they could apply structured testing approaches like Boundary Value Analysis to improve the robustness of testing. Any significant application of effective testing techniques, found by researching the topic, could be considered in this category.</p> <p>To show novelty or innovation the Tester will need to originate a new, effective and beneficial approach to testing.</p> <p>The Tester will be instructed by all other roles as appropriate, and their role is to assist the creative roles to perform effectively.</p>			

Expanded Main Mission	Design	Double	Software & Documentation
Advanced Mobile Web Design			
<p>The “Mobile Web Designer” will create a simple idea on the website to be implemented by the team. They will also create a short “Mobile Web Design Document” which outlines the details of the website in a written form. The website should be a small website of a maximum of 10 pages. This website can be a “clone” of an existing website. The website must include the following elements:</p> <ul style="list-style-type: none"> • Interaction and control – the website must be able to process user input and display results accordingly • Optimization – the website should be optimized for mobile devices with low computational power • Splitting style and layout – CSS/CSS3 should be used for adding style to the website • Enhancing the design with images/photos and colouring • Compatibility – the website should be optimized for popular mobile devices (e.g. smartphones, tablets) • Usability – the website should be optimized for mobile devices while providing the user with high-quality user experience • Animation – enhance the appearance of the website by adding animation effects • Multimedia – the website may contain a wide variety of multimedia contents such 2D/3D graphics, audio, video, etc <p>The Mobile Web Document will be an articulation of all of the relevant parts of the design of the website, but need not be extensive. The job of the Mobile Web Design Document is to explain the website to somebody who does not use it. The qualities that the Mobile Web Design Document should display are:</p> <ul style="list-style-type: none"> • Clarity – clear use of error-free English • Communication – effective methods of communication use to get your ideas across. This means you may want to consider using pictures, diagrams, tables, bullet-points, screen-shots, maps or anything else you think would be helpful. • Brevity – the document should be short and to the point. <p>If you would like to tackle a simpler website, you may want to consider replacing this mission with the <i>Mobile Website Design</i> mission.</p> <p>To go beyond expectations the Mobile Web Designer can expand the website beyond the elements outlined here, for example in interface design.</p> <p>To show novelty or innovation the Mobile Web Designer could create a website which has a unique take on the elements here, either wholly new, or recombining them in a novel way.</p> <p>The Mobile Web Designer will need to take direction from the Mobile Web Producer, and give instructions to the Mobile Web Programmer (server side), the Mobile Web Programmer (client side), and the Tester. They may need to work in collaboration with all other members of the team.</p>			

This mission replaces the single mission *Mobile Web Design*

Expanded Main Mission	Technical	double	Software and Documentation
Advanced Mobile Web Development (Client-side)			
<p>The “Mobile Web Developer (Client-side)” will be responsible for creating the mobile website, including the layout of the website. In consultation with the Mobile Web Designer, they will take responsibility for constructing the whole website. They will also create appropriate documentation of their work. The elements that need to be created are:</p> <ul style="list-style-type: none">• Validating user input – at least three inputs from the user, the input should be validated (e.g. the ‘age’ field should be an integer number) on the website• Displaying the results – display the results on the website according to the user input• Permanent connection with the server – establish permanent connection for data exchange (e.g. WebSocket)• Real-time Communication – establishing and controlling communication (e.g. video conferencing) on the webpage (within the internet browser) <p>The website needs to also display these qualities:</p> <ul style="list-style-type: none">• Be of consistent appearance – with experience, the user should be able to predict interactions• Consistent theme - e.g. education, commercial, technology• Self-contained – the user can access all relevant parts of the website they need to• Interconnected – all web pages should be linked• Fits the design – the layout of the website should fit the design provided by the Mobile Web Designer <p>The Mobile Web Programmer (Client Side) is also expected to produce simple documentation expressing the workings of their code. This document is expected to be useful for handing over the systems to another programmer, or for assisting maintenance or expansion of the systems. You may use any system of documentation you like, but it should be clear. If you use UML you can assume the tutors also know UML. The qualities the documentation need to display are:</p> <ul style="list-style-type: none">• Completeness• Clarity – You may want to add appropriate commentary to clarify diagrammatic representations.• Accuracy – the documents should accurately reflect the actual code. <p>Please note – this documentation requirement is not “design documentation” – it is acceptable to the marking team if you create the documentation after the programming. However, this does not preclude your team asking for or requiring some indication of how you intend to achieve things beforehand.</p>			

If you intend to make your website simpler you may want to opt for the single mission *Mobile Website Development (Client-side)* instead.

There are many ways a Mobile Web Programmer (Client-side) could **go beyond expectations**, including introducing interactive elements on the front-end of the website, using advanced techniques such as AJAX, etc.

To **show novelty or innovation** the Mobile Web Programmer (client side) will need to do so in the way they program the interactivity, using novel or innovative methods or techniques which significantly enhance the website, or streamline the development process.

The Mobile Web Programmer (Client-side) will take direction from the Producer and the Mobile Web Designer, and will collaborate with the Mobile Web Developer (Server Side) as appropriate, and will give instructions to the Tester. They may need to collaborate with all other team roles.

This mission replaces the single mission *Mobile Web Development (Client-side)*

Expanded Main Mission	Technical	double	Software and Documentation
Advanced Mobile Web Development (Server-side)			
<p>The “Mobile Web Programmer (Server-side)” will be responsible for the code that makes elements of the back-end of the website interactive to the user input. In consultation with the Mobile Web Programmer (Client-side), they will take responsibility for constructing the whole website. They will also create appropriate documentation of their work. The elements that need to be created are:</p> <ul style="list-style-type: none"> • Processing user input – process the validated input obtained from the front-end of the website • Preparing the results – prepare the results to be displayed at the front-end with an appropriate data format • Server-sent events – the server-side program can push events to a client (e.g. notification) • Content Management System – provide an interface to edit the contents and settings of the website <p>The website needs to also display these qualities:</p> <ul style="list-style-type: none"> • Working without errors – no glitches either programmatically or logically. “It didn’t do that yesterday” will not be considered a valid claim if things go wrong in demonstration. Even if you display all of the elements above, noticeably non-working elements will have a detrimental effect on your mark. • Reasonable design – the code should be effective and clear, and should be as simple and clear in implementation as the problems permit. Clear program flow, judicious use of comments and helpful variable names are all part of this. 			

- **Fits the design** – the back-end system should fit the design of the functionalities of the website

The Mobile Web Developer (server side) is also expected to produce simple documentation expressing the workings of their code. This document is expected to be useful for handing over the systems to another programmer, or for assisting maintenance or expansion of the systems. You may use any system of documentation you like, but it should be clear. If you use UML you can assume the tutors also know UML. The **qualities** the documentation need to display are:

- **Completeness**
- **Clarity** – You may want to add appropriate commentary to clarify diagrammatic representations.
- **Accuracy** – the documents should accurately reflect the actual code.

Please note – this documentation requirement is not “design documentation” – it is acceptable to the marking team if you create the documentation after the programming. However, this does not preclude your team asking for or requiring some indication of how you intend to achieve things beforehand.

If you intend to make your website simpler in the back-end system you may want to opt for the single mission *Mobile Website Development (Server-side)* instead.

There are many ways a Mobile Web Programmer (Server-side) could **go beyond expectations**, such the variety of the services to be provided.

To **show novelty or innovation** the Mobile Web Programmer (Server-side) will need to do so in the way they program the interactivity, using novel or innovative methods or techniques which significantly enhance the website.

The Mobile Web Programmer (Server-side) will take direction from the Producer and the Mobile Web Designer, and will closely collaborate with the Mobile Web Developer (Client-side), and will give instructions to the Tester. They may need to collaborate with all other team roles.

This mission replaces the single mission *Mobile Web Development (Server-side)*

Side Mission	Technical	single	Software
Recommender System			
<p>The “Recommender System Programmer” will design and implement an approach for predicting the preference of the user and recommend appropriate item(s) to the user accordingly. If the team decide to use an existing recommender system, they have no need to take this mission. If they do take this mission, this does not mean the Programmer has to create everything from scratch, but they will need to meet the requirements (elements) laid out here:</p> <ul style="list-style-type: none"> • The approach(s) to be used will be implemented (i.e. coded) by the Programmer • Preparation of the information (e.g. purchase records) of users <p>The qualities that need to be shown in the modelling work are:</p> <ul style="list-style-type: none"> • Appropriate level of accuracy • Taking advantage of using mobile devices (e.g. obtaining location information) <p>In order to go beyond expectations it is not necessary to provide a huge amount of user data for analysis. We would rather the Recommender System Programmer display more analytical skill than more effort. This may be said to be achieved if the selected approach fits well with the theme and functionalities of the website, as well as the possibility to obtain those user information from the website.</p> <p>To show novelty or innovation the Recommender System Programmer would need to use some novel, helpful method in their work, for example, obtaining user information implicitly form the mobile devices (such as GPS location).</p> <p>The Recommender System Programmer will work alongside the Mobile Web Developer (Server-side) and take instruction from the Producer and the Mobile Web Designer. They may provide instruction to the Tester and they may need to work in collaboration with any other roles in the team.</p>			

Side Mission	Technical	single	Software
Payment Gateway			
<p>The “Payment Programmer” will be responsible for the design and implementation of the payment process of the webpage. They are expected to use an existing payment gateway to handle the actual money exchange, and the main development elements are listed below:</p> <ul style="list-style-type: none"> • Collect the information needed by the payment gateway and prepare them in an appropriate format • Send the information to the selected payment gateway 			

- Setup a call-back page (i.e. redirected back from the payment gateway) to display the status transaction

The **qualities** that the work needs to display are:

- **Working without errors** – no glitches either programmatically or logically. “It didn’t do that yesterday” will not be considered a valid claim if things go wrong in demonstration. Even if you display all of the elements above, noticeably non-working elements will have a detrimental effect on your mark.
- **Clear and efficient code** – code which is constructed in a reasonable and easy-to-follow fashion
- **Effective interface design** – interfaces need to be clear and easy to understand.
- **Consistent style** – which also needs to be consistent with the style of the website.

There are several ways in which a Payment Programmer can **go beyond expectations** – these include, but are not limited to enforcing additional validation check for the transaction (e.g. comparing billing address and shipping address, user location, etc).

To **show novelty or innovation** the Payment Programmer would need to use novel or innovative methods or techniques which significantly enhance the website, or streamline the development process.

The Payment Programmer will need to take instruction from the Producer, and collaborate strongly with the Mobile Web Developers (both client-side and server-side). They will provide instructions for the Tester. They may need to collaborate with any of the other roles in the team.

Side Mission	Technical	single	Software and Documentation
Database Access			
<p>The “Database Programmer” will be responsible for creating the following elements:</p> <ul style="list-style-type: none"> • A database schema to explain the structure of the database (design paperwork) • The required tables in the database • The server-side coding related to database access. <p>The qualities that the work needs to display are:</p> <ul style="list-style-type: none"> • The Schema should be clear and sensible • Working without errors – no glitches either programmatically or logically. “It didn’t do that yesterday” will not be considered a valid claim if things go wrong in demonstration. Even if you display all of the elements above, noticeably non-working elements will have a detrimental effect on your mark. • Clear and efficient code – code which is constructed in a reasonable and easy-to-follow fashion 			

To **go beyond expectations** there are several things a Database Programmer could do. For example storing sensitive data in a secure way is very important and the Database Programmer can work closely with the Tester on this.

To **show novelty or innovation** the Database Programmer would need to use novel or innovative methods or techniques which significantly enhance the website.

The Database Designer will receive instruction from the Producer, the Web Developer (server side), and possibly from the Web Designer. They may give instruction to the Tester, and they may need to co-operate with any other roles in the team.

Side Mission	Technical	single	Software and Documentation
Hybrid Apps			
<p>The “App Developer” will be responsible to integrate the website into an app. This enables the ‘app’ to access to the resources (e.g. camera, accelerometer, etc) of the mobile device.</p> <p>The App Developer will need to provide the following elements:</p> <ul style="list-style-type: none"> • Access to the resources of the mobile device • Using some of the information obtained from the mobile device resources in the interaction between the client-side and server-side <p>The qualities that the sound design should display are:</p> <ul style="list-style-type: none"> • Working without errors – no glitches either programmatically or logically. “It didn’t do that yesterday” will not be considered a valid claim if things go wrong in demonstration. Even if you display all of the elements above, noticeably non-working elements will have a detrimental effect on your mark. • Clear and efficient code – code which is constructed in a reasonable and easy-to-follow fashion <p>There are several ways in which an App Developer may go beyond expectations which include the compatibility of the app to be deployed on different mobile devices, Human-computer interaction (HCI), etc.</p> <p>To show novelty or innovation the App Developer would need to use novel or innovative methods or techniques which significantly enhance the app.</p> <p>The App Developer will need to work with all other members of the team to ensure equivalence of functionality. The App Developer will provide instructions for the Tester.</p>			