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| Assessment Title | Evaluate the software design |

## Competency Details

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| Unit code/s and title/s | ICTPRG546 - Validate application designs against specifications |
| Qualification code/s and title/s | ICT50220 Diploma in Information Technology |
| Business unit/Work group | Business and Arts / IT Studies |

## Instructions

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| Method/s of assessment | Questioning (Written)  Product (Written assignment) |
| Overview of assessment | This assessment will require you to:   * Complete written questions within this document. * Provide screen captures for written questions within this document. * Code your registration page using appropriate IDE * Review and validate the database design for its suitability for your application * Find, review, and validate the software design document for the project * Validate the code for the existing SPS application and review errors or warnings * Determine the completeness of your SPS application project and areas of development moving forward |
| Task/s to be assessed | This assessment will require you to complete the following tasks  Task 1 – Create and Code the Registration page for the study plan system (SPS) with appropriate IDE  Task 2 – Review and validate the Database  Task 3 – Validate the software design document  Task 4 – Validate the code and software consistency  Task 5 – Determine completeness of project |
| Time allowed | Refer to your schedule for submission dates |
| Location of assessment | Assessment can be completed anywhere with access to the resources required. (See Resources Required section below) |
| Decision making rules | To receive a satisfactory outcome for this assessment you must complete all parts correctly.  Word counts are provided as guidance only. |
| Assessment conditions | This assessment must be undertaken where conditions are typical of a work environment requiring cyber secure practices, processes, and procedures.  This is an unsupervised assessment, and you may access any required resources. |
| Resources required | To complete this assessment, you will require the following:  Software needed on class computers includes:   * Microsoft Windows * Microsoft Office * Invision Studio or Adobe XD * Microsoft Visual Studio Code * Microsoft Visual Studio 2019 IDE   The following documents will be required:   * ICTPRG546 - ASDS – ITWorks Schema.png * ICTPRG546 - ASDS – ITWorks Schema.mwb * ICTPRG546 – ASDS – SPS application.zip * ICTPRG546 – ASDS – SPS software design document.docx * ICTPRG546 – ASDS – Test Plan.docx * ICTPRG546 - ASDS – Policy ID 191 - Rapid Application Development   You can complete on your own computers or laptops if you are able to source the above requirements. |
| Result notification and reassessment information | You will be provided feedback and the result for your assignment on TAFESA Learn. You will be and given the chance to resubmit with required corrections only once.  Refer to the TAFE SA assessment policy for more information <https://www.tafesa.edu.au/apply-enrol/before-starting/student-policies/assessment> |

**SCENARIO**

You have been asked by ITWorks to complete a software project on a study plan system (SPS) for a client. The client currently has a system which does not meet all its needs. A software requirements specification document has been completed for the project and you will need to access this for more information about what is required moving forward.

You have completed a prototype for the project and now have approval to move to the next stage of development. There needs to be a comprehensive review and confirmation of the existing technologies, documentation and back-end setup.

**Review and validate the database**

Use the “ICTPRG546 - ASDS – ITWorks Schema.png” or the “ICTPRG546 - ASDS – ITWorks Schema.mwb” files to answer the questions about the ITWorks database.

1. **Database Structure**

Describe the databases normalised state (30 words)

The database is in 3rd normal form as no tables have partial or transitive dependencies, this ensures data integrity and minimising redundancy by organising tables systematically

Describe minimum five table relationships from the database

* Student-> Student\_grade
  + This table relationship is a one to many where a student can have one or many grades, but a grade belongs to one and only one student, Student\_grade takes the StudentID as a foreign key
* Qualification –> subject\_qualification
  + this relationship resolves a many to many between qualification and subject, this means that Qualification – subject\_qualification is a many to only one, with subject qualification taking QualCode as a foreign key
* Student\_garade -> crn\_detail
  + A grade must have one and only one CRN, a CRN can have one or many student Grades, the student\_grade takes the CRN id as a foreign key
* Lecturer -> crn\_detail
  + A lecturer may have one or many CRNs, and a CRN may have one, and only one, lecturer. The CRN takes a lecturer ID as a foreign key
  + This is a non-identifying relationship, as both entities can exist without each other.
* Crn\_detail -> department
  + A department may have one or many CRNs, and a CRN may have one, and only one, department. The CRN takes a departmentCode as a foreign key
  + This is a non-identifying relationship, as both entities can exist without each other

1. **Database elements**

Does the structure of the database allow for all required features to be completed from the software requirements document? For each feature listed below, add a description of whether the database structure allows for it to be included and how

Login Screen

No, as there is no table that can handle the storage of authentication data, such as passwords or emails

Registration Screen

* + Student search
    - The database does allow for the search of a student using an ID as there is a student table with all the required information
  + Students completed units
    - The completed units can be found also by going through the student table and to the “student\_grade” to locate all CRNs that have been completed
  + The certificate that the student is studying
    - The certificate can be found by going into “student\_studyplan” and then into “qualification” using the QualCode
  + The semester
    - The semester can be found by going into “student\_studyplan” and into “termdatetime” using the “semesterCode”
  + A list of units to choose from for the coming semester
    - The list of units to choose from for the coming semester can be found in “crn\_session\_timetable” by going through “crn\_detail” and into “termdatetime” to get specifics for a student, or go through “subject\_competency”-> “competency” -> “competency\_qualification” finaly into “qualification” if you want to go by a specific qualification

1. **User interface elements**

Provide screenshots of your login and registration screens that you created for your prototype:

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Provide details about how your user interface design allows for all features to be completed from the software requirements document.

* + Student search
    - There is a page that allows for lecturers to search for students by using their student ID, this sends them to the certificate information of what they are studying
  + Students completed units
    - This is a sub-screen of “The certificate that the student is studying”, this shows a table of all courses that the student has enrolled into and their status as completed or not. This is shown along with units to choose from for the semester.
  + The certificate that the student is studying
    - This is shown on searching for a student using their ID, this page shows their course name along with their completion status for all units, e.g. 12/19 and the percentage, e.g. 63%
  + The semester
    - “The semester” is shown as a calendar for the student and their currently enrolled units, this page is navigated to from the " The certificate that the student is studying” page
  + A list of units to choose from for the coming semester
    - This is a sub-screen of “The certificate that the student is studying”, this shows a table of all courses that the student can enrol into for their course, this is shown along with completed courses

**Evaluate the software design**

After your work with the user interface prototype, ITWorks has now completed an application prototype in the most recent sprint which includes a user interface design and code. You are to complete a design and code review on this application to help with development in the next sprint.

Using

* ICTPRG546 – ASDS – SPS application.zip
* ICTPRG546 – ASDS – SPS software design document.docx
* Your prototype design from Assessment 1

complete the following questions.

You must determine if the SPS applications design is complete according to your prototype from assessment 1. Compare the design of the SPS application to your prototype and provide a description of whether the application design is complete (50 words)

The SPS application is not complete as many functions are not yet complete, such as viewing the timetable, adding courses, or even at its most basic, having a log in screen. The design is also not complete again with many screens not being implemented enough to even open let alone compare with the prototype.

You must determine if the SPS applications design is accurate according to your prototype from assessment 2. Compare the design of the SPS application to your prototype and provide a description of whether the application design is accurate for the below features

Login Screen

-No there is no login screen nor any authentication functionality

Registration Screen

* + Student search
    - This functionality is not implemented in the SPS application, therefore it is not accurate to my design
  + Students completed units
    - This functionality is implemented but the design is different to the prototype developed, in the prototype this is on a different screen to the certification information unlike on the SPS application, meaning it is not accurate to my design
  + The certificate that the student is studying
    - This design is similar to the design in the prototype, although it does not include a course completed/total courses, nor a completion percentage, it also does not have a way to access the calendar from this screen. Meaning it is not accurate to my design
  + The semester
    - This functionality is not implemented in the SPS application, therefore it is not accurate to my design
  + A list of units to choose from for the coming semester
    - This functionality is not implemented in the SPS application, therefore it is not accurate to my design. Although the list of enrolled units is shown and a button to enrol exists, it goes nowhere.

You must determine if the SPS applications design is consistent according to your prototype from assessment 1 and to the colour styles which are required for the client. Compare the design of the SPS application to your prototype and to the software requirements document and provide a description of whether the application design is consistent

The prototype created was based on a dark mode-esque design principle with the background being a darker read in line with the TAFESA colour scheme, this was not followed in the SPS application as the background was all white. The application was also not consistent with some buttons being red filled and others being red outlined with a white fill

**Validate the software design document**

Using ICTPRG546 – ASDS – SPS software design document.docx and the ITWorks policy ICTPRG546 - ASDS – Policy ID 191 - Rapid Application Development.docx, you are to validate the software design document and provide feedback.

Are all the required sections included in the software design document as required by the policy? List each required item or section and if it is included in the software design document. Provide 30 words for each section about its accuracy:

· Title

Yes, Study Plan System

· Author

Yes, Joe Bloggs, software developer

· Reviewer

Yes, Sally Smith 01/01/2023

· Project overview and context

The overview of the project is given with a heading stating it, the context on the project is not provided within the paragraph nor is there a heading for it

· User interface

A heading is created but there is no information filled it, it only includes “<<to be confirmed>>”, this will have to be done at a later date, although the SPS application has already made a UI without the design document specifying one.

· Milestones

Milestones are set out in the document with 7 specified although none have been marked archived with their date

· Timeline

A header for the timeline has been created, it has not been filled out although it says 6 months has been allocated without a breakdown of the timeline

Using the files in ICTPRG546 – ASDS – SPS application.zip, you are to validate the code using visual studio. Open the solution file included for the SPS application and run the visual studio code analysis tool on the solution.

Provide screenshots of the below:

**Screenshot of the location of the code analysis tool**

A screenshot of a computer program

Description automatically generated

**Screenshot of the results of the code analysis tool, including all error, warning, and information events**

A screenshot of a computer

Description automatically generated

List minimum two of the issues found by the code analysis tool and a description of the issue (25 words per issue)

Naming rule violation: this shows that a method “contact” is named with a lower case, when it should start with upper case.

Unnecessary assignment of a value to 'term\_dateTime2': this message comes up due to the variable 'term\_dateTime2' being assigned and then never used in the program, making it less efficient

Provide details about the consistency of the method names in the application

The consistency of the method names in the application is quite consistent, the only issue is with the method “contact” in the HomeController as it is not capitalised as the rest are.

**Test plans and test cases**

ITWorks has a prepared a test plan and test cases for the SPS application. You are to review and validate the test plan and test cases to assist with development of the project.

Using

* ICTPRG546 – ASDS – SPS application.zip
* ICTPRG546 – ASDS – SPS test plan.docx
* ICTPRG546 – ASDS – Policy ID 191 - Rapid Application Development

complete the following questions.

Create a minimum 5-minute video of you walking through the SPS test plan and test cases. You must describe each section of the test plan and describe each test case in your video. The video must include your screen sharing and the test plan document should be visible.

Submit your video or a link to your video on Learn with your assessment files.

**In zip file**

Provide some details about the accuracy of the test plan document. Has the correct test plan template been used?

The test plan is accurate for testing api calls and authentication with in that system, it is not accurate for the SPS application. The correct test plan template had been used.

Are all the sections in the test plan document completed? If not, which sections are missing?

All sections are done, the issue with the test plan is that the SPS application was not actually tested but the back end

In section 3.1 some parts of the template relating to a “Sale System” where left in

Suggest minimum two improvements that could be made to the test plan document

Screenshots of test cases either in table in appendix should be added as to have proof of successful test cases

The Test scope, although it has been specified in other documents, should have been filled out specific to this test plan

**Software development concepts**

Provide a description of UML

Unified Modelling Language (UML) is a standardised visual modelling language used in software engineering to depict, design, and document systems. It employs various diagrams, such as class diagrams and use case diagrams, to represent different aspects of software structures and behaviours.

What is the purpose of a UML activity diagram?

A UML activity diagram shows the flow of activities within a system, showing sequential and parallel processes. It helps model business processes, workflow, and dynamic aspects of software systems.

What is the purpose of a class diagram?

A class diagram in UML represents the static structure of a system by depicting classes, their attributes, relationships, and methods. It serves as a blueprint for software design and modelling.

What are two tools that can be used to create these UML diagrams?

StarUML and Modelio are two tools commonly used for creating UML diagrams. They provide user-friendly interfaces and support various diagram types, facilitating the design and documentation of software systems.

Describe the Agile software development methodology

Agile is an iterative and collaborative software development methodology. It emphasises adaptability to changing requirements, customer collaboration, and incremental delivery. It prioritises individuals and interactions, working solutions, and customer satisfaction.

When does validation of project documentation and design occur in an agile approach?

In Agile, validation of project documentation and design occurs continuously throughout the development process. Regular reviews and feedback sessions with stakeholders are conducted to ensure alignment with evolving requirements and expectations

Describe the waterfall software development methodology

The waterfall software development methodology is a linear, sequential approach. It proceeds through distinct phases, including requirements, design, implementation, testing, deployment, and maintenance. Each phase must be completed before moving to the next.

When does validation of project documentation and design occur in a waterfall model approach?

Validation of project documentation and design in a waterfall model typically occurs at the end of each phase. It is a sequential process, with validation following completion of each stage.

What is the systems development life cycle?

The Systems Development Life Cycle (SDLC) is a structured process for planning, creating, testing, deploying, and maintaining information systems. It consists of phases such as planning, analysis, design, implementation, and maintenance.

Describe the principles of object-oriented programming

Object-oriented programming (OOP) principles include encapsulation, inheritance, and polymorphism (objects behaving differently based on their types). These principles enhance code modularity and flexibility.

Of the ITWorks supported development environments listed in section 5.5 from ICTPRG546 - ASDS – Policy ID 191 - Rapid Application Development, which are open source?

Visual studio code

Postman contains open source components but is not fully open source

What is usability testing?

Usability testing is observing real users try your product to understand how easy it is to use and identify any problems.

Regarding testing, what is a software heat map?

A software heat map is a visual representation of user activity, typically on a website or app. It uses colour gradients to show where users click, scroll, and interact most, highlighting areas of high and low engagement. This helps identify usability issues and optimise the user experience.

**Submission documents**

Include the following documents with your submission:

* Answers from this assessment document
* Test cases and Test plan video