Web Service
Project Description Document
BITP 3123 Distributed Application Development
Sem 2 2022/2023

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Tuesday, 16 May 2023

Table of Content

Document Description

This document contains a description of the project. The description includes instructions on executing and submitting the project. There are three (3) projects described in this document.

Instruction 1

1. The project described in this document is to be completed by a group of three (3) students, a similar team that was registered for the assignment.
2. The team must implement the project as selected for the assignment
3. The implementation must use Java Spring Boot.

Project 1: Airport Luggage Handling System

Introduction

A luggage handling system is used in airport hubs to move luggage and baggage from one location to another. It typically involves a combination of automated machinery, conveyor belts, scanners, and other equipment to transport efficiently, sort, screen, and deliver luggage to the appropriate destination, such as an aircraft, a train, or a baggage claim area.

Problem Statement

Lost luggage happens when luggage is accidentally loaded into an aircraft different from the passenger. Locating and returning the luggage to the passenger is tedious and time-consuming. The airport operator must refer to multiple documents and contact multiple people to locate the luggage. The dedicated staff is assigned to inform the passenger about the status of his luggage. The luggage is returned to the passenger after the airport operator successfully located the luggage. The whole process of managing lost luggage will increase the operational cost of the airport. Furthermore, lost luggage left a bad experience for the passenger. The passenger will not trust the airline or airport to handle their luggage. This could tarnish the reputation of the airline and the airport, which later cause a loss of business.

There were instances of passengers mistakenly taking other passengers' luggage due to the similar look of it. In most cases, the passenger only realised when they reached their destination, such as home or hotel. The passenger will inform the airport of the mistakenly taken luggage. This problem is more difficult to identify than lost luggage when all the data and information are aligned with the passenger arrival data. The process of handling mistakenly taken luggage is tedious and time-consuming. The impact on the passenger is huge such as frustration and exhaustion. On top of that, the cost of collecting and returning the mistakenly taken luggage is high, which will increase the operational cost of the airport.

A systematic computerized process to monitor the luggage handling after the customer checks in at the counter is non-existent. A computerized process will help reduce luggage mishandling and improve passenger trust and the workflow process of luggage handling.

Description of Luggage Tracking Module

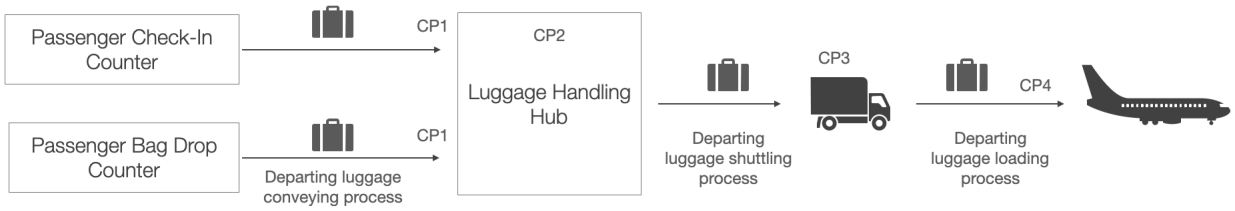

Figure 1: Departing Luggage Handling Processes

Figure 1 shows the processes of handling luggage at departure. The verified luggage will be tagged with an RFID sticker at the check-in or bag drop counter. The sticker consists of passenger flight information and luggage information. The luggage will be conveyed to the luggage handling hub. The luggage will be scanned at CP1 upon entering the hub. The luggage will be sorted to a specific conveyer lane according to the flight number in the hub. This point is called CP2. The luggage handling hub has many conveyor lanes. The luggage will be scanned, and the conveyer lane information will be recorded. The conveyer lane will move the luggage until the end of the hub. The luggage will be loaded into a shuttle truck at the end of the conveying process. This point is referred to as CP3. The shuttle truck number will be recorded and tracked before shuttling begins. Then, the shuttle truck operator transports the luggage to the departing aeroplane. The shuttle truck operator scans and loads the luggage into the aeroplane. The process ends after all luggage is loaded into the departing aeroplane. Bar code readers are used at CP1, CP2, CP3 and CP4 to record and track the luggage status and information.

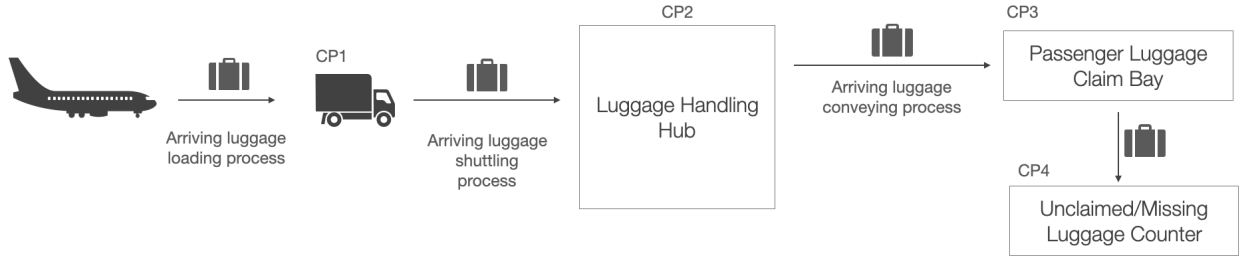

Figure 2: Arriving Luggage Handling Processes

Figure 2 shows the process of handling luggage at arrival. The shuttle van operator will unload the luggage from the arriving aeroplane. The luggage will be scanned and loaded into the shuttle truck. This point is known as CP1. Then, the luggage will be shuttled to the luggage handling hub. The luggage will be loaded and sorted into the designated conveyor lane at the hub. The information on the luggage and the conveyor lane is recorded, known as CP2. The lane will convey the luggage to the claim bay, which is known as CP3. The luggage status and information will be recorded upon entering CP3. There will be an airport staff that monitors the passenger luggage claiming process. Unclaimed luggage will be moved to CP4 by the airport staff. CP4 also handles missing luggage reported by the passenger. Bar code readers are used at CP1, CP2, CP3 and CP4 to record and track the luggage status and information.

Task

Design and implement the solution for the luggage tracker module. The movement of the luggage can be monitored at any place in the airport by the airport staff. The staff will use desktop computers or smartphones to monitor and track the luggage. The passenger will be notified about the status of his luggage upon departure and arrival. The module should recognise mishandling luggage, especially at CP2, CP3 and CP4 at departure and CP2 and CP3 at arrival. The module will be interfacing with the flight information system and RFID scanners. The module should produce the necessary information to track missing luggage. The solution must address the described processes in Figure 1 and Figure 2.

Project 2: Examination Attendance System in Physical Space

Introduction

There are a series of processes to manage the face-to-face examination in a physical space such as a classroom and examination hall. The process involves the students and staff. The staff are appointed as the chief invigilator and invigilator to administer the examination space. The process includes preparing the space, disseminating examination questions, recording student and invigilator's attendance, and collecting the student answer script.

Problem Statement

The student has to fill out various documentation before the examination starts. The information they must fill out includes the matric number, venue, course, lecture and program section/group. The information will be written on the answer script cover and attendance slip. The speed of writing is crucial for the student. The process of filling out the information is time-consuming. The overwhelming information that needs to be filled out distressed the student. The distress may affect the student's performance in the examination.

The invigilators must validate the attendance information. The invigilator compares the attendance slip with the exam slip and the matric card to validate the attendance information. The traditional validation process is time-consuming and error-prone. Additional invigilators are added to the bigger exam venue. The additional invigilator increases the operational cost of managing face-to-face examinations.

The information in the student attendance slip is transferred into multiple documents to produce an attendance report. The attendance report contains the number of present and absent students. The transferring process is hand-operated and time-consuming. The report cannot be generated on time. As a result, the other stakeholders, such as the faculty, did not receive the report promptly to take appropriate action on the absent student.

The traditional process of generating the attendance report is error-prone. The number of answer scripts must match the number in the attendance report. Multiple counting processes have taken place for unmatched numbers due to inaccurate values from the report or the counting process.

Description of Examination Attendance Module

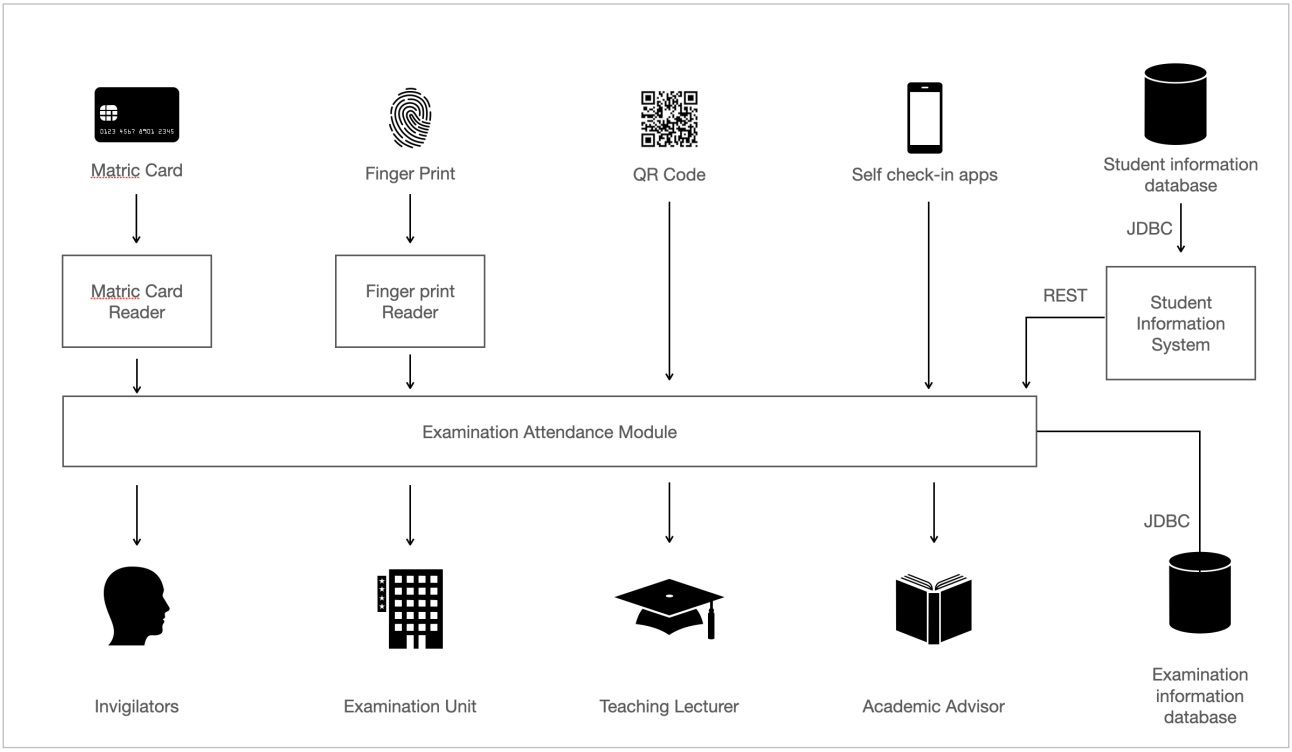

Figure 3: Architectural view of Examination Attendance Management Module

Figure 3 shows an architectural view of the examination attendance management module. The module capture input from devices such as matric card reader and fingerprint reader. Each device contains a location number. Apart from the devices, the input is also captured from a QR code and self-check-in apps. The module will validate and record all input in the Examination Information Database. The validation is interfacing with the Student Information System. The student can use self-check-in apps upon the approval of the Chief Invigilator. Otherwise, the feature of self-check-in will be disabled.

The module compiles the examination attendance system for the invigilators, Examination Unit, teaching lecturers and academic advisors. The student is considered late when the attendance is not recorded 10 minutes after the commencement of the examination. The student, teaching lecturers and academic advisors will be notified by SMS and email.

After the examination has ended, the attendance report will be emailed to the teaching lecturer and academic advisor for their reference.

Task

Design and implement a solution for the examination attendance module. Create two programs to represent the readers. The solution must include all the processes described in the previous section of this project.

Project 3: Clinical Consultation Appointment System for a Government Hospital

Introduction

Providing a good health care service is the responsibility of the government. The health care services are provided at governmental hospitals such as Hospital Besar Melaka. The hospital has many clinics. These clinics are operated by specific departments such as paediatric, dermatology and urology. These clinics scheduled the patient's appointment. The patient will come to the clinic for a consultation with the specialist. The patient will be given a medical prescription upon his consultation. The patient will collect the medical prescription from the pharmacy.

Problem Statement

The patient will be given a call number upon registration for consultation. The call number is printed on a slip for the patient's reference. The patient will be called from the number to come into the doctor's room for the consultation. Other patients have to wait for their turns. The duration of the consultation is varied from one patient to another.

The varied duration of consultation time has posed several problems to hospital management. Other patients' waiting time increases when the current patient's consultation exceeds the allocated time. The waiting patients became exhausted due to the long waiting time. The waiting patients become tired. Some of the waiting patients need to reschedule their activities due to the waiting time.

The process of monitoring the consultation time is non-existent. Therefore, it is challenging for the hospital management to reschedule the patient's appointment and doctor's consultation schedule. The traditional approach of re-assignment the other patients to another doctor is tedious and time-consuming.

The traditional approach of re-assignment leads to imbalance loading. The doctors have to work long hours attending to the re-assigned patients. The doctors became exhausted. This will affect their medical assessment of the patients.

Task

Design and implement a solution for a module that manage the patient appointment for medical consultation. The module must interfaced with Patient Registration System and Pharmacy Dispensary System. The solution must address all the problem stated in the previous section.

Instruction 2

1. Design a web service for the project using an object-oriented approach and adhere to MVC princple.
2. The design must be ready to be reviewed during the lab session in Week 10.
3. The implementation of the design will start on Wednesday, 24th May 2023.
4. The implementation must be ready to be assessed during lab sessions on Week 13.
5. The assessment of design and implementation will start randomly upon the Project Manager's selection.

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