



Assignment 1B

IC1007 HT17-1

Human-computer Interaction: Principles and Design

Group 11

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1 Introduction

The assignment is to come up with a number of solutions in form of styles of interactions for the same system. Each problem demands a different type of solution (style of interaction) which may or may not work incoherently.

The system in the assignment is a fully automatic ice-cream robot that can serve different types of ice-cream as per user's choice. It can serve:

- Popsicles (Magnum Infinity Choklad & Kola, Magnum Double Caramel, Magnum Infinity Choklad, Magnum Chocolate & Nuts, Magnum Classic, Magnum Mandel, Magnum Strawberry White, Magnum Ghana, 88:an, Nogger Classic, Piggelin, Sandwich, Twister, Twister frukt and Päransplitt)
- Readymade cones (Cornetto Enigma choklad & kola, Cornetto Enigma Cookie, Cornetto Enigma Vanilj & Hallon, Cornetto Classic, Cornetto Jordgubb, Dajmstrut, Dajmstrut Pear dream, Tiptop and Tophat)
- Gellato (cioccolato fondente, bacio, cioccolato all'arancia, pistacchio, mandorla, nocciola, fior di latte, zabaione, cocco, caffè, amarena) (served in a cone, beaker or a whole box of different sizes (1/2, 1 and 2 liter) to bring home.
- Sorbet (fragola, lampone, limone, mandarino, melone, albicocca, frutti di bosco, pera, pesca) (served in a cone, beaker or a whole box of different sizes (1/2, 1 and 2 liter) to bring home.
- Soft ice cream (vanilla chocolate and strawberry (served in a cone or beaker)
- Topping: sprinkles (mixed, chocolate, fruit, toffee, licorice)
- Topping: sauces (caramel, chocolate, licorice, strawberry)
- Topping: whipped cream
- Topping: pickled fruits (cherries)" (Assignment 1b, n.d.)

2 Exercise 1

2.1 Problem

"In this first exercise let's consider regular customers walking in from the street and want to choose an ice-cream. Create an information structure (categorization) for a menu that would be suitable for a regular desktop GUI. (nota bene, You don't have to make the finished graphical design, the informational structure will suffice for now, perhaps in form of a tree-graph or something similar.)" (Assignment 1b, n.d.)

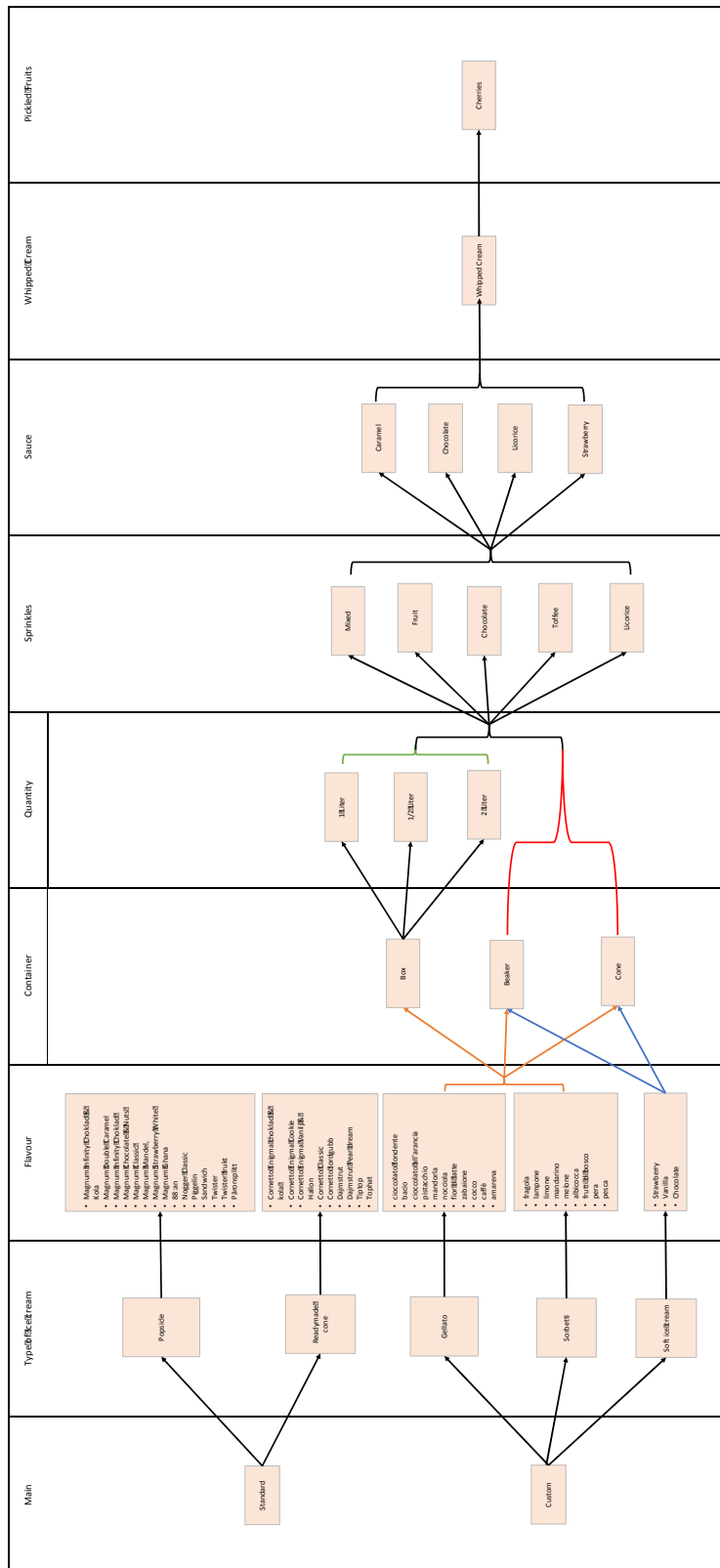
2.2 Solution

Our solution for the exercise is to categorise the types of ice-creams and ice-cream flavours into 2 main categories, "Standard" and "Custom". The detailed structure is displayed in Figure 1 (next page).

Standard ice-creams are those which come pre-packed and hence do not provide customisations like choice of container, quantity or toppings. The customer only needs to choose the type of ice cream i.e. Popsicle or Readymade Cone, and then choosing the desired flavour will allow Robot to serve it.

Custom ice-creams are those which are not pre-packed and can be customised as per customer's preference including choice of container (cone, beaker or box), quantity (in case the container is a box) and toppings (choice of sprinkles, sauces, cream and fruit). The customer will have to choose the type of ice-cream i.e. Gellato, Sorbet or Soft Ice-Cream, and then the desired flavour. Next, customer will have to choose among different type of containers and quantity. Later, the customer can choose among or reject types of toppings to finally complete the order which the robot can serve.

The reason why we chose to divide the ice-creams into a standard and custom category, is due to the fact that custom made ice-creams contain more properties such as sauce, sprinklers etc. than the standard one. Since the ice-creams that can be customized have different flavours from each other, we thought it would be wise to put each type of the ice-cream in their own subgroups, as the flavour is a property.



3 Exercise 2

3.1 Problem

“In the second exercise we turn to a technician, which works with serving and updating this system, as the user. Create a command language for the system. You don’t have to show “the whole” language, just enough to show how the language structure is meant to be.” (Assignment 1b, n.d.)

3.2 Solution

```

Welcome to XYZ Ice-Cream Service Zone CLI. Enter your passcode to continue...
xyzic> ****
Access Granted to the System Database. Type "HELP;" to view list of commonly used commands.
xyzic> HELP;
XYZ Help Centre. The common commands are:
• SHOW CATEGORY;                                //To view all categories
• CREATE CATEGORY "category_name";                //To add new category
• ALTER CATEGORY "category1" TO "category2";      //To change category name
• DROP CATEGORY "category_name";                  //To delete a category
• VIEW * FROM "category";                          //To view all entries in a category
• VIEW [WHERE condition(s)] FROM "category";       //To view filtered entries
• INSERT ("name", "price", ...) INTO "category";   //To add new entry to a category
• DELETE [WHERE condition(s)] FROM "category";     //To delete filtered/all entries
• UPDATE category SET "value1" TO "value2";        //To replace previous entry
• QUIT                                              //To close the Service Zone
xyzic> SHOW CATEGORY;
There are 10 categories: "Popsicles", "Readymade", "Gellato", "Sorbet", "Topping_Sprinkles", "Topping_Sauce",
"Topoing_Cream", "Topping_Fruit", "Container", "Size".
xyzic> CREATE CATEGORY Soft-Cream;
New category added "Soft_Cream".
xyzic> VIEW * FROM Soft_Cream;
No records found under Category "Soft_Cream".
xyzic> INSERT (Vanilla, 25) INTO Soft_Cream;
Record "Vanilla" for Price "25" added to category "Soft_Cream".
xyzic> INSERT (Chocolate, 25) INTO Soft_Cream;
Record "Chocolate" for Price "25" added to category "Soft_Cream".
xyzic> INSERT (Blueberry, 25) INTO Soft_Cream;
Record "Blueberry" for Price "25" added to category "Soft_Cream".
xyzic> UPDATE Soft_Cream SET Blueberry TO Strawberry;
In category "Soft_Cream", record "Blueberry" is updated to "Strawberry".
xyzic> VIEW * FROM Soft_Cream;
Category "Soft_Cream" contains 3 records: "Vanilla", "25"; "Chocolate", "25"; "Strawberry", "25";
xyzic> QUIT
System is securely closed. Thank you.

```

Figure 2: Sample for Command Line Interface for Automated Ice-Cream system by XYZ.

We developed a command system loosely based on the database management system language MySQL. The language is fairly simple and allows the technician to view and edit the current records in the system. As shown in Figure 2, the command “HELP;” demonstrates the basic commands like “SHOW”, “CREATE”, “ALTER TO”, “DROP”, “VIEW FROM”, “INSERT INTO”, “UPDATE SET TO”, “DELETE FROM” and “QUIT” allows user to add categories and records in it with prices.

We have chosen to base our language on MySQL as it is best suited for managing complex databases as it allows linking multiple categories (tables) on basis of current condition. Our information structure is more like a database than a simple level-up-down structure as followed by unix-based languages. MySQL is a simple language closely based on natural language, hence the learning curve is smaller than complex commands offered with unix/linux. A common problem that command languages share is the user (our technician) needs to rely on the ability to recall specific command names and the language’s complex syntax. By basing our command language on an already existing language the technician will probably recognize the syntax which will put less burden on the working memory and make the learning process faster. (Benyon, 2014, pp.273).

4 Exercise 3

4.1 Problem

“Create a way to interact with the system using direct manipulation for making an ice cream cone. (This can be hard to illustrate. Work with a combination of (several) sketches and text.)” (Assignment 1b, n.d.)

4.2 Solution

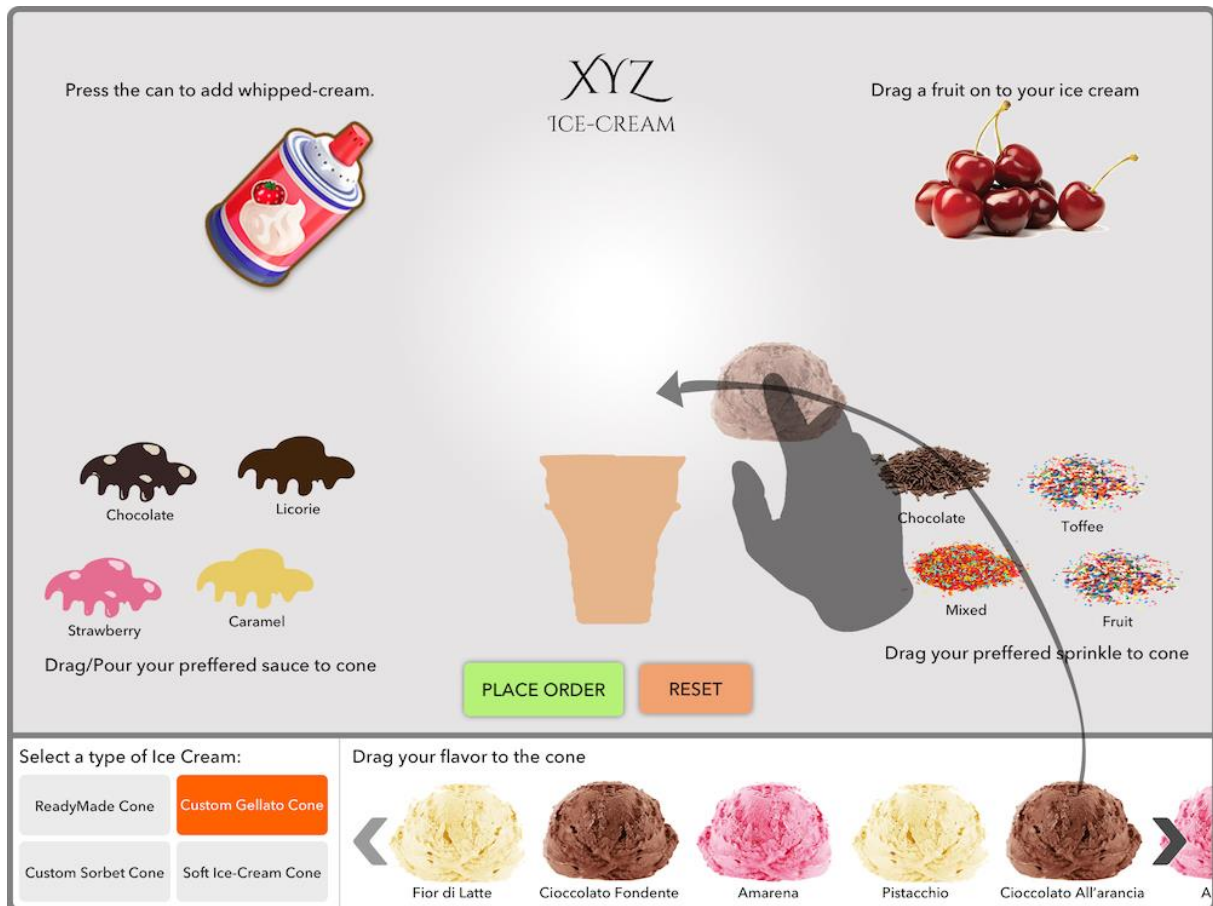


Figure 3: Manipulating GUI of System using touch.

We created a graphical interface which allows the customer to select the type of ice-cream they prefer by simply dragging the preferred options of flavours and toppings as shown in Figure 3. The system changes the offerings based on selected ice-cream type. For example, the flavours for a soft ice-cream cone are different from flavours for a gelato cone. The customer always knows which type is selected due to the change of colour in the left menu.

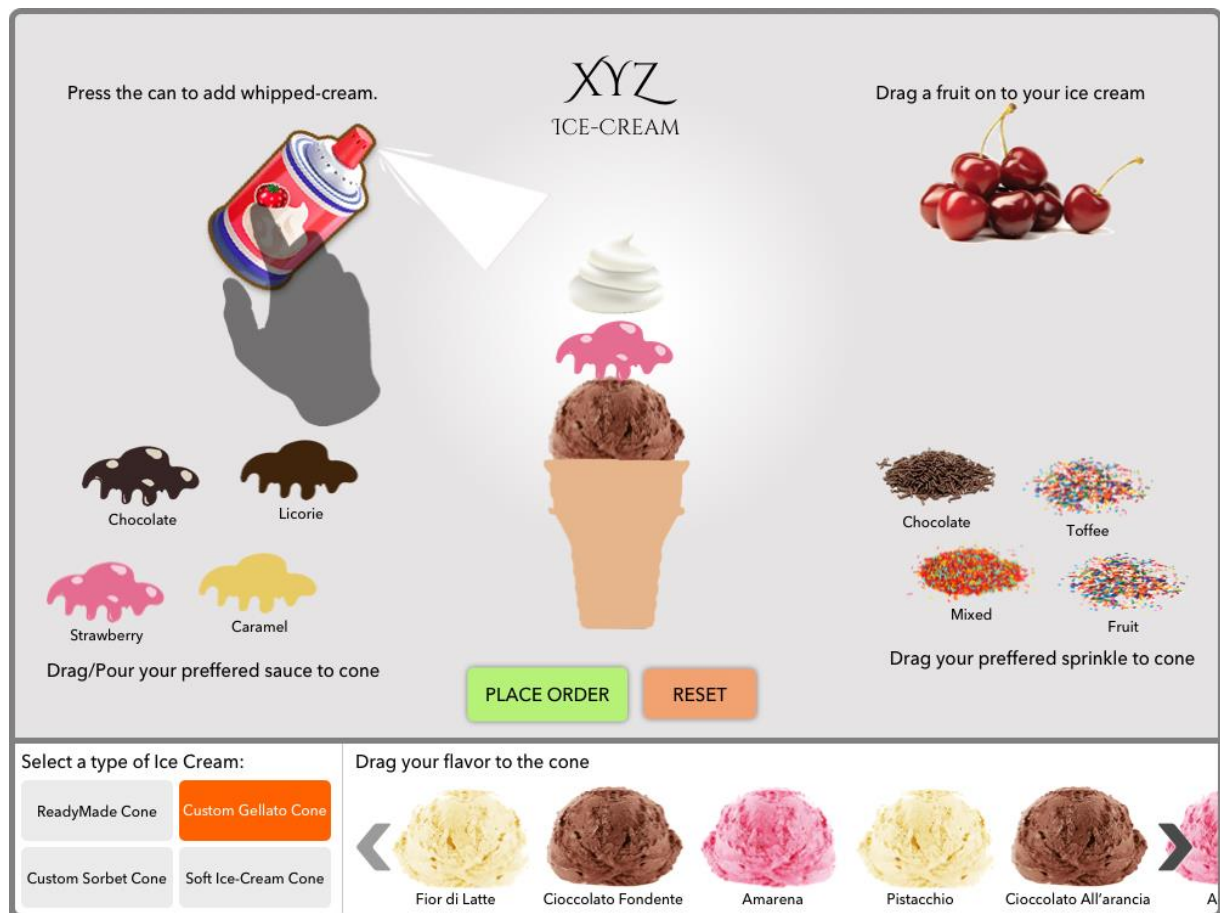


Figure 4: Manipulated GUI of System. User has selected the preference from Gellato section.

As the customer is deciding among the offerings, the current selection can always be seen/verified via the cone silhouette always showing the current combination. This is shown in Figure 4.

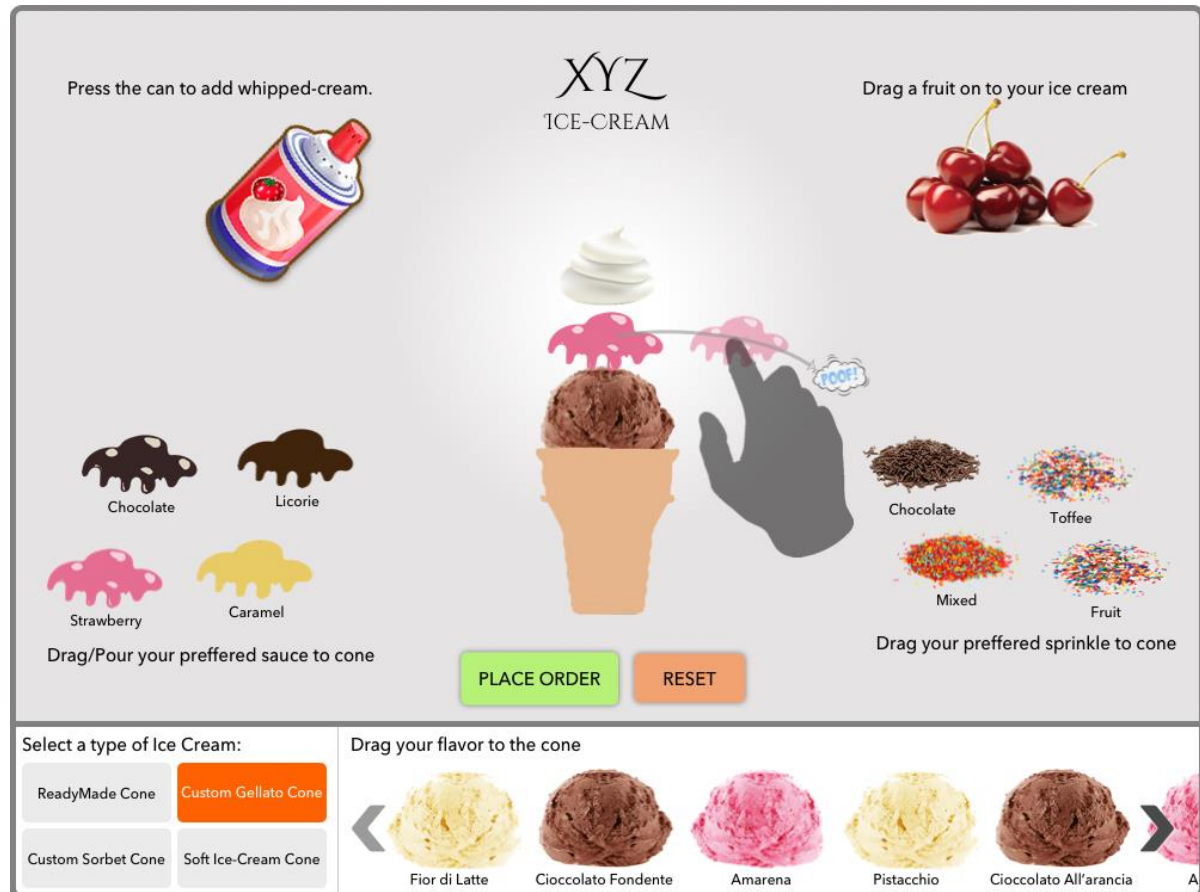


Figure 5: Removing selected option from System using touch.

Since toppings are optional, the user always has an option to select none of the Sprinkles, Sauces, Cream and Fruit. Once the customer is satisfied with their current selection/combination, they can click on the green button in the bottom right labelled "PLACE ORDER" to proceed to checkout.

The orange button in the bottom right labelled "RESET" can be used to clear all selections and revert the system into default mode for reselection or the next customer. This function is useful if the customer completely changed their mind. If the customer only wants to change a few things they can simply undo their choices by dragging and dropping. This is of importance since quick, reversible operations is a criteria for direct manipulation, which allows the customer to easily recover from mistakes (Benyon, 2014, pp.258).

5 Exercise 4

5.1 Problem

“Create a form (like a paper form) for pre-ordering of many portions (perhaps the ice-cream for an entire school on a field trip, or a big party or something like that). The form should contain information about the person ordering, the paying customer, delivery address, time, etc. AND the actual ice creams.” (Assignment 1b, n.d.)

5.2 Solution

In our form, shown in Figure 6 (next page), all offerings are mentioned at the top of the form allowing customers to know all the options available. We thought this was a good way for the customer to get a structured overview of their choices and at the same minimize the number of boxes they have to fill in/tick for everything they want or don't want to order.

First, the customer must fill in details about himself/herself and details about the delivery to be made. This is done using text-based input fields of appropriate length allowing the customer to enter text like name and address in fields. The form constraints both customer and server as only a limited amount and type of data can be inputted and thus collected.

Next, the customer must fill-in the selection table for respective kinds of ice-cream, Custom or Standard. Standard ice-creams support no customisations, the customer only needs to type the name of ice-cream and mention the quantity to be delivered. Multiple rows allow for different types of ice-cream to be ordered.

Custom Ice-Creams, for the purpose of delivery, have been limited to box container, as it might be cumbersome to deliver open cones and beakers. Thus, these ice-creams have associated customisations including size of the box (Quantity in Litres) and toppings like sprinkles, sauce, cream and fruit. Since there are multiple types of sprinkles and sauces, the customer must type-in the selection. As for the cream and fruit, customer may only tick the appropriate box as the options are just YES or NO.

At the end, the customer is asked about mode of payment (in checkbox format) before turning in the form.

We utilize the Gestalt law of proximity to group the flavours, ice-cream types, payment information and delivery information into separate categories, which is done by using blank spaces and boxes (Benyon, 2014, pp.271). This creates a contrast between the different information on the form. It is for example clear to the user where they are supposed to write down their payment information and where they should write down their orders.

COMPANY NAME AND TAGLINE					
Standard Ice-creams <ul style="list-style-type: none"> • Popsicle: Magnum Infinity Choklad & Kola, Magnum Double Caramel, Magnum Infinity Choklad, Magnum Chocolate & Nuts, Magnum Classic, Magnum Mandel, Magnum Strawberry White, Magnum Ghana, 88:an, Nogger Classic, Piggelin, Sandwich, Twister, Twister Fukt and Pärönsplitt. • Readymade Cones: Cornetto Enigma Choklad & Kola, Cornetto Enigma Cookie, Cornetto Enigma Vanilj & Hallon, Cornetto Classic, Cornetto Jordgubb, Dajmstrut, Dajmstrut Pear Dream, Tiptop and Tophat. 		Custom Ice-creams <ul style="list-style-type: none"> • Gellato: Cioccolato Fondente, Bacio, Cioccolato All'arancia, Pistacchio, Mandorla, Nocciola, Fior di Latte, Zabaione, Cocco, Caffè, Amarena. • Sorbetti: Fragola, Lampone, Limone, Mandarino, Melone, Albicocca, Frutti di Bosco, Pera, Pesca. • Soft Ice-cream: Vanilla, Chocolate and Strawberry. 		Custom Toppings <ul style="list-style-type: none"> • Sprinkles: Mixed, Chocolate, Fruit, Toffee, Licorice; • Sauces: Caramel, Chocolate, Licorice, Strawberry; • Whipped Cream; • Pickled Fruits (Cherries) 	
<hr/>					
Name		Avantika			
Delivery Address		Electrum Kista			
<hr/>					
Delivery Date		September 20		Delivery Time 5.00 pm	
Phone Number		0725673097		E-mail avantika@kth.se	
<hr/>					
Custom Ice cream (box)					
Flavour	Box Size(L)	Sprinklers	Sauce	Whipped Cream	Fruits
Frogola	5	fruit	caramel	<input type="checkbox"/>	<input checked="" type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
Standard Ice cream					
Flavour	Quantity				
Mode of Payment <input type="checkbox"/> Cash <input type="checkbox"/> Card <input type="checkbox"/> Online (_____)					

Figure 6: Paper based Form collecting data about customer and selection of ice-creams.

6 Exercise 5

6.1 Problem

“Create a question answer dialogue for purchasing Gellato, with accessories.” (Assignment 1b, n.d.)

6.2 Solution

We developed a conversation bot (system) which can ask meaningful questions to the customer and the customer can reply with ease by either answering (typing) the name of their preference or the numerical representation. Based on the reply, the bot ask follow-up questions until the complete order is recorded and ready to serve.

In Figure 7 (next page), in the conversation, the bot is represented by letter B and customer is represented by letter C.

Since, the exercise demands a gellato Ice-cream only, we start by asking about the preferred flavour of the customer. There are 11 flavours of gelato and that is too many options for the customer to weigh in just to answer a simple question. To limit the options the customer is asked some questions about their preferences in order for the bot to rule out some flavours.

It is the information structure at the back-end which decides which question the bot will ask next, depending on the customer's previous replies. For example, if the customer chooses to reply with “No” to the question “Would you like to have some toppings?”, the bot will skip the next 4 questions and directly ask customer if they are satisfied with their choice, i.e without toppings.

Although the question-answer dialogue is a slow process, it does not require the user to learn any new languages (compared to command languages) or more complicated graphical interfaces. By offering the user a numerical representation they can rely on their recognition instead of needing to recall the flavour's name, which also decreases the risk misspelling (Benyon, 2014, pp.273-274).

B: Thank you for choosing XYZ Ice-creams. You have chosen Gellato as your option. You can reply with "Quit" at any time to exit from the conversation or "Reset" to start from the beginning. Now please answer some questions so we can find the perfect flavors for you.

Do you like chocolatey ice-cream? (Reply with "Yes" or "No")

C: Yes

B: Do you like nutty ice-cream? (Reply with "Yes" or "No")

C: No

B: Do you like fruity ice-cream? (Reply with "Yes" or "No")

C: No

B: Here are some flavors you might like based on your preferences. Which one would you like? (Reply with number 1-5)

1. Cioccolato Fondente
2. Cioccolato All'arancia
3. Fior di Latte
4. Zabaione
5. Caffè

C: 3

B: You have chosen Fior de latte flavour. How would you like it served in? (Reply with number 1-3)

1. Cone
2. Beaker
3. Box

C: 2

B: Would you like to have some toppings on your Pistacchio Breaker? (Reply with "Yes" or "No")

C: Yes

B: Which type of sprinkles would you prefer? (Reply with number 1-6 or "none")

1. Mixed
2. Chocolate
3. Fruit
4. Toffee
5. Licorice
6. None

C: 1

B: Which sauce to pour on it? (Reply with number 1-6 or "none")

1. Caramel
2. Chocolate
3. Licorice
4. Strawberry
5. None

C: None

B: Would you like some Whipped cream on top? (Reply with "Yes" or "No")

C: Yes

B: Would you like a cherry on top? (Reply with "Yes" or "No")

C: No

B: Great Choice! Please check and confirm if your choice is done. Gellato Pistacchio Ice-cream in a beaker with toppings: mixed sprinkles and whipped cream? (Reply with "Yes" or "No")

C: Yes.

B: How would you like to do the payment? (Reply with "Cash" or "Card")

C: Cash

B: Thank you so much for shopping with us. Hope you enjoy your ice-cream!

Figure 7: Question-Answer Conversation between System Bot and Customer for Gellato Ice Cream.

7 Conclusion

We as a group were given five exercises corresponding to one system of an autonomous ice-cream selling robot. Each exercise represented a different style of interaction.

Exercise 1 focused on Menu interaction (Benyon, 2014, pp.261-263), we categorised all available data under specific categories and decided the flow of the interface using an Information Structure.

Exercise 2 focused on Command interaction. We created a simple command-line language to interact with system which can be used at back-end by technician and likes to service and update the system.

Exercise 3 focused on Direct Manipulation interaction. We created a graphical user interface for a customer to see and interact with. The customer at any time choose any type of ice-cream and customise the choice by manipulating the interface via touch gestures. Every interaction is undoable and each interaction is visible throughout. At any given time, customer can reset or submit the order too.

Exercise 4 focused on Form Filling interaction. We were limited to paper-based form, so we devised a form which displays all required information together on top from which the user can decide from. The length of fields, types of fields (text or checkbox) and number of rows (of fields) allows user to easily fill the form.

Exercise 5 focussed on Question-Answer interaction. We formulated a mock-conversation between the system bot and the customer where the customer must answer the questions asked by bot in order to prepare an ice-cream. The bot adapts to the customer's previous answers and presents more appropriate and interactive questions, thus making interaction smoother.

8 Reference

Assignment 1b. (n.d.). Retrieved from KTH Instructure:

<https://kth.instructure.com/courses/3070/assignments/9920>

Benyon, D. (2014). Designing Interactive Systems. United Kingdom: Pearson.

9 Appendix

9.1 Peer Review for Group 12 - IC1007 HT17-1 Human-computer Interaction: Principles and Design - Assignment 1B

On a general note, other than some of the general documentation rules being followed, a few things are a miss:

1. Missing an introduction and conclusion for the report.
2. Missing Heading for Table of Content, and completely missing the Table of Figure.

9.1.1 Exercise 1

1. The design of the customer GUI has been organized in a good way and the graphical representation is clear.
2. The design is well described but the design choices are not motivated. For the highest grade the design choices need to be well grounded in the course literature.
3. There is an additional form/container called “cup”, not mentioned in options.
4. Under the group 1 (form) “Popsicle” and “Ready-Made Cone”, the flavours are placed in group 2 (type) rather than group 3 (flavor).
5. In the categorisation chart, it is unclear what the column between Group 3 and Group Properties represent.

9.1.2 Exercise 2

1. The technical interface uses a Unix-based command-line system called CRUD, which covers most of the required interactions.
2. There is an error in the 3rd sample where the directory does not change after the “enter gellato” command. The response of the bot/system to command “properties” should also be shown.

9.1.3 Exercise 3

1. Missing the problem statement from report.
2. The current system is an interactive system which has place-holder cone in centre. The ice-cream flavours and toppings are available in the bottom and left (scrollable) panels respectively as menu options. Attributes can be dragged on to the cone to add to current customisation. On the right panel, the current selection is shown. To remove any selection or to confirm the order, user needs to swipe in the area.
3. The solution suggest the cone can hold more than 1 flavor, but a maximum limit isn't mentioned.
4. The horizontal panel, as per our understanding, contains all the flavours from 4 categories of ice-cream (readymade, gellato, sorbetti, soft-cream), leading to 31 flavours to choose from. Some flavours share the same name and other properties and it is unwise to make the user go through all of them. It would be more fitting if there was some sort of filter to categorise the flavor, shown if figure 1 (below).
5. The vertical panel contains all toppings, again uncategorized, making the user scroll through to find the right type. The suggestion is similar to figure 1, to categorise the toppings by tabs.
6. Also, since all toppings are readily available, it suggests that user can add multiple toppings of similar nature like all 4 kinds of sauce to the mix. Again, an upper limit is required.
7. Due to unavailability of a screenshot in a different scenario, it is unclear how the flavours and toppings will be placed on the place-holder cone, or if it is possible for the user to drag the selected flavor/topping from the cone to outside area to deselect the flavor/topping.
8. The model can be improved by having an option to start-over or reset if user feels the current complex combination isn't something that he/she desires.

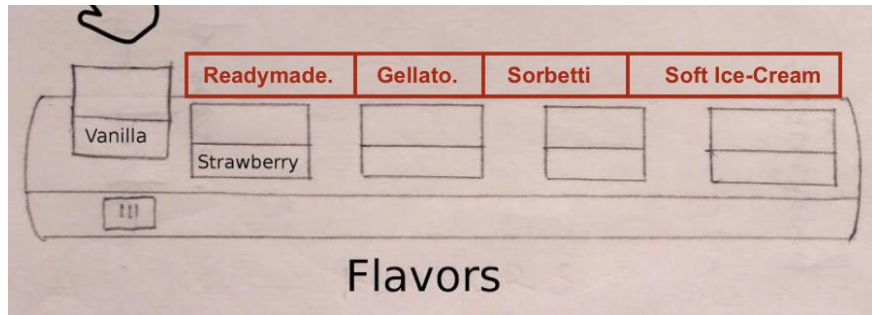


Figure 8: Suggestion for improve interface for selecting flavours.

9.1.4 Exercise 4

1. Missing the problem statement.
2. Making use of google form was clever and easy. Good choice! Additional option for “Pick-up” is a nice touch but doesn’t support the problem.
3. The form does not ask customer for “Delivery Time”
4. Instead of 2 separate forms, they could have used a single form to make it easy for customers. If the customer wants both types of ice cream and they might prefer to have a single form in order not to have to repeat their personal information, etc.
5. In the order description of Form 1, the form fails to mention what kind of container options are available to choose from.
6. In the order description of Form 1, rather than starting with the flavour, one starts with choosing a container. A motivation for such design choices is missing.
7. In the order description of Form 1, the field widths are incomprehensible or too small for someone to write in. Only one type of topping is allowed on one ice-cream. However, It does not specify the type or flavour to be put if the customer wants whipped cream or fruit (cherry).
8. In the order description of Form 1, the column to choose size of box is too wide. The supporting text could have appeared as footnote or the column could have been merged with quantity.
9. In the order description of Form 2, the field for flavour name could’ve widened by reducing width of quantity column.
10. Mode of payment can also be mentioned in order for complete information.

9.1.5 Exercise 5

1. Missing the problem statement.
2. Starting dialogue was good and in scenario 1, the idea of using number rather than text for selection was good and less time consuming for the customers.
3. In scenario 2, it is difficult to comprehend that if the bot can understand human language fluently and decode the sentence to find the reply (gelato), as such capabilities are not showcased with any other question.
4. In scenario 2, reply to second question (“½”) is unclear.
5. In scenario 2, the options for toppings are unclear as it is not stated that whether the topping is a sauce or sprinkles.
6. It would nicer to confirm the final order with the customer before placing the order.
7. Mode of payment can also be mentioned in order to complete checkout.