

Design patterns in products

Siddharth Patil (02613802)

Guide : Prof. A. Joshi

Extensions of pattern language:

- The connection of pattern languages can be shown across the different fields.
- The concepts used in software user interface like wizards, menu items, popup menus, combo boxes have some ideas behind them which were in existence and in use from long time before their use in soft wares.
- Many principles which hold true in the field of control panels(of cars, power plants), consumer electronics, book design etc are directly applicable to software field and so as the patterns behind them.
- The patterns in one areas can be extended to other areas.

Focus of project:

- Find out the possibility of developing a pattern language in products.
- The patterns if found can be converted into a language and can prove helpful for designing the products to be more usable and convenient.
- For the initial stage, only a category of products is taken into considerations for this effort. i.e. products in public domain.
- The public domain products are selected as these products are more specifically governed by function compared to the category of personal products which may be more subjective and are ruled by personal choices, market stimuli and manufacturer's efforts/convenience.

sitting



communication



Time keeping



Personal products

- Personal products :
Products which are meant for personal use,for a single person. The products like toothbrush, mobile phone, wristwatch fall into this category.



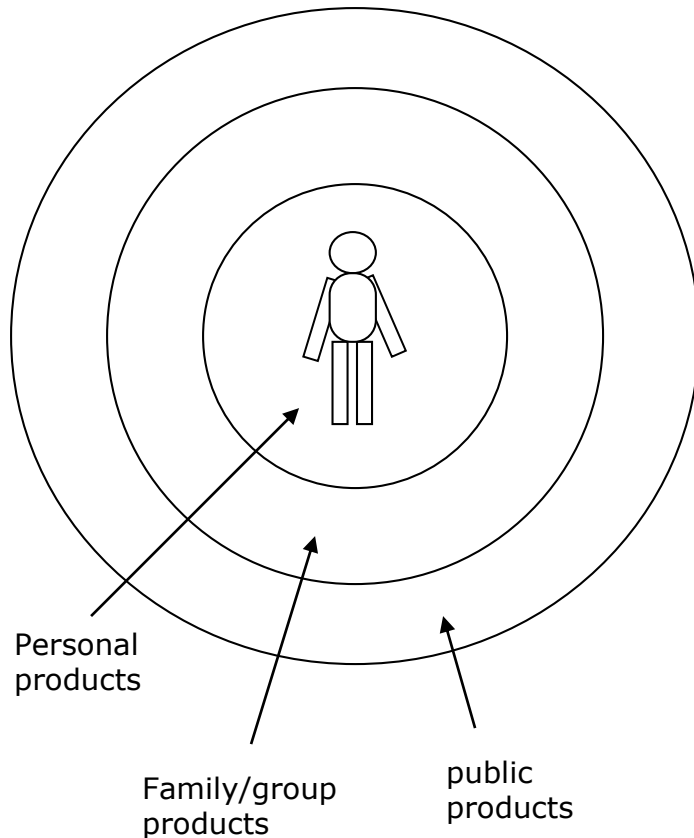
group products

- Family or group products : Products which are used by more than one person like a car, a sofa set, a refrigerator which are used by a group of people come under this category.



Public products

- Public products : Products which serve a large category of people with no one having authority on them will fall in public products category. The local trains, stadiums ,theaters , pay phones etc products fall in this category.



The model for these products can be further built on the way these products are purchased or owned.

- In personal products the decision of purchasing the product does not depend on any other person. The choice is done by the person without any reasoning and the decision is taken solely by himself or his concerned.
- In family products the decision of purchasing is done by the head and/or collectively by the family. They are generally purchased by more than one's opinion. And the control on buying process is distributed among a small family(group).
- The products for which the person using it are not involved can be taken as public products. There is possibly no involvement of the user in purchasing decision. The budget etc decisions are not taken by the user directly.

There are some products which lie in the boundary regions according to the involvement of the user in decision process, like few office products.

Patterns in public products:

Here I have tried to come up with few patterns observed in public products.

- The patterns are not very refined and doesn't form a group or networks like Alexandrian patterns at this stage. But certainly they exhibit the possibility of developing a pattern language for products on similar lines.

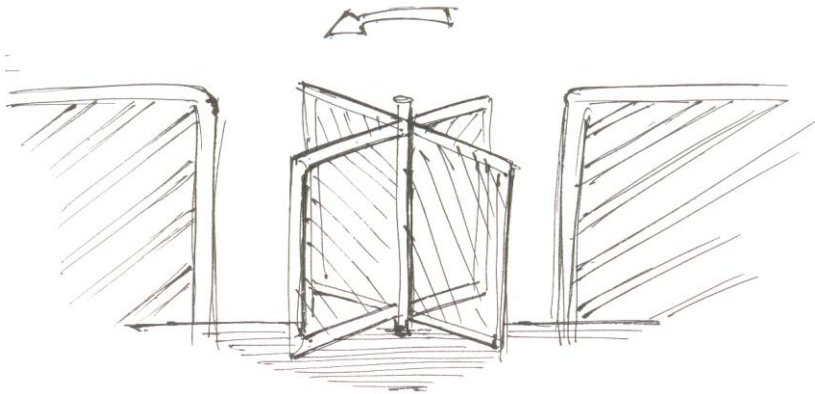
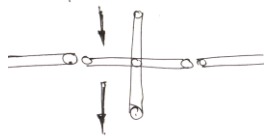
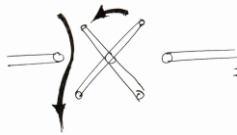
Pattern 1 : Off by default products

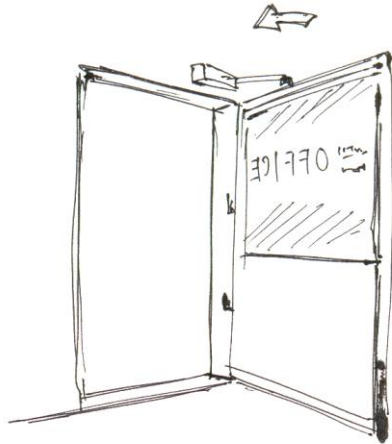
Public products which are not attended by anyone should be made to be OFF as their default stage.

Explanation :

- Publicly used products which are not taken care of by anyone can be non functional or less efficient because of careless handling.
- People at times can forget or be irresponsible to take care of the products which are used in common places.
- Sometimes the products can be wasteful if proper attention is not given towards them.

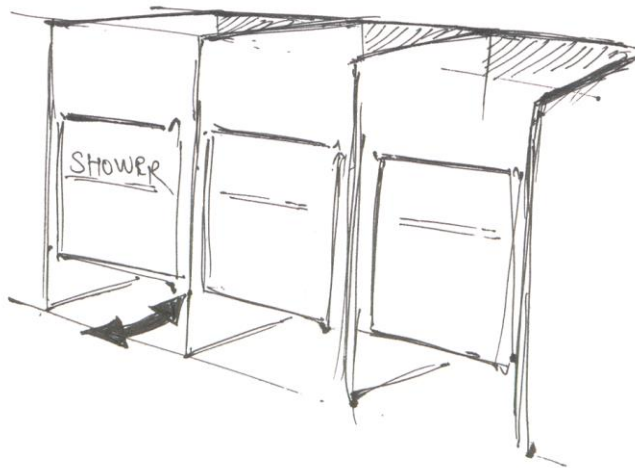
1) The circular gates which are used against a small entry. After using it for once, the gate becomes close at its default position. Thus nobody is required to close the gate after using it. This gives an efficient solution to publicly used unattended small entry spaces.





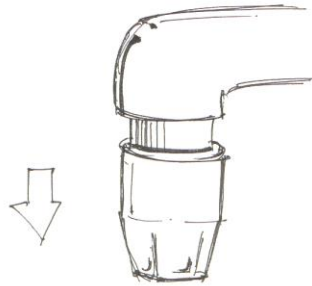
2) The doors of public places like banks, offices, theaters etc are more efficient if they are supplemented with auto close feature. The places which are not attended by guards are often seen to have this feature. Air conditioned places are often observed with auto close doors.

- bank/office doors
- Public toilet doors
- doors at theaters, airport



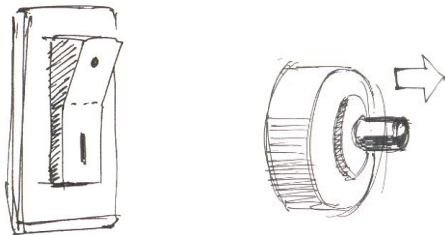
3) The taps which are made to be off by default are more efficient and avoid wastage in public usage compared to normal ON-OFF taps. The ON-OFF taps are often left unclosed, half open in public places.

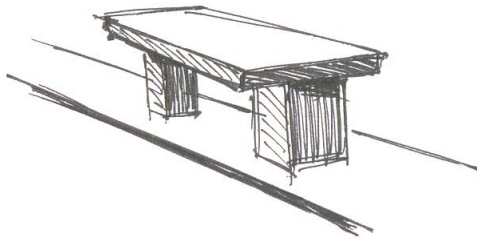
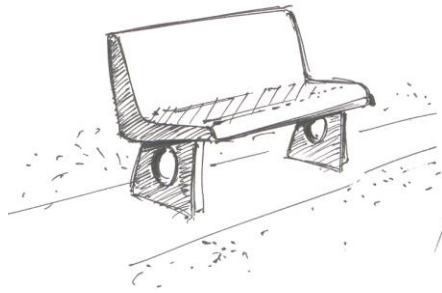
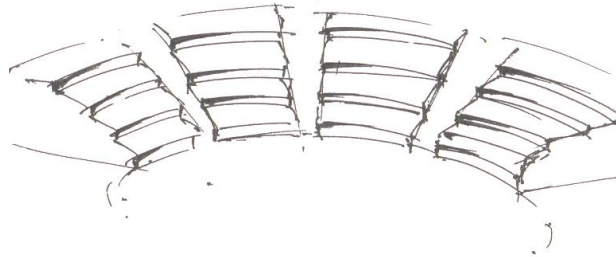
These by default OFF taps are adopted at different places like railway platforms, theaters, and schools where people are in hurry and/or can forget/be irresponsible to close the tap after using it. These taps may be little uncomfortable for using but still it's a good solution to avoid wastage due to irresponsible behavior.



4) The switches, or on off devices (controls) accessible to public are made to be OFF by default.

Cigarette lighter in pan shops, canteens.





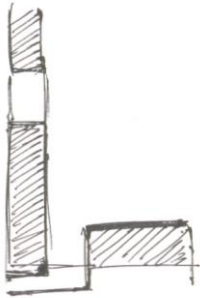
Pattern 2: One state products

Products which can be used in their default stage without any change are more suitable and feasible in public domain. Whenever possible public products should be made to be used in default stage.

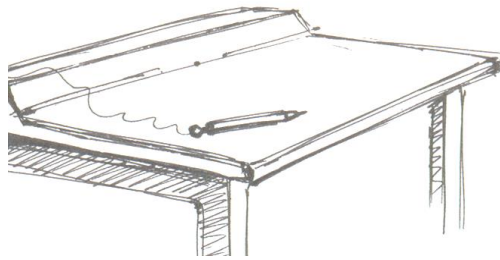
Explanation :

- Some products are designed in such a way that they will be used by people without any change in their state.
- These products perform well in public context.
- The interaction with the user is minimum with minimum complexity of interaction. The products which are not supposed to interact are more convenient for use and easy to maintain.

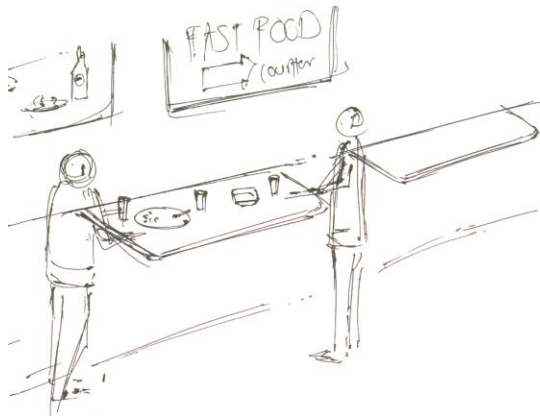
1) Sitting in public places like park benches, stadium seating etc are fixed and rigid. They don't change or cannot be changed in any way throughout the use of the product. Their positions, place, direction can not be changed. And they may not be much comfortable but they provide a good and feasible option for public sitting. The sitting arrangements in local trains is another example.



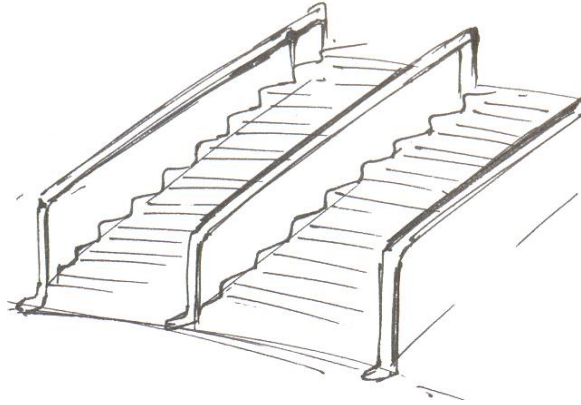
2) The public urinals which are made to be used without water don't require any interaction by the user for using it.



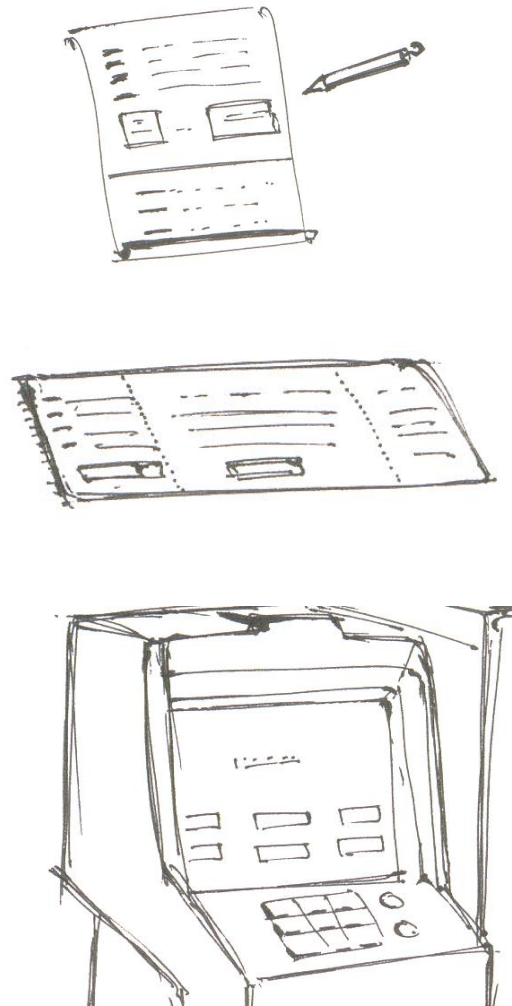
3) The writing pens tied with thread in banks, post offices are without any cap and can be used without interaction, opening etc.



4) The eating platforms (stand and eat) in fast food centers at station are convenient compared to pulling a chair at table.



4) The elevators used at crowded places compared to conventional lifts.



Pattern 3: Constraint controlled interaction

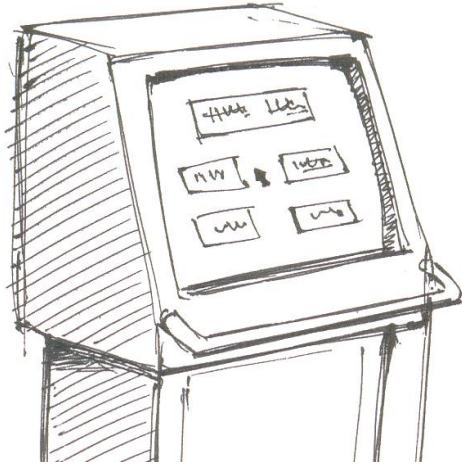
The constraint control approach for interactive products in public domain is better to reduce errors and avoid confusions. Only necessary options should be given to the users as and when required.

Explanation :

- More freedom can lead to more mistakes and errors in system.
- Users may be new or novice to the systems.
- User needs to know the options from which he will be able to decide and select best suitable option. but at the same time user can get bewildered by the huge no of options.
- By providing less freedom the number of possible mistakes can be reduced.

1) -In railway reservation forms the user has to input info with pen and he is free to write anything. Thus the chances of mistakes are more and it may create confusion in the user.

-Compared to that in screen and buttons type of interaction (like pay phone) the user has limited freedom and has less possibilities of errors (not null).



-The touch screen kind of interaction allows only limited option (whenever required) and has even less possibilities of error situation or confusion.

- The dynamic menus and drop boxes at websites changes the contains according to previous information given by users to reduce the possibility of errors.

Pattern 4 A: Authenticating users

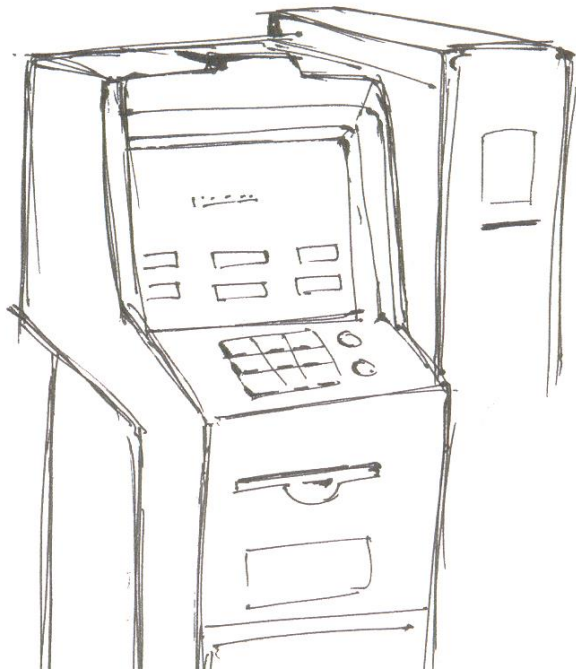
Interactive products offering services in public domain should first authenticate the user for eligibility and then interact to avoid unnecessary actions and confusion to user.

Explanation:

- To avoid unnecessary interaction and misuse of the products it is better to verify the user at first place.
- User may not be having the data to use the system. Thus asking for this data at first place will make the user aware of it at the starting of process only.
- Unknown users may not be sure about the interaction cause and method.
(in the change vending machine the user may not be interested if he knows that the service is paid one)
- But at the same time this approach restricts people from exploring and experimenting with the products to know and get used to them.

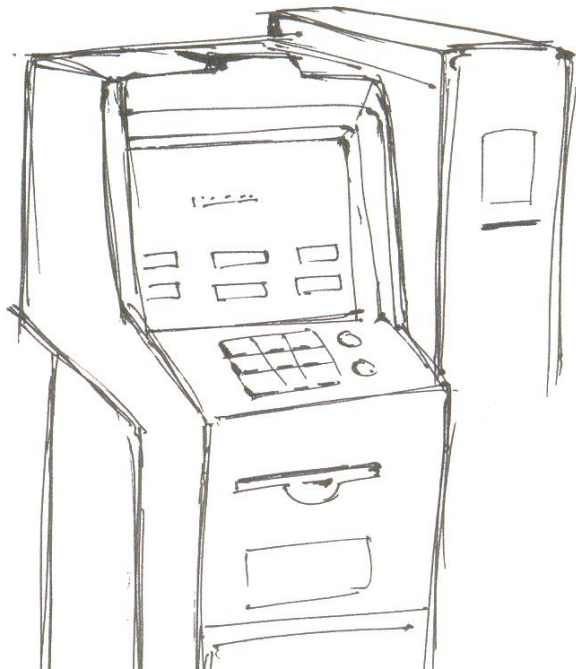
1) In pay phones the tone will start only after the coin is put in the box.(Earlier it used to allow the phone to get dialed before paying.)

2) In some websites registration process the credit card no is asked at the end of feeding all the information(which makes the user to quit the process)



3) In ATM's the user has to first authenticate himself with card and password before asking any other question.

4) In railway enquiry system the ticket number is asked at first place.



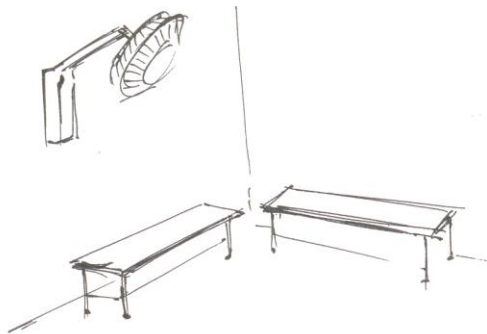
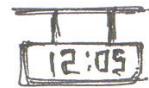
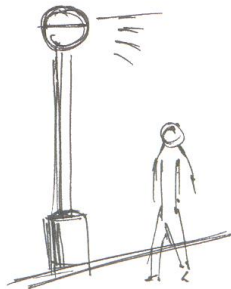
Pattern 4 B: Authenticating users

Public products should be kept safe and secure from unauthorized people by locking with different means.

Explanation:

- The protection from unauthorized people can be done in different ways.
- The physical lock and key is used in case of protection of letters in letterboxes.
- Passwords or non physical keys are used in case of websites.
- In case of ATM's there is combination of physical key (card) and non physical key (password).

the products which are protected with more than one methods are more secure. In the case of ATM's both the keys are required to break into the system, which makes it harder to breaking in.



Pattern 5: Out of reach products

Whenever possible the public products should be kept out of reach and inaccessible and still provide the services.

Explanation:

- Unnecessary interference with public active area is avoided by keeping the products as away as possible.
- Unnecessary interaction with the product should be avoided.
- People has at times attitude to tamper and fool around with products (vandalism) which should be taken care of.
- products in which there is no need of physical contact with user should be kept as away as possible.

1) The lights in common places are placed on height in such a way that they wont be accessible normally and still provide ample lighting . e.g. office lighting, local trains ,parks.

2) The public displays, signboards, platform clocks,direction boards etc are placed at heights.

3) In waiting rooms etc. the wall fans are preferred rather than table fans.

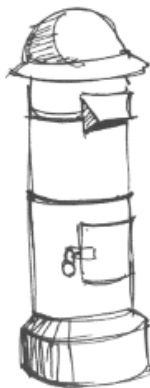
4) The voltage meters etc are always kept away from public reach.

Pattern 6: Separation of interfaces

Wherever possible in public products the interaction area and service area should be kept separate from each other.

Explanation:

- The public products are normally required to get serviced quite frequently. (the cash feed to ATM, coins taken out from payphone, change feed to the change vending m/c, letters collected from letterboxes.)
- To avoid the confusion and unnecessary interference and in some sense adopting a black box approach, the user area should be kept as much away from the service area.
- The user interaction area should be kept as much simplistic and clean as possible.



1) the letterbox has two openings. One for putting letters inside the box and other for collecting the letters.

2) the payphones have the coin collection box at the bottom and behind.

3) in ATM's, vending machines, the interaction area is kept as subdued, unnoticeable and separate from the interface area.

Pattern 7: Modes of communication

In interaction with products, the products should communicate with the user in more than one means but the user should be able to interact with product by lesser means.

Explanation:

The lesser the modes of communication with the product, less is the possibility of user getting confused and more is the comfort.

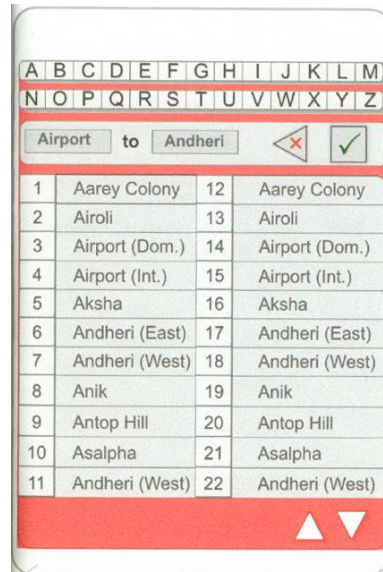
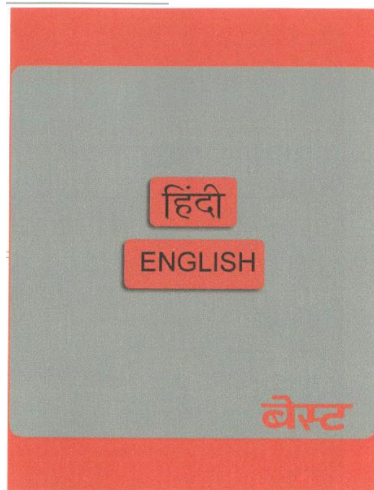
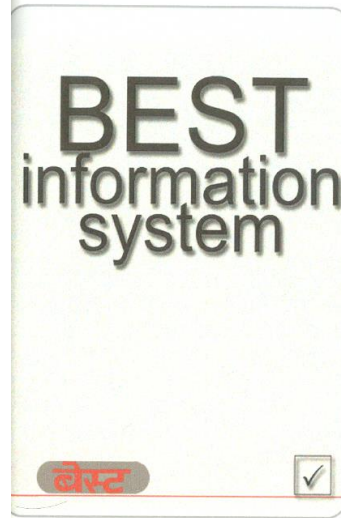
-In touch screen interaction, the user is interacting with the screen for both watching and selecting options. Compared to ATM kind of interaction, where user has to see the output on screen and press the buttons which are away from the screen.

-The touch screen removes function of keyboard and mouse and simplifies the interaction.

The more the modes of communication from the machine to the user, better are the chances of communication.

-Some phones interact with the user by giving light signals, sound signals in conjunction with tactile signals. This way the understanding of the happening is better for the user.

-The weighing machine on railway platforms uses sounds and light variations to communicate the result of action.



Pattern 1 : Off by default products

Public products which are not attended by anyone should be made to be OFF as their default stage.

Pattern 2: One state products

Products which can be used in their default stage without any change are more suitable and feasible in public domain. Whenever possible public products should be made to be used in default stage.

Pattern 3: Constraint controlled interaction

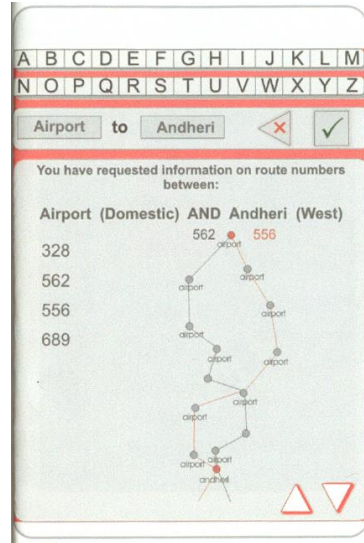
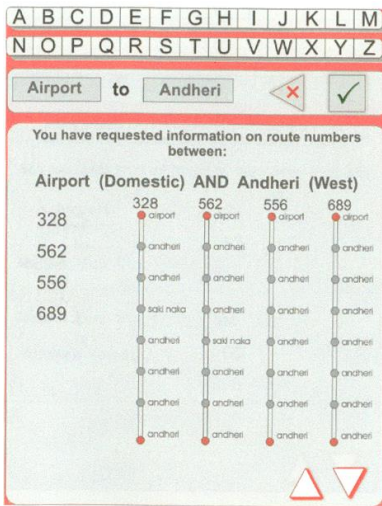
The constraint control approach for interactive products in public domain is better to reduce errors and avoid confusions. Only necessary options should be given to the users as and when required.

Pattern 4 A: Authenticating users

Interactive products offering services in public domain should first authenticate the user for eligibility and then interact to avoid unnecessary actions and confusion to user.

Pattern 4 B: Authenticating users

Public products should be kept safe and secure from unauthorized people by locking with different means.



Pattern 5: Out of reach products

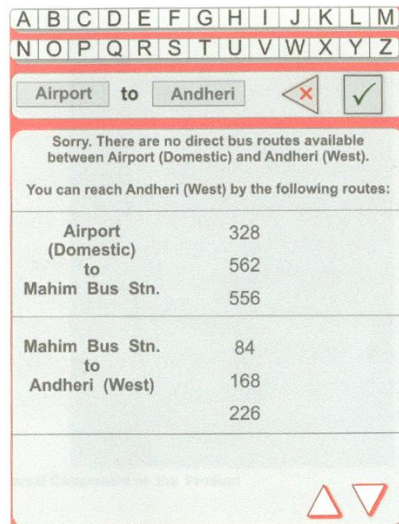
Whenever possible the public products should be kept out of reach and inaccessible and still provide the services.

Pattern 6: Separation of interfaces

Wherever possible in public products the interaction area and service area should be kept separate from each other.

Pattern 7: Modes of communication

In interaction with products, the products should communicate with the user in more than one means but the user should be able to interact with product by lesser means.



Conclusion:

-The patterns found out in public domain can be used to make a particular product more public or more personal oriented.

-It is possible to evaluate some specific public products based on the patterns identified. Though the full fledge set of patterns is not developed and the interconnection does not exists, some suggestions can be definitely derived from the pattern set.

- It is possible to come up with a pattern language similar to Alexandrian patterns for products as a whole or for a category.

Thank you.