

## AUTOMATIC TOILET

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Special dedicated to my beloved parents Mr. Ab.Gafor bin Sultan and Mrs. Fazidah binti Dirin, my lovely siblings, my kindly supervisor Engr. Siti Fatimah binti Sulaiman, and special greeting to the dear friends.

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## ABSTRACT

Toilet hygiene is one factor for the user to use the toilet. Most public toilets in Malaysia have poor hygiene though various campaigns have been carried out to improve cleanliness. But, do these things happen due care casualness of the parties should be, or as a result of the users own attitude? Therefore automatic toilet system has been created aimed to teach people to keep public toilets clean. The system is also loaded with light and fan which is on and off when the toilet is use and not in use. This automated system saves electricity. Before using the automatic toilet users must make a payment of twenty cents, to enable the doors to be opened because the toilet door is always locked. It is controlled by using solenoid actuator. Solenoid works as the same ways as normal Direct Current (DC) motor, in order to trigger in both directions two relays are used. The system at once reduces the labor. Upon completion using automatic toilet, users have to press flush to allow the door opened. The system is able to educate Malaysians especially to ensure cleanliness of the public toilet. Music is also included in the automatic toilet system which is designed to give comfort to the toilet user. Automatic toilet system is controlled by Programmable Interface Controller (PIC16F877A) and is program using C program.

## ABSTRAK

Kebersihan sesebuah tandas itu merupakan salah satu faktor bagi pengguna untuk menggunakan tandas tersebut. Kebanyakan tandas awam di Malaysia mempunyai tahap kebersihan yang rendah walaupun pelbagai kempen telah dijalankan untuk meningkatkan kebersihan tandas. Tetapi, adakah perkara tersebut berlaku disebabkan penjagaan yang sambil lewa daripada pihak yang sepatutnya ataupun hasil daripada sikap pengguna itu sendiri? Oleh sebab itu tandas automatik ini telah dicipta bertujuan untuk mengajar orang ramai supaya menjaga kebersihan tandas awam. Sistem ini juga dimuatkan dengan kawalan lampu dan kipas yang menyala apabila tandas digunakan dan terpadam apabila tandas tidak digunakan secara automatik. Sistem automatik ini dapat menjimatkan penggunaan tenaga elektrik. Sebelum menggunakan tandas, pengguna haruslah membuat pembayaran sebanyak dua puluh sen bagi membolehkan pintu dibuka, kerana pintu tandas akan sentiasa berkunci jika tidak digunakan. Pintu ini dikawal oleh penggerak solenoid. Solenoid berfungsi sama seperti motor Arus Terus (AT) biasa. Untuk membolehkan solenoid bertindak dalam dua arah, dua geganti digunakan. Sistem ini sekaligus dapat mengurangkan tenaga pekerja kerana duit dimasukkan secara automatik. Setelah siap menggunakan tandas, pengguna haruslah menekan pemancar bagi membolehkan pintu dibuka semula. Sistem ini dapat mendidik rakyat Malaysia terutamanya untuk menjaga kebersihan tandas kerana kebersihan tandas tanggungjawab bersama. Muzik juga dimuatkan dalam sistem tandas automatik ini bertujuan memberi keselesaan kepada pengguna tandas. Sistem tandas automatik ini dikawal oleh Pengawal Antaramuka Perisian (PIC16F877A) dan diprogram menggunakan program C.



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**LIST OF ABBREVIATIONS**

PIC	- Programmable Integrated Circuit
TTL	- Transistor-Transistor Logic
LED	- Light Emitting Diode
PC	- Peripheral Interface Controller
UV	- Ultraviolet
PLC	- Programmable Logic Controller
RAM	- Random Access Memory
EEPROM	- Electrically Erasable Programmable Read Only Memory
HLCM	- Home Light Control Module
PC	- Personal Computer
DC	- Direct Current
RF	- Radio Frequency
AT	- Arus Terus

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## CHAPTER I

### INTRODUCTION

#### 1.1 Overview

A toilet is a sanitation fixture used primarily for the disposal of human excrement and urine, often found in a small room referred to as a toilet, bathroom, and lavatory. A public toilet also called a bathroom, restroom, latrine, comfort room, powder room, toilet room, washroom, water closet, public lavatory, and convenience is a room or small building containing one or more toilets and possibly also urinals which is available for use by the general public, or in a broader meaning of public, by customers of other services. Public toilets are commonly separated by gender into male and female facilities, although some can be unisex, particularly the smaller or single occupancy types. Increasingly, public toilets incorporate accessible toilets and features to cater for people with disabilities. Public toilets may be unattended or be staffed by a janitor possibly with a separate room, or attendant, provided by the local authority or the owner of the larger building. In many cultures, it is customary to tip the attendant, while other public toilets may charge a small fee for entrance, sometimes through use of a coin operated turnstile. Some venues such as nightclubs may feature a grooming service provided by an attendant in the toilet. They are typically found in railway stations, schools, bars, restaurants, nightclubs or filling stations as well as on longer distance public transport vehicles. Portable toilets are often provided at festivals and at temporary events for public use.

Public toilets are valuable assets that should be kept comfortably used by the public. Bad attitude some users and is not responsible polluter is the cause of the foul smelling toilet. Public toilets should be kept clean and comfortable to use. Toilet hygiene is important to prevent the spread of germs and bacteria. Cleanliness also symbolizes the individuality of the people of Malaysia especially for the tourists who come to Malaysia.

On the basis of the responsibility the project of an 'Automatic Toilet' was created. Automatic toilet project was created to educate the public to keep public toilets clean. The toilet is controlled by an automatic system designed to save electricity. Automatic toilet is also equipped with an automatic payment system using the slot money before entering the toilet, aimed at reducing the workforce responsible for working out the toilet to charge before using the toilet. Before using the toilet should ensure LED is green, indicating no user in the toilet. Cheap charge that is applies to use the toilet only twenty cents. Twenty cent coin to be inserted into the slot money to allow the door opened. After entering the toilet, red LED lights is on, the door will be locked and will not be open as long as the flush is not pressed. When the user goes into the toilet, light, fan, and music will be on automatically. When the users have finished using the toilet, press the flush to allow the door opened. When users are out, the light, fan and music will be goes off automatically. After a few seconds door will be locked and the green LED lights up means it can be used toilet. Water in the tank is controlled by a water level sensor which when pressed flush, motor 1 will on to pump water into the toilet tank. When the water level sensor detects water in the tank 1 is empty, motor 2 will on to fill the tank 1. When the tank 1 is full motor 2 will stop pumping water. All inputs and outputs of the system are automatically controlled by PIC16F877A and C program.

## 1.2 Objectives

Ministry of Housing and Local Government said, ‘Although it has many campaigns keeping public toilets clean but the toilet still very bad performance from time to time’. Therefore, this project is designed to teach and educate the public to keep public toilets clean, which is users must press the flush after finished using the toilet to enable the doors to be opened because the toilet door is locked. It is controlled by using solenoid, solenoid works as the same ways as normal DC motor, in order to trigger in both directions two relays are used. In addition the project is loaded with features light, fan, and music that comes on when there are user and off when no user. This is intended to save energy consumption. Light and fan do not need to be constantly running, even no user in the toilet. Apart from that, the main input to the system is the use of an automatic toilet money slot where the user must make a payment of twenty cents to use the toilet. When money slots accept coins, money slot will send pulse to PIC16F877A. PIC16F877A will receive pulse and carry out its functions. PIC16F877A is used to run all the automated system's toilet. C program is used to compile all this toilet automated system. Money slot system is designed to reduce labor.

Objectives of the project are:

1. To maintain the cleanliness of public toilets.
2. To conserve electricity, because the system will work only after the user goes into the toilet.
3. To reduce labor, because the money is automatically inserted.

### **1.3 Problem Statements**

Nowadays, has many radio stations aired in Malaysia, to get a general view about the level cleanliness of public toilets in Malaysia. On average than they say public toilets in Malaysia are not satisfactory, and there is also a flattering public toilets in foreign countries so clean compared to Malaysia. Undoubtedly, there are public toilets are so dirty, no appetite to see what more to get into it. This often happens in restaurants, shopping malls and even toilets at highway stops. Automatic toilet project is designed to handle the problem of dirty public toilet.

### **1.4 Scope of Projects**

The scope of this project is to investigate and research some information related to the automatic toilet. The project is divided into two parts which are hardware and software, software which is C program and hardware which is PIC16F877A that control all functions of the automatic toilet, and hardware also including the prototype. Hardware design of the materials and find resources on the right track with the project. Paramount concerns in hardware design are the ability of the circuit, price and size. In addition, it should ensure that the project will be fully functional when all the necessary circuits combined together in the design. Although the software design is focused on finding and reviewing software for the project, but the software can also be combined with the hardware. Software used for this project should be suitable, simple program design, and easy to understand functions.

## **1.5 Report Structure**

This thesis is organized in six chapters accordingly. The first part of this thesis discusses the concept of automatic toilets, working methods, and objectives.

The second part of the literature review described automatic toilets and public toilets study background.

The third part of the project methodology which covered the design and development of automatic toilet system.

The fourth part of Chapter IV of the protected design the project and how the project functions in accordance with the methodology.

The fifth part of Chapter V consists of results and automatic toilet system application also includes analysis and software projects.

Finally, the last part is the concluding part of the overall development of the project and how to fix it properly.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Overview**

World Toilet Day Celebrations at the national level is part of the Clean Toilet Campaign activities carried out by Ministry of Housing and Local Government through the Department of the local. This response is intended to remind people about the practice good care and clean toilets and thereby improving image cleanliness of public toilets in the country.

On the initiative of the World Toilet Organization or the World Toilet Organization, World Toilet Day was started in 2001. This year was a celebration for the 10th time. World Toilet Day Celebration theme globally 2011 was Toilet Civilizations Health Tourism, Quality of Life.

In addition to alerting the world community about the practice of good hygiene toilet, it also seeks to remind the inhabitants of the earth about the sanitation crisis in some of the less developed countries.

Professor Jenna Davis findings from the Faculty of Civil and Environmental Engineering, Stanford University, United States, showed that about 40%, 2.6 Billion the world's population still lacks access to basic toilet facilities.