



## Using an Extreme Programming Method for Hotel Reservation System Development

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### ABSTRACT

This paper will be discussed about how the system information helped so much in hotel industry this day. There are a lot of hotel that still use a conventional methods for their reservation system especially, which can be spent a lot of time for customer to make a reservation room. And we can't avoid that the system information helped a lot for increasing service quality of the hotel itself and can be used for customer support too. So, with that problem, we plan to make a reservation system for hotel using the XP (Extreme Programming) method because for project construct need fast adaptation or rapid adaption to changes that happen while the development of the system itself. This Extreme Programming method priority on systems development and software construct with CRC (Classroom Responsibility Collaborator) and we think that use of Extreme Programming method will be very helpful for developing hotel reservation system.

**Key words :** Extreme Programming, Hotel, Reservation System, System Development Life Cycle.

### 1. INTRODUCTION

Hotel is an industry that makes economic facilities for business owner and clients. It provides hospitality services to customer that wants to get a room or space to skip every day or stay longer for some reason. These customers can be a normal visitors, travelers, backpackers, or even businessmen [1]. Nowadays hotel is one of important industry to improve tourism sector and are rapidly growing in diversity, number and popularity [2]. This industry is focused on the customer and it perceived quality of physical environment, value and image in order to ensure customers loyalty. Not even to improve tourism sector, hotel have become one of the main segments of the accommodation industry [3].

Beside of the accommodation industry is very popular this day, in this modern era that internet is one of important things in people life. Many accommodation industry especially hotel is implement a technology to intergraded their system to the internet. It provides an online booking system for their reservation services to help customers making their reservation schedule directly from internet [4]. From using this information technology is not just help a customer to make their reservation easily, it help the front office of the hotel to manage their room reservation, registration and even all of their daily transactions directly from the system [5]. And one of the hotel's main goals is provide an easiest way to make an order or reservations from anywhere and anytime so the information technology is the most important thing because manual reservation is doesn't effective anymore these day [6].

In fact that information technology is important, so many hotels are make their own system for reservation or booking based on information technology to improve their facility and customer satisfaction. Not only for customer, will this system be used by staff hotel for helping the operational of that hotel itself like generate a report. In this project we are using an Extreme Programming (XP) method for systems development that known as "Agile" ways. This XP method is one of the method that easy-to-use development, simple and fast especially for developing a small application like reservation, check-in, check-out, payment and report for a small hotel [7]. Even we have an option like Waterfall method that may software development used as their prime development framework and SDLC plan to develop an application but now we have an Extreme Programming method that has been classified as a top method for developing an application [8]. So we use the Extreme Programming method to develop this hotel management system.

From this case, the main problem for the most hotels these days is they can't improve their service without using information technology on their business model and can't provide updated information about a promo, discount or anything to their customer directly. So, based on this case we'll develop a user-friendly application that can be used by a

customer for making a reservation directly via internet. It has a feature like reservation and payment. And we will explain the development in this hotel system using the Extreme Programming method.

## 2. LITERATURE REVIEW

In this chapter will explain briefly about several concepts that underlie this research, include of Hotel, Reservation Systems, SDLC Methods and Extreme Programming.

### 2.1 Hotel

Hotel is a building that many travelers look into for temporary lodging when they are travelling or businessman that came to other countries for business reason. Customer relationship is a very important thing for this industry because hotel is focused on their service consists about transactions and interactions that result in relationship between customers and hotel's staff [9]. This industry is depending on intermediaries for a long time to reach customers. But now to reach customers this day, this industry using an internet as their distribution channel because it'll help a lot especially on consumers side [10].

### 2.2 Reservation Systems

Reservation systems are a particularly interesting area of information systems (IS) in hospitality or sociability. Their one of characteristic is the interest they have for the hotel as the aim of each hotel is to fill to accommodate contents, in order to increase sales and profit. Another important feature of reservation systems is that they connect the hotel to an outboard circumference or to a client (visitor or agents) located in an external system compared to the hotel [11]. Online hotel reservation is reasonable a very popular systems for ordering hotel rooms or space. Visitors can book hotel rooms from outside using online security to protect their privacy and financial information and using several online travel agents to compare prices and facilities at different hotels. The benefit of using global distribution channels is that they provide a single database from which all reservation sources draw immediate room existence and room prices or rates [12].

### 2.3 System Development Life Cycle (SDLC) Method

SDLC or systems development life cycle is one method used in developing software systematically, which also allows to improve the completion of system development according to the deadline, and in ensuring the quality of the product remains in accordance with the standard. The SDLC framework accommodates several activities that must be followed by system designers and system developers in carrying out software development; it is part of an integral software development cycle. Life cycle models contained in SDLC, separated into several different activities, and also determined how each of these activities can be arranged in all efforts when developing software [13]. The activities contained in the development of SDLC are broken down into several manageable stages called phases, where there are several phases such as understanding existing problems based on requirements collection and analysis, system design,

program script coding, testing, release and maintenance [14].

## 2.4 Extreme Programming

Extreme Programming is one of many agile systems that have emerged in the recently of the current era. All the existing agile methods, XP are one of most popular in agile methods. XP has several advantages, especially in the areas of principles, values, and best practices that supply actual direction for the application construction process [15]. And there are some shortcomings in XP programming, including the lack of documentation, complex structures and poor system design, making it unsuitable for medium and large level of projects [16]. There is no upfront architectural framework available in XP as well as no clear design activity is carrying out. Without architecture and design activities of programmers or systems analysis don't get improve understanding of the jobs. In circumstances they have to rely on code refactoring that advance time or period and effort tasks. Furthermore allocation of tasks among team members is problematical due to absence of software construct [17].

## 3. RESEARCH METHODOLOGY

Extreme Programming (XP) is one of a way of systems development framework that is fast, adaptive, and supple. The majority of Extreme Programming re-quires team work for example asking other team member to review the design and coding [18]:

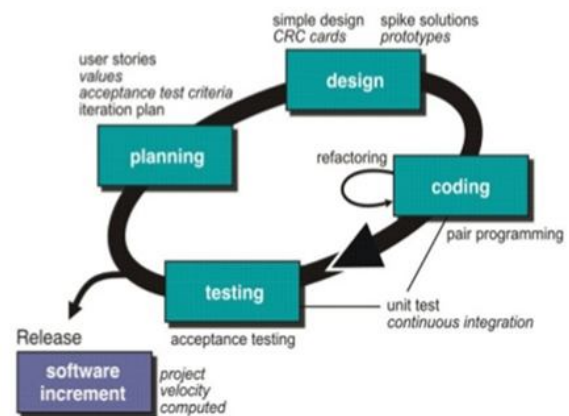


Figure 1: XP SDLC [19]

Based on Figure 1. XP SDLC, for developing software there are five main stages that used in Extreme Programming method. The five stages are [19]:

### A. Planning phase

The planning step is the first stage in the software development life cycle, which starts from requirements analysis. The main objective of this stage is to get out what the requirements gathering are actually needed by the user and document them appropriately. In the requirements analysis phase, the more emphasized is in identifying what is needed from a system [20].

### B. Design Phase

In the next stage is to implement the specification of the results of the collection of requirements and analysis into the activity of designing the system [21]. During the design stage autonomous developers must model modules and system classes which will be implemented in the iteration. The developer must aim to design the system based on the needs needed by the client at this time, without thinking about what will be needed in the future [22]. So with CRC card is rather for explaining the software construct in this paper.

### C. Coding Phase

In this stage is arguably the logical stage of the systems development life cycle, where the end of the result itself is the program code [23]. In this stage the developer will implement all objects that have been defined before in the design stage by writing coding and navigating systems in the form of scripts in programming languages [24], [25].

### D. Testing Phase

The next step is the testing phase, which is carried out after the coding phase; it contains activities to find out the results of the finished application. The test itself is made to find out how the actual results are and also the results of expectations of the application [26].

### E. Release Phase

The last stage where the client will test the system acceptance. After the client's approval of the system will be applied, a release will be made. What if the system developed major product satisfaction does not satisfy the client or company [27], the development will be repeated with changes or modifications to the requirements of the client or customer requirements keep to changed [28], [29].

## 4. RESULT AND ANALYSIS

### 4.1 Requirement

Requirement is an ability that must be owned by software that aims to solve a problem or things needed in the software. Examples such as basic provisions that must exist in the software such as having to have a login form must have a user input form and etc. When we build a system / software, this requirement process must be done because it can help work in developing the system itself and help the project manager to manage how the team works according to their respective roles.

### 4.2 Mapping of Application

The mapping table in Table 1 Mapping Application is used to briefly and clearly tell the details of the system contained in the software that will be developed.

**Table 1:** Mapping Application

No.	Description
1	User
2	Guest
3	Room
4	Check-in
5	Check-out
6	Stay
7	Report

With this table the developer team can work according to their role and also increase the efficiency of the team itself. In this mapping we show the mapping in the form of main menus contained in the application in the form of user modules, room modules, guest modules, check-in modules, check-out modules and report modules.

### 4.3 Cycle of Hotel Reservation System

Base on Figure 2 Cycle of Application, it explains that the process of Hotel Reservation is the first step to do is guest registration, then proceed with the selection of available rooms, after the room is selected, then proceed to the check-in process, then check-out process when the stay is up, and the last is a report to display data - user, guest and lodging data.



**Figure 2 :** Cycle of Application

### 4.4 Schedule Development

In order for the development process to run well, it is necessary to develop a scheduler so that the application developed can be released on time as expected. And this scheduling stage must be done because it is included in the framework of the Extreme Programming methodology. Life cycle and system development schedule can be seen in the Table 2 Schedule Development.

**Table 2 :** Schedule Development

March				April			
1st	2nd	3rd	4th	1st	2nd	3rd	4th
-	-	-	-	-	-	\$	\$

### 4.5 Planning

**Table 3:** Input Application

No	Input	Description
1	User	Input admin / user data to operate the system
2	Room	Input room
3	Guest	Input guest data

All activities carried out during development are very important. Therefore it is necessary to do the planning phase in the application development process.

**Table 4:** Result of Application

No	Result	Description
1	User Report	Recap and print user report
2	Room Report	Recap and print room report
3	Guest Report	Recap and print guest report
4	Transaction Report	Recap and print transaction report

And at this stage all activities in the development process are recorded and documented. Below is an example of documentation to explain the business / business process

context of a hotel reservation system through user stories. Based on Table 3 Input Application and Table 4 Result of Application, mapping in the hotel reservation system.

**4.6 Design**

At the design stage we use the CRC method to design this system because the application is developed object-oriented. Each CRC design created will be a class because this concept is the basis of object-based programming. We will be create 4 CRC Design including Login, Username, Room, and Guest that each of that CRC Design using an own class, can be seen Table 5: Design CRC and Class Mapping.

**Table 5:** Design CRC and Class Mapping

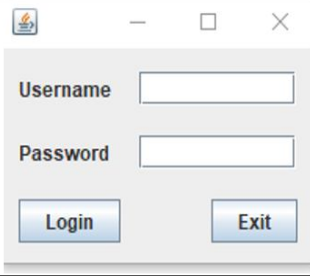
No	CRC Design	Class Mapping
1	Login	clsLogin
2	Username	clsUsername
3	Room	clsRoom
4	Guest	clsGuest

Examples of CRC can be seen below.

Document Name	Design CRC		
Name of Application	Hotel Reservation System		
Activities	Design CRC		
During	11/02/2019 – 14/02/2019		
No	CRC	Description	
1	<b>LOGIN</b>	Login CRC can be modeled into a class	
	Superclasses :		-
	Subclasses :		-
	Responsibilities :		Collaborators :
	Username		clsUser
	Password		
...	...	etc	

**Figure 3 :** Mapping of CRC

Then we also show examples of design prototypes from hotel reservation systems that are based on CRC design.

Document Name	Design Prototype	
Name of Application	Hotel Reservation System	
Activities	Design Prototype	
During	11/02/2019 – 14/02/2019	
No	Prototype	Description
1		Example of prototype login
...	...	etc

**Figure 4 :** Mapping of Design Prototyping

Figure 3 Mapping of CRC and Figure 4 Mapping of Design Prototyping can show stage of design. Due to the limitation in this research, only one example of the main prototype design can be displayed, due to the limited pages of this paper.

**4.7 Coding**

The next process is the coding stage. This stage is a process that is usually the longest run because in this process many activities are carried out such as created a database and created a code of program. There is a mapping in the database that will be used in developing this system, can be seen in Table 6 Entity of Application Database.

**Table 6 :** Entity of Application Database

No	Table Name	Explanation
1	tb_guest	To save guest data
2	tb_room	To save room data
3	tb_stay	To save stay data
4	tb_discount	To save discount room data
5	tb_user	To save user data
6	tb_transaction	To save transaction data

Base on the Table 7 Mapping of User Interface on the system will be shown. The mapping contains forms from the main modules that are on the system such as the login form, user form, etc.

**Table 7 :** Mapping of User Interface

No	Name of frm	Explanation
1	frm_login	To log-in to software
2	frm_user	To Input user
3	frm_room	To Input room
4	frm_guest	To Input guest
5	frm_stay	To Input stay
6	frm_checkin	To Input check-in
7	frm_checkout	To Input check-out
8	frm_report	To Record Report

Base on Figure 5 documentation of table for table design documentation from the database on this system.

Document Name	Design Table													
Name of Application	Hotel Reservation System													
Activities	Design Table													
During	13/02/2019 – 28/02/2019													
No	Table	Description												
1	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> 1</td> <td>room_id</td> <td>varchar(15)</td> </tr> <tr> <td><input type="checkbox"/> 2</td> <td>discount_value</td> <td>int(3)</td> </tr> <tr> <td><input type="checkbox"/> 3</td> <td>duration</td> <td>int(4)</td> </tr> </tbody> </table>	#	Name	Type	<input type="checkbox"/> 1	room_id	varchar(15)	<input type="checkbox"/> 2	discount_value	int(3)	<input type="checkbox"/> 3	duration	int(4)	Example of table discount
	#	Name	Type											
	<input type="checkbox"/> 1	room_id	varchar(15)											
<input type="checkbox"/> 2	discount_value	int(3)												
<input type="checkbox"/> 3	duration	int(4)												
...	...	... etc												

**Figure 5 :** Documentation of Table

Due to the limitation in this research, only one sample of documentation design of table is shown. Based on Figure 6 documentation of coding about the coding process that is carried out on the design of the user interface.

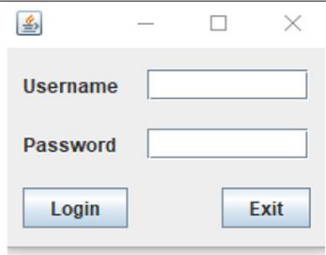
Document Name	Coding to User Interface	
Name of Application	Hotel Reservation System	
Activities	Design User Interface	
During	01/03/2019 – 16/03/2019	
No	Table	Description
1		Example of user interface login
...	...	etc

Figure 6 : Documentation of Coding

#### 4.8 Testing

In the Extreme Programming method, the testing process can be done in 2 ways, namely testing with white boxes and black boxes in each module. The module is considered to fulfill the requirements if it passes from both of these tests. The following are the results of testing the modules in the system. The testing process is the stage where the system is tried to be tested / run with the aim of being able to meet the needs of the system itself and also to find errors in the system.

#### 4.9 Software Increment

The software or systems increment phase is the stage where the system can be released which previously was developed using the Extreme Programming method.

### 5. CONCLUSION

System development life cycle plays an significant role in the software development process, SDLC aims to map the phase of activities and life cycles in the system development process, the Extreme Programming method is way of the modelling included in the agile approach, where the Extreme Programming method is very responsive, fast, and suitable to develop a system with requirements that often changes to user needs, with ever-changing requirements, the user is involved in each stage of development, especially in communication between the user and the developer, so that the final results of the system can be in accordance with the specifications and expectations of the user. The system made in this study is a hotel reservation system based on the Extreme Programming method, considering that the basic concept of this application is object oriented so that the design process uses the CRC method which is divided into several classes such as Login, Username, Room and Guest.

### REFERENCES

1. R. Bemile, A. Achampong, and E. Danquah, **Online Hotel Reservation System**, *Ijiset*, vol. 1, no. 9, pp. 1–12, 2019.
2. N. Vrček, Journal of Information and Organizational Sciences: From the editor, *J. Inf. Organ. Sci.*, vol. 33, no. 2, pp. 41–54, 2009.
3. F. Ali, R. Omar, and M. Amin, **An examination of the relationships between physical environment, perceived value, image and behavioural Intentions: A SEM approach towards Malaysian resort hotels**, *J. Hotel Tour. Manag.*, vol. 27, no.2 pp. 9–26, 2013.
4. O. Abdullah, M. Al-Maktari, R. Jamaludin, and A.-S. Hosam, **The Acceptance of Online Booking System (OBS) Based on the Theory of Reasoned Action (TRA): A Case of Sana'a University**, *Int. J. Sci. Eng. Res.*, vol. 3, no. 2, pp. 3–6, 2012.
5. R. C. Castilloa, L. M. U. Asi, D. J. A.. Berberabec, M.A. Mandigmad and M.A A. Sarmiento, **Importance of Computerized System to Reservation and Front Office Operations of Hotels in Batangas, Philippines**, *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, Vol.16, No 1, pp 284-302, 2014.
6. B. R. V. Chan, A. F.D. Cruz, J. M. T. landayan, and M. N. S, Osayan, **Hotel Information with Online Reservation and Billing System for Yuj Inn Hostel**, 2012.
7. T. Krishna, C. Phani Kanth, C. Krishna, and T. Krishna, **Survey on Extreme Programming in Software Engineering**, *Int. J. Comput. Trends Technol.*, vol. 2, pp. 2–2, 2011.
8. J. F. Andry, G. Juliawan, Y. Christian, J. Leonardo, and . Nicolas, **Parking System Development Using Extreme Programming Method**, *J. Digit. Inf. Manag.*, vol. 16, no. 6, p. 279, 2019.  
<https://doi.org/10.6025/jdim/2018/16/6/279-288>
9. A. Galamboš, L. Đeri, A. Dragin, and T. Galamboš, **Two-factor Analysis of Employee Motivation at "Postal Traffic – Department in Novi Sad**, *European Journal of Economic Studies*, pp. 15–25, 2014.
10. G. Agag and A. A. El-Masry, **Understanding the determinants of hotel booking intentions and moderating role of habit**, *Int. J. Hosp. Manag.*, vol. 54, pp. 52–67, 2016.  
<https://doi.org/10.1016/j.ijhm.2016.01.007>
11. M. Simunic, L. P. Stifanich, and M. P. Prodan, **The Level of Hotel Reservation Synchronization Processes Using Information**,” no. September, 2018.
12. R. Law and A. Cheung, **A Study of Online Hotel Reservations on Asia Pacific-based, European-based, and North American-based Travel Websites.**,” *FIU Hosp. Rev.*, vol. 24, no. 1, pp. 32–41, 2006.
13. S. S. Ghuman, **SDLC Models- A Survey**, vol. 2, pp. 33–38, 2013.
14. I. G. N. Suryantara, and J. F. Andry, **Development of Medical Record With Extreme Programming SDLC**,

- International Journal Of New Media Technology (IJNMT)*, vol. 5, no. 1, pp. 47–53, 2018.  
<https://doi.org/10.31937/ijnmt.v5i1.706>
15. O. Kobayashi, M. Kawabata, M. Sakai, and E. Parkinson, **Analysis of the interaction between practices for introducing XP effectively**, no. May, p. 544, 2006.  
<https://doi.org/10.1145/1134285.1134361>
16. R. Fojtik, **Extreme programming in development of specific software**, *Procedia Comput. Sci.*, vol. 3, pp. 1464–1468, 2011.  
<https://doi.org/10.1016/j.procs.2011.01.032>
17. R. Crocker, **The 5 reasons XP can't scale and what to do about them**, *Proc. 2nd Int'l. Conf. Extrem. Program. Agil. Process. Softw. Eng.*, pp. 62–65, 2001.
18. J. Choudhari and U. Suman, **Iterative maintenance life cycle using extreme programming**, *Proc. - 2nd Int. Conf. Adv. Recent Technol. Commun. Comput. ARTCom 2010*, no. January, pp. 401–403, 2010.  
<https://doi.org/10.1109/ARTCom.2010.52>
19. F. Anwer and S. Aftab, **SXP: Simplified Extreme Programing Process Model**, *Int. J. Mod. Educ. Comput. Sci.*, vol. 9, no. 6, pp. 25–31, 2017.  
<https://doi.org/10.5815/ijmecs.2017.06.04>
20. S. K. Dora and P. Dubey, **Software Development Life Cycle (SDLC) Analytical Comparison and Survey on Traditional and Agile Methodology**, *Natl. Mon. Ref. J. Res. Sci. Technol.*, vol. 2, no. 8, pp. 22–30, 2013.
21. M. K. Sharma, **A study of SDLC to develop well engineered software**, *Int. J. Adv. Res. Comput. Sci.*, vol. 8, no. 3, pp. 520–523, 2017.
22. Y. Dzhurov, I. Krasteva, and S. Ilieva, **Personal Extreme Programming – An Agile Process for Autonomous Developers Personal Extreme, Programming – An Agile Process for Autonomous Developers,** no. January 2009, 2014.
23. D. T. Connors, **Software development methodologies and traditional and modern information systems**, *ACM SIGSOFT Softw. Eng. Notes*, vol. 17, no. 2, pp. 43–49, 2004.
24. Y. Beng Leau, W. Khong Loo, W. Yip Tham, and S. Fun Tan, **Software Development Life Cycle AGILE vs Traditional Approaches**, *Int. Conf. Inf. Netw. Technol.*, vol. 37, no. 1, pp. 162–167, 2012.
25. A. D. M. Africa, G. Ching, K. Go, R. Evidente, J. Uy, **A Comprehensive Study on Application Development Software Systems**, *International Journal of Emerging Trends in Engineering Research*, vol. 7, no. 8, pp. 99 – 103, 2019.  
<https://doi.org/10.30534/ijeter/2019/03782019>
26. M. E. Kahn and F. Khan, **Importance of Metrics in Software Development Life Cycle**, vol. 3, no. 5, pp. 1–5, 2014.
27. V. K. L. Srivastava, N. C. s. Reddy, A. Shrivastava, **An efficient Software Source Code Metrics for Implementing for Software quality analysis**, *International Journal of Emerging Trends in Engineering Research*, vol. 7, no. 9, pp. 216 – 222, 2019.  
<https://doi.org/10.30534/ijeter/2019/01792019>
28. G. J. Myers, **The art of software testing**, *Second Edition*. 2004.
29. S. Bhanu, J. Baswaraj, S. D. Bigul, J. K. R. Sastry, **Generating Test cases for Testing Embedded Systems using Combinatorial Techniques and Neural Networks based Learning Model**, *International Journal of Emerging Trends in Engineering Research*, vol. 7, no. 11, pp. 417 – 429, 2019.  
<https://doi.org/10.30534/ijeter/2019/047112019>