UMP Squash Reservation System using Lighting Control

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Highlights: University Malaysia Pahang (UMP) sports center is the main placed for the students and staff for doing their activities, such as playing squash, badminton, football and basketball. The UMP sports center provides two squash courts to the student and staff to use. They must make a reservation and pay with affordable price to use the court. Users must pay for RM 1.00 (Student) and RM 5.00 (Staff) for one hour.

The concept to make a reservation is first come, first serve. Unfortunately, the manual reservation has many *vulnerabilities*. After doing some interview session with Mr Azizi as assistant administration in the UMP sports center, there have been issues that *the customer using squash games without doing any reservation and payment*. Furthermore, *the customer will extend the games until the next customer comes in*. This situation occurs because lack of the surveillance from the staff to monitor the court. The customer will take these advantages because of vulnerabilities in the UMP reservation management. Moreover, *staff needs to print reservation form every day and write manually the available squash court using notice board*.

So in this project, we will design and try to develop the system which *will provide the user to display a countdown timer using the LED screen*. *This system will have the sound beam that notifies the user that the time*

is running out. Furthermore, *this system will turn off the lamp automatically* when the time is running out to avoid customer to play 'FREE' games.

Problem Statement

1. User using squash court without permissions and payment.
2. User not alert when the time is running out.
3. Admin who handles reservation need to print and write manually using the notice board for court information every day.

Objective of Innovation Project

The objectives for developing this project are:

1. To display countdown timer for each squash courts to users.
2. To control the light and sound for UMP Squash Reservation System.
3. To enhance the manual reservation form by using a system.

Scope of Innovation Project

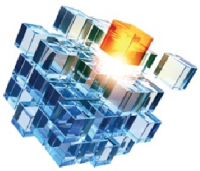
1) User
    i. University Malaysia Pahang (UMP) staff and student will become the user for this application.
2) Technology
    i. PHP, JQuery and Arduino UNO as a controller to control the light and sound. Lastly Android studio as app development.

3) Feature
    i. Provide automatic on/off lamp and thermal printer to print receipt.
    ii. Sound beam to notify the customer that the time is running out.
    iii. Provide a countdown timer using digital LED screen.

Methodology

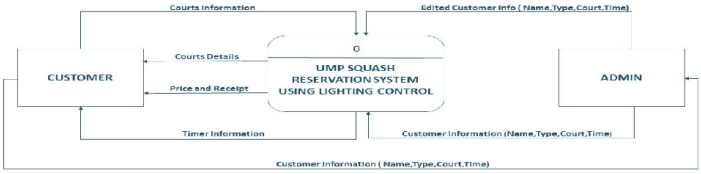
Based on my study and observation, the **Agile: Scrum** methodology is chosen as a software development process model for UMP squash reservation using lighting control. This methodology suit to my knowledge and have many advantages to achieve my objective and goal. This Agile (Scrum) methodology is a very interactive method which it can help to finish my entire software development and probability of project failure is low. Moreover scrum work on small modules and easy to interact with the client or customer. Some of the other benefits and advantages of using scrum development have been stated as below:

1. Easy to get customer feedback.
2. Increase the quality.
3. Matched to small product and team.
4. Accept and expect the changes.
5. Less risky to failed the project.
6. Early discovery of technical issue



System Flow

Figure 1.0 showed the context diagram for UMP Squash Reservation System using Lighting Control.



System Functionality

1. User can view court available using a smartphones.
2. User can view countdown timer at LED monitor screen for each court.
3. User can view announcement easily using a smartphones.
4. Admin can make reservation using a system.
5. The system provide automatic on/off lamp using a system.
6. The system provide generate receipt.
7. The system provide sound to notify user that time is running out.
8. Admin can view user who return the racket and who does not return the racket.

Delivery software and hardware

Quantity	Hardware	Specification
1	Desktop (HP Compaq 6200 Micro Tower)	• Processor Intel Core i-5-460M • VGA: ATI Radeon HD6540 • RAM : DDR3 4G • Hard Disk : 1 Terabyte
1	SAMSUNG LCD/LED Screen TV (For Courts Information)	• Size 54.6 Inches • HDMI • Quad Core Processor
2	SAMSUNG LCD Screen TV (For Courts Timer)	• Size 19 Inches • HDMI • Single core Processor
2	Arduino UNO (starter kit)	• Microcontroller ATmega328
1	Windows 8.1 Professional	• 64 Bits

Conclusion

To implement this UMP Squash Reservation using Lighting Control, the objective, problem statement and project scopes are recognized to provide a solution for each problem that derived. The main objective to implement this UMP squash reservation, is to provide with information about the squash daily schedule and to turn off the lamp automatically when the time is running out to avoid customer to play without any payment or reservation. By using this squash reservation it can also

overcome the problem and the vulnerability in the UMP squash reservation management.

The UMP Squash Reservation using Lighting Control has fulfil of this project objective as follows.

i) To display countdown timer for each court for the user. The LED screen monitor will show the countdown timer for each court. The timer will automatically countdown so that the user can know the time left.

ii) To control the light and sound for UMP Squash Reservation System using Lighting Control. The light will automatically turn on if the time is matched with reservation time. Meanwhile the light will automatically turn off if the time is running out. In addition, the buzzer will beam once the time is running out.

iii) To enhance the manual reservation form by using UMP Squash Reservation System using lighting control. Using UMP Squash Reservation System using lighting control user can view the available court and time using mobile phones. Next, the admin has authority to create an announcement using UMP Squash Reservation System using Lighting Control. Moreover to make a reservation is easier than before, admin just insert name and choose a date, type of user and time and the receipt will automatically generate by using UMP 'Squash Reservation System using Lighting Control.

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References

Moore, J. (2003). ISO 12207 and Related Software Life-Cycle Standards. *Association for Computing Machinery (ACM), Technical Standards Committee, New York. www. acm. org/tsc/lifecycle. html, accessed in Apri*l

Mahalakshmi, M., & Sundararajan, M. (2013). Traditional SDLC Vs Scrum Methodology–A Comparative Study. *International Journal of Emerging Technology and Advanced Engineering, 3*(6), 192.

Sommerville, I. (1996). Software process models. *ACM Computing Surveys (CSUR)*, 28(1), 269-271.

Taurun, A. SDLC & Scrum: How Do They Compare.

Paul Rand. (n.d.). BrainyQuote.com. Retrieved May 16, 2016, from BrainyQuote.com

Web site: http://www.brainyquote.com/quotes/quotes/p/paulrand542772.html

Williams, L. (2006). Testing overview and black-box testing techniques. *Retrieved August*, *12*, 2015.

Teikari, Petteri, et al. "An inexpensive Arduino-based LED stimulator system for vision research." *Journal of neuroscience methods* 211.2 (2012): 227-236.

Kushner, D. (2011). The making of Arduino. *IEEE Spectrum*, 26.

Monk, S. (2012). *Programming Arduino*. United States of America: McGraw-Hill Companies.