



Faculty of Computer Science and Information Technology

Restaurant Employee Shift Scheduling System (R3S)

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This project is submitted in partial fulfilment of the
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TING SENG SHIONG

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ABSTRACT

The Restaurant Employee Shift Scheduling System (R3S) is a web-based application designed to assist restaurant managers in scheduling their employees' shifts efficiently. The system allows managers to create and manage shift schedules for their employees, taking into account factors such as employee availability, positions, and workload. It also allows for easy communication of shift schedules to employees and provides an overview of the restaurant's staffing needs. R3S has the potential to significantly optimise the shift scheduling process for restaurants and improve the overall management of staff with the ability to create and manage employee schedules in real-time, minimise scheduling conflicts, and ensure that all shifts are adequately covered. Additionally, R3S offers an intuitive interface and enables managers to manage their employee information. Thus, managers can print the schedule and let employees view their schedule. This allows the employee to communicate with their managers about scheduling issues. It greatly improves employee satisfaction and reduces the stress often associated with managing work schedules. R3S also provides a centralised database of employee and restaurant information. This allows human resources (HR) to quickly and easily obtain the schedule information to analyse for market use. With its unique features and efficient design, R3S provides a comprehensive solution that can greatly benefit managers, employees, and HR alike.

ABSTRACT

Sistem Penjadualan Shift Pekerja Restoran (R3S) adalah aplikasi berasaskan web yang direka untuk membantu pengurus restoran dalam menjadualkan pergeseran pekerja mereka dengan cekap. Sistem ini membolehkan pengurus membuat dan mengurus jadual shift untuk pekerjanya, dengan mengambil kira faktor-faktor seperti ketersediaan pekerja, kedudukan, dan beban kerja. Ini juga memungkinkan komunikasi jadual shift dengan mudah kepada pekerja dan memberikan gambaran keseluruhan keperluan kakitangan restoran. R3S berpotensi untuk mengoptimumkan proses penjadualan shift untuk restoran secara signifikan dan meningkatkan pengurusan keseluruhan kakitangan dengan kemampuan untuk membuat dan mengurus jadual pekerja dalam masa nyata, meminimumkan konflik penjadualan, dan memastikan bahawa semua pergeseran dilindungi dengan secukupnya. Selain itu, R3S menawarkan antara muka intuitif dan membolehkan pengurus menguruskan maklumat pekerja mereka. Oleh itu, pengurus dapat mencetak jadual dan membiarkan pekerja melihat jadual mereka. Ini membolehkan pekerja berkomunikasi dengan pengurus mereka mengenai masalah penjadualan. Ini boleh meningkatkan kepuasan pekerja dan mengurangkan tekanan yang sering dikaitkan dengan menguruskan jadual kerja. R3S juga menyediakan pangkalan data terpusat mengenai maklumat pekerja dan restoran. Ini membolehkan sumber manusia (HR) memperoleh maklumat jadual dengan cepat dan mudah untuk dianalisis untuk penggunaan pasaran. Dengan ciri unik dan reka bentuk yang cekap, R3S menyediakan penyelesaian komprehensif yang dapat memberi manfaat kepada pengurus, pekerja, dan HR.

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Chapter 1: Introduction

1.1 Background

Scheduling refers to the process of planning and organising the allocation of resources, such as time, manpower, and equipment, over a specific period, while shift scheduling is the practise of creating schedules for employees working in shifts, such as in a 24-hour retail or service industry or in a restaurant where there are multiple shifts over a day. Employee scheduling is critical for all businesses, large and small, as it impacts the efficiency of the business. In small firms, the manager or supervisor creates the work schedules, while in large firms, the Human Resource (HR) management handles the employee scheduling.

A well-planned schedule is required for a firm to run smoothly. A suitable schedule will guarantee that the appropriate number of employees are scheduled for each shift. It is essential to ensure that the right number of employees is available at the right times to meet customer demands and achieve sales targets. Overstaffing can result in increased labour costs, while understaffing can lead to longer wait times for customers, decreased customer satisfaction, and lower sales. There could be arguments as to which employees should come in for a specific shift if effective scheduling is not in place. This can cause havoc, particularly during busy business hours. For example, a restaurant is usually crowded around lunch and dinner times. Managers had to ensure that there were enough employees to serve the customers during peak hours. Having experienced employees during these times will ensure effective and seamless service.

It is important for HR to track and manage ideal working hours, actual working hours, overtime, and breaks, as this ensures compliance with labour laws and protects the well-being

of employees. Ideal working hours, actual working hours, overtime, and breaks are important aspects of shift scheduling as they impact the overall cost of a business. Ideal working hours refer to the expected or planned number of hours that an employee should work in a day or week. The ideal working hours are based on forecasted sales and business needs and serve as a guideline for creating the shift schedules. Actual working hours refer to the actual number of hours that an employee works, including overtime and breaks. It is important to track the actual working hours to ensure that the employees are not overworked and that their total working hours do not exceed the legal limits. Overtime refers to the additional hours worked by an employee beyond their regular working hours. In Malaysia, the Employment (Limitation of Overtime Work) Regulations 1980 state that the maximum amount of overtime work in any given month is 104 hours. This equates to an average of 4 hours every day. Thus, managers had to arrange the employees' schedules without disregarding the labour law. Overtime must be properly managed to ensure that the employees are fairly compensated for their additional work and that the business does not incur excessive labour costs. Breaks are the scheduled pauses in the workday for employees to rest, recharge, and eat. Adequate breaks are important for employee well-being and to prevent burnout. Breaks should be scheduled into the shift schedule to ensure that employees have the time they need to recharge and return to work refreshed and ready to be productive.

1.2 Problem Statement

In Malaysia, there are some companies with many restaurant outlets and the number of outlets can reach over a hundred. The HR management needs a scheduling system to manage those outlets' employees' shift schedules. First, the HR management will plan the forecast sales and ideal working hours for the restaurant outlets monthly. Then, the restaurant managers had

to plan and arrange the employees' schedules based on the forecast sales and ideal working hours. Managers had to create the schedule template in a spreadsheet and fill in the employees' names and positions. The managers needed to arrange schedules weekly, which means they had to create the same schedule template and fill in the employees' names and positions repeatedly. Managers also had to arrange the employee shifts based on the number of employees and their leave arrangement so that there are enough employees during the peak hours.

Furthermore, managers should also calculate the total working hours and overtime so that the total working hours will not be over 10% of the ideal working hours on that particular day. Sometimes, the managers will present wrong calculations for the total working hours and it is difficult to track the error. After they have done the schedule, they had to upload it to a cloud storage. This is time-consuming and inconvenient whenever they wanted to create and update the schedule. It is also difficult to search for specific outlet schedules when the number of spreadsheets in the cloud storage increases.

Managers might also forget to upload the spreadsheet onto cloud storage which might cause some problems when HR management tries to look for the information. It is not easy for HR management to use the employees' schedule data for data analysis due to calculation errors, missing spreadsheets, or incomplete schedules.

1.3 Scope

This project is developed for restaurant managers to schedule employee shifts for both full-time and part-time employees. It is a web-based system that comprises the manager side and administrator side. On the manager side, the manager can create, read, update, and delete

the schedules of employees while on the administrator side, the administrator can manage the account of managers and employees' schedules of all restaurants.

1.4 Aims and Objectives

The main aim of conducting this project is to build a web-based R3S to allow restaurant managers to manage employee schedules. The project's objectives are:

- a. To design a shift scheduling system for managing employees' information and viewing all restaurant schedules.
- b. To develop a web-based employee shift scheduling system to assist managers in managing employees' schedules.
- c. To test the usability and functionality of the developed system in the employees' shift arrangements.

1.5 Brief Methodology

The methodology that is chosen for this project is Rapid Application Development (RAD).

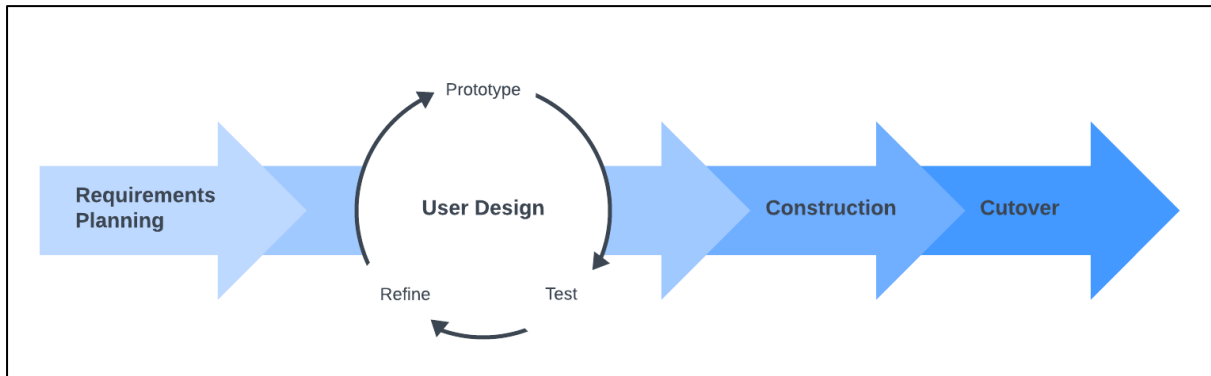


Figure 1: Rapid Application Development (RAD)

Rapid Application Development (RAD) is a type of agile software development process that emphasizes the product creation in a short period of time. RAD employs numerous iterations and continuous feedback, allowing your firm to create systems quicker while preserving quality and lowering expenses. As the need for new applications grows, the overall purpose of the process is to get functioning software solutions to market faster. In reality, quick application development emphasizes an adaptable approach above planning.

1.6 Phases in Rapid Application Development (RAD)

1.6.1 Requirements Planning

In this phase, developers and clients communicate to determine the aims and objectives of the project as well as the user requirements. It is critical that everyone has the chance to involve in the communication to avoid misunderstanding.

1.6.2 User Design

In this phase, the developers design some prototypes based on the client's needs. It will be given to the client for testing then the client will provide feedback to developers. Both developers and clients will communicate to make sure the prototypes meet the client's expectations.

1.6.3 Rapid Construction

This phase is the most important phase for Rapid Application Development (RAD) methodology because it takes the prototypes that were produced from the user design phase to produce a working model. This phase is broken down into a few steps which are prepared for rapid construction, program and application development, coding, unit, integration, and system testing. In this phase, developers still communicate with the client so the client can provide some ideas or suggest changes. The development teams work together to make sure the client is satisfied with the product created.

1.6.4 Cutover

The last phase of the RAD methodology is the stage at which the finished system is ready for launch, ensuring that the system maintains a suitable degree of stability. It also included data conversion, testing and user training.

1.7 Significance of Project

The completion of this project can provide a web-based R3S that can replace the traditional method of shift scheduling systems like spreadsheets. The developed system allows the managers to manage the employees' attendance and overtime based on the date, number of employees, and positions. As a consequence, the system will significantly improve in terms of time consumption, and convenience of managing schedules. With the developed system, the employees' shift schedule will not be lost easily due to human error compared to the usage of spreadsheets.

1.8 Project Schedule

The project is anticipated to be completed within two semesters following the course Final Year Project I and Final Year Project II.

Table 1 : FYP 1 and 2 course schedule

Agenda	Start Date	End Date
Submission of the Approved Brief Proposal	17-Oct-2022	28-Oct-2022
Feedback and Comment from Reviewer/Examiner	29-Oct-2022	4-Nov-2022
Submission of Full Proposal	5-Nov-2022	14-Nov-2022
Submission of Chapter 1	15-Nov-2022	21-Nov-2022
Submission of Chapter 2	22-Nov-2022	9-Dec-2022
Submission of Chapter 3	10-Dec-2022	30-Dec-2022
Submission of FYP 1 Final report & Paper for assessment	31-Dec-2022	12-Jan-2023
FYP Symposium	17-Jan-2023	19-Jan-2023
Amendment and Modification Period for FYP	20-Jan-2023	10-Feb-2023
Submission of Final Report	11-Feb-2023	19-Feb-2023
Submission of Chapter 4	8-Apr-2023	15-May-2023

Submission of Chapter 5 & 6	16-May-2023	29-May-2023
Submission of Full Report & Paper for assessment	30-May-2023	10-Jun-2023
Submission of Final Report	11-Jun-2023	1-July-2023
FYP Live Presentation	7-July-2023	8-July-2023
Amendment and Modification Period for FYP	1-July-2023	24-July-2023
Submission of Final Report after Amendment	25-July-2023	30-July-2023

1.9 Expected Outcome

The expected outcome of this project is R3S, which will assist restaurant managers in managing the shift schedules of employees based on forecast sales and ideal working hours, replacing traditional scheduling methods. For employees, R3S allows them to communicate their scheduling preferences and availability, ensuring that their needs are taken into account when creating schedules, while R3S provides HR with a dashboard that allows them to analyse scheduling data and ensure that scheduling is fair and equitable across the workforce.

1.10 Summary

Chapter 1 provides the introduction that contains the background, problem statement, aims and objectives, scope, expected outcome, the significance of the project, and project schedule.

Chapter 2: Literature Review

2.1 Introduction

This chapter will review similar systems that have functionality like the proposed system for this project, an employee scheduling system. Three similar systems will be chosen based on their functionality, with the ability to manage them easily being the most important factor. This chapter will also discuss the comparison between the existing systems and go through the tools and technologies that will be required to build the proposed system.

2.2 Review of similar systems

2.2.1 7shifts

7shifts is a restaurant employee scheduling and management tool. 7shifts is used to, among other things, simplify employee scheduling, enhance team communication and on-leave requests, standardise shift activities, reduce labour expenditures, and monitor labour compliance.

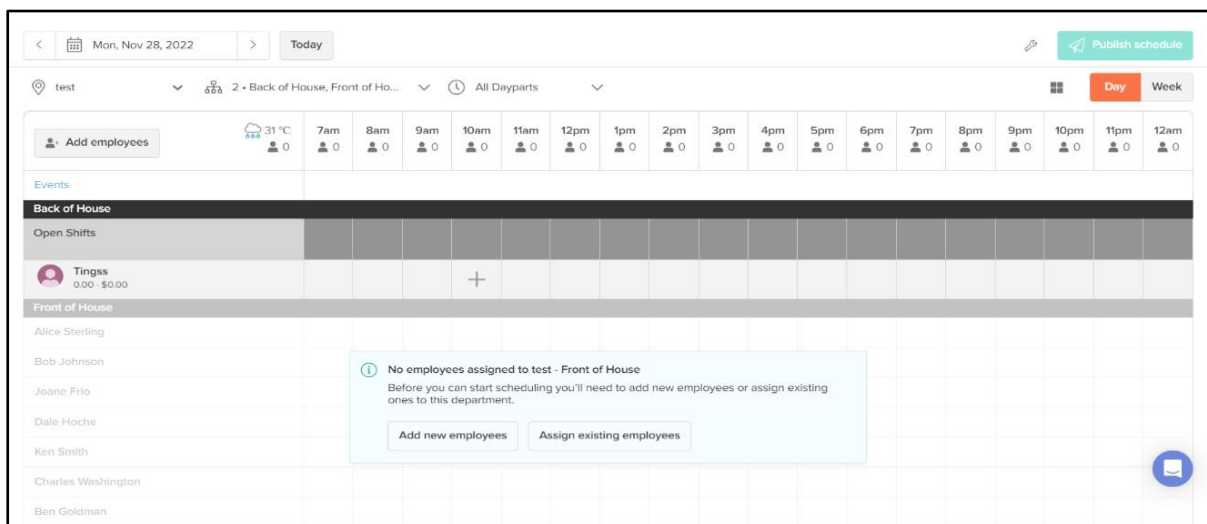


Figure 2.1: The daily schedule page of 7 shifts

The system displays the employee's department, such as back of house and front of house, in Figure 2.1. The users can add new employees to the department or assign existing employees to it. They can simply select any empty column to arrange the employee shift, and the system will display the dialogue box shown in Figure 2.2.

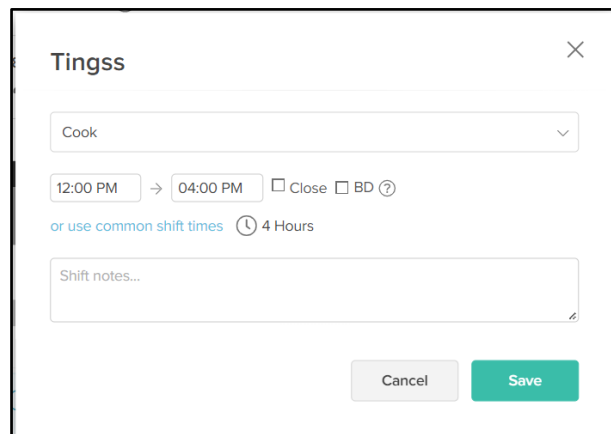


Figure 2.2: The dialog box to save the start time and end time

After saving the employee's working time, a draggable button will appear in the table columns with the working time, the users could update the working time by clicking the pen icon or dragging the button. The column headers show the hour and the number of employees in that hour. Furthermore, the system could detect employees' overtime based on working time and highlight it in red inside the table as shown in Figure 2.3.

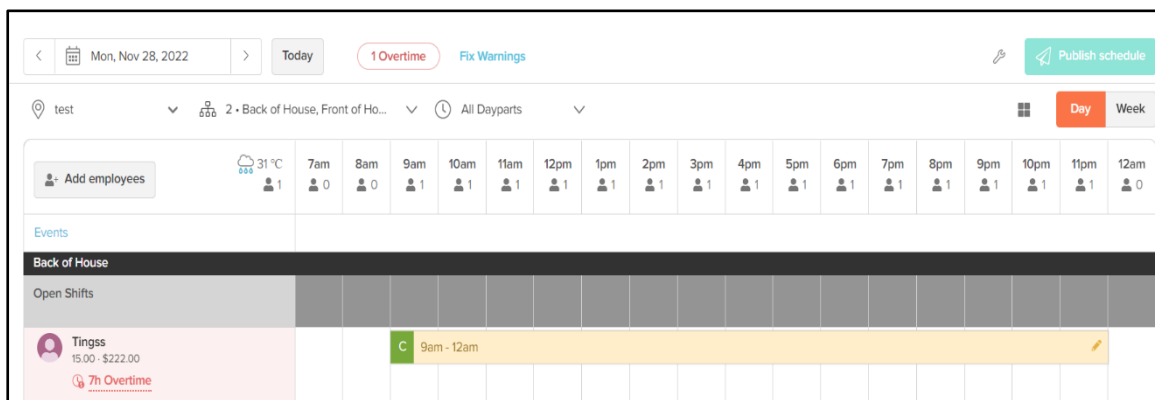


Figure 2.3: A overtime warning in the schedule

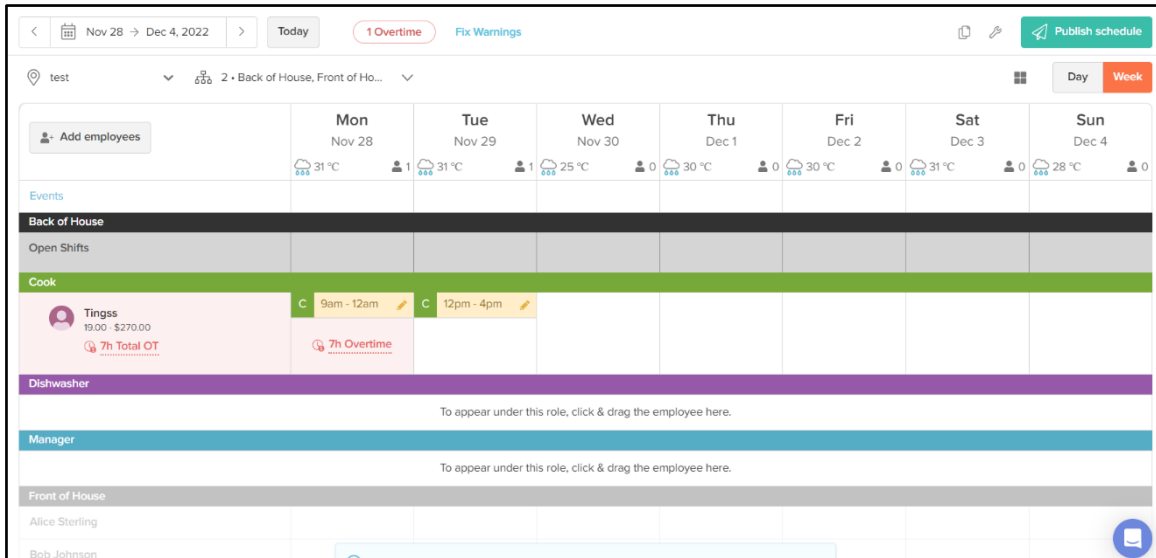


Figure 2.4: The weekly schedule page of 7shifts

Thus, the weekly schedule displays one week of employees' shifts and has the same functionality as the daily schedule page, including the ability to add, update, and delete working shifts (refer to Figure 2.4). The users could also view the dashboard, which displays a chart comparing expected sales and labour to actual sales and labour (refer to Figure 2.5). In the dashboard, the users could choose whether the chart should be displayed weekly or monthly, and then they can also filter it by restaurant outlet.



Figure 2.5: The dashboard of 7shifts