IN PARTNERSHIP WITH PLYMOUTH UNIVERSITY

Name: Mr. Ranul Pasan Ladduwahetty
Student Reference Number: 10673986

Module Code: CNET343SL - 20/AY/AU/M	Module Name: CNET343SL Distributed Systems (20/AY/AU/M)
Coursework Title: Coursework Proposal (CNET343SL/C1/W1)	
Deadline Date: Friday, 4 December 2020	Member of staff responsible for coursework: Dr. Bogdan Ghita and Mr. Rasika Alahakoon
Programme: BSc (Hons) Software Engineering (4872)	

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Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.

Mr. R.P. LADDUWAHETTY (Team Head)
Mr. H.V.L. HASANKA
Mr. M.I.C BANDARA
Mr. W.A.D.N.N. WIJESURIYA
Mr. A.D.K. DINUJA
Mr. D.A.K.V. WIJESEKERA

We confirm that we have read and understood the Plymouth University regulations relating to Assessment Offences and that we are aware of the possible penalties for any breach of these regulations. We confirm that this is the independent work of the group.

Signed on behalf of the group: Mr. R. P. Ladduwahetty

Individual assignment: ***I confirm that I have read and understood the Plymouth University regulations relating to Assessment Offences and that I am aware of the possible penalties for any breach of these regulations. I confirm that this is my own independent work.***

Signed :

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If used, please state name of software……

Overall mark _____% Assessors Initials _____ Date_____

Group Details

Group No: 1

Group Name: TEAM RPLS

Coursework Project Idea: Movie Reservation Booking System

GitHub: https://github.com/LRANUL/UOP_SE_Y3-CNET343SL_DISTRIBUTED_SYSTEMS *(Private till Final Coursework is released)*

Project Management: https://dev.azure.com/10673986/Distributed%20Systems (*Private till Final Coursework is released)*

Technologies – Angular JS, Firebase, mongoDB, Ionic Framework, NodeJS, Stripe, OMDb and ElectronJS

Note: Text content of Proposal CNET343SL-C1-W1 have been limited to 5 Pages (excluding references, diagrams, and appendices)

Group Members

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10026404	10673969	Mr. H.V.L. HASANKA (Deputy Head)	SE
10012039	10673936	Mr. M.I.C BANDARA	SE
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*SE: BSc (Hons) Software Engineering (4872)

TABLE OF CONTENTS

List of Figures

List of Tables

1 Introduction

1.1 Brief

According to the statistics from the previous decade, number of movie watchers in cinemas throughout the world more people tend to visit cinemas in person rather than waiting for the Blu-ray version. This is the cause and effect when movie industries create the movie to produce a realistic experience in the cinema by using the special effects and different sound effects. Due to this the lines to purchase the movie tickets can get excessive. This will cause more confusions, delays, and unnecessary issues within the cinema premise.

Even though the cinema industry has been booming, in 2020, a global pandemic has outbroken. This resulted everyone to evolve their lifestyles to life among the disease while taking the necessary precautions. So now, the movie watchers are not recommended to purchase their movie tickets at the counter in long queues. There must be an alternate solution for purchasing the tickets like an automation system along with the meal and snack ordering to simplify and reduce the possibility of interactions.

1.2 Current Solutions

There are numerous ticket reservation systems around the world but in Sri Lanka there are a few reliable and easy to use systems. Main system that is used by the customers are the 444 system, the Tak Tik book and finally the system provided by the scope cinemas called scope.

The 444 system is one of the most used application by customers to book or make reservations because it provides much more functionalities than just the movie reservation it also allows users to book for other activities such as special events, bus tickets, spa, and salon (Dialog Axiata, 2020). The Tak Tik book also provide functionality to book movies, events, and has a blog for movies (Tak Tik Book, 2020). Finally, the system provided by scope cinemas is a one which provides functionalities related to their theaters. This system allows customers to book tickets and in addition customers can also book food and beverages to make it easier for themselves.

2 Business Case

2.1 Business Need

Most of the leading companies in Sri Lanka use E-Commerce to fulfill their business, in that situation, most reservations are going through online platforms (Ex: Flight ticket reservation, Hotel reservation, E-channeling). In our project, we decide to develop a ticket reservation system for cinema. In most cases people are in the habit of going to the cinema and queuing up to buy tickets from the ticket counter, because they are not familiar with the online platforms but these days all the Sri Lankan peoples are tiring to getting involved to the online platforms because of the current situation of the Covid-19 in Sri Lanka. We hope our reservation system will help the Consumer Community and the Business Community as well.

2.1.1 Underlaying Problem

Most cinemas in Sri Lanka use a manual ticketing system and a few use an automated system. The purpose of this study is to design and develop an online cinema booking / ticketing system that aims to providing convenient customer service.

- Delaying booking seats by customers.
- Network service fluctuation.
- Inability to reserve seats for computer ignorant customers.
- Corrupt and cunning customers who can sneak into a movie theater with fake seat number printing.

2.2 Business Objectives

The business objectives of this project are to modernize ticket reservation systems from old methods such as phone reservations and in person bookings at cinemas.

- Mitigates waiting times for reservations as with phone reservations.
- Provides customers an in-depth view of seating available.
- Effective management of reservation done online, via phone and in person.
- Allows ordering beverages and snacks online while booking.
- Effective marketing for customer by aggregation of information for future use.

3 Project Objectives

The project objectives are the desired results we want to see in the project closure. Our ticket reservation systems will contain the following objectives

- Create a user-friendly environment for people to book the current movies. this will include a public website and a mobile application that users can install on their devices
- Creating a Desktop application to book tickets on the go for people who does not want to book their seats online.
- An access point to get information (ratings, description, released date, etc.) of the movies.
- Creating a content manager/controller to manage the information the going through to the database of the application
- Creating a central database to connect every application to the same data set.

4 Initial Scope

4.1 Functional Requirements

The functional requirements define the functionalities that should be available in the system to make it a unique and useful system. These are the functional requirements for the planned movie ticket reservation system.

- The user should be able to see the seats that are available and the seats that are booked by other people.
- The user should be able to book all the different types of tickets available.
- The user should be provided with all the different cinema locations from which the user can book tickets.
- The system should provide a small description about the movie.
- The system should send a message to the user with the booking Id and the booking details.
- If a user is in the booking process a timer should be set to make that selected seat unavailable to avoid double booking.
- The users should be able to rate the movies in which they have booked tickets.
- The users should be able to book for snacks and drinks along with their movie ticket.

4.2 Non-Functional Requirements

Non-functional requirements are the are the functions that improve the systems operation capabilities to provide a better service or a product. These functions may change from system to system and for the current ticket reservation system the following are the non-functional requirements

- Should provide the user with the information of each movie

- Provide customers with information about the current trending movies.
- The system should be user friendly for the customers.
- The system should be available in mobile phones for better portability and because it is widely used these days to book tickets
- The users should be able to personalize their account like change their personal details and more
- Managing the loading times effectively to make the application more efficient.

4.3 System Architecture

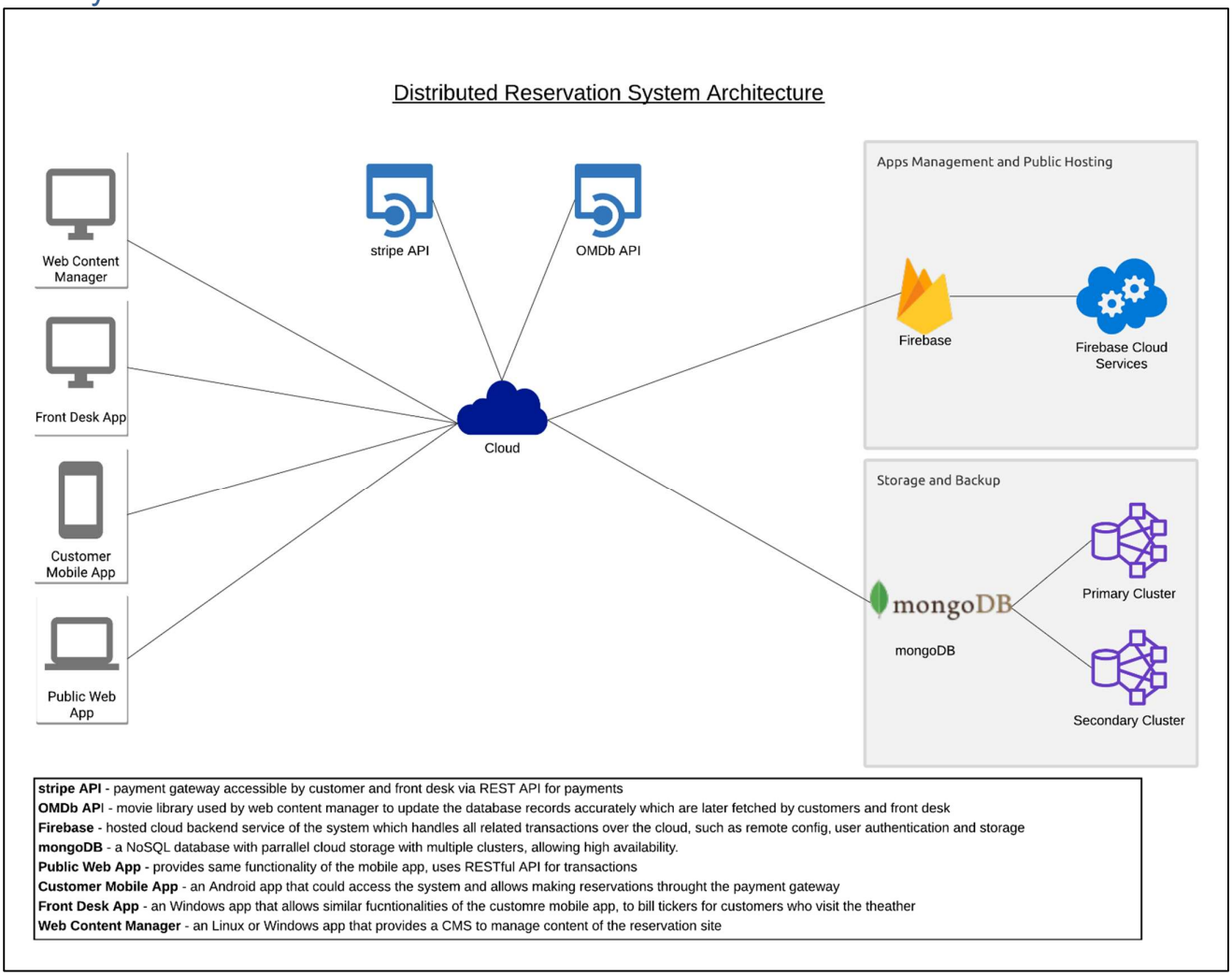

Figure 4.3.1 Proposed System Architecture

Frontend of the application would be developed using Ionic framework and backend of the application would be NodeJS, The APIs would be used at authentication gateways, payment gateways and for CRUD operations and data would be stored on mongoDB.

The website would be hosted with Firebase hosting services and other application would be available as package installers to be downloaded and installed. Planned products would be a web, mobile and a desktop application which would communicate with the server backend and with other payment gateways to fulfil reservation requirements.

Web Content manager would use third party API OMDb to fetch movie data and would update the collection with payment details for user, both front desk users and customers would fetch setup by the CMS and make payments using another API stripe, for authentication firebase API would be used and other CRUD functions would be handled by mongoDB and these would contribute to the distribution of the system.

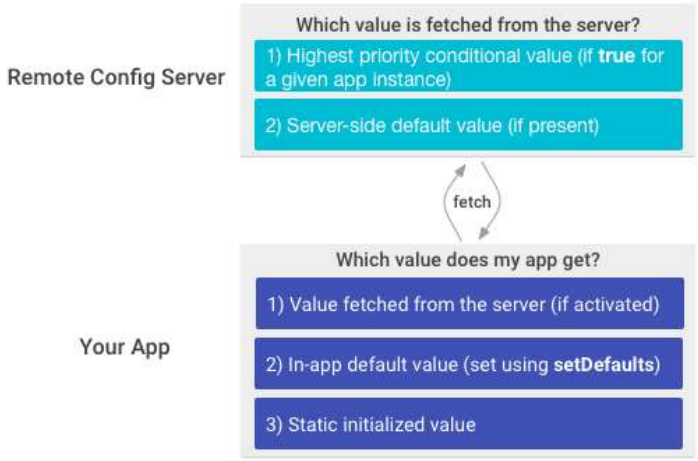

Figure 4.3.2: Illustration of Firebase Remote Config (Firebase, 2020)

To demonstrate remote functions invocation, we would use firebase remote configuration service, so we could activate offers remotely or even lock the app during maintenance by activating a function that was placed during app development.

5 Method of Approach

5.1 Agile

The project would focus on the development of a reservation system, agile incremental design approach seems most suitable and would be employed for this project.

Initial core components of the application would be developed, and then components would be reused during the development of other clients of the system. i.e., authentication system.

6 Technologies and Budget

6.1 Technologies

In order to develop this system, we are planning to use several programming languages, frameworks, middleware and databases. As mentioned in the system architecture, the system will operate on three different platforms, web application, desktop application, and mobile application. In the below table the technologies and the purpose of usage is mentioned.

Technology	Category	Project Platform	Purpose	Cost
Firebase Cloud Firestore	Database	Centralized Database	Store and manipulate the system data.	No costs involved with the required functionalities.
Ionic Framework (Angular Language)	Frontend Programming Language, and Mobile App Framework	Web App, Desktop App, Mobile App	Develop the frontend and backend of web app, desktop app, and mobile app.	No Cost
NodeJS	Backend Programming Language	All Platforms	Allowing different platforms to communicate with each other.	No Cost
Electron	Desktop App Framework	Desktop App	Develop the desktop app.	No Cost

Firebase (Rest API)	Middleware	All Platforms	Interact data within the system and with third-party services.	No Cost
mongoDB (Rest API)	Middleware	All Platforms	Interact data within the system	No Cost
Stripe API	Third-party Web Service	All Platforms	Used for online payment transaction processing in the system.	No Cost
OMDb API	Third-party Web Service	All Platforms	Used to retrieve details about the movies.	No Cost

Table 6.1: Technologies Breakdown

7 Project Plan

7.1 Project Plan

Stage	Expected Start Date	Expected Finish Date	Products/Deliverables/Outcomes
1. Initiation		04/11/2020	Proposal
2. Requirements analysis and High-level design	06/11/2020	15/11/2020	Requirement gathering via surveys, analyzing requirements and design database diagrams, architecture diagrams and low-fidelity prototypes
3. Phase 1	16/11/2020	26/11/2020	Development of authentication and registration.
4. Phase 2	26/11/2020	16/12/2020	Development of user profiles and frontend pages such as booking pages for all platform
5. Phase 3	17/12/2020	23/12/2020	Integrate backend connection and CRUD functions, populate database
6. Christmas and New Year Holidays	24/12/2020	31/12/2020	
7. Phase 4	01/01/2020	15/02/2020	Development of desktop and mobile applications
8. Phase 5	15/02/2021	28/02/2021	Documentation and addition of payment gateway
9. User Testing	16/02/2021	10/03/2021	Audit website and user testing
10. Complete Project	10/03/2021	30/03/2021	Host website and publish installers, prepare the final report for submission

Table 7.1: Project Plan

7.2 Control Plan

In the current pandemic situation manual data collection is not possible, many researchers have substituted to online data collection methods such as Google forms, MS forms etc. Thus, collected should be analyzed efficiently and accurately using software such as Tangara, MAXQDA.

Technological failures and schedule overruns are two critical obstacles that can occur, a feasibility study should be conducted prior and overcome by PM software. Every research note/material can be of benefit to the researcher. A service expected by the client is product delivery at scheduled time deviating from initial plan is not acceptable.

The coders and requires should come to an agreement of what the end product should be and keep it fixed and readable and reusable codes must be used. All ends of testing have to be conducted to both system and user acceptance thus achieving a high-quality product.

7.3 Communication plan

The communication plan represents the ways team members communicate project details and information.

- Team meetings will be held weekly to manage the progress of the project and to clarify issue regarding the project. Most of the team meetings will be done online via Microsoft Teams or Zoom.
- We will have constant communication with the supervising lecturers to clarify issues with the project
- GitHub and Azure DevOps will be used to manage the workload within the Project members

8 Initial Risk List

Risk	Management strategy
Data collection	Use of electronic surveys and virtual meetings to collect data, overcome issues with collecting data in person during a pandemic situation at the time of the project
Data analysis	Analytics software for data analysis
Gold plating	Follow the plan with requirements
Technology Failure	Use source control such as GitHub
Schedule overruns	Use of project management tool Azure DevOps for tracking and team meetings
Difficulty Learning or Management	Use of provided documentation and lecture material as supportive content to project

Table 8.1: Risk List

9 Initial Quality Plan

These are the relevant quality checks that would be overviewed during this project.

Quality Plan	
Quality Check	**Strategy**
Requirements Validation	Each requirement will be analyzed before the initiation of the designing phase. Requirements will be tallied with the business objectives. Conduct end-user verification of the requirements using questionnaires.
Design Validation	A prototype will be developed to check the design feasibility.
Maintain Source Code Standards	At the end of each task in the development phase the developer will review the code to check for the coding standards before uploading their code block to GitHub.
System Testing	Unit testing and integration testing will be commenced after the development of each code block. Usability testing will be conducted after the implementation phase to check the usability of the system in the real world.
User Acceptance Testing	This will be conducted at the testing phase to collect the feedback on the system from a dedicated user.
Process quality	Check on design, program version and testing phases

Product quality	Quality check of code style and conventions used in programming.
End phase verification	Maintain quality at end of every phase

Table 9.1: Quality Plan

9.1 Quality Control

Quality control procedures, entities also review the quality of all factors involved in the final production. Considering and listing down these facts will help to deliver better and suitable product to client, and this will help to reduce time, cost, and workload as well. In our ticket reservation system project, we are considering some quality control facts. First, we gathered information according to customer satisfaction and loyalty,
In this fact we are considering how much we achieve of customer requirement and how our system will take to the user and, also to what extent is our software is user-friendly. If our final product meets the customer's requirement, it means definitely next time the customer will give their other projects as well. Next, we gathered information under the compliance and customer feedbacks**,** we consider how to reduce the customer compliance. To reduce the customer complains first of all we might give the project on time at the deadline and to do that we have to distribute workload among the team members and the each team member must complete their work on time as well and we also consider some additional facts as follows,

- Reduce the cost
- What are the tools and technic planned to use?
- After giving the software keep touch on with deliverable to maintain.
- Work with a proper plan and schedule some meetings to keep touch with each group members to get better outcomes.
- Double check the final product (software) and give the report and user guide to the customer

9.2 Quality Monitor & Maintaining

Maintaining the quality of the project is a key component that we try to achieve during the development of a project. The quality of a system is one key component that affect the user acceptance of a project. Since it is a defining factor of a project it should be monitored closely, so some of the ways used to monitor and maintain quality are by:

- Create and follow a detailed project plan
- Clearly identify the Project deliverables
- Check members performance by regularly checking their progress
- Have a risk plan to manage risk effectively
- Conduct appropriate Tests to find its limits such as stress tests
- User validation of the system to ensure that this what the customer wanted
- Ensure there is a substantial amount of time for testing purposes before the end of the project.

References

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Appendices

Appendix A: Workload

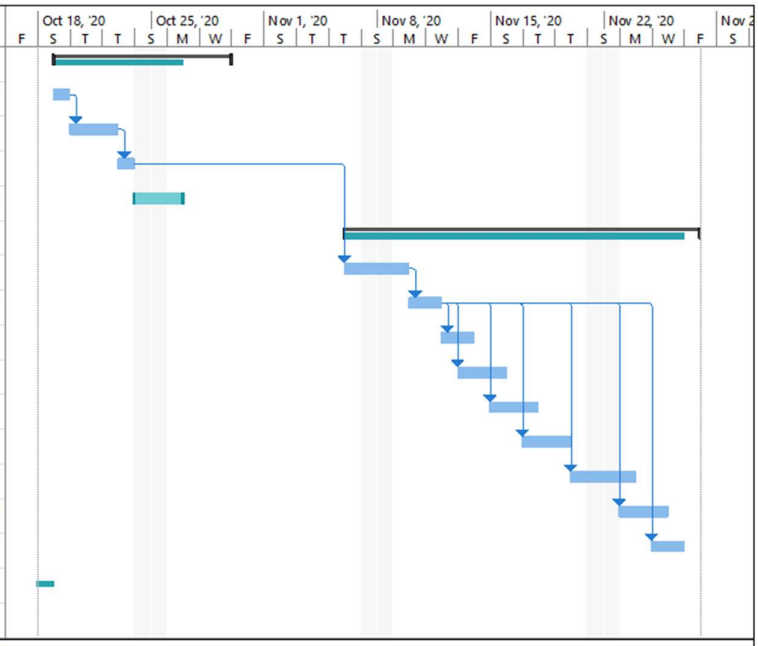
Student Name	Plymouth ID	Work Description*
Mr. R.P. LADDUWAHETTY	10673986	• Proposed Scenario • Business Objectives • System Architecture • Method of Approach • Project Plan • Quality Plan • Risk List
Mr. H.V.L. HASANKA	10673969	• Proposed Scenario • Project Brief • Technologies • Work Breakdown Structure • Quality Plan
Mr. W.A.D.N.N. WIJESURIYA	10674049	• Proposed Scenario • Current Solutions • Functional Requirements • Quality Monitor
Mr. M.I.C BANDARA	10673936	• Proposed Scenario • Project Purpose • Non-functional Requirements • Communication Plan
Mr. D.A.K.V. WIJESEKERA	10673333	• Proposed Scenario • Underlying Problems • Control Plan • Supported Project Plan
Mr. A.D.K. DINUJA	10673958	• Proposed Scenario • Business Need • Quality Control

*Each member signed and filled this workload form.

*Work has been cross checked by all team members and finalized for submission on 28th November 2020.

Appendix B: Gannt Chart

ID	Task Name	Duration	Start	Finish
1	**Initiation**	**9 days?**	**Mon 10/19/2(**	**Thu 10/29/20**
2	Meeting	1 day	Mon 10/19/2(	Mon 10/19/20
3	Research	3 days	Tue 10/20/20	Thu 10/22/20
4	Internal Proposals	1 day	Fri 10/23/20	Fri 10/23/20
5	Scenario Selection	2 days	Sat 10/24/20	Mon 10/26/20
6	**Proposal Initiation**	**17 days**	**Fri 11/6/20**	**Fri 11/27/20**
7	Introduction	2 days	Fri 11/6/20	Mon 11/9/20
8	Background	2 days	Tue 11/10/20	Wed 11/11/20
9	Business Case	2 days	Thu 11/12/20	Fri 11/13/20
10	Project Objectives	2 days	Fri 11/13/20	Sun 11/15/20
11	Scope	3 days	Sun 11/15/20	Tue 11/17/20
12	Method	3 days	Tue 11/17/20	Thu 11/19/20
13	Project Plan	2 days	Fri 11/20/20	Mon 11/23/20
14	Risk List	3 days	Mon 11/23/2(	Wed 11/25/20
15	Quality Plan	2 days	Wed 11/25/2(	Thu 11/26/20
16	**Requirements analysis**	**TBD**		
17				



Project: CNET343SL Distributed
Date: Sat 11/28/20

Task	Inactive Summary	External Tasks
Split	Manual Task	External Milestone
Milestone	Duration-only	Deadline
Summary	Manual Summary Rollup	Progress
Project Summary	Manual Summary	Manual Progress
Inactive Task	Start-only	
Inactive Milestone	Finish-only	

Page 1

Appendix C: Work Breakdown Structure