Individual Assignment B0985

by Khoo Sze Zhe

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WAY AHEAD

Faculty of Engineering & Computing

Course: Bachelor of Software Engineering (BSE)

Module: Software Requirements Engineering (CISY1007)

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Coursework: Report

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Table of Contents

Task 1 – Identify the Problem Faced by the Company

From the case study given, identify what are the problems faced by the Domino Pizza.

According to the case study given [1], Domino's Pizza Malaysia had few major problems related to their discount vouchers and the system. They discovered these problems after realising there are some unusual value of orders received in their system. Apparently, they claimed that there are customers who are using unauthorised vouchers to purchase their pizza by "hacking" into their online system. Due to this, they have contacted the authorities and publicised this issue, but received major backlash by the public. It is clear that there are many flaws reside in their system that caused this major issue, and it will be addressed in this section.

Failure of Data Integrity for Promotion Code

One of the major problems that caused this issue is Domino's Pizza Malaysia's lack of data integrity for their promotion code in their system. Their system has a great security weakness regarding to their pizza promotion code, as the users can reuse the same promotion code multiple times.

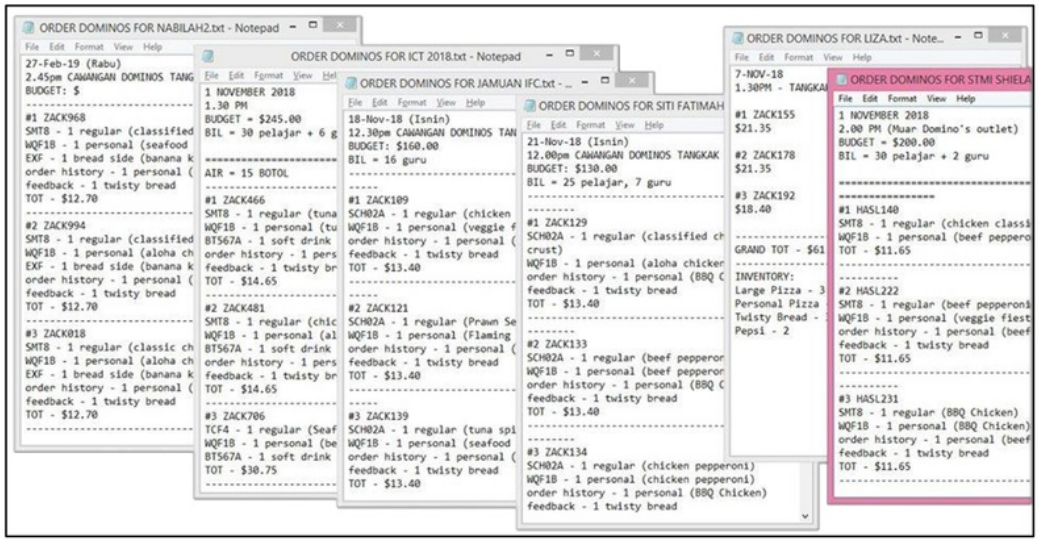

Figure 1: Different Orders with Same Promotion Code
Source: Adapted from [2]

As seen in [2, Figure 1] above, the customer involved in the case, Zacky Khairudean posted an image of all his and his co-worker's previous Domino's Pizza orders. In each of those orders, the same pizza promotion code has been reused over and over again. Apparently, the system accepted those promotion codes that have been used before and proceed with the transaction in the consecutive orders. Besides, some of the vouchers were also used despite not adhering to the minimum spending amount. The system by rights should validate the promotion code entered to prevent the users from reusing the same code again, but obviously it has failed to do so. Hence, we can conclude that this is Domino's Pizza Malaysia's major failure of maintaining the data integrity of their system.

Weak Security of the System

Another problem of Domino's Pizza Malaysia is their system's weak security. Apparently, someone mentioned that a certain individual managed to use the free pizza voucher without buying any pizza by exploiting Domino's Pizza Malaysia's system security weakness [3]. It is also worth noting that Domino's Pizza Malaysia claimed that their system has been compromised by certain individuals that caused such an issue. Due to this, the customer that was using a late delivery voucher to claim the free pizza has been treated as a criminal despite proving to Domino's Pizza Malaysia that their system has a lot of weaknesses [4]. From here, we can see that Domino's Pizza Malaysia failed to realise the fact that it was their own fault that they did not enhanced the security of their system. Instead of fixing the obvious flaws in their system, they filed a report and pressed charges against the customer. They did not realise the fact that the customer could be innocent and it is their system security that went wrong, thus they received hate for this.

Outdated System

After discussing those two problems mentioned above, we can see that Domino's Pizza Malaysia has quite an outdated system as they did not seem to update, maintain and validate their system frequently. This means that anyone can easily bypass their system without hassle and modify the data. The promotion vouchers can be easily validated if the users were to use it at the store as the cashier could be able to identify the validity of the vouchers. However, if the users were to use those vouchers code through the system, no one can validate the validity of the vouchers other than the system. Since the security of the system is in such a weak state, the users could easily bypass it and make the vouchers code work. All these are caused by the lack of system updating and maintaining, thus these flaws went unnoticed until they found out that some customers' orders were unusual. Therefore, we can see that the outdated system has indirectly caused the two problems mentioned above to happen.

Task 2 - Discussion

This section will analyse what could be done to fix the problems regarding the Domino's case study.

Re-analysis of the System

a) Discuss in which stages of the software requirement engineering activities you will perform the re-analysis again?

Requirements Validation and Verification

As we can see from the problems Domino's Pizza Malaysia has faced, it is clear that their system did not support the customers' and their own needs. Hence, the requirements validation and verification stage needs to be re-analysed again. This is because this stage involves in checking the consistency, completeness and accuracy of the requirements document for the system [5]. Domino's Pizza Malaysia should revalidate their system to make sure it can meet not only the system's quality criteria, but also the customers' needs. They should also verify whether or not their system is doing exactly as it intended, and as we can see their system is definitely not working as intended. In this case,

Domino's Pizza Malaysia will have to use certain requirements validation techniques [6] such as test case generation, prototyping and inspection. Domino's Pizza Malaysia will have to run test cases of their system and requirements to make sure that the system is testable and can be easily designed. This will also allow them to detect system glitches and errors earlier as well, so that the software developers or system maintainers are able to fix the problems in time. These early detections can not only fix Domino's system irregularities, but can also prevent the users from exploiting the system's weakness and keep reusing the same voucher code.

Apart from that, Domino's Pizza Malaysia should do prototyping of the system for them to validate and verify the requirements. It is difficult at times for developers to determine the requirements that are needed to be validated and verified, thus having a prototype

could allow them to look into the working model and slowly discovering the requirements. The prototype may also allow the end-users to experiment around with the system and determine whether or not it could meet their needs.

Besides, inspections for the verification of the system and its requirements [7] are quite important as well. Domino's Pizza Malaysia will have to verify the system by conducting inspections on the existing system and check on its requirement to figure out what went wrong, as their system certainly did not satisfy the customers. They will have to inspect their requirements documentation again and verify the cause of the voucher code function. They will also have to visually examine the voucher codes data entry of their website and the internal code to determine which part went wrong. In this case, we can roughly determine that the code itself accepts any code that entered the system but did not record down the used codes. If they inspect the internal code and requirements of that function one by one, they could surely figure out what went wrong with the system.

Requirements Management

Another stage that Domino's Pizza Malaysia needs to perform re-analysis on is the requirements management stage. Requirements management is the process of managing the various changes of a system's requirements, as requirements always evolve due to the changes of the system's environment and also the customer when they developed a better understanding of their needs [8]. They will have to undergo change control to keep up with the evolving needs of the customers, as constantly propose changes and update their system plans is needed for the system to evolve. They would also have to analyse the impact of the current system and its changes will make to the customers. But as far as we know, the current system's voucher code function has definitely caused a negative impact to the customers. Apart from that, Domino's Pizza Malaysia will have to constantly manage and maintain their system every month to prevent these system issues. This plays a huge role for the requirements management stage as the environment and customer needs are constantly changing. Therefore, the system developers and maintainers should ensure that the requirements and systems are up to date in order to conform to the current environment and customer needs.

Requirements Improvement

b) What are the requirements (functional, qualities, and constraints) the company should improve on?

Functional Requirements

Domino's Pizza Malaysia should definitely improve on the main functional requirements of their system, as it should only allow the users to use unused voucher codes when performing online ordering transaction. This means that the system should check the validity of the voucher code the users entered before proceeding with their transactions. Apart from that, the system should calculate the user's order amount to check whether they have met the minimum amount before they are able to use the voucher code. Besides, the system should also produce a weekly summary report. The system should generate all the transaction records that have been made within the week in this report so that the management team could detect any unusual transactions. As such, they could detect and look into the suspicious transactions to figure out the cause and the solution for it so that they could prevent such a problem persisting in the system.

Quality Requirements

As for the quality requirements, Domino's Pizza Malaysia should improve the quality of their system in terms of accuracy, security and maintainability. In this case, we can clearly see that the Domino's Pizza Malaysia system is not accurate in terms of the transaction part. Their system should make sure that the calculation of the transaction should be accurate, especially the minimum amount required for the eligibility of a voucher code. If the minimum amount in the system is not accurate, the users could exploit the weakness and use the pizza voucher codes without adhering to the minimum order amount. Since Domino's Pizza Malaysia claimed that some customers have hacked into system, they should also enhance their system security to prevent such a thing from happening. If what they said were true, then they should protect their internal system algorithm against unauthorised access. Besides, we can see that all those happened is due to the fact that Domino's system is unmaintainable. Therefore, they should improve their system's maintainability so that their system is able to further expand and modified easily

to achieve the system's current standards and requirements. They should always maintain their system so that they could detect and fix any irregularities in time without causing trouble for both themselves and the customers. Therefore, they should improve their maintainability quality to detect any errors and anomalies in the transaction process during the working hours, which is usually from 10:30AM to 11PM.

Constraints

For improvements on system constraints, Domino's Pizza Malaysia should update and maintain the system every 5 months to make sure that their system is up to date with the latest data such as the voucher codes, promotions along with the terms and conditions of the system. These are all the important data that are needed to be maintained and updated, thus they should apply this constraint to make sure they would constantly keep the system and the data up to date.

Example of Requirements

c) Based on your discussion in Task 2 b). Provide **THREE (3)** examples of the requirements.

Functional Requirements

F-1: The system shall validate the voucher codes entered by the users for every transaction.

F-2: The system shall calculate the users order amount to check whether it has met the minimum amount required to use the voucher code.

F-3: The system should generate weekly report for the management team to detect any unusual transactions.

Non-Functional Requirements

NF-1: The system shall calculate the minimum order amount accurately to determine the eligibility of the voucher code.

NF-2: The system shall protect their internal system against unauthorised access.

NF-3: The system should be maintainable to detect errors and anomalies during the transaction process.

C-1: The system shall update and maintain their system every 5 months to make sure that their voucher codes are up to date.

C-2: The system shall update and maintain their system every 5 months to make sure that their promotions are up to date.

C-3: The system shall update and maintain their system every 5 months to make sure that their terms and conditions are up to date.

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