

**Diploma in Computing (with strands in Software**

**Development & Computer Networks) Level 7**

**(Software Development Strand)**

**DC304 Object-Oriented Analysis and Design**

NQF Level 7, 14 credits

# Assignment

**v.3.17**

(Worth 80% of final grade)

# Marks

Attach:

Gathering requirements.ppt

**Instructions and guidelines for the assignment:**

1. Submission date and time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The completed assignment must be handed to the lecturer at the beginning of the class on the due date.
3. Submit a print and bonded copy of your report along with the electronic copy of all work. The lecturer will inform you how to submit the soft copy.
4. ***Warning: All media must be virus free!***  Media containing virus or media that cannot be run directly will result in a FAIL grade.
5. You must read and understand Ntec’s policy on ‘Academic Dishonesty and Plagiarism’.

Assignments completed using unfair means or plagiarised will receive a FAIL grade.

1. The report must have a title page with your name, class and id number clearly printed.
2. Start working on the assignment as soon as it has been handed out in the class. Working on the assignment right from day one will ensure that it is completed on time.
3. Work through each task, making copies of the source codes, diagrams and output produced as you complete them as they will be required as part of your submission.
4. Use the right naming and indentation style. Use comments to document each class and method.
5. Assignments will be judged on the basis of completeness, correctness and clearness.

**Learning Outcomes Targeted:**

1. Examine system complexity and develop skills in decomposing and organising complex systems.
2. Apply object-oriented analysis and design for real world systems.
3. Develop system analysis and design models for business solutions.
4. Classify and build quality classes and objects.
5. Write documentation for OOAD of a system applying the Unified Modelling Language.

**Tasks details and Learning outcomes targeted**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task** | **Topic** | **Learning outcomes targeted** | **Marks** |
| 1 | Introduction and overview of the project | 1, 5 | 15 |
| 2 | System Requirement Specifications | 1, 2, 3, 5 | 15 |
| 3 | Functional Model | 2, 3, 5 | 20 |
| 4 | Object Model | 2, 3, 4, 5 | 15 |
| 5 | Logical Design Model | 2, 3, 5 | 25 |
| 6 | Documentation | 5 | 10 |
| **Total** | |  | **100** |

**Group Project Assignment:**

**Sample Business Scenario:**

Golden Grammy Cinema is a private cinema set up for the employees (customers) of a multinational organisation. It screens both English and foreign movies for its audience every evening of the year plus afternoon matinee show on Saturdays and Sundays. The Cinema has one screen only and thus only one movie can be played at a time.

Tickets are offered at a subsidised price to the employees of the organisation and their accompanying guests. Due to the increase in the number of employees coming to the cinema and demand for a variety of movies, the manager of Golden Grammy Cinema would like to automate its ticket booking and movie planning into a single computerised system.

The Cinema would like an IT system solution that will simplify the ticket sales and bookings of movies throughout the year. The manager plans all the movies for the year and schedules different movies for every night. A system is required to record the movie dates and times, the customer details, and the ticket sales. There can be only one movie played at any given time. The manager needs to records the following details for the movie:

* Name of the movie
* Type of movie (e.g. comedy, action, romance, etc.) o Star cast o Show date and time o Ticket price

The cinema has a capacity of 200 seats and employs 4 assistants that are responsible for ticket sales and advance bookings, office duties and maintaining records of customers. Customers can either buy the tickets over the counter or book in advance for a movie show over the phone. Since the cinema offers a subsidised price for its customers, the following customer details are recorded to verify if they are employees of the organisation:

* Customer name and address
* Phone number o Employee Id number Subsidised ticket price is only given to customers who are employees of the organisation. An employee ID card is necessary to obtain subsidy on the ticket price. Customers who are not employees of the organisation can buy movie tickets but they have to pay the full price of the ticket. Each ticket sold/booked carries the following information:
* Ticket seat number o Movie name o Date and time of show
* Price (Prices change depending on latest movie)
* Customer name

For each movie show, the system is required to record the following information of ticket sales: o Total number of tickets sold o Price per ticket

* Total collection for the show

The manger would like the functionality to get the audience numbers and collections made weekly, monthly and yearly. This will allow him/her to determine the types of movies popular with the audience and change the movie plan to accommodate more of these types of movies. Also the system must be easy to understand and use. The customers will be given an option to book tickets online at a later stage through a website. The manager would like you to keep this in consideration when designing the system.

**Assignment Tasks:**

## Task 1: Introduction and overview of the project (15 Marks)

An introduction section briefly introducing the business problem and the system proposed as a solution including the requirement specifications. The introduction should include the following:

* Discussion of the Business Context
* Project Description
* Goal and objectives of the project
* Development Methodology which will be adopted
* The target audience and benefit of the information system

# Introduction and overview of the project

## Introduction

Nowadays many construction companies in Auckland have several objects under construction called projects and each of these projects might have several sites. Employees are assigned to the sites depends of their specialization and qualification on a daily basis. Site managers have to track and approve workers’ working hours. After that Project Managers can reject or approve the Timesheet.

## Business Context

Construction companies

* + *The business problem is correctly identified*

## Project Description

* + *A brief description of the project idea and importance and the proposed functions that will be provided by the project.*

## Goal and objectives of the project

* + *The project’s main goals and objectives have been identified.*

## Development Methodology which will be adopted

* + *The development methodology to be used have been identified*
  + *The motivations behind selecting this methodology have been described*
  + *The development methodology steps have been clearly explained*

## The target audience and benefit of the information system

* o *The targeted people that will get benefited from the project have been identified* 
  + *The benefits of the project have been described*

*(tangible and intangible)*

# System Requirement Specifications

## Task 2: System Requirement Specifications (15 marks)

Generate a requirement specification providing the key features expected from the system. Collect any additional information that you may need from the lecturer. The requirement statement should include:

## Functional requirement

Application should:

* Provide login/password access for all managers
* Keep information about projects and sites
* Keep workers’ personal information and working hours
* Provide multi-level approval of timesheets
  1. Process Oriented
  2. Information Oriented

## Non Functional Requirements

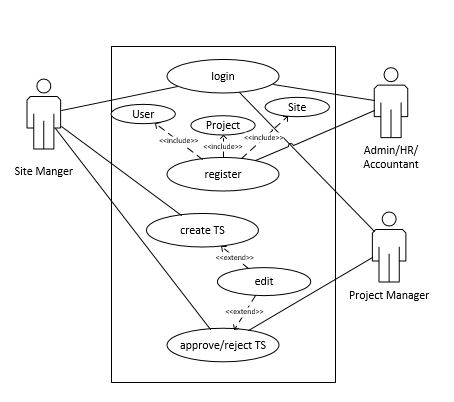
Application should:

* Handle 6 projects with 6 sites and 50 workers
* Be available 24/7
* Be user friendly with simple UI
  1. Operational
  2. Performance
  3. Security
  4. Cultural and Legal

|  |
| --- |
| **Functional Model**  **Task 3:** |
| Use case Diagrams   * The use case diagram should capture all the system functionalities in scope and actors. * *The diagrams analyse the required system correctly* * *The diagrams use correct UML 2.0 notation* |
| Use case Specification   * A specification has been given for each use case * Each specification includes the main sections (use case name, actors, preconditions, post conditions, steps). |
| Activity Diagram   * Capture all functionality in use cases * *The diagrams use correct UML 2.0 notation* |

# Functional Model

## Use case diagrams



## Use case specifications

|  |  |  |
| --- | --- | --- |
| **Use Case ID:** | LOL 1.0 | |
| **Use Case Name:** | Construction Site Timesheet’s Approval | |
| **Actors:** | | Site Manager  Project Manager  Admin / HR Manager / Accountant |
| **Description:** | | This diagram shows all the use cases of system and their relations. There are 4 main use cases include Login for identifying users and their authorization, registering projects, sites and users (include workers), Creating timesheet and then approve timesheet. Also Editing Timesheet is extended to Create and Approve use cases.  [Provide a brief description of the reason for and outcome of this use case.] |
| **Trigger:** | | The site manager wants to submit timesheet of workers in the site for approving by project manager and calculating the wage of them. [Identify the event that initiates the use case. This could be an external business event or system event that causes the use case to begin, or it could be the first step in the normal flow.] |
| **Preconditions:** | | 1. Desktop application is installed  2. Default Admin login/password is created  3. Site and Project Managers have login/password set up for them by the administrator |
| **Postconditions:** | | 1. Working hours are successfully submitted and approved by Project Manager. |
| **Normal Flow:** | | Admin / HR Manager / Accountant   1. Login to the system 2. Register Users (Site Manager / Project Manager) 3. Register Sites and Projects   Site Manager   1. Login to the system 2. Create Daily TS 3. Approve/edit TS   Project Manager   1. Login to the system 2. Choose TS and approve/reject/edit it. |

Activity diagrams

## Task 4: Object Model (15 marks)

Analyse the required system based to produce an Object Model including:

1. Class diagrams
2. Attributes and operations
3. Object diagrams

## Task 5: Logical Design Model (25 marks)

Design the required system to produce a Logical Design Model including:

1. Sequence diagrams
2. State machines
3. Communication diagrams

## Task 6: Documentation (10 marks)

The assignment report should include the following main sections, under each section you may have number of subsections:

* Cover page o Table of Content
* Introduction and Overview of the project o Requirement Specification o Functional Model o Object Model o Logical Design Model
* Discussion: briefly describes any lessons learnt during the analysis and design process.
* References: APA referencing style should be used, please refer to <http://www.bibme.org/apa>for a quick APA referencing guide.
* Appendices (if any) o Marking Criteria

The report should have a professional presentation with all ideas and topics presented are clear and well structure. Correct language and grammar should be maintained throughout the report.

## Project Marking Criteria

|  |  |  |  |
| --- | --- | --- | --- |
| **Marking Criteria** |  |  | **Comment(s):** |
| **Task 1: Introduction and overview of the project** |  |  |  |
| * Introduction * Discussion of the Business Context   + *The business problem is correctly identified* * Project Description   + *A brief description of the project idea and importance and the proposed functions that will be provided by the project.* * Goal and objectives of the project   + *The project’s main goals and objectives have been identified.* * Development Methodology which will be adopted   + *The development methodology to be used have been identified*   + *The motivations behind selecting this methodology have been described*   + *The development methodology steps have been clearly explained* * The target audience and benefit of the information system o *The targeted people that will get benefited from the project have been identified*    + *The benefits of the project have been described*   *(tangible and intangible)* | 1    2    2        2        1    2    2        1    2 |  |  |
| ***Total>>>*** | 15 |  |  |
|  |  |  |  |
| **Task 2: System Requirements Specification** |  |  |  |
| Functional Requirements   * The functional requirements are clearly identified and summarised precisely. * They have been classified as Process Oriented or Information Oriented requirements. | 4      3 |  |  |
| Non Functional Requirements   * The non-functional requirements are clearly identified and summarised precisely. * They have been classified as Operational, Performance, Security or Cultural and Legal requirements. | 4        4 |  |  |
| ***Total>>>*** | 15 |  |  |

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| **Task 3: Functional Model** |  |  |  |
| Use case Diagrams   * The use case diagram should capture all the system functionalities in scope and actors. * *The diagrams analyse the required system correctly* * *The diagrams use correct UML 2.0 notation* | 4    2  2 |  |  |
| Use case Specification   * A specification has been given for each use case * Each specification includes the main sections (use case name, actors, preconditions, post conditions, steps). | 3    3 |  |  |
| Activity Diagram   * Capture all functionality in use cases * *The diagrams use correct UML 2.0 notation* | 3  3 |  |  |
| ***Total>>>*** | 20 |  |  |
|  |  |  |  |
| **Task 4: Object Model** |  |  |  |
| Class Diagrams   * Correct classes have been identified * Attributes and operations are identified for each class * Appropriate relationships are used (Association, multiplicity, generalization) * *The diagrams use correct UML 2.0 notation* | 3  3  3    1 |  |  |
| Object diagrams   * The diagrams are consistent with the class diagram. * *The diagrams use correct UML 2.0 notation.* | 4  1 |  |  |
| ***Total>>>*** | 15 |  |  |
|  |  |  |  |
| **Task 5: Logical Design Model** |  |  |  |
| Sequence Diagrams   * The diagrams are consistent with the use case diagram. * *Capture all possible scenarios identified in use cases* * *The diagrams use correct UML 2.0 notation* | 4    4  1 |  |  |
| State Machines   * The diagrams are consistent with the class diagram. * Capture the states of each class. * *The diagrams use correct UML 2.0 notation* | 3  3  1 |  |  |
| Communication Diagrams   * The diagrams are consistent with the use case diagram and sequence diagrams. * *Capture all possible scenarios identified in use cases*  *The diagrams use correct UML 2.0 notation* | 4    4  1 |  |  |
| ***Total>>>*** | 25 |  |  |
|  |  |  |  |
| **Task 6: Documentation (10 marks)** |  |  |  |
| * The report includes all the required sections: o Cover page o Table of Content   + Introduction and Overview of the project   + Requirement Specification o Functional Model o Object Model o Logical Design Model   + Discussion: briefly describes any lessons learnt during the analysis and design process.   + References: o Appendices (if any)   + Marking Criteria      * *The report is presented to a professional standard with correct language and grammar is used*      * Discussion Section: *includes appropriate lessons learnt with examples*      * *References:* APA referencing style is used correctly | 2                                    2      3      3 |  |  |
| ***Total>>>*** | **10** |  |  |
| **Overall Mark>>>** | **100** |  |  |