# Student Practical/Written Assessment (Assignment)

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| **Business Unit/Work Group** | BJIT/IT Studies | | |
| **Qualification Code** | National Code: ICT50715 | **Qualification Title** | Diploma of Software Development |
| **Unit Code/s** | ICTPRG523 | **Unit Title/s** | ICTPRG506 Design application architecture<br>ICTSAD505 Develop technical requirements for business solutions |
| **Assessment Task Title** | Assessment 3 – Assignment | | |
| **Student Name** | Submit your solution via your LEARN account | **Student SIS ID** | Submit your solution via your LEARN account |
| **Assessor Name** | You have been added to a LEARN group which defines your assessor. This is normally your Course Registration Number (CRN) lecturer. | **Date** | 2018 Semester 2 |

| **Student Guide for Written Assessment** | |
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| **Overview of Assessment** | This is a written and practical hands-on assessment that will require you to interpret a Requirements specification in the role of an analyst/designer and produce a set of UML models that will meet the required specifications and an updated Software Architecture Document to document your solution. The Main Requirements has section A-N, some of which have to be completed individually and some in a team. The individual/team sections will be clearly labelled.<br>The Additional Requirements section which is only required for merit points and has to be complete individually. |
| **Task/s to be assessed** | You will be assessed on the successful completion of all sections of the Main requirements as set out in this assessment. |
| **Time allowed** | Till the end of the semester. |
| **Location** | You could complete this assessment in class or at another approved site (e.g. another TAFE location) |
| **Decision making rules** | To receive a satisfactory outcome for this assessment you must complete all the steps as outlined in the Main Requirements section |
| **Assessment conditions** | • You may be asked to explain your solution to the instructor in class<br>• You have until the end of the semester to complete this assessment and upload your solution on the subject LEARN site using Assessment 3 upload link. |
| **Resources required** | To complete this assessment, you will need to Star UML or some other suitable UML modeling tool and MS Word.<br>A version of Star UM and Word L will be installed on your PC in class.<br>You can use a Mac if you prefer but these are not provided. |
| **Results/Re-assessment** | You will be provided with feedback for the assessment and be given the opportunity to resubmit any required corrections only once. |
| **Submission Instructions** | • Create a folder called <your Name>_5SAD__Assignment on the desktop and add your completed Star UML project folder and Software Architecture document to this folder. Zip the folder and upload it to Learn using the using Assessment 3 upload link. |

**ONLINE COURSE REGISTRATION SYSTEM**

## Abstract

**IT Works** has hired you in the capacity of a Systems Analyst Designer to work in a team of other analyst that will be involved in the development of a UML Design Specification for their client TafeSA.

The application under consideration is an online web based Course Enrolment Management system - based on a set of specification found in the Appendix below.

Some preliminary Requirements analysis work has been already done and the following analysis artefacts have been completed:

1. TafeSA Online Enrolment System - Requirements Specification
2. A Use Case Model/ Use Case Report
3. Glossary
4. Supplementary Specifications
5. Star UML Template

You can reference to the above documents in Project Documents folder

Your team lead has allocated to you the following Use Cases:

- *View Report card*
- *Select Courses to Teach*

For the above Use Cases, you are expected to analyse/review the Analysis stage artefacts documented in the provided Software Architecture document and produce the following UML models/documents as part of the business process model - detailed in the sections below. The models/documentation you produce form the basis for establishing and documenting the systems Technical Specifications and Architectural Requirements. Use the Star UML Template provided to create your models and the provided Software Architecture template to record your documentation.

## Main Requirements

**Section A – Stakeholder Identification/Communication Plan**

Identify and document a list of the main stakeholders of the system and explain what communication strategies would be suitable to liase with them. Document this using the template provided in the Software Architecture Document.

*On completion of the above, the team lead will review your models to verify and validate them for correctness and its impact on the systems architectural requirements*

### Section B - Determine/Design the Business Model and Architecture

The lead architect has called you into a meeting to discuss and determine the client's business model from a list of potential alternatives before any concrete decision could be made on preliminary Architecture of the system.

Given the requirements specification and other ancillary documents you are required to document and describe the system Business Model and its impact on the choice of Architecture.

Also explain what and how Object-Oriented Design/Programming principles have influenced the architecture, with emphasis on the MVC pattern and document this in the Software Architecture Document, under the proper heading.

### Section C - Create the user experience model for above Use Cases

Using the Use Case Flow of Events as a guide:

1. Model the participating screens.
2. For each screen identify:
    - the dynamic content
    - user supplied content and
    - user actions
3. Model the screen flows
4. Define the screen navigation paths
5. Model a complete navigation map

*On completion of the above, the team lead will review your models to verify and validate them for correctness and its impact on the systems architectural requirements*

## Section D – Design and Implementation Mechanisms

Use the Analysis Mechanism previously identified and the Supplementary Requirements that have been documented in the appropriate section of the software architecture document. Keep in mind the prevailing corporate strategies that may influence the selection of the Implementation mechanisms, and if so, explain how.

Identify the required Design and Implementation Mechanisms

a. Identify the Design Mechanisms (including interacting with external and external systems)
b. Document the Design and Implementation Mechanisms in provided Software Architecture document in the appropriate section

*On completion of the above, the team lead will review your models to verify and validate them for correctness*.

## Section E– Identify Design Elements and interconnecting Components

1. Identify and model the different logical layers and layering considerations based on the Separation of Concerns (SoC) patterns and practices
2. Identify and model Design Subsystems and their interfaces
3. Identify and model the subsystem Component and their responsibilities, based on best practices/patterns for developing Enterprise Applications
4. Identify and model Design Classes based on their responsibilities

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

## Section F –Model the use case realization

1. Realize each use case flow of events using the identified design elements and their responsibilities

2. Update the View OF Participating Classes (VOPC)

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

## Section G – Class Design

Re-examine the classes/relationships you produced in section D – and add, delete and/or modify your classes to reflect the following considerations:

1. Identify if any of your classes require state management.
2. Can you leverage the benefits of Generalization and other Design Patterns?
3. Determine any system-wide cross-cutting concerns and its impact on your Design classes
4. Identify and model class interconnections through relationships
5. Update your classes in the Star UML model

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

**Section H – Database Design**

1. Map the Entity classes to tables in the database (ORM Mapping)
2. Produce an ER model using the principles of Normalization (up to 3rd Normal Form) / Database Design

2. Document the above in the appropriate section of the Software Architecture document.

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

**Section I – Non-Functional Requirements**

Use the supplementary specifications documented in the Software Architecture Document

1. Against each of these requirements, document how you have catered for them in your final design models.
2. Where relevant, document how will these factors be measured and benchmarked. You can assume the benchmarks values, for example, under Performance you can assume that pages will have to load between 2-5 seconds.

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

## Section J – Deployment

1. Define/Identify the Hardware, Software and Network Requirements to deploy test aand run the application in a testing and production environments.
2. Model the HW (server) nodes using the appropriate UML model in your Star UML Template

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

## Section K – Analyse and document the Impact of the new system

The project manager has tasked you to document the impact the new system will have on the currently existing processes and will get a signoff form the key stakeholders identified earlier.

Use the appropriate section in the Software Architecture Document to record the following, using the Use Case report as a guide:

1. What existing processes in the current system will be impacted by the new system
2. Determine and explain to the client how the new system will add value to the exiting business.
3. Identify and document the training needs of the system users/personnel to match the required skills to use the new system. Document this in the Software Architecture Document under the relevant section.

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

## Section L – Work Breakdown Structure (WBS)

To complete the project, you will require additional project resources such as personnel like system architect, analyst/designers, testers, database designers and documentation specialist. You can make your own assumptions as to the number and type of personnel you will need

The project manager has requested you submit WBS identifying required project resources, costs and usage timelines. The WBS should be included in the relevant section of the Software Architecture Document.

*On completion of the above, the team lead will review your models to verify and validate them for correctness.*

**Section M – Verification/Validation and Signoff**

On completion above sections of the project you will meet with the project lead who will verify/validate your solution and signoff confirming that requirements were met. The signoff will be included in the appropriate section of the Software Architecture document.

**Section N – Post Project Analysis**

At this point you have completed the Design models/documentation and the project manager has invited you to be part of a discussion about how future such projects could be better implemented by using a different software methodology approach.

In preparing for the discussion you are required to produce a document that focuses on the following considerations:

1. Document a range of the current software development methodologies being used for similar

   Projects in industry - A table format with the name of the methodology, a short description, the advantages and disadvantages would suffice.

2. What would have been the most suitable methodology for this type of business model and explain your choice by describing the software development life-cycle in the context of the selected methodology.

## Additional Requirements

The project lead has requested the design models as defined in Sections C, E, F, G and H for the Use Case Register for Courses. Modify your previous UML model to accommodate the above models and update your Software Architecture Document in the appropriate Section.

## Appendix

## TafeSA – Online Enrolment System – Requirements Specification

TafeSA is looking at revamping its legacy Student Management System (SMS) and the first phase of the project is to target the Student Enrollment System which is a legacy desktop application developed around outdated technology.

They have requested the development of a new web based on-line student enrollment system to accommodate the growing number of students that enroll both as on-shore and offshore through their overseas partner sites.

The new system will allow students to register for courses and view report cards from personal computers attached to the campus LAN, or from a PC at home or any other PC system that has internet access. The system should also be able to accommodate students enrolling from its overseas partner sites.

**Due to a decrease in State government funding, the institute cannot afford to replace the entire system at once. The college will keep the existing student management system (SMS), where all student information is maintained.**

**This database is a legacy Ingres relational database running on a Unix Server. The institute has invested in an open SQL interface that allows access to this database from Institutes servers. The legacy system performance is rather poor, so the new system must ensure that access to the data on the legacy system occurs in a timely manner. The new system will be able to access student information from the legacy database.**

**The Registrar's office will continue to maintain student and course information through another system.**

Lecturers will be able to access the system to register their interest to teach courses, see their teaching schedules as well as record student grades.

**At the beginning of each semester, students may request a course catalogue containing a list of course offerings for the semester. Information about each course, such as lecturer, cost, times, prerequisites, etc will be included to help students make informed decisions.**

The new system will allow students to select a maximum of six course offerings for the coming semester. In addition, each student will indicate two alternative choices in case the student cannot be assigned to a primary selection.

Course offerings will have a maximum of twenty students and a minimum of ten students. A course offering with fewer than ten students will be cancelled.

For each semester, there is a period of time that students can change their schedule. Students must be able to access the system during this time to add or drop courses. Once the registration process is completed for a student, the registration system sends information to the billing system, so the student can be billed for the semester. If a course fills up during the actual registration process, the student must be notified of the change before submitting the schedule for processing.

At the end of the semester, the student will be able to access the system to view their electronic academic transcripts. Since student grades are sensitive information, the system must employ extra security measures to prevent unauthorized access.

Lecturers must be able to access the on-line system to register an interest of which courses they would like to teach for that semester, and should select at least six course offerings and two alternatives choices in case the lecturer cannot be allocated their first choice. They will also need to see which students signed up for their course offerings. In addition, the lecturer will be able to record the grades for the students in each class.

The registrar will finalize all lecturer teaching schedules after examining each lecturer's course offering teaching preferences and be also responsible for creating that semesters course offerings.