A Level Computer Science Coursework

FOLSS Uniform Shop Program

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# Analysis

## Description of the Problem

I am going to build a program for my school PTA (FOLSS) to manage pre-loved uniform sales.

FOLSS run a pre-loved uniform shop where they sell items that have been donated by students, parents and boarding Houses. The money raised from the sales goes back into providing treats and other items for the pupils. Each house receives 75% of the sales price of items they donate, and the other 25% goes to FOLSS. At the moment, when stock is donated, each item is manually labelled with the name of the donating House. When an item is sold, this label is detached, and the sales price and House is recorded on a spreadsheet. This process is labour intensive and is also slow during sales because a customer may be purchasing several items which have been donated by several different houses. This can lead to a backlog at the checkouts during busy sales. After the sales, the amounts due to houses have to be calculated.

The program I will create will contain a checkout system to speed up the processing of sales, as this is currently done manually. It will also contain ways for the volunteers and staff at the school to access the totals for how much uniform has been sold and sort this by house. I am also planning to create an online shop where pupils or parents can buy uniform from the shop. They will then be able to either pick it up from the shop or have it delivered to them in school. The program will also include stock management features to help the volunteers to sort through the uniform and know what items they need more of.

To solve this problem I am going to use a database with a web front. Users will input data into the website which will be stored in the database and then be accessed from other parts of the website.

I will start this project by considering the needs of stakeholders to understand exactly what the website needs to be able to do, and also consider existing solutions to similar problems.

## Stakeholders

I have identified three main groups of stakeholders: FOLSS Volunteers, Uniform Shop Customers, and School Staff. I have also split these three groups into smaller sub-sections. All of these users will use the website in different ways, so they all need to be considered. I will interview stakeholders before I start to design my coursework, and also get opinions from them throughout the development process.

### Volunteers

The FOLSS uniform shop is run by volunteers who are parents of pupils at Oundle. They are in the shop for uniform sales and also spend time in the shop outside of sales organising uniform and managing stock. They will use management side of the website while the customers will mostly use the online shop. Within the volunteers section there are also two sub-categories, Committee members and Other volunteers.

#### Committee Members

The FOLSS committee membership form the leadership of FOLSS. There are three members who have different roles. They will need to be able to use all the functions other FOLSS volunteers use, but they will also need to perform other tasks. Some of these include:

* View the total amount raised from each sale, and how it has been split by house
  + This is so that they can distribute the money to different houses and know how effective the sale was. Currently these totals are calculated manually after each sale, so a live view during the sale would be useful to see how it is going. It would also decrease the amount of work that they have to do calculating totals which can take a long time. Reducing this time is important as all three members have full time jobs so are very busy.
* Add volunteers to the system
  + They need to be able to do this as volunteers will have different permissions than other users such as being able to access the checkout system and adding stock to the shop.
* Add, edit and remove items on sale in the shop
  + This is so that if the uniform changes or the price of it changes the shop can adapt to this and edit what is on the website. All of the members have minimal technical experience, so this needs to be done in a way that is easy to use for non-technical people.

I will interview all three of them so that I can get their opinions on the system as they will be the people who use it the most.

#### Other Volunteers

FOLSS has many other volunteers who aren’t part of the committee. They will use the website in the following ways:

* Use it as a checkout system for the shop
  + Having a checkout system will speed up the process of checking out orders as currently it is done on paper or on a spreadsheet so a website will greatly simplify this. Sometimes different people have different ways of writing down sales which can get confusing for people who are trying to sort out the totals later.
* View online orders and mark the progress of the orders. E.g. In progress, finished, ready to be delivered/collected
  + They need to be able to see the orders so that they can fulfil them. Marking the status of them will help to organise what still needs to be done so that this can be co-ordinated with different members.
* Add stock to the system when it is donated to the shop
  + When stock is donated, volunteers need to be able to add it to stock. This is so that they can easily keep track of how many of each item they have, and understand what they are short of. Currently there is no way to accurately know how much stock the shop has, so adding this feature to the website would be useful.

I will interview Nat as a representative of this group to get advice on how to best suit the needs of the volunteers.

### Customers

At FOLSS sales there are many customers who come to buy pre-loved uniform. Customers will use the online shop part of the program, and they will also be indirect users of the checkout system as volunteers will use it to process their orders. This can be split into parents and students, and they might have different requirements for the program.

#### Parents

Parents are the main customers at uniform sales. They come to sales to buy uniform for their children, and also sometimes contact FOLSS to buy uniform outside of the sales. They will use the website in the following ways:

* Use the online shop to place orders outside of sales times
  + Parents can’t always come to the shop to buy uniform, so being able to place orders online would mean that they can still buy the shop’s pre-loved uniform. They can also make sure that the shop has what they need instead of coming to the shop to find they don’t have it.
* Have a way to arrange picking up an order or having it posted to them or delivered to their child’s boarding house
  + Parents need to be able to receive their online orders and there are multiple ways which they need to be able to do this. They can pick it up at the next sale. If they can’t come to the shop then they could also have it posted to them, but if the child needs it urgently then this might not be the best way so they should also be able to have it delivered to their child’s boarding house.
* Store details such as their address in the system to make checkout easier in the future. These details are confidential so will need to be secured securely in the database.
  + This is needed as inputting details every time would be tedious so being able to store them would be much more convenient for parents.
* View orders they have placed and the status of them
  + This is so that parents can understand the progress of their orders and then they are likely to be delivered. This would give parents peace of mind that their orders are being dealt with and haven’t been ignored.

I am going to talk to Sam who will represent the parents who use the shop so that I can suit the solution for their needs.

#### Students

Students also buy uniform from the shop. They will mostly use the online shop and will have the following needs for it:

* They need to be able to arrange to pick up items in store or have them delivered to their boarding houses
* Use the online shop to place orders
* View orders they have placed and the status of them
* Be able to pay for orders by adding it to their school bill

I will talk to \_\_ to get student’s opinions about the website.

### Staff

Staff at the school will need to be able to use the system to view how much money each house has made. There are two main groups of people who will need to view these totals, Matrons and Housemasters/Housemistresses (Hsms for short).

#### Matrons

Matrons play a larger role in boarding and day house life. They also donate a lot of uniform to the shop as it is passed down from pupils in the boarding house. They will use the website in the following ways:

* View the money raised from sales for their house
  + This is so that they can see how well the uniform they have donated is selling, and also decide with Hsms how the money will be spent on the pupils.
* See what items of uniform the shop is short of
  + If Matrons can see what uniform the shop is short of, they can see if they have any of that kind of uniform so that they can donate it to the shop. Donating items the shop is short of means that they are more likely to get sold so more likely to earn the house money.
* View items that are selling well at the shop
  + If matrons can donate items that are in-demand this means that their house will get more money so be able to provide more for the pupils.

#### Housemasters/Housemistresses (Hsms)

Hsms are the head of a house and are responsible for all the pupils in that house. The money for each house from sales goes into the house bank account which Hsms are responsible for, meaning they decide how that money is spent on the pupils. They need to be able to see how much money their house is owed so that they can ensure that they get the right amount of money sent to them.

## How the problem can be solved by computational methods

This problem is suitable for a computational solution because it requires data to be stored, processed and distributed. This is much easier to do with an online database instead of on paper as it is less prone to mistakes, and can be accessed by many people from multiple locations at the same time. It also reduces the need for volunteers to process the data, as it can be done automatically by the system.

The online shop will make it easier to place orders from further away which would be much harder to do without a computer system as it would take longer for the data to travel between places.

### Thinking Abstractly

Abstraction is the removal of unnecessary detail. I will utilise abstraction in many different ways across the system to hide data that different users don’t need to know.

For the customers I will utilise it in the following ways:

* They will only see details about uniform which is relevant to them. For example they will be able to see that an item is in stock but not how many are left in stock
* They will only see information such as the name of the item, not the item ID and other information such as where it is stored or what house it was donated by
* Customers will be able to see key information about their current orders such as the items of uniform and the price. They won’t be able to see information such as orders other people have placed or which volunteer was responsible for completing their order

For volunteers I will use it in these ways:

* The checkout system will only display information which is useful. For example details such as the item ID of the item will be abstracted and the name will be displayed instead
* They will only have to input a few details about the item when they are checking it out instead of having to write multiple details on paper or a spreadsheet
* Completed orders will be removed from the system so that volunteers don’t get confused when completing orders

For Hsms and Matrons I will utilise abstraction in the following ways:

* They will only be able to see the totals for their house, not other houses. This will simplify the process and also make it more secure

### Thinking ahead

### Thinking Procedurally

### Thinking Logically

### Thinking Concurrently

## Research

### Current System

### Interviews with Stakeholders

I will interview at least one person from all of the groups of stakeholders to identify their needs for the website.

#### FOLSS Committee

Questions I will ask the committee:

* What functions do you want the website to be able to perform?
* What do you want the website to look like?
* How do you currently record the amount of money for each house?
* How would you like the online shop feature to work?
* How are the levels of stock managed?
* What additional functionalities will the committee need compared to other volunteers?
* What types of devices should the website be compatible with?
* What information should be displayed about the items of uniform on the online shop?
* How would you like the checkout system to work?

Questions for the treasurer: Joanne

* How is money taken from customers at the checkout?
* How would you like the transaction at the online shop to work?
* How is the money from each sale split between the houses?

Questions for the chair: Becky

* How do FOLSS use the money that is raised from the sales?

Questions for the secretary: Christina

* How are houses currently made aware of how much money they are owed from uniform sales?

Conclusions

#### FOLSS Volunteer

I interviewed Nat, one of the FOLSS volunteers, to understand how FOLSS volunteers will need to be able to use the program.

Here is a transcript of the interview:

What happens when new uniform comes into the shop?

What we do is we identify which house it belongs to and we check each item for quality and determine whether it can go for a sale or if it is a bargain buy for £5. If it doesn’t meet the current school regulation in terms in uniform such as the old hoodies, they can’t be sold. With items that are non Oundle specific we send them to the charity shop so a blank white shirt that doesn’t have any cresting or identification we will recycle those. And for things that are too poor quality unfortunately they have to be binned. Once we’ve identified what criteria it meets, if it does make the uniform shop we label it with the house that it belongs to and we hang it on a hanger into the right area of the shop.

You mentioned the bargain bucket, what exactly is that?

So this is a bargain rail for items that require repair basically. So that aren’t too poor quality but they may need a button or there might be a small tear on a pocket that needs a stitch as an example and we sell those for £5 and it really is helpful to parents especially when they first come to the school because the cost of the uniform is so much.

How do you know what size the item is when it goes to the checkout?

The sizing can be quite difficult. When it comes to the checkout we look at the label to see what size it is. However this can sometimes be misleading because parents may have modified uniform for example taking up trousers. When an item doesn’t have a label on it when it comes into the shop we have to label it with the size which we find by comparing it against others of the same size. Looking at this label take a long time as sometimes they are in awkward places and have faded over time.

How does the checkout system currently work?

Oh my goodness, so it is very basic. It is hand noted on a piece of paper with the total for the house for example Sanderson £15 and that is totalled up per customer and then afterwards the information is transferred to a spreadsheet to give some basic data on how many sales were made according to each house. It can be quite tricky because the table can become chaotic as there are bags and coat hangers everywhere and it is quite tricky to keep on top of it. Checking out is a double entry process, once on paper then someone has to transfer that data at a later time into the spreadsheet to work out how much we have sold. Quite cumbersome and time consuming and also if there was a question and data isn’t populated on the spreadsheet you only have the paper sheet to refer back to see what kind of uniform was bought. The information is minimal.

What happens when there are multiple people who come to the checkout at once? How quick is it to get through each one of them?

Quick isn’t the word we would use. So the system’s managed by two people. Someone will be folding and taking off hangers and folding the items, the other person will be noting down the sales and handwriting each item on a sheet of paper. Everybody else has to wait . we only have one card machine so we can only do one transaction at a time and also the second hand uniform shop doesn’t have the space to run two tills which would be useful on a big sales day.

And so what else will you need to be able to do with the system other than using it as a checkout?

What would be really great is to take a model form any supermarket or clothes shop. So ideally at the point when the uniform when the uniform comes in and is screened because that takes time to identify whether it is something that can be repaired or what size it is. it would be great to give it a barcode or a QR code or something where you could put all the information in and say the size and the house that it belongs to and then at the point of sale just scan that in as quick as it is to do supermarket shopping or any clothes shopping.

If there was barcode scanning would you be able to have more than one checkout at once or would it be quicker to do each one?

I think it depends on cost as we could have a couple of scanning the devices but it would be a lot quicker even if it was just one as at that point you’re not saying is it a 30 inch waist, which house does it belong to. It would just be the price and the code would identify all the information which would provide meaningful information to the second hand uniform shop and the school ultimately.

Do you think more parents would buy uniform form the shop if they could shop online?

I do. I think perhaps the advertising of the second hand uniform shop could be improved. For example a lady came in today who is from another school but who has a child joining Oundle soon and asked how she can find out about sales. If you’re within the Oundle community the school doesn’t publish the dates so it’s left to the parents and it’s hoped that there’s enough volunteers in each year group to be able to send out the communications to the parents. It’s noted in the joining instructions that there is a second hand uniform shop but you don’t know when you can go to purchase uniform and if you come from outside of the school then you don’t stand any hope of finding information out. It would be really good if we could have access to email addresses in which we could communicate the sales.

If there was an online shop what would be the best way for volunteers to fulfil the orders when they came in?

If we moved to an online sale system we have enough volunteers at the moment that we could do it on a rotational basis around twice a week to go in and select the items because they would be coded so we could identify which item each person has bought and box it up for them. it just would enable parents who are boarding parents to have access to the uniform shop more frequently. However there would be a problem with returns because the student hasn’t tried it on so the uniform might not be the right size as it might have been previously modified by parents. There would have to be a returns policy to be able to manage online sales which were incorrect.

Conclusions

#### Parent

I interviewed Sam who has a daughter in first form to get his opinions on how he would use the website.

Here is a transcript of the interview:

How often do you go to the FOLSS uniform sales?

I’ve been to a couple so I went to one before we started and I’ve been to one since

How do you find the checkout system?

It’s smooth as a customer. I think sometimes you can be unlucky in terms of if the person in front of you is buying a load of stuff it can take a while to go through and obviously they can only process one person paying at a time but other than that it’s fine.

So if there are a lot of people and items does it get slow?

It does get a bit slow when it’s busy. I didn’t come properly but I did pop into the famous June 2023 mega sale when there were queues out the door. I wasn’t shopping but I was just passing by. In situations like that the checkout can’t keep up with the number of customers and items.

Would you find it useful if there was an online shop? Would you buy more uniform?

I think so. I think it would be really useful for parents who aren’t local. I’m fortunate that I don’t live far away so it is easy for me to come to sales. I think for people who live far away it would allow them to use the shop more. I think I would use it as well because instead of coming and browsing you could just buy it and pick it up and that would be easier especially at busy times.

What would be the easiest way to get the uniform you buy online?

For me picking it up but again because I’m local. If you were to have an online shop you would have to have a way of sending things as so many people wouldn’t be here to pick it up. At some point they have to come to visit the school though. Because you only have uniform sales at certain times of the year maybe they don’t coincide with parents coming to the school so you could have a system where you leave things for pickup at non uniform sale times.

How do the aesthetics of a website affect whether you will buy things on that website?

I suppose if it looks too unprofessional you feel a bit nervous about it because you question whether it is secure. It has to look professional to trust it. However this is a captive market so it wouldn’t have to be too good because people are using it to buy a specific thing. They wouldn’t just be browsing like fashion or retail where a bad website might just put you off and you might go and shop elsewhere whereas this there is no alternative second hand shop. It does affect you but given that it’s a captive set of customers it wouldn’t have to be that slick.

Do you find it easy to know when the sales are?

No. I think that’s pretty chaotic. A lot of the time information is sent out in an informal way for example on WhatsApp groups by volunteers. Sometimes they’re in the school calendar but I’m not sure if that’s a very robust process.

Would something like an email list or more information on a website be something which could potentially solve that problem?

Yeah I think that would be a good idea. If you just have sign up on a website where if you put your email address in you get emails about when the sales are. I could see most parents signing up to that. That’s a great idea.

Are there any other features that you would like to see for the online shop or a website FOLSS would have in general?

I think there could be an opportunity to have some of what you get from the volunteers in the shop which is real world advice about the uniform. For example about fitting or which items that you need. You don’t get advice like that from Schoolblazer, and you only get it anecdotally from volunteers in the shop. For example telling you that the school will lend you certain items so you don’t need to buy them.

#### Student

Questions for students

* How often do you go to the uniform shop to buy uniform?
* Do you find it easy to find time to go to the shop?
* Would you buy more uniform if you were able to buy it online?
* Do the aesthetics of a website affect your experience of using it?
* What would make it easier for you to buy uniform?

#### Matron

Questions for Matrons

#### Hsms

Questions for Hsms

* How have you spent the money raised from the uniform shop?

### Similar Solutions

#### Schoolblazer

Schoolblazer is where new Oundle school uniform is bought. They don’t sell second hand uniform but there are many features on their website which would be useful to include in my website.

This is the main shop page.

A screenshot of a website

Description automatically generated

Features identified

* Clear photos of the uniform
  + This makes it easy to see what you are buying and what it looks like. This will be something I will oncoorporate into my website.
* Shows if the item is in stock or not
  + Can easily tell if you can buy it without having to click onto another page. This is another feature that would be useful for my website.
* Navbars along the side and top
  + Navbars make it easier to navigate the website however having two in different places can be confusing.
* Prices are clear
  + Parents can easily see the prices of the items they are buying. Clear pricing is something I will make sure I consider in my website.
* Tab to switch between school uniform and sports kit
  + This makes it easy to select which one you want to look at and organises the uniform. I could do this on my website and have different categories of uniform which are easy to switch between.
* Only the relevant uniform is shown
  + At the top of the page you can select which child you are shopping for and only uniform relevant to them is shown. This is based on year group, gender and house. In my website I could incoorporate a way to filter the items by these categories.

Negatives identified

* The two navbars are in different places
  + This makes the website confusing to navigate. On my website I could have a navbar but in one place to avoid this problem.
* Different uniform is shown depending on which child you select.
  + While this can sometimes make it easier as you are only shown the uniform which is relevant to your child, it also means you have to switch between the two frequently which can be annoying.
  + To improve on this in my website I could make options to filter uniform based on categories such as year group, gender and house.

Additional feature

The page also has another feature which is that it shows if an item is compulsory and if it needs to be bought from Schoolblazer or if it can be bought elsewhere. There is a C in the right hand corner of the item if it is compulsory and an O if it is optional.

A screenshot of a shirt

Description automatically generated A collage of sports clothes

Description automatically generated

#### Veeqo

stock management <https://www.veeqo.com/gb/inventory-management-software-system>

Veeqo is a stock management system that is mostly used by wholesale retailers who sell on websites such as Amazon and eBay. Although it is different to the website that I will create, it has some useful features that I will try to include in my website.

A screenshot of a product list

Description automatically generated

Features identified

* Shows the location of the stock
  + Could be useful in the uniform shop to show amount of uniform on shelves and the amount in different cupboards
* Columns say committed or available
  + Could be used to see how many items have been bought online so how many more can be sold in store

Negatives identified

* Includes ways to add different shops such as shopify and Etsy which wouldn’t be needed for the uniform website

A graph with green and purple lines

Description automatically generated

This photo was taken from one of their marketing videos.

Features identified

* The website tracks the most profitable items over time
  + Could be incorporated into my website to show matrons and FOLSS volunteers which items are the best selling so that they can get more of them

#### Inflow inventory

stock management <https://www.inflowinventory.com/>

Inflow is another stock management system. It is a paid for service which costs 89 USD/month for the most basic service. As you have to pay to use it I have looked at the features that they advertise on the website.

* Look at barcodes on there

A screenshot of a computer

Description automatically generated

Features identified

* Status messages for orders are clear and shows which orders still need to be completed
* The quantity of items

Negative aspects

### Conclusions from Research

## Features of my Proposed Solution

### Volunteers

### Customers

* Create a home page for the shop where users can navigate easily to other pages of the shop
  + This is so that customers can easily navigate around the website. This will make them more likely to use it as they won’t get frustrated not being able to use it
* Ability for customers to look at uniform online and add it to their basket
  + This is so that they can use the website to order uniform. Without being able to do this the online shop part of the website would be useless
* Customers can check out their orders
  + Without this customers could only view uniform not actually be able to buy it which wouldn’t make their needs
* Customers can enter their preferred delivery option e.g. to their address, to their boarding house or collect in shop
  + This means that they can choose the option which is most convenient for them and will mean it is easier for them to buy uniform.
* View orders they have placed and the status of them
  + This reminds users of what they have ordered and also how close it is to being finished. This gives them piece of mind that their concerns are being heard

### Staff

## Limitations of my Proposed Solution

* Not include a way to pay on the website

## Hardware and Software Requirements

### Hardware

My solution will not require me or FOLSS to buy any additional hardware as it will be web-based so able to run on any computer or other device. I will use XAMPP as a local webserver during the development stages of the project.

When I have finished the website, it will need to be hosted on a webserver. I am planning to host the website on Award Space as it is a free hosting service which provides a large amount of storage space and a MySQL database. FOLSS have said that it would be good to host the website using a free service so that they can spend more of their money on providing things for the pupils. While the bandwidth available with free web hosting services isn’t as much as paid ones, it should be enough for the shop as it won’t have that much traffic. If it is too much for the hosting website to cope with, then I can upgrade to a paid service.

### Software

During development I will host the website locally using XAMPP as it provides me with a webserver and a MySQL database. This also means that I will be able to use PhpMyAdmin to edit and view what is stored in the tables in the database. This will make debugging code easier as I can see if pieces of code have worked and inserted/removed items as they should have done.

I will use visual studio code to develop the website as it supports all the programming languages I will use. It also has helpful debugging features such as different parts of code being in different colours. Using VSCode it is easy to back up my work to GitHub so that it isn’t lost if something happens to my computer.

## Success Criteria

### Volunteers

### Customers

### Staff