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Introduction

Team FAGE is proposing the implementation of a Book Store Management System (BSMS). The purpose of this system is to allow customers access to information at home, as well as providing an easy-to-use graphical interface to organize functions within the store.

Using this system, customers of a book store would be able to log on to the system via the web and use it to search inventory, reserve books at the store, and place out of stock books on order. A store clerk would use the BSMS to input transactions (sales) with customers and also to search inventory to help customers locate specific books. A stock person would use the system to update the inventory database to reflect new purchases, new locations for books within the store, and damaged or missing books. Finally, a manager would be able to use the BSMS we are proposing to manage employee schedules and pay, manage stock (inventory), adjust inventory prices and plan store promotions.

This document is a summary of the team's user and task analysis. Without yet attempting to draw any conclusions regarding the design of the system, this analysis is meant to bring the team members closer to the potential users of our system.

After assembling the analysis team, members attempted to make some assumptions about who we believe might be the users of the BSMS. The results of these initial brainstorming sessions are presented in the first section, Identifying Potential Users of the System.

The team then made plans on how to best test these assumptions and conducted a site visit with interviews to update the information gathered so far. A more in depth look into

the users, their tasks and environments, and the artifacts related to them can be found in the second section, Additional Analysis Methods.

Identifying Potential Users of the System

For this project, we have assembled a team of four computer science students to analyse the potential users of the bookstore system:

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Before conducting interviews with actual potential users of our system, the team, named Team FAGE, attempted to identify these users and some of their characteristics. The team also determined the best ways to test these assumptions with further analysis. This section will outline those assumptions.

Potential Users

Team FAGE compiled a possible list of potential users, deciding that the four most likely discrete users might be the customer, a clerk, a stock person, and a manager.

The customer would likely wish to search inventory, reserve books, place books on order, purchase books, complain to or compliment the store, and make returns or exchanges.

A clerk might be responsible to ring through sales, search inventory for helping customers and so on, reserve books or place books on order, forward or possibly handle complaints, arrange the store's stock, and note missing books. A clerk may also act as a customer, but with a possible discount on purchases.

A stock person may be in charge of preparing a list of books to order, managing waste such as packing materials, updating inventory lists when new stock arrives, and updating

inventory lists for missing or damaged stock.

Finally, a manager would probably have to manage employee schedules and pay, stock, promotions for the store (sales, etc), inventory prices, and hiring and firing. She might also be the one to deal with suppliers and handle customer complaints.

Initial User / Task Matrix

The following user/task matrix represents this information:

	Customer	Clerk	Stock Person	Manager
Search inventory	X	X		
Reserve books / put books on order	X	X		
Purchase books	X	X	X	X
Complaints / compliments	X	X		X
Ring through sales		X		
Arrange stock		X		
Update or control inventory		X	X	X
Ordering stock			X	X
Manage delivery waste			X	
Employee schedules and pay				X
Promotions (sales, etc)				X
Deal with suppliers				X
Interviewing / hiring / firing				X

Assumed Characteristics

In addition to these possible tasks, Team FAGE also created a list of assumed characteristics surrounding the users and their environment:

❏ Bookstores are, in general, are quiet places to work and shop in.
❏ There would probably be a lot less stress here than in many other retail stores. The most stressful situations probably surround special promotions.
❏ Customers are likely intellectuals.
❏ Employees at the book store likely do not have much experience with computers, being average users at best.
❏ The check out process would be slower than at many other retail stores. Employees likely chat with their customers.
❏ Customer relationships are important, so it might be useful to retain certain information about customers (personalized information can help give customers relevant recommendations, for example).
❏ Visual appeal would be important, but there probably wouldn't be spectacular displays that might be seen in bigger stores.
❏ Smaller bookstores probably try to specialize in a particular niche market for the kinds of books they sell.
❏ In addition to books, calendars, bookmarks, magazines, stationary, gifts, snacks, and knick knacks might be sold.
❏ Most employees are probably passionate about books.

Testing the Assumptions

To test the many assumptions made thus far, Team FAGE made plans to visit a small book store, called Singing Pebble Books. The team planned to interview a few employees to find out how close our assumptions were, and to learn as much as possible about their

current workflow and how their current computer system fit into it.

Following is a list of questions we planned to ask the various kinds of employees of the store to determine who the actual users of the system might be and their characteristics.

- ❏ What kinds of employees work at this store? In other words, what different roles do employees play?
- ❏ Are there different kinds of customers that shop at this store? How would you categorize them?
- ❏ How might employees get access to someone (ie who would they ask) to maintain the software?
- ❏ Who do you report to?
- ❏ What education background do you have?
- ❏ What kind of previous relevant experience do you have?
- ❏ How long have you been working here? How long do people work here in general?
- ❏ How do you feel about your job? Do you enjoy it? Do you feel this job is a part of your career, or just something temporary?
- ❏ Do you have a passion for books?
- ❏ How comfortable do you feel using computers?
- ❏ How do you feel about learning new things?

The following questions were meant to discover a thing or two about the store's environment:

- ❏ What types of equipment do you use for your job?
- ❏ What kinds of relationships are important to employees?
- ❏ When is the job stressful or high paced? Are days usually busy? Are workers under pressure to perform tasks quickly? Are there often long lines?
- ❏ Where / how are important documents stored and are they shared?
- ❏ How often do phones ring? Who is responsible for answering? Who has access to phones? Customers?

- ❏ Does anyone work from home?
- ❏ What kinds of sections of books does the store have? Would anything be considered controversial in some cultures?
- ❏ What kinds of items does the store sell other than books?
- ❏ What kind of computer equipment does the store use? (Operating system, software used)
- ❏ What kind of input/output devices does the store use with their computers?
- ❏ How would you describe the different "areas" that employees work in?
- ❏ How are noise and lighting levels?
- ❏ What kinds of mistakes can be made on the current system? How is data backed up?
- ❏ Are there rules for things like appropriate dress and cell phone use?

In addition to the preceding questions, the team planned to have employees discuss and possibly show us how they perform some of their most important tasks.

Outside of the store, the team wanted to find out more information about the typical customer. Although some information will have been gathered about customers from the preceding sets of questions, it would be beneficial to interview an actual patron of the store as well. Following are the questions to be asked in such an interview:

- ❏ What education background do you have?
- ❏ Do you have a passion for books?
- ❏ How comfortable do you feel using computers?
- ❏ How do you feel about learning new things?
- ❏ How often do you shop at bookstores? This one?
- ❏ What makes you decide which book store to visit given your book buying goals at the time?
- ❏ Do you have frequent and reliable Internet access?

The next section of this report will present the information the team gathered from the described interviews and site visit.

Additional Analysis Methods

On the morning of October 5, 2005, Team FAGE visited Singing Pebble Books, a small bookstore in downtown Ottawa that specializes in such subjects as health and healing, spirituality, psychology, philosophy, fiction, yoga, and more. This section will outline some of our findings.

Users

The initial assumption about users was that we could define them as the customer, clerk, manager, and stock person. In reality, the employees at the store would be more appropriately categorized as owner, manager, and clerk, where each person would have some responsibility surrounding stock.

Following are profiles of each of these representative users of our system. Most of the information presented here comes from the interviews conducted at the book store, although all names have been changed for privacy. Note that we were able to speak to the store's manager and owner, but not any clerks in particular. The clerk's profile is therefore based on answers given by the other two employees, and on our own assumptions.

Owner - Nikki

Nikki is an energetic woman in her 30's. She has owned her store for 13 years, and never had another job, so it would have to be considered her career. Her sister owns the store next door, and her mother founded the vegetarian restaurant next door to that. She lives close by, spending a lot of time either in her store or nearby.

Nikki says she loves books, and mentions that the selection of books she provides is very

much linked to the services her family members offer next door. She has a degree in Anthropology from 1994. She never used computers much before setting up the system for her store, so she's learned all of what she needs just by using her system. It is currently still based in DOS, although she also has a Windows machine. She prefers to know only what she has to know about computers to do her job.

Manager - Paul

Also in his 30's, Paul has worked at the bookstore for 4 or 5 years. Before that, he worked at two other independent bookstores. The most recent one had the same computer system as his current store, but the first one had no computer system at all.

Paul has a degree in English, and isn't sure that he'd call working in bookstores his career. He likes books, but he doesn't seem to feel very attached to the store. When asked about his relationships with other employees, he says that they are 'surface-friendly,' not really socializing more than necessary.

Paul appreciates consistency in life, so he found that learning the computer system, very much based on the paper processes found at any bookstore, was very easy after working at another bookstore. He also very much appreciated that his current job uses the same system. He would not appreciate a new program, or even drastic updates to the current program. He says "if it ain't broke, don't fix it."

Clerk - Tabitha

Tabitha is quite a bit older than her co-workers. She is 48 years old, and has worked in a few different bookstores. She has been with this bookstore for 7 years. This is definitely her career.

Tabitha doesn't like learning new things, and doesn't have a very good relationship with the computer. She'll use it to ring through a sale, but avoids it otherwise. She thinks the current program is alright and fairly straightforward. She would not want to have to learn a new system, however.

Customer - Ronnie

Ronnie is a modern-thinking woman of about 40 years of age. She is a vegetarian, and frequents the restaurant next door. She likes to come in the bookstore to check out the sale shelf, browse the yoga section, and perhaps rent an instructional yoga DVD.

Ronnie could be described as being in the upper middle class, and has a computer at home that she is fairly comfortable using for email and surfing the Internet in a Windows environment. She has seen the bookstore's website, occasionally checking for updates. She would consider using an online system to reserve or order books, but she's more likely to buy something if she just wanders into the store.

Environments

Some of the environments the team observed at the book store are discussed in this section. The physical environment that the employees work in as well as the social and cultural surroundings they are exposed to are considered.

List of Environments

The following aspects of the store environment were observed:

❏ Front counter
❏ Platform office
❏ Basement

❏   Front sidewalk area

❏   Main store area

Physical Environment

The main floor of Singing Pebble Books is approximately one hundred square feet. The walls are lined with shelves, and books are categorized by genre; there are 100 sections, including some relating to controversial subjects (e.g. Wicca, past lives, conspiracy, channeling, and ancient mysteries).

Figure 1 Working at the front counter, ringing a customer through.

Figure 2 The workspace in the platform office.

The door to the store is sometimes left open, at which time it can become noisy and dirty. Popular books are also sometimes displayed outside the front door on the sidewalk. Deliveries are received at the back door where boxes aren't left for long.

The platform (or boss's) office, used mainly for accounting, is positioned at the back of the store. The office computer is connected with the store's two other computers, located at the front cash. All three computers access the same software system (see artifact analysis

for a discussion on the system).

Figure 3 Customers browse for books in the main store area.

Figure 4 The atmosphere at Singing Pebble Books is rather friendly.

The staff kitchen is located in the basement of the store. However, the basement is rather unpleasant, so it is used primarily for the storage of seasonal inventory, miscellaneous goods, and boxes belonging to the neighbouring restaurant.

Overall, the store has limited storage space. Current stock is stored on the tops of the bookshelves on the main floor of the store.

Cultural/Social Environment

Staff members are between the ages of 35 and 55 years old, and turnover is minimal. The newest member of staff has been working there for four years.

While some staff members do occasionally work from home, they all live close by and are therefore readily available.

Generally, the store is quiet and serves between three and five customers per hour. The store does, however, benefit from seasonal business; at peak periods, a queue forms at

the front cash and employees must work faster than normal.

Tasks

While visiting the bookstore, we were able to observe and discuss some of the key tasks performed by the owner, manager, and clerks. Following is a list of all tasks that might be performed by the users of our system, and then a detailed description of several specific tasks.

Task List

The following tasks are those the team felt could be important to our potential users in relation to our system:

- ❏ In-store sale (ringing a customer through)
- ❏ In-store return
- ❏ Books delivered
- ❏ Searching for and ordering new inventory
- ❏ Scheduling work shifts
- ❏ Stocking and pricing
- ❏ Paying bills
- ❏ Handling email or phone requests from customers
- ❏ Finding items for customers in store
- ❏ Managing promotions (sales, etc)
- ❏ Checking for store info like prices
- ❏ Making requests such as ordering/reserving books

In Store Sale

When a customer arrives at the front cash indicating that he would like to make a purchase, whomever is at the cash (be it an owner, manager or clerk) responds. For this scenario, let's say that it's the manger Paul available.

The first thing Paul must do is bring up a new order (called a Point of Sale) using the computer system. Paul then manually inputs the ISBN numbers of all of the books that are being purchased since there is currently no access to a bar code scanner. Once all of the books have been input, the system tells Paul what the total price will be, including all applicable taxes. Before receiving payment, Paul asks the customer for his name so that he can bring up his profile on the computer. Paul checks if the customer is eligible for the $10 credit available after spending $250 (this is called the Frequent Buyer Program). If required, the credit is applied to the price and if not, Paul simply puts the new purchase amount onto the customer's account. If this is the customer's first ever purchase, his name and phone number are recorded so that an account can be set up. In the final steps of the sale, Paul asks the customer how he would like to pay and then completes the transaction accordingly. Once the sale has been finalized, the system automatically updates the store's inventory levels so all Paul has to do is wish the customer a nice day as he leaves with his newly purchased books.

In Store Return

The owner Nikki does not like to allow people to make returns but sometimes the situation warrants one and she has no choice. The main case where people can make a return is when the purchase was a gift. Aside from that, Nikki only allows returns when there are irregular extenuating circumstances. Returns are more likely to be allowed if the purchase was on credit, since Nikki does not have to pay any money directly from the cash.

To process a return, the ISBN for the book is entered into the system and -1 is input for the

quantity. This automatically puts the book back into the inventory in the system. The customer is also asked for her name so that the price of the book can be taken off her total for the frequent buyer program. Once the transaction is complete, Nikki or one of the other employees puts the book back on the shelf so it can be resold to someone who will (hopefully) keep it.

Ordering New Inventory

Before the owner Nikki actually makes an order with her supplier, she inputs the order into the store's computer system. Then, Nikki has a few options when it comes to purchasing new inventory. Often times she simply mails or faxes her order into the publishing company (her supplier) and doesn't need to speak with anyone. She sometimes uses a system called Bysac, which is connected to the publisher and gives automatic confirmation of whether or not the order has gone through. If she wants to speak to someone directly, she calls the publishing company and puts in the order through one of the customer service representatives. Part of the confirmation that Nikki receives is the invoice number that will be included with the delivery. Nikki makes sure to associate this invoice number with the order in the system so everything can be verified when the shipment arrives.

Inventory Delivered to the Store

A new shipment of books has arrived at the store and the clerk Tabitha needs to process the shipment and get the books on the shelves as soon as she can so that they can be available for customers to purchase.

The first step required when inventory is delivered is to open the box and take out the invoice. After Tabitha does this, she brings the invoice to the front of the store and uses a free computer to enter the invoice number into the system. This brings up the order that the delivery was made for onto the computer screen. Tabitha compares the totals from the

order on the system and the invoice in her hand to match totals and ensure that there hasn't been a mistake. If everything is fine, the system updates the store's inventory and Tabitha prints stickers for each of the books in the invoice which contain the book's name, author and selling price. The stickers are taken to the box with the books and placed on the corresponding books. This is another opportunity for Tabitha to ensure that no mistake has been made as she will quickly realize if a book is missing or if books that were not ordered were delivered and paid for. Once all of the books have their correct stickers, Tabitha puts them all in their rightful locations in the store so that they can be examined and purchased by customers. Once this is done, Tabitha puts the invoice with all of the other invoices that need to be paid by owner Nikki.

Scheduling Work Shifts

It's the beginning of the week and the manager Paul has been given the responsibility of scheduling everybody's work shifts for the week.

This isn't a very difficult task since everyone works the almost same hours every week, but there are still some considerations that need to be taken into account. This week, Tabitha has indicated that she is unavailable to work on Thursday and thus Paul must switch the adjust the schedule to accommodate. There is no system in place to automatically generate the schedule for him, so Paul must figure out a way to meet everyone's availability manually. Paul and Nikki also need to decide whether to close the store on Friday, a provincial holiday. Since the store is not a big corporation, they can choose wether or not to be open on days such as these. Once this decision is made, the schedule needs to be adjusted so that the employees know not to show up this day. Once the schedule has been completed, Paul posts it up in the staff kitchen in the basement so everyone can see when they will be working during the week.

Helping Customers Find Books

Sometimes Ronnie, a frequent customer of the book store, looks for a specific book when she shops, but cannot find it by herself. In that case she approaches a clerk and asks for help.

If the clerk knows where the book can be found, she simply points Ronnie in the right direction. If the clerk does not know where the book is, she searches for it using the computer system. She can search using many criteria including the author and title. If the system responds that the book is indeed in the store's inventory, it will tell the clerk what section of the store to look in. The store has upwards of 100 sections, so this makes it much easier to locate a specific book. The clerk will then either tell Ronnie where she should find the book or go get it for Ron herself. It may be possible that the system says the book is in stock but in reality it is not there. This means the book is either missing or has been stolen. If the clerk cannot find the book, she adjusts the inventory level in the system to reflect that the book is missing. In the case where the book is not in the store's inventory, the clerk tells Ronnie that they do not currently have the book, but will look into ordering it. The clerk will then write down the information about the book as well as Ronnie's contact information and pass this information to Nikki or Paul who will try to order the book and then contact Ronnie to let her know if and when the book will be available to be picked up.

User/Task Matrix (Revised)

Given the data on users and their tasks, the following revised user / task matrix can be presented.

	Owner	Manager	Clerk	Customer
In store sale	X	X	X	
In store return	X			
Books delivered	X	X	X	
Ordering new inventory	X	X		
Scheduling work shifts	X	X		
Stocking and pricing		X		
Pay bills	X			
Handling email or phone requests from customers			X	
Finding items for customers in store	X	X	X	
Managing promotions (sales, etc)	X	X		
Checking store info like prices	X	X	X	X
Making requests such as ordering or reserving books	X	X	X	X

Artifact Analysis

This section aims to discuss some of the documents used by the book store, the store's current software system and the hardware it runs on, information on the phone system, and the types of items sold in the store.

Documents

These documents are kept on paper in the basement and at the owner's home. Some also have electronic versions that are stored on the computer and backed up onto CD.

- ❑ Invoices
- ❑ Daily / monthly / yearly point of sale (POS) records
- ❑ Daily / monthly / yearly totals
- ❑ Visa / Mastercard receipts
- ❑ Check ledgers
- ❑ End of year accounting
- ❑ Monthly records
- ❑ Inventory
- ❑ Sales per hour
- ❑ Sales per clerk

An important document that is of particular interest is the receipt that is given to the customer after a sale. This document provides the customer with a summery of the sale as well as confirmation that his books have been paid for. The information on the receipt is similar to the information that is stored in the system. On top of the receipt is the name and address of the store. Then there are a bunch of rows, each representing a book that was purchased. The columns provide the book name and price. After all the books are listed, there is a row for GST, one for PST, and one for the total cost. The receipt also contains an order number and the date and time of the sale.

Current Computer System

The current software system is DOS based and 8 years old. The store receives tech support and updates for $300 / year. There are only two useful people to talk to for tech support: the software's creator or one other expert. Otherwise, employees do not find tech support to be very helpful.

An example of the frustration with tech support is the trouble the book store had with their printer. When the employees of the store were having problems printing, they tried to have the tech support staff solve the issue. Tech support became confused, and the book store ended up buying a new printer unnecessarily. Although the printer was better than the old one, the book store was not pleased with having to buy a new one, and they were not satisfied with the support they received.

Two software titles used in this system are Pub Stop and Title Wave. Pub Stop is used to view all the publishers / suppliers that provide inventory, and to check their prices and availability. Title Wave is linked to a database of books that are still in print, but not to the publishers of those books. Given an ISBN, Title Wave can tell you whether the book is out of print.

The system does not support the mouse, so all entry is done with the keyboard. The software can support a bar code scanner, but the book store chooses not to use this functionality. Keyboard entry can be cumbersome, and certain key combinations can even cause the user to be kicked out of the program. Fortunately, this does not seem to cause any loss of data.

Power failures are an issue because they can cause loss of data. Apparently the data lost this way is not critical, but even so, backups are made just in case.

Phone System
The book store receives between five and eight calls per day. Generally, these calls are about answering questions about the store having particular books in stock. There are two lines available. The first has call waiting enabled, and the second line is used for fax. There is also a dedicated line for credit card transactions.

Items Sold

There are several other types of items sold in addition to books. Therefore, the system cannot handle only books. Some of the other items sold are listed below and shown the figure.

- incense
- calendars
- agendas
- journals
- yoga equipment
- jewelry
- DVDs and CDs (for sale and for rent)

Figure 5 A view of some of the various items sold at Singing Pebble Books