

FRONT DESK CUSTOMER SERVICE FOR QUEUE
MANAGEMENT SYSTEM

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DECLARATION

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Date : 20 NOVEMBER 2007

DEDICATION

Specially dedicate to
My beloved parents, sisters and brothers

ACKNOWLEDGEMENT

Alhamdulillah, the highest thank to God because with His Willingness I possible to complete the final year project in time.

I would like to express my gratitude to my dedicated supervisor, Mr. Saifudin Bin Razali for guiding this project with clarity and that priceless gift of getting things done by sharing his valuable ideas as well as his knowledge.

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ABSTRACT

Front desk customer service for queue management system is a system that help the customer to manage their business when they at the place that provide the customer service. There are many applications that have been develop base on the service provided by this system in electronic field nowadays such as thermal printer, LCD Touch Screen, push button panel option, high speed system structure without needing and external computer, special display and console design, monitoring system, moving message, and TV units can be adapted to the system, multiple ticket machine supported, WAN, LAN, internet supporting through TCP/IP and according to the customer needs, additional function are supported. The purpose of this project is to develop a Queue Management System model that can display a number display module, a queue module and a sound module. The system was controlled by PIC Microcontroller as a system controller. By using PIC 16F877, push button, decoder, latch, LED, seven segment, buzzer and voltage regulator circuit, the operational of this system were programmed using the PIC Basic programming language. As the result, the Queue Management System is operated as the expected operation and be able to achieve the objective of the project.

ABSTRAK

Sistem pengurusan barisan perkhidmatan pelanggan adalah sebuah sistem yang digunakan bagi membantu para pelanggan menguruskan hal-hal perniagaan mereka apabila mereka berada di tempat yang menyediakan servis perkhidmatan pelanggan. Terdapat banyak aplikasi yang telah dibangunkan merujuk kepada servis yang disediakan oleh sistem ini pada masa sekarang didalam bidang elektronik seperti pencetak 'Thermal', skrin sentuh ' Paparan Kristal Cecair', panel pilihan butang tekan, struktur sistem berkelajuan tinggi tanpa memerlukan computer tambahan, pameran khas dan pelan ' Console', sistem pengawalan, mesej bergerak, unit tv yang dapat diadaptasikan ke dalam sistem, mesin tiket berbagai yang disokong, 'WAN', 'LAN', internet sokongan melalui 'TCP/IP' dan merujuk kepada keperluan pelanggan fungsi tambahan adalah disokong. Tujuan projek ini adalah untuk membangunkan sebuah model sistem pengurusan barisan yang mampu mempamerkan modul nombor, modul barisan dan modul bunyi. Sistem ini telah dikawal dengan menggunakan pengawal mikro PIC sebagai pengawal sistem. Dengan menggunakan PIC 16F877, butang tekan, penyahkod, 'Latch', diod pemancar cahaya, 'Seven Segment', 'buzzer', dan litar pengawal voltan, operasi bagi sistem ini telah diprogramkan dengan menggunakan bahasa asas pemrogram PIC. Sebagai hasil, Sistem Pengurusan Pembarisan ini beroperasi seperti yang telah dijangkakan operasinya dan mampu mencapai objektif bagi projek ini.

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LIST OF SYMBOL

PIC	-	Peripheral Interface Circuit
Dp	-	Decimal Point
FIFO	-	First In First Out
SPF	-	Shortest Processed First
SQ	-	Single Queue
LAN	-	Local Area Network
WAN	-	Wide Area Network
RAM	-	Random Access Memory
ROM	-	Read Only Memory
CPU	-	Central Processing Unit
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
UART	-	Universal Asynchronous Receiver/Transmitter
CAN	-	Controller Area Network
LCD	-	Liquid Crystal Display
LED	-	Light Emitter Diode
OC	-	Output Control
C/CLK	-	Clock
BCD	-	Binary Coded Decimal

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Queuing is a process of moving customer from a central location to a specific place or service. Waiting in lines is something everyone does everyday. Lines are encountered everywhere like at the airport, checking into hotels and other place that provide service. Because of lack in customer service management, customer can be left confused as to what line to stand in, what counter to go to when called and distracted by noisy and crowded environments. So a model of Queue Management System is designed to reduce the traffic in the queue flow regarding nowadays people are always spending time while queuing. Basically, this projects more like design and builds a model of Queue Management System.

1.2 PROJECT OBJECTIVE

The objective of this project is to develop a Queue Management System model that consist of number display module, queue module, and also sound module by using PIC 16F877 Microcontroller.

1.3 PROJECT SCOPE

The Queue Management System is designed to manage 18 peoples of customer with single department and multiple counters. There are two operations and four customer counters in this system, that is Option A, Option B, Counter 1, Counter 2, Counter 3 and Counter 4. The related information from this system will be displayed at the display module (Seven Segment Display) and Sound Module (Buzzer). To achieve the entire project objective, the designer must have some knowledge on the following technology:

- i) Using PIC Basic Language for programming the system of Queue Management System.
- ii) Using PIC Simulator IDE for programming testing
- iii) Knowledge and skills in designing the system circuit
- iv) Using multiplexing method at the display circuit

1.4 THESIS OUTLINE

This thesis consists of five chapters together including this chapter. The contents of each chapter are outlined as follow:

Chapter 2 discusses about the literature review on Queue Management System, the existing product of the Queue Management System to be the guideline for this design, multiplexing technique and the information about PIC Microcontroller.

Chapter 3 discusses about the methodologies of hardware design and software development for Front Desk Customer Service for Queue Management System.

Chapter 4 explains and discusses all the result obtained and the analysis of the project. All the discussion is concentrating on the result and performance of the system development.

Chapter 5 discusses the conclusion about the development of the system. This chapter also discusses the recommendation for this project and overall system for the future development and modification.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A Queue Management System is the organization of queues of people within a retail or public sector department. This can be reactive, through a Queue Management System that can organize the existing queue, or proactive, through the queue management statistics gathering system, so that trends can be identified and anticipated. Queue Management Systems work by streamlining front-end operations into centralized contact points, enabling managers to monitor and set performance thresholds. Either people join a standing in line queue, and are directed to the next free position by the system, or visitor are issued with a ticket. With a ticketed system, the customer is taken out of a waiting in line scenario and their own resources according to the visitor demands. Queue Management Systems can be tailored and wait in a more relaxed environment businesses. The client requirements and queuing environments are an essential part of designing the most cost-effective queuing solution. This determines how the system will be used on a daily basis to maximize efficiency and organize queues.

2.2 QUEUE MANAGEMENT CONCEPT

In queuing system, there are many types of queue model like SPF (Shortest processed first), FIFO (First In First Out), SQ (Single Queue), Multiple Queues, Diffuse Queue and Head of Queue.

In SPF, its more offend used by the restaurant. SPF more accurately describes a model where transactions of short expected length are dealt with sooner (as in a 10 items only queue in a supermarket). SPF can work well but is problematic if the customers do not perceive the right degree of fairness from the system. It is necessary to explain why customer are being served in an order other than simple First In First Out (FIFO) and ensure that consumers understand and see the logic of this alternative approach.

FIFO is the model of service provision which is most fairly, where each customer is served in the order in which they registered for service. In service models where all customers think of themselves as equal, this model is important.

The single queue is the familiar snake or corral queue format. Each person waiting is served in turn and the format of the queue discourages pushing in. It also provides visible reassurance to customers that they will be served in fairly and that the queue is progressing.

For the multiple queues, this is the format that we have always seen at the supermarkets. Like a number of individual. Take-a-ticket queue models are example of diffuse queue. There is no formal queue line but customer register place in the process with a ticket.

Lastly is a head of queue, this is the place where the next person to be served waits in a single queue environment. It's vital that they can see along the line of service position to avoid significant gaps in service provision. With more than 5 checkouts, this factor becomes increasingly significant. In order to maintain fairness in the queuing system, there are the rules have been set for the Queue Management System concept:-

- Queue must be fair.
- Queues must be managed systematically and not allowed to descend into a free-for-all.
- The process must include positive feedback of progress.
- The process must be clearly identified; start & end points must be visible.
- Perception of waiting time should be managed.

2.3 ADVANTAGES OF QUEUE MANAGEMENT SYSTEM

In this system, it provides many advantages to the customer service provider and the customer itself. The advantages are:-

- a) Staffs dealing with customers who have been well-treated get less stressed and this increases job satisfaction.
- b) Staff can serve more customers per hour if those customers are fed to each counter efficiently.
- c) Help the management by producing statistical reports on information such as arrival rates and patterns, waiting and service times, and default and renegeing cases.
- d) Enabling managers to monitor and set performance thresholds.
- e) Customer will treated with fairness and in more relaxed environment.
- f) The queue flow will be smoother and increase the efficiency of queue management.

2.4 EXISTING QUEUE MANAGEMENT SYSTEM

In the Queue Management System, there are many products have been produced according to increase the effectiveness in the queue flow. There are Stand Alone Queue System, Advance Queue System and Centralized Control Queue System.

2.4.1 STAND ALONE QUEUE SYSTEM



FIGURE 2.1: Stand Alone Queue System

Figure 2.1 shows the system of a queue processor based solution. This system design is based on the single service and single counter operation. For the operation of this system, this system is operate as calling number in sequential or randomized order. This system is best use in application of small business, clinic & single payment counter.

Figure 2.2 below shows the example of operation in Stand Alone Queue System.

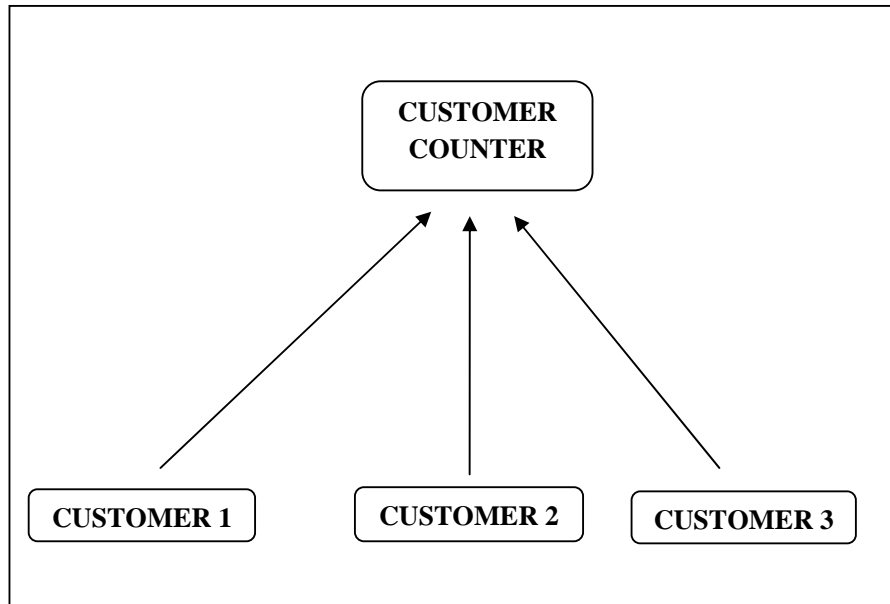


FIGURE 2.2: Operation of Stand Alone Queue System

In the Stand Alone Queue System, there are only one counter operates in Queue Management System. The entire customer will be managed at the same counter with the single service operation. The operation of this system is used the FIFO queue model. FIFO queued model or First In First Out is the concept of first come first serve. With this concept, the entire customer will be treated equally. The Stand Alone Queue System is best describe with single department service operation.

2.4.2 ADVANCE QUEUE SYSTEM

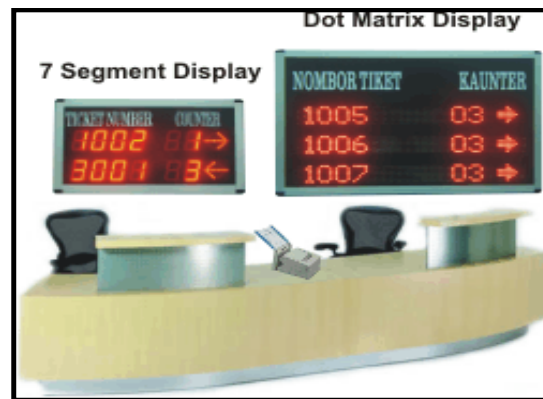


FIGURE 2.3: Advance Queue System

Figure 2.3 shows a system of queue processor based solution. This system design is based on the single departmental use and can support up to 32 service and 60 counters. It provides useful queue features and comprehensive reports. The application of this system is best use for service center, bank, hospital pharmacy, or any organization with multiple counters. It also provides real-time status monitoring for the queue management analysis. Figure 2.4 below shows the example of the Advance Queue Management Systems operations.

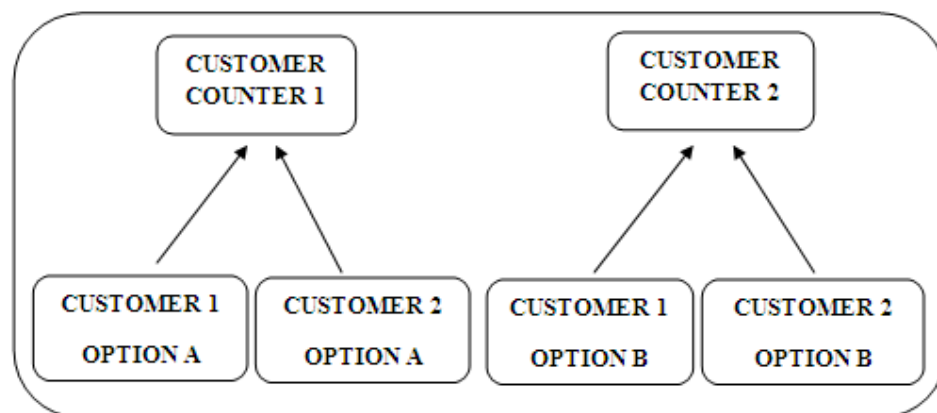


FIGURE 2.4: Operation of Advance Queue System

The Advance Queue Number System is the system that consists of multiple service operation and multiple counters. In this system, the customer will be arranged according to their service operation. This system operation is efficient when it have to manage many customers with many service operations. This system operation is best described as the single departmental operation with multiple counters.

2.4.3 CENTRALIZED CONTROL QUEUE SYSTEM



FIGURE 2.5: Centralized Control Queue System

Figure 2.5 shows a system of a high-end PC-based solution. This system queue server will be able to support up to 20 departments. Each of departments can have up to 32 services and 60 counters. The system is network compatible, this means each department can be located at different building or even different geographical are which is connected through LAN or INTRANET. This system also provided real-time status monitoring. Figure 2.6 shows the example of Centralized Control Queue Management System.