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Cakelicious: Web App for Designing a Customised Wedding Cakes

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Abstract— In the fast-paced changing world, the Internet keeps people connected to each other. Online shopping has changed the way people buy things, and so does how people book flight tickets and movie passes. Cakelicious Web App is another interesting story of how we revolutionize the way people book wedding cakes the way they love it. The system is designed to replace the current manual booking methods used by Dr. Munie's Kitchen for managing cakes order, thus is more efficient and effective, as well as meets the user requirements. Prototyping methodology approach has been used to develop and test the system in a systematic manner, which includes the development phases of planning, design, and testing and implementation. This system is developed using the PHP programming language, MySQL database, and runs on an Apache web server.

Keywords— online booking system, cake customization system.

I. INTRODUCTION

What makes the economy works today is the simple concept of demand and supply. In this era of technology advancement, people no longer need to go to groceries store to buy household, instead online shopping has become a part of our lifestyle. Similar to our basic necessity and wants, bakeries and pastries should be available online for orders.

In this paper, we present a web-based application developed for Dr. Munie's Kitchen, a café set up in 2014 which offers a wide-varied delicacies and food-catering services. Several objectives were set-up as follows: i) to identify problems and gather requirements to establish the online service, ii) to develop and deploy a web-based cake ordering system, and iii) to evaluate the robustness of the system for production use.

An online booking system is an online services which allows users to search for products or services, order, and purchase the products or services over the Internet. From a business perspective, an online booking system is a system which allows consumers to buy either products or services via the Internet. The use of an online booking system has grown rapidly over the years, largely because it is more convenient, instant, and transactions become easier as users can access a product or service anywhere as long as the user is connected to the Internet.

II. LITERATURE REVIEW

To fully understand the workflow of a booking system, a thorough review on equivalent systems has been done as a guideline for development of the proposed system and overcoming the weaknesses which present in the existing system. In the work, we have directly review several online booking systems including PlarreBakehouse.com [1], DQCakes.com [2], and BakerDays.com [3].

A. Fergusson Plarre Bakehouses Reservation System

Fergusson Plarre Bakehouses Reservation System [1] consists of several modules such as registration module, user login module, cake customisation module, search module, reservation module, and payment module. Integration of these modules provides a consistent and coherent user experience in customising and purchasing their self-designed cake over the Internet.

The user interface used is simplistic, which avoids clutters, hence allowing users to focus on designing and close the deal. There are several pre-customised cake choices that have been made to make it easy for users to design their own cakes without the need for an expert help.

B. DQ Cakes Reservation System

The DQ Cakes Reservation System [2] utilises a simpler working methods which requires users need to fill an online order forms and make payments through the system. Further deal needed to be completed directly with the store. Hence, a lot of modules are eliminated from this system, focusing only to receive an order and payments.

The user interface display provided is limited to listing the nearest branches and cake designs only. Prepared cakes need to be manually received at a store by the residence.

C. Baker Days Reservation System

Baker Days Reservation System [3] has several modules including registration module, login module, search module, cake design customisation module, reservation module, and payment module.

The reservation system displays several cake designs based on categories; welcoming celebrations, birthday cakes, corporate cakes, graduation cakes, and others. Users can choose a certain category before designing the cake appropriate to certain occasions. Images of each corresponding cakes based to certain categories have also been included to help the user to make a decision.

D. The Proposed System (Cakelicious)

The system to be developed is a cake ordering system, known as Cakelicious. The proposed system consists of several modules including registration module, login module, cake customisation module, reservation module, reporting generating module, and payment module. By integrating all these modules into a single environment, we are able to facilitate customers to order a custom cake and allows administrators of the system to manage the order.

The built-in interface includes product showcase, booking page, and cake customisation page. Administration module is reserved for managing products information Comparison of the various booking system is summarised in Table 1.

TABLE I
COMPARISON OF RESERVATION SYSTEMS CAPABILITIES

Criteria	Existing Systems			Proposed System
	[1]	[2]	[3]	Cakelicious
Has Back-end Login	Yes	No	Yes	Yes
Has Search Function	Yes	No	Yes	Yes
Has Cake Design Module	Yes	Yes	Yes	Yes
Reservation Restriction	1 item per book	1 item per book	1 item per book	Multiple items per book
Has Online Catalogues	No	No	Yes	Yes
Has Report Module	No	No	No	Yes (Monthly and annual)
Additional Features	Store cake designs for later use	Suggest nearby store location	Has several prepared cake designed	Easy to be managed by small and mid-scale businesses

The development of the Cakelicious system considers the functions and modules contained in the other existing systems.

III. THE DEVELOPMENT METHODOLOGY

To provide a guidance throughout the system development process, prototype modelling methodology has been employed. Methodology can also be defined as a sequence of systematic step-by-step approaches needed to achieve the objectives of a project [4]. Prototype modelling allows the system to be deployed to users for testing purposes. The choice of this methodology, therefore, is relevant to system requirements so that system development can run smoothly since the development is done in a short period. The work flow process for the prototype model is shown in Fig. 1.
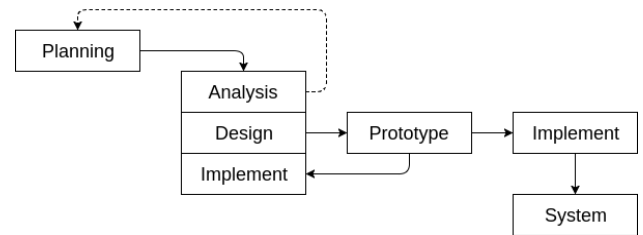

Fig. 1 Prototype Model Methodology [5]

Fig. 1 shows the advantages of the prototype model which allows a quick review in the user requirements and the feasibility of some designs. By employing prototype modelling methodology, we are able to test and evaluate the system once the prototype is ready. These phases will be repeated over a cycle so that the prototype system developed can meet the needs of the users and will be implemented into a complete real system.

A. The Planning Phase

During this phase, discussion was done to gather the system requirements from the stakeholders. Interviews have also been conducted to identify the background of the problem, the objectives of the system to be developed, the goals and scope of the system. In this phase, the development timeline was first arranged, alongside with the available resources. Tangible and intangible cost were determined and considered.

B. Analysis Phase

After gathering all the requirements related to the proposed system, the information is further analysed and an intensive literature review has been conducted to compare the requirement needs with similar existing systems. The steps were taken in order to consider the advantages of each system, therefore establishing a guideline in developing the new proposed system

C. Design Phase

The information gathered in the planning phase and the analysis phase will be processed in this phase. Database design were properly planned by creating data flow diagram (DFD), entity relationship diagram (ERD), and context diagram. The database design is then constructed into data

tables in MySQL database. Fig. 2 visualises the ERD for the database design.
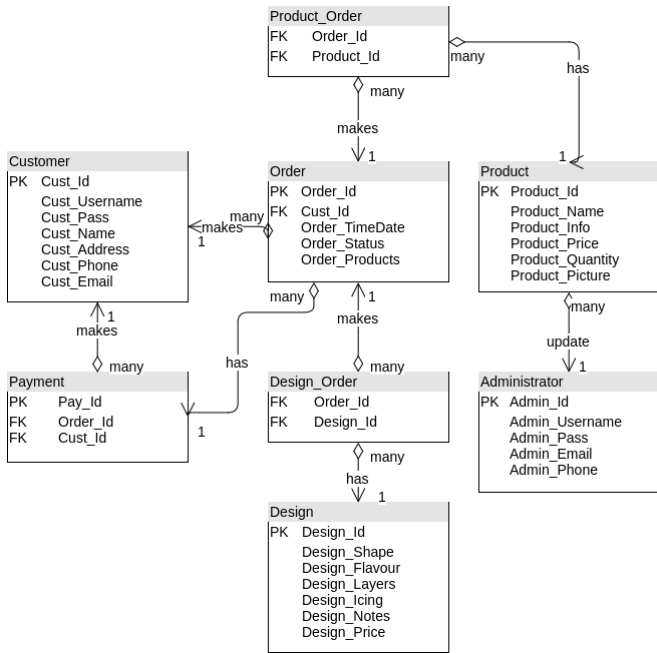

Fig. 2 Entity Relationship Diagram between data tables

Algorithm 1 shows the pseudocode for customising cake design page which considers various types of user input, including text, numbers, and image files. Customers are able to create their own customised cake by selecting its flavour, layers of cake, shape, colour, text for the icing, and any additional notes such as special request for the topping. The page then display a preview of the cake design before proceed to create a purchase order. Figure 3 visualises the page for designing and customising the cake.

Algorithm 2 shows the pseudocode for updating the shopping cart functionality. Customers may update quantity of the ordered items, add new items into the cart, and remove any existing item from the cart. All the changes are saved into the database and the new total price is updated.

Algorithm 1	Cake Design Customization Functionality

Input: cakeWeight, cakeType, cakeShape, cakeFlavour, cakeDesign, cakeSpecNotes
Read user input for the cake specification
Validate user inputs; if valid, proceed
Establish connection to database
Store the cake customization specification in database

Algorithm 2	Update Shopping Cart Functionality

Display list of items available in the shopping cart
if *changes occurs to items in the shopping cart* **then**
    Update the changes into database (add/removal of items)
    Update total of charges for current items in cart
end

The graphic user interface, on the other hand, was designed using the Adobe Dreamweaver CS6 and Adobe Photoshop CS6 software. Fig. 4 shows a page for new customer registration, while Fig. 5 visualises the shopping cart page where customers update their order.
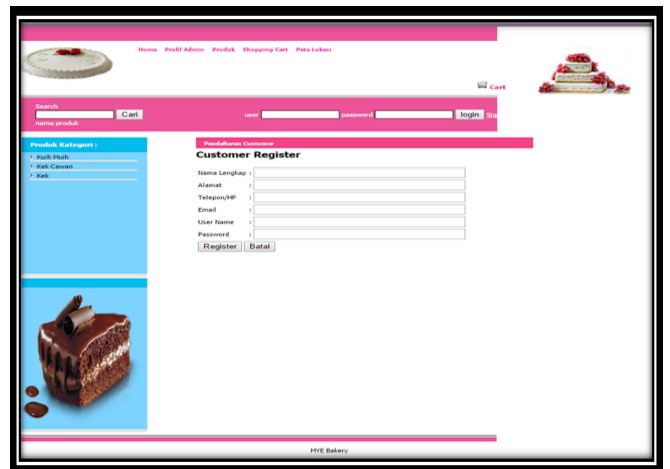

Fig. 3 Cake customization page

Fig. 4 Customer registration page

Fig. 5 My cart page lists the cake orders

D. Testing and Implementation Phase

In this phase, the source codes are deployed into a server hardware to host prototype system. Next, the system is tested by the end-users to ensure the developed system meets the needs of the user. There are two main users of this system; customers and administrators. The testing was performed by 80 users to identify any errors and bugs on the system codes so that the error can be corrected before it is deployed into a deployment server.

IV. RESULT AND DISCUSSION

The developed web application has been tested to validate its robustness in handling various types of requests, and to find any faulty and error in design and code implementation. As soon as the prototype patch is completed, system testing activity can begin. System testing aims to test functionality and identify existing errors. This testing process focuses on three methods including module testing, expected results, and actual results.

Overall all the modules and functions are successful and 90% of the system functions are the same as the expected results. Table II shows overall results for all functions.

TABLE II
SYSTEM TESTING RESULTS

Module	Functionality Test Score	Result
User Registration	100%	Pass
Log in process	100%	Pass
Product Selection	100%	Pass
Product Reservations	100%	Pass
Overall Design	70%	Pass
Payment	100%	Pass
Product Management and Reservation	90%	Pass
Generate Report	70%	Pass

V. CONCLUSIONS

Overall, the Cakelicious system developed for Dr. Munie's Kitchen has successfully been completed and created to meet the standard set by user requirements. Based on the final assessment test, however, there are still room for improvement for future works, as follows: i) improve the user interface to be mobile-friendly to facilitate customer ordering on tablets and smartphones, ii) integrate Cakelicious with an international payment gateway for online transactions, and iii) improve the processing engine by utilising modern web frameworks such as Laravel.

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