Project assessment: Design and develop a mobile application

Criteria

Unit code, name and release number

ICTICT420 - Develop client user interface (1)

ICTPRG409 - Develop mobile applications (1)

ICTPRG427 - Use XML effectively (1)

Qualification/Course code, name and release number

ICT40518 - Certificate IV in Programming (1)

Amend the qualification box before distributing to the student. The information here should only contain the qualification the student is enrolled in

Student details

Student number

800564948

Student name

Shuowei Li

Assessment Declaration

- This assessment is my original work and no part of it has been copied from any other source except where due acknowledgement is made.
- No part of this assessment has been written for me by any other person except where such collaboration has been authorised by the assessor concerned.
- I understand that plagiarism is the presentation of the work, idea or creation of another person as though it is your own. Plagiarism occurs when the origin of the material used is not appropriately cited. No part of this assessment is plagiarised.

Student signature and Date

Shuowei Li 18/11/2021

Version: 20200414

Date created: 3 March 2020

Date modified: 2 April 2020

For queries, please contact:

Technology and Business Services

Ultimo

This assessment can be found in the: Learning Bank

Assessment instructions

Table 1 Assessment instructions

Assessment details	Instructions
Assessment overview	The objective of this assessment is to assess your knowledge and performance as required to develop a client user interface that integrates with front-end applications, develop a mobile application and use XML effectively.
Assessment Event number	1 of 3
Instructions for this assessment	This is a project-based assessment and will be assessing you on your knowledge and performance of the unit. This assessment is in six parts: 1. Determine user needs 2. Confirm user needs 3. Design the application prototype 4. Obtain prototype sign-off 5. Develop and deploy the web-service application 6. Build, test and deploy the mobile application. The assessment also contains: • Assessment Checklist 1-4 • Observation Checklist 1-2. • Assessment Feedback. **Check the Assessment and Observation Checklists to ensure that you've covered all the required tasks.**

Assessment details	Instructions

Submission instructions	On completion of this assessment, you are required to upload it or hand it to your assessor for marking.
	
	Ensure you have written your name at the bottom of each page of your assessment.
	
	Submit the following documents for each part:
	
	• Part 1: Determine user needs
	  ○ Proposal report
	• Part 2: Confirm user needs
	  ○ Student will be observed by the assessor
	• Part 3: Design the application prototype
	  ○ Application prototype
	  ○ Application prototype report
	• Part 4: Obtain prototype sign-off
	  ○ Student will be observed by the assessor
	  ○ Completed Usability test plan
	• Part 5: Develop and deploy the web-service application
	  ○ XML documents
	  ○ Document with validation and deployment screenshots
	  ○ XML stylesheet
	  ○ Completed code for web service application
	• Part 6: Build, test and deploy the mobile application
	  ○ Completed code for mobile application
	  ○ The packaged mobile application
	  ○ Completed testing checklist
	  ○ Student will be observed by the assessor (for demonstration).
	
	It is important that you keep a copy of all electronic and hardcopy assessments submitted to TAFE and complete the assessment declaration when submitting the assessment.

Assessment details	Instructions
What do I need to do to achieve a satisfactory result?	To achieve a satisfactory result for this assessment all questions must be answered correctly and all items in the Assessment and Observation Checklists must be marked Satisfactory.
Assessment conditions	Assessment conditions will be safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the ICT, programming and software development industry. Assessment may be undertaken in normal classroom conditions, which is assumed to be noisy and similar to workplace conditions, or within the workplace. This may include phones ringing, people talking and other interruptions.
What do I need to provide?	• USB drive or other storage method with enough free space to save work to.

What will the assessor provide?	• Access to the Learning Management System
	• Development tools including an environment (IDE), text editor and web browser
	• Specific tools and licences for platform
	• The internet and web services
	• A web server and software to deploy and test applications
	• Libraries to develop the web service and client applications
	• Mobile devices or simulators
	• Information in the scenario including:
	    o client design specifications and requirements
	    o organisational standards for documentation and version control
	    o project management process and hierarchy
	    o usability test plan, including agreed usability metrics.

Due date and time allowed	Indicative time to complete assessment: • In class: Seven hours • Out of class: 20 hours.

Assessment details	Instructions
Assessment location	Parts 2 and 4 will be completed in the classroom. All other parts may be completed both in and outside of the classroom. You may access your referenced text, learning notes and other resources.
Supervision	Some parts are unsupervised, take-home assessments. Your assessor may ask for additional evidence to verify the authenticity of your submission and confirm that the assessment task was completed by you.
Reasonable adjustment	If you have a permanent or temporary condition that may prevent you from successfully completing the assessment event(s) in the way described, you should talk to your assessor about 'reasonable adjustment'. This is the adjustment of the way you are assessed to take into account your condition, which must be approved BEFORE you attempt the assessment.
Assessment feedback, review or appeals	In accordance with the TAFE NSW policy *Manage Assessment Appeals,* all students have the right to appeal an assessment decision in relation to how the assessment was conducted and the outcome of the assessment. Appeals must be lodged within **14 working days** of the formal notification of the result of the assessment. If you would like to request a review of your results or if you have any concerns about your results, contact your Teacher or Head Teacher. If they are unavailable, contact the Student Administration Officer. Contact your Head Teacher for the assessment appeals procedures at your college/campus.

Specific task instructions

Scenario

You are working as a software developer with *Red Opal Innovations* (ROI_Scenario.pdf) (ROI). The ROI Human Resources Department (HR) would like you to develop an application for managing the contact information of people who work within the company.

Client requirements and problem domain

ROI HR needs an application to manage contact information of staff members, including retrieving, inserting, updating and deleting records. The application must be available on both web (HTML) and mobile (Android) platforms. The types of devices that the mobile application needs to cater for include phones and tablets.

Each of the contact management procedures, as well as simple help and tutorial content for each procedure, must be available through a menu in the application.

Screen dialogues/messages must be included to indicate when a record has been inserted, updated and deleted successfully. Error messages must be included where applicable, and be useful and intuitive.

The application must meet the organisational goals and guidelines.

All these criteria must be met for the project to be accepted by the client.

Organisation goals

This project is part of a larger organisation-wide project to ensure that all organisation data and documents are easy to update and branded appropriately. An extract from their *Diversity and Inclusion* policy states:

> *Red Opal Innovations believes that accessibility is important and is committed to ensuring all applications developed by us are accessible.*

Organisational guidelines

All documents and software applications must follow the ROI branding. You have been provided with the following documents:

- ROI Style Guide (ROI_Style_guide.pdf)
- ROI Records Management Procedure (ROI_Procedure_RecordsManagement.pdf)
- ROI Usability test plan (ROI_Usability_test_plan.docx)
- ROI Report template (ROI_Report_template.dotx).

An extract from the *ROI Development Policy* states:

All applications must be documented, following the ROI Records Management Procedure.

ROI uses Agile project management processes, which include emphasis on interacting and collaborating with stakeholders (including developing prototypes for feedback), responding to change, maintaining a constant pace and delivering a final working product. This includes a flat hierarchy structure, as every team member and stakeholder is equally important.

Technical specifications

This project will require developing a web service application and mobile client application. The mobile application will communicate with the web service to retrieve, insert, update and delete contact information for each person.

Contact details for all people must be persisted in the format of a file, which will require the design and development of a valid document using e**X**tensible **M**arkup **L**anguage XML.

You have been provided with the following data for People and Departments:

Table 3 - Data document (People)

Id	Name	Phone	Department	Address: Street	Address: City	Address: State	Address: ZIP	Address: Country
1	John Smith	02 9988 2211	1	1 Code Lane	Javaville	NSW	0100	Australia
2	Sue White	03 8899 2255	2	16 Bit Way	Byte Cove	QLD	1101	Australia
3	Bob O'Bits	05 7788 2255	3	8 Silicon Road	Cloud Hills	VIC	1001	Australia
4	Mary Blue	06 4455 9988	2	4 Processor Boulevard	Appletson	NT	1010	Australia
5	Mick Green	02 9988 1122	3	700 Bandwidth Street	Bufferland	NSW	0110	Australia

Table 4- Data document (Departments)

Id	Name
0	General
1	Information Technology
2	Accounting
3	Marketing
4	Human Resources

Part 1: Determine user needs

Refer to Assessment Checklist 1 for the criteria for this part.

Review and critically analyse the design specifications, requirements, problem domain and data in the scenario, as well as a variety of hard copy and online technical and design information. Based on your review, prepare a proposal report for the client in a word-processed document, including the following information.

Ensure that you use correct spelling and grammar, plain English and follow organisational guidelines in your report. Your report should be 400-750 words.

1. Identify the client business area that this project relates to.
2. Determine the user needs and requirements for both the web and mobile applications, including the interface, system environment and functionality.
3. Determine the impact that the system environment, for example mobile, tablet or desktop, will have on the user interface design for each.
4. Determine the target platform for the mobile devices to be used with the application.
5. Based on the target platform and hardware, choose and evaluate a development environment to use (Note: this may be different for each platform):
    a. Research suitable options for a development environment.
    b. Evaluate the options, using suitable criteria that will allow you to decide between them, including their ease of use.
    c. Select the development environment to use, justifying your selection.
6. Review the organisational goals in the scenario and discuss how you will ensure that your interface design will be consistent with the organisational styles. Discuss the implications of ensuring that they are followed.
7. Determine and outline the formats that are required for each application interface for:
    a. querying the data (inputs)
    b. displaying reports (outputs).
8. Include a bibliography of the documents and resources you accessed and used.
9. Include space for name and signature of the client.

Part 2: Confirm user needs

You need to meet with your client in a role play of 10-15 minutes to review and clarify the user needs for their application.

Your assessor will observe the role play and complete Observation Checklist 1.

Make sure that you use:

- effective listening and questioning techniques
- simple and relevant language.

Role play participants:

- Client – arrange for another person to act as the client.
- Application developer (this is you).

Ensure that you include the following in your role play:

1. Discuss and determine the following with the client, summarising the relevant parts of your proposal report:
    a. The user needs and requirements for the application, including the interface and system environment
    b. The impact that the system environment will have on the user interface design
    c. The organisational goals, to ensure that your interface design will be consistent with the organisational styles
    d. The formats of the data queries and reports.
2. Obtain approval for your interface proposal from the client.

Part 3: Design the application prototype

Refer to Assessment Checklist 2 for the criteria for this part.

Now that you have client approval for your proposal report, you need to design and develop an interactive prototype to demonstrate to the client. Use appropriate digital applications and technology for these tasks.

1. Design the following user interface items for the mobile application, according to the user and organisational requirements and acceptance criteria. Make sure that you consistently follow design principles and organisational styles and designs, and use concise plain English:
    a. Mockups depicting the page layout for each screen, including:
        - required content sections
        - specific measurements or proportions of each section
        - titles, text links, buttons and other relevant interface objects
        - portrait orientation and small mobile resolution (phone)
        - landscape orientation and medium resolution (tablet).

    b. The menu structures depicting each screen and how they are linked.

    c. Screen dialogues for error, confirmation or other messages.
2. Design the batch procedures for the relevant sections using pseudocode, a flowchart or similar, according to the technical specifications and acceptance criteria.
3. Design and write online help and tutorials according to the user and organisational requirements, following design principles. You must:
    a. use correct spelling and grammar, plain English and specific terminology where needed

    b. match the style of writing to the purpose and audience, using appropriate conventions.
4. Build a prototype of the user interface:
    a. Create views for the different screen orientations and resolutions according to your mockups.

    b. Integrate appropriate navigation according to your menu structures.

    c. Integrate appropriate user input techniques.

    d. Include the online help and tutorials.

5. Document the prototype in a report for the client, including explanations and images/ diagrams of the items you designed. Ensure that your report:
    a. uses correct spelling and grammar
    b. uses plain English
    c. follows organisational goals, policies and procedures
    d. includes space for name and signature of the client.

Part 4: Obtain prototype sign-off

You need to meet with your client in a role play of 5-10 minutes to obtain approval for your prototype.

Your assessor will observe the role play and complete Observation Checklist 2.

Make sure that you:

- use simple and relevant language
- use an appropriate format and tone to suit the purpose and the audience
- are prepared with everything required for the demonstration.

Role play participants:

- Client – arrange for another person to act as the client.
- Application developer (this is you).

Ensure that you include the following in your role play:

1. Follow the Usability test plan (ROI_Usability_test_plan.docx) to obtain and record the client's feedback.
2. Submit the prototype to the client and obtain sign-off.

Part 5: Develop and deploy the web-service application

Refer to Assessment Checklist 3 for the criteria for this part.

As the application has to be available on both web and mobile platforms, you must develop an XML web service application that provides HTTP endpoint for managing the data. Use an appropriate language to develop the application.

Ensure that your documents are logical, succinct and accurate, and correct syntax is used where applicable.

1. Create two XML documents for storing the information for the application, as detailed in the client requirements. Ensure that the documents are well formed by using the appropriate structure and sequence, including a root element, child element and sub-child element.
2. Validate the XML documents using a validation tool. Include screenshots of validation results and tool used in a word-processed document.
3. Develop an XML-based web service application (for example, using ASP.Net Web Forms) including:
   a. web pages to display the two XML files you created
   b. an XML stylesheet document to format the data according to the organisation styles
   c. web methods for accessing and browsing elements and attributes of records in both XML files
   d. web methods for inserting, modifying and deleting elements and attributes of records in the person XML file.
4. Deploy the web service application (this can be in the local environment (localhost)). Include screenshots of the deployed web service application in a word-processed document.

Part 6: Build, test and deploy the mobile application

Refer to Assessment Checklist 4 and Observation Checklist 3 for the criteria for this part.

Build the mobile application according to the client requirements, using an appropriate language. The mobile application must communicate with the web service that you set up in Part 5.3.

1. Prepare and configure the application development environment that you selected (Part 1.5) using appropriate features of the application. Include screenshots of your configuration and the features used in a word-processed document.
2. Build the user interface for the application in the configured development environment. Your interface must be built according to the approved prototype and the required functionality (Part 1.2), and incorporate any client feedback from your demonstration (Part 4.1). Include screenshots of your application within the development environment in a word-processed document.
3. Write code to allow users to configure application settings and output, such as background colour, text size, brightness and sound effects.
4. Integrate the mobile application with the XML web service to access, insert, update and delete the remote data. Use XML serialisation to persist data.
5. Bind the relevant user interface controls to the data retrieved from the web service.
6. Create a checklist of requirements (as identified in Part 1.2) for testing the overall functionality of the application, including space for descriptions and screenshots. Iterate testing, debugging and building the application until it meets all requirements. Complete the checklist while testing, including screenshots of all test results and descriptions of your iteration (including incorrect results), for example, what you changed to debug the application.
7. Package the application for deployment.
8. Deploy to the target mobile devices and demonstrate the deployed application to your assessor.

Assessment Checklist 1

The following checklist will be used by your assessor to mark your performance against the assessment criteria of Part 1. Use this checklist to understand what skills and/or knowledge you need to demonstrate in your submission. All the criteria described in the Assessment Checklist must be met. The assessor may ask questions while the submission is taking place or if appropriate directly after the task/activity has been submitted.

Table 2: Assessment checklist 1

TASK/STEP #	Instructions	S	U/S	Assessor Comments
1	Identifies the client business area			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Determines the user needs for the interface			
3	Itemises the required functionality of the application			
4	Investigates and determines impact of system environment on each interface			
5	Determines the target platform			
6	Selects and evaluates a development environment, based on target platform and hardware, establishing criteria			
7	Reviews organisational goals to ensure consistency with organisational styles, considering the implications			
8	Defines the data query and report formats			
9	Documents needs and findings, using correct spelling and grammar, plain English and following organisational guidelines			
10	Accesses and critically analyses complex texts, including hard copy and online technical and design information, data and problem domain			

Observation Checklist 1

The Observation Checklist will be used by your assessor to mark your performance in Part 2. Use this Checklist to understand what skills you need to demonstrate in the role play. The Checklist lists the assessment criteria used to determine whether you have successfully completed this assessment event. All the criteria must be met. Your demonstration will be used as part of the overall evidence requirements of the unit. The assessor may ask questions while the demonstration is taking place or if appropriate directly after the task/ activity has been completed.

Table 3 Observation Checklist 1

Task #	Task/Activity Performed	S	U/S	Assessor Comments (Describe the student's ability in demonstrating the required skills and knowledge)
1	Uses effective listening and questioning techniques			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Uses simple and relevant language			
3	Determines the user needs for the interface with client			
4	Investigates and determines impact of system environment on interface with client			
5	Reviews organisational goals with client to ensure consistency with organisational styles			
6	Defines the data query and report formats with client			
7	Obtains approval for interface proposal			

Assessment Checklist 2

The following checklist will be used by your assessor to mark your performance against the assessment criteria of Part 3. Use this checklist to understand what skills and/or knowledge you need to demonstrate in your submission. All the criteria described in the Assessment Checklist must be met. The assessor may ask questions while the submission is taking place or if appropriate directly after the task/activity has been submitted.

Table 4: Assessment checklist 2

TASK/STEP #	Instructions	S	U/S	Assessor Comments
1	Designs mobile application user interface according to user and organisational requirements and acceptance criteria, including: • page layout and content • menu structures • screen dialogues			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Consistently follows design and writing principles, organisational styles and designs, and uses concise plain English on user interface text and objects			
3	Extracts mathematical information and applies mathematical strategies when designing layout			
4	Designs batch procedures according to the technical specifications and acceptance criteria, using appropriate syntax and conventions			
5	Designs and writes online help and tutorials according to the user and organisational requirements, following design principles			
6	Online help and tutorials use correct spelling and grammar, plain English and specific terminology			
7	Text content of online help and tutorials matches purpose and audience, and uses appropriate conventions			

TASK/STEP #	Instructions	S	U/S	Assessor Comments
8	Develops a user interface prototype using digital technology, including: • views for different screen orientations and resolutions • appropriate navigation and user input techniques • online help and tutorials.			
9	Documents prototype according to organisational goals, policies and procedures, using correct spelling and grammar and plain English			

Observation Checklist 2

The Observation Checklist will be used by your assessor to mark your performance in Part 4. Use this Checklist to understand what skills you need to demonstrate in the role play. The Checklist lists the assessment criteria used to determine whether you have successfully completed this assessment event. All the criteria must be met. Your demonstration will be used as part of the overall evidence requirements of the unit. The assessor may ask questions while the demonstration is taking place or if appropriate directly after the task/activity has been completed.

Table 5 Observation Checklist 2

Task #	Task/Activity Performed	S	U/S	Assessor Comments (Describe the student's ability in demonstrating the required skills and knowledge)
1	Uses simple and relevant language			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Uses an appropriate format and tone to suit the purpose and the audience			
3	Prepares for demonstration by actively identifying the requirements			
4	Obtains client's feedback			
5	Submits prototype to client and obtains sign-off			

Assessment Checklist 3

The following checklist will be used by your assessor to mark your performance against the assessment criteria of Part 5. Use this checklist to understand what skills and/or knowledge you need to demonstrate in your submission. All the criteria described in the Assessment Checklist must be met. The assessor may ask questions while the submission is taking place or if appropriate directly after the task/activity has been submitted.

Table 6: Assessment checklist 3

TASK/STEP #	Instructions	S	U/S	Assessor Comments
1	Writes well-formed XML documents using appropriate structure, sequence and syntax, including a root element, child element and sub-child element.			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Validates the XML documents using a validation tool			
3	Develops a web service application using a language			
4	Formats the XML documents using appropriate styling tools (XML stylesheet)			
5	Deploys the web service application			
6	XML documents are logical, succinct and accurate			
7	Writes accurate code using correct syntax			

Assessment Checklist 4

The following checklist will be used by your assessor to mark your performance against the assessment criteria of Part 6. Use this checklist to understand what skills and/or knowledge you need to demonstrate in your submission. All the criteria described in the Assessment Checklist must be met. The assessor may ask questions while the submission is taking place or if appropriate directly after the task/activity has been submitted.

Table 6: Assessment checklist 4

TASK/STEP #	Instructions	S	U/S	Assessor Comments
1	Prepares and configures the application development environment using application features			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*
2	Builds the user interface in the development environment, according to the approved prototype and the required functionality			
3	Writes code to allow users to configure application settings and output			
4	Accesses remote data using XML web services			
5	Persists data using XML serialisation			
6	Binds controls to data sources			
7	Develops client application using a language			
8	Tests application for functionality, according to requirements			
9	Iterates testing, debugging and building the application until it meets all requirements			
10	Packages the application for deployment			

Observation Checklist 3

The Observation Checklist will be used by your assessor to mark your performance in Part 6.8. Use this Checklist to understand what skills you need to demonstrate in the role play. The Checklist lists the assessment criteria used to determine whether you have successfully completed this assessment event. All the criteria must be met. Your demonstration will be used as part of the overall evidence requirements of the unit. The assessor may ask questions while the demonstration is taking place or if appropriate directly after the task/ activity has been completed.

Table 5 Observation Checklist 3

Task #	Task/Activity Performed	S	U/S	Assessor Comments (Describe the student's ability in demonstrating the required skills and knowledge)
1	Deploys application to target devices			*Date of Observation:* *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student's performance against the criteria.*

Assessment Feedback

*NOTE: This section **must** have the assessor signature and student signature to complete the feedback.*

Assessment outcome

☐ Satisfactory

☐ Unsatisfactory

Assessor feedback

☐ Has the Assessment Declaration been signed and dated by the student?

☐ Are you assured that the evidence presented for assessment is the student's own work?

☐ Was the assessment event successfully completed?

☐ If no, was the resubmission/re-assessment successfully completed?

☐ Was reasonable adjustment in place for this assessment event?

If yes, ensure it is detailed on the assessment document.

Comments:

Assessor name, signature and date:

Student acknowledgement of assessment outcome

Would you like to make any comments about this assessment?

Student name, signature and date

Shuowei Li. 18/11/2021

NOTE: Make sure you have written your name at the bottom of each page of your submission before attaching the cover sheet and submitting to your assessor for marking.