

Sketch Diary

Group 6: Ramkiran Chevendra, Shreyas Kulkarni, Sudipta Laha, Hai Thanh Tran, Ja Eun Yu

Iteration 1

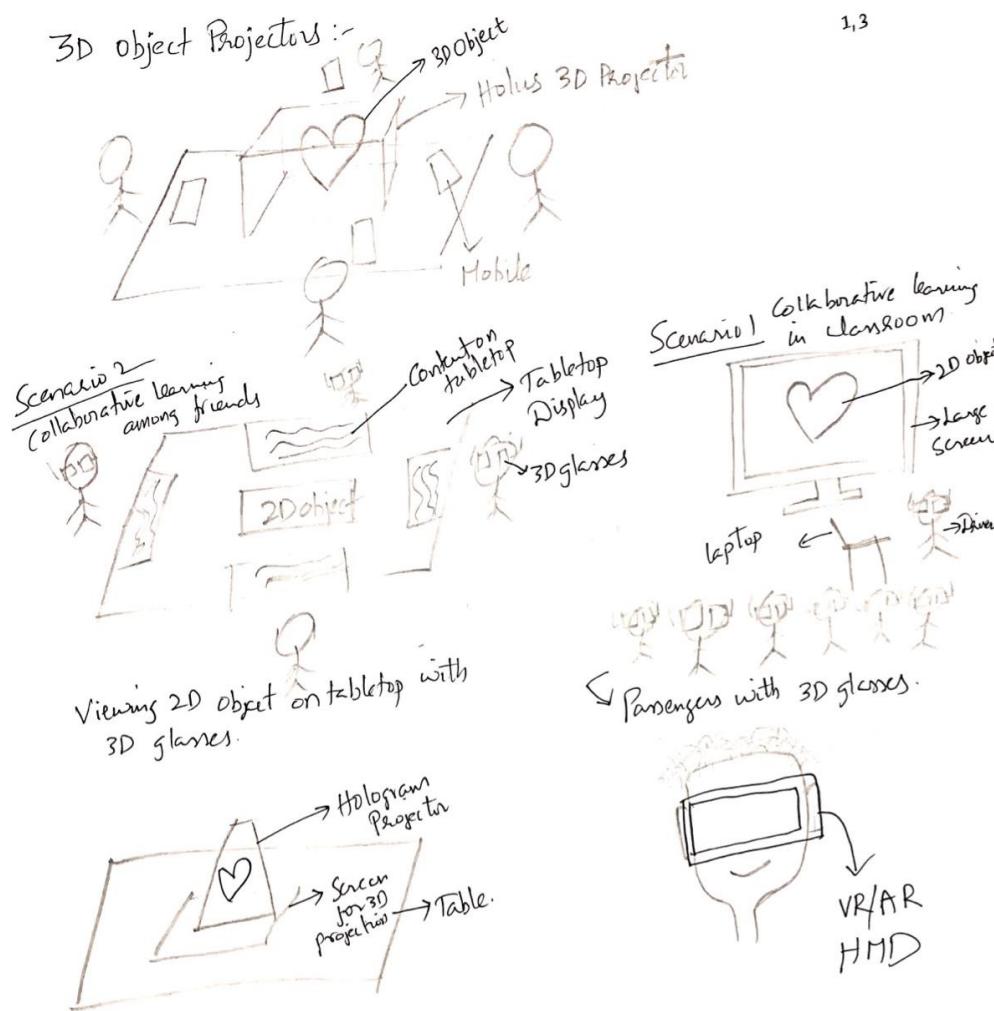
Design Challenges in Iteration 1:

1. How to display a 3D object to a group of learners.
2. How will the system allow learners to see an individual view of the content and a shared view of the content being discussed.
3. How to interact with the 3D object (Hardware to use and Rotation and Zooming).

Sketches:

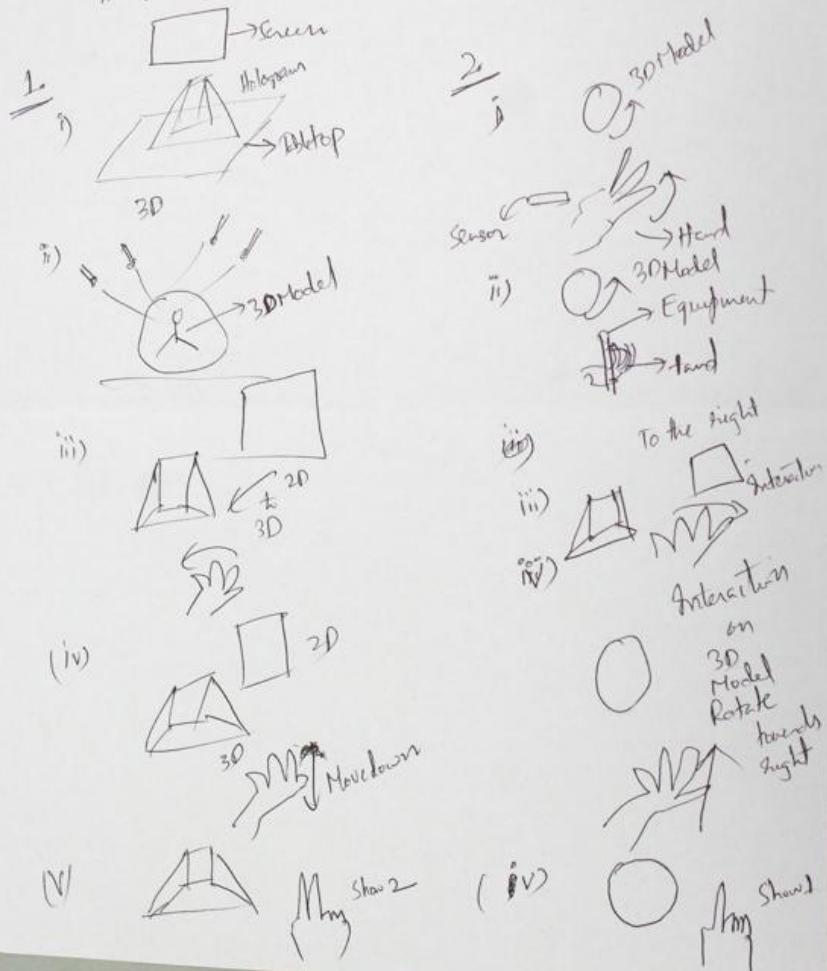
Ramkiran:

Sketches for Design Challenge 1 and 2:

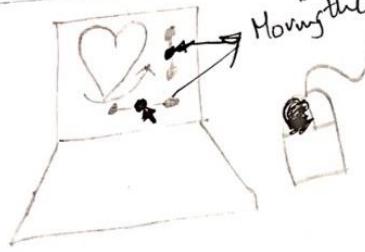
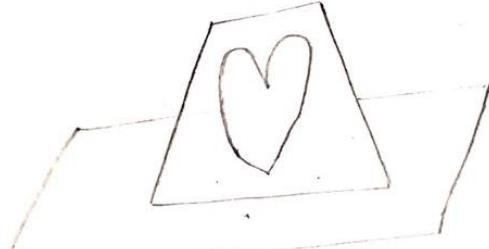


Collaborative learning

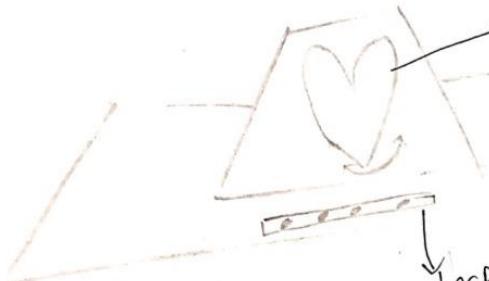
1. How to generate 3D
2. Interact with it. (rotation)



Sketches for Design Challenge 3:



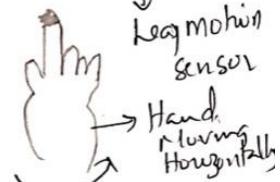
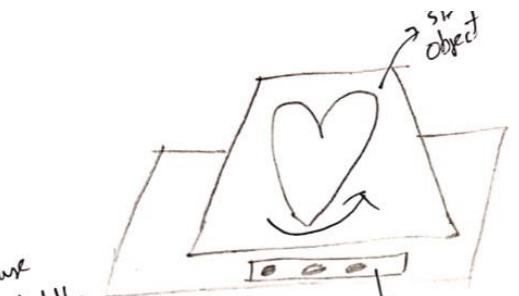
Moving the cursor using Mouse device in horizontally & vertically



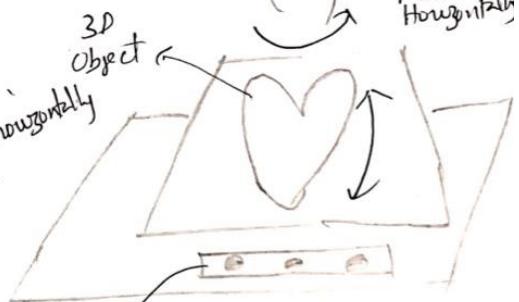
3D object continues to rotate horizontally at slow pace until a hand is shown



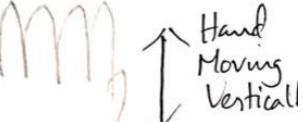
Hand is shown
the image stops from rotating horizontally



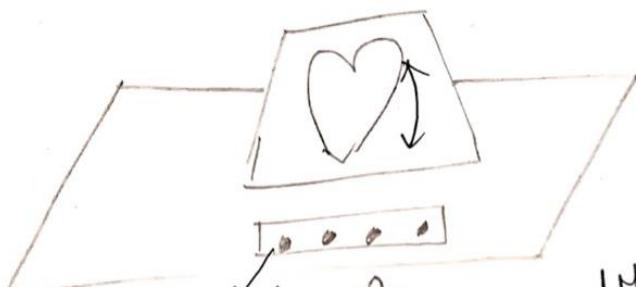
Hand moving Horizontally



Leap Motion Sensor



Hand Moving Vertical



Leap Motion Sensor



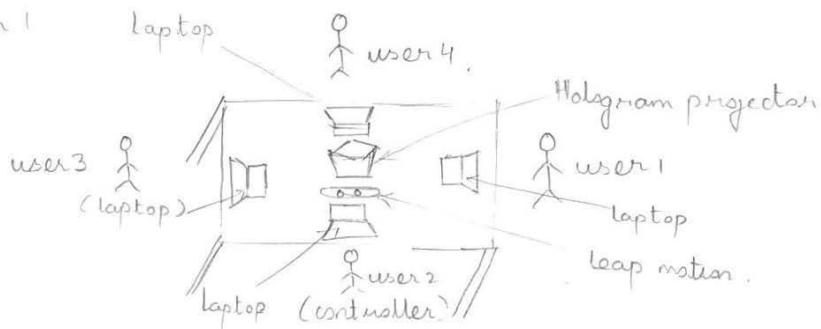
Upward Movement will initiate the image to rotate vertically until the hand is shown

Shreyas:

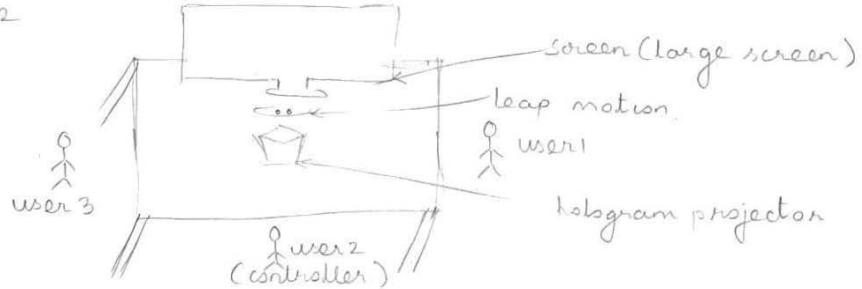
Sketches for Design Challenge 1 and 2:

1) How the users will sit around the system.

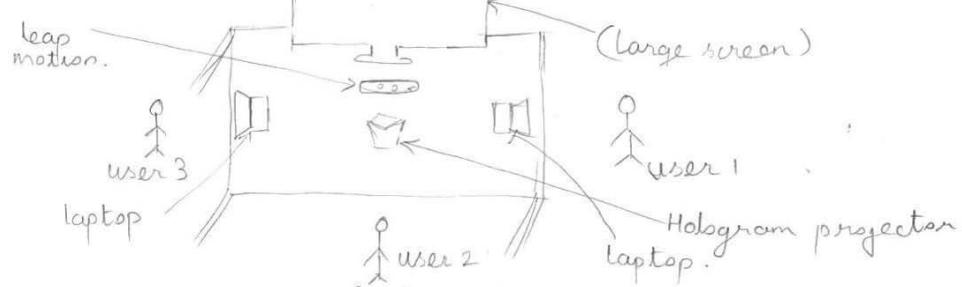
Sketch 1



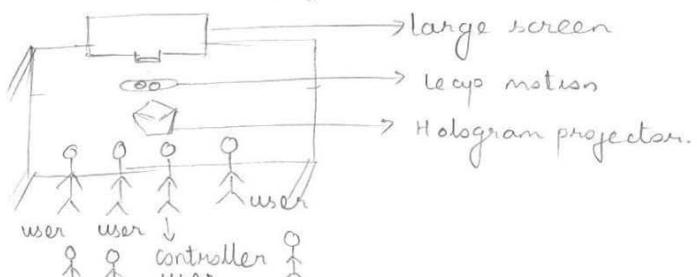
Sketch 2



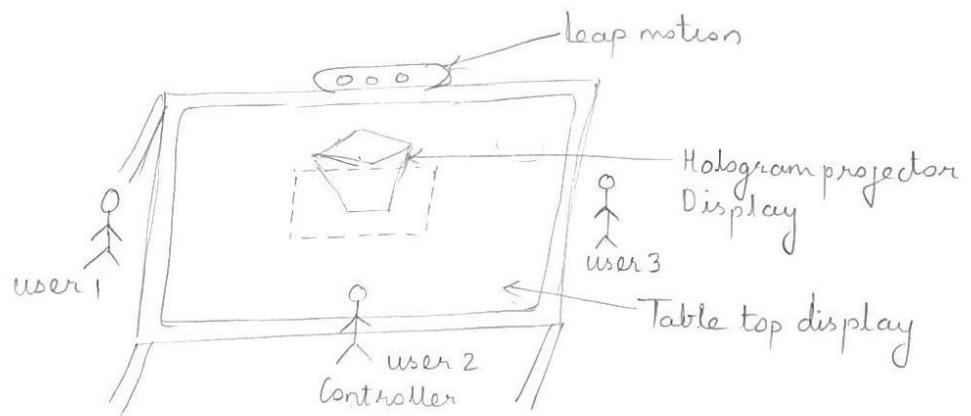
Sketch 3



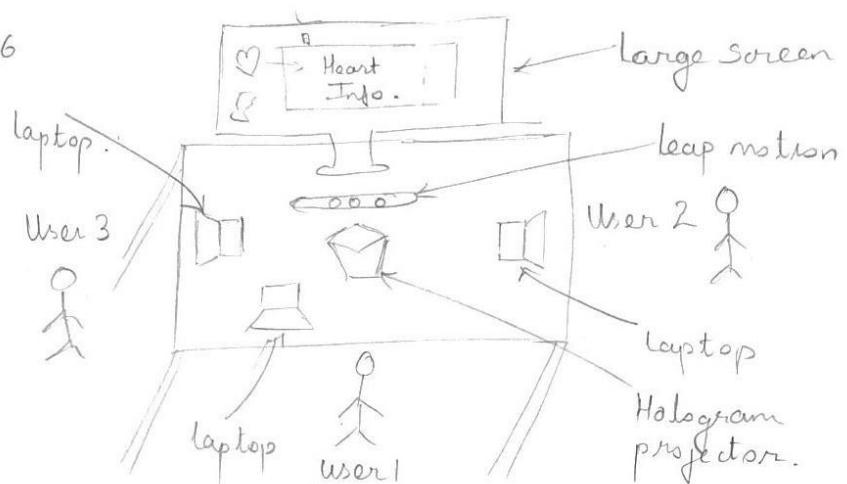
Sketch 4



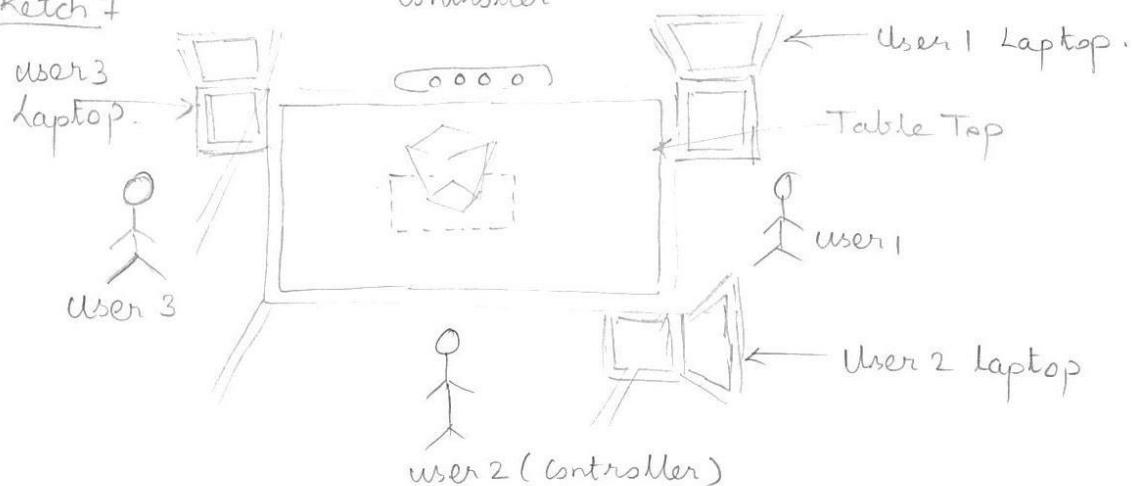
Sketch 5



Sketch 6

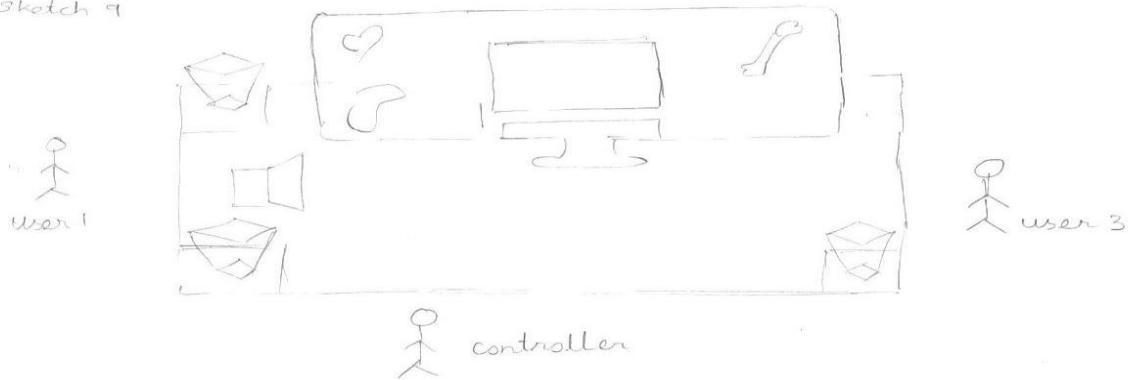


Sketch 7



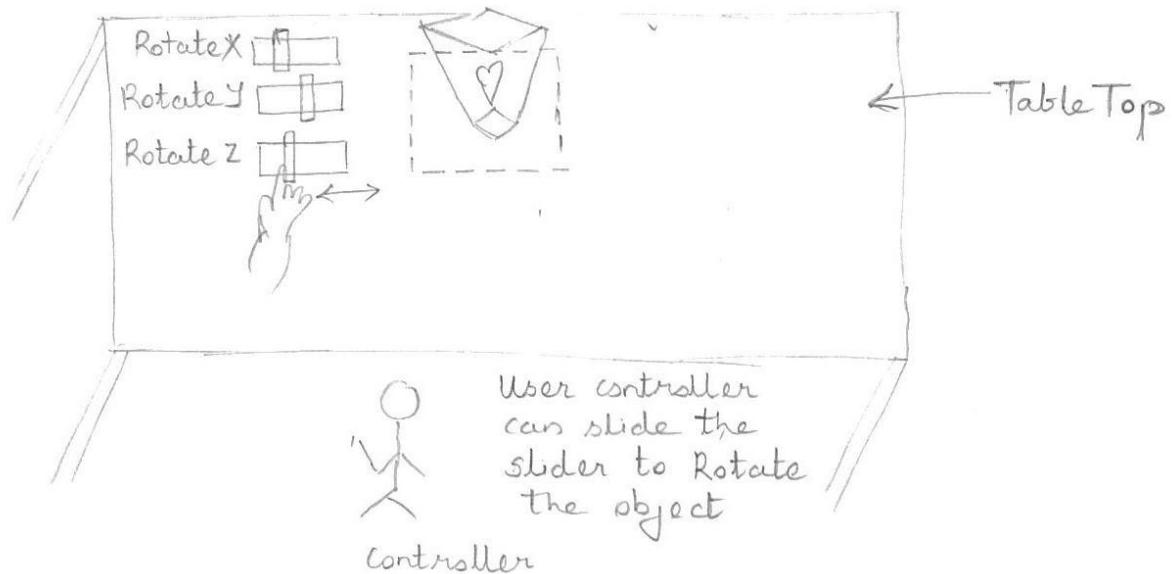


Sketch 9

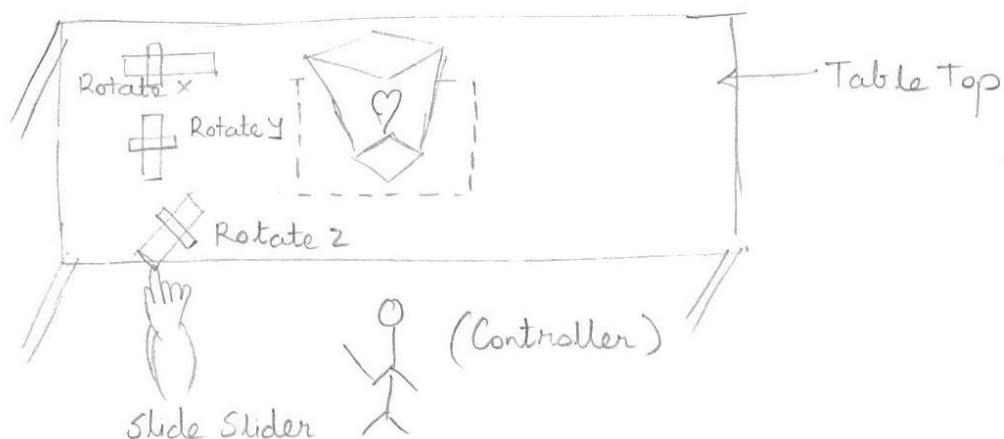


Sketches For Design Challenge 3:

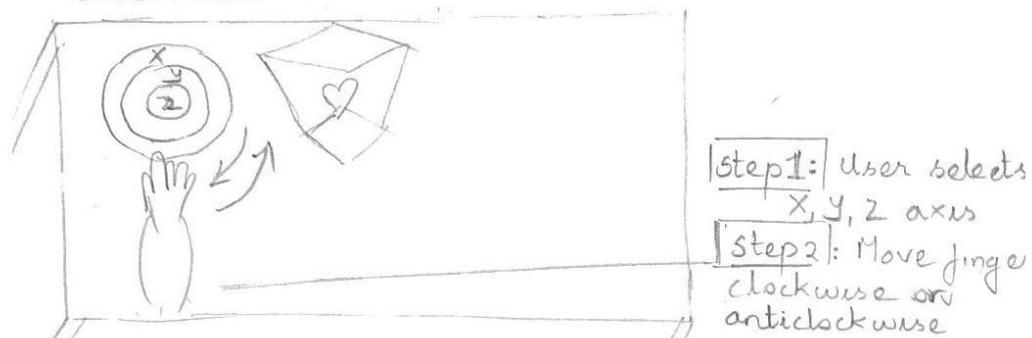
Sketch 6



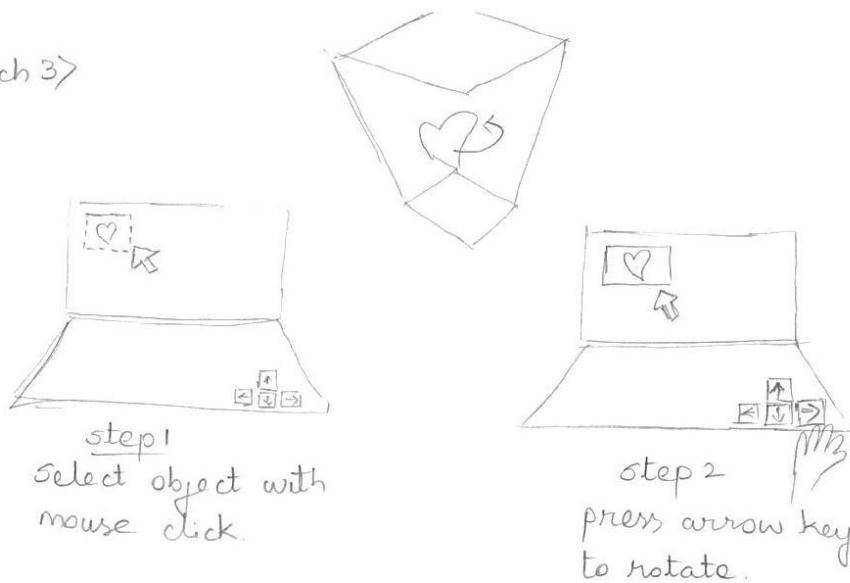
Sketch 7



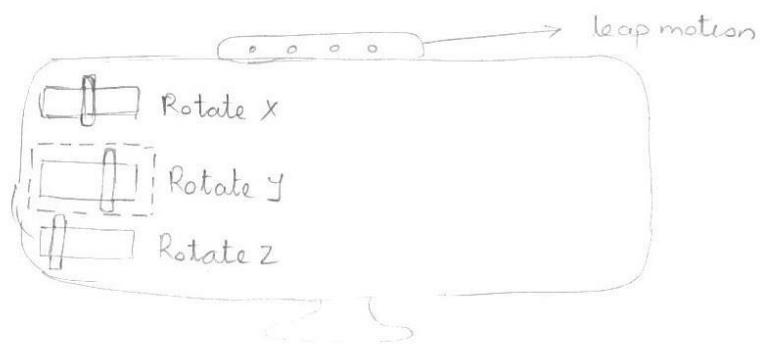
Sketch 8:



Sketch 3>

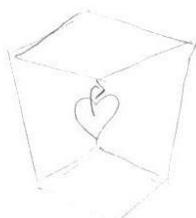


Sketch 4>

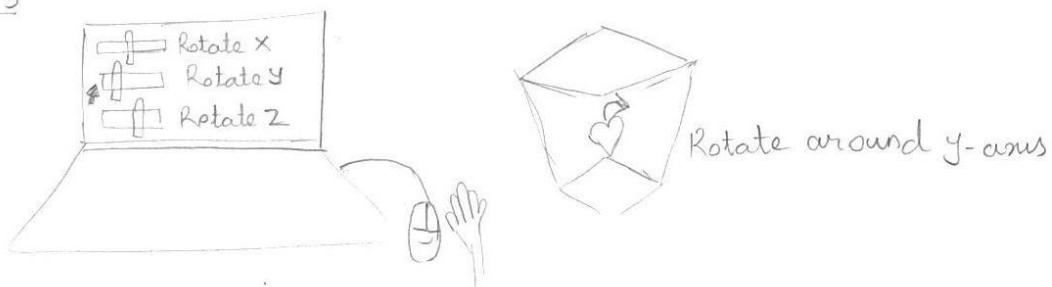


Selected Rotate 'Y'

Move slider



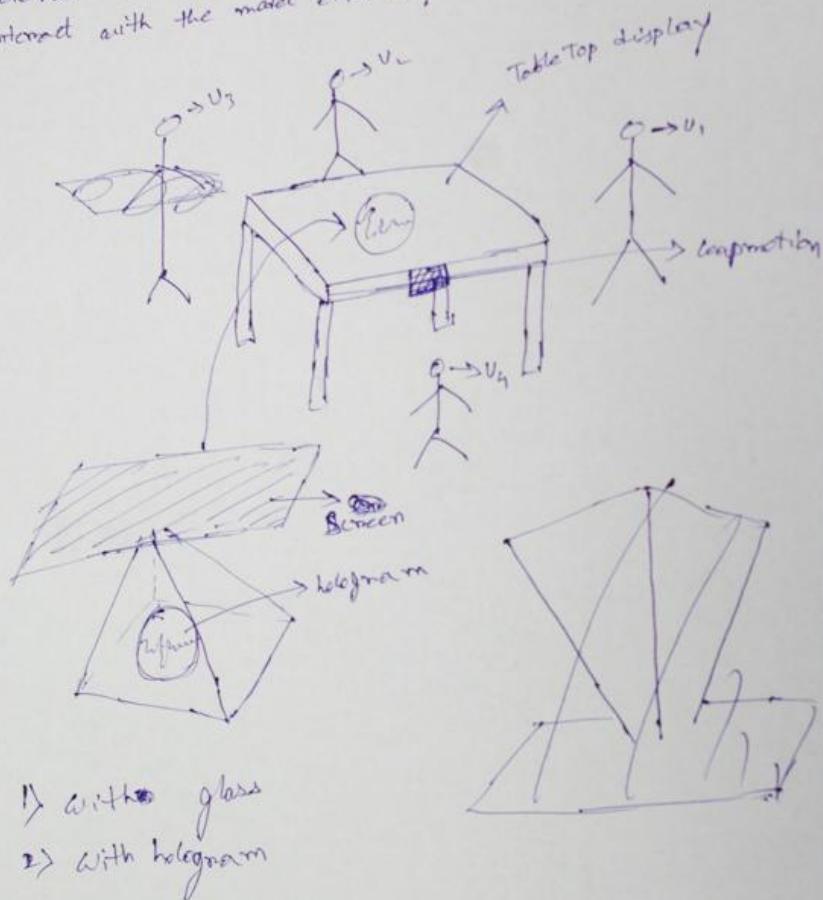
Sketch 5



Sudipta:

Sketches for Design Challenge 1:

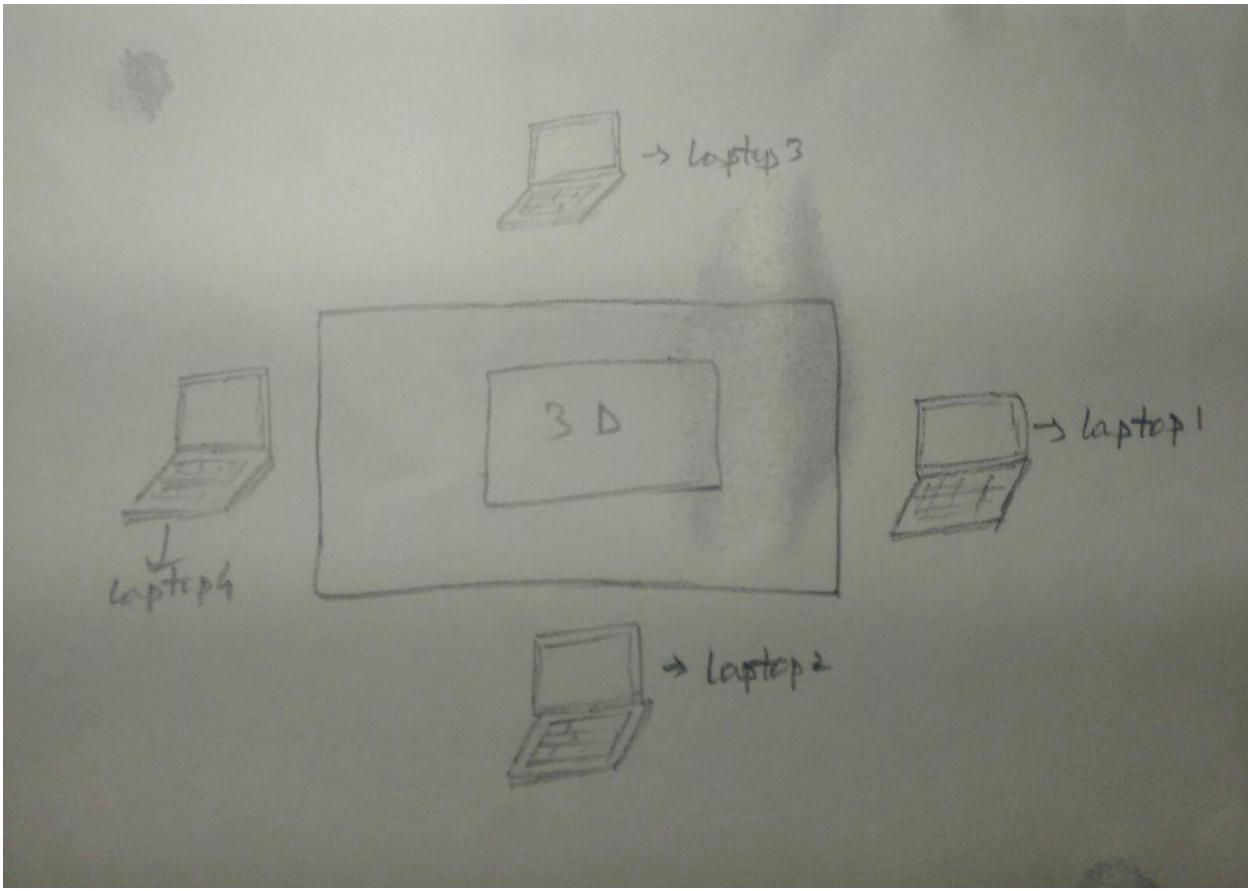
- 1. Generate 3D model which can be viewed collaboratively
- 2. Interact with the model efficiently



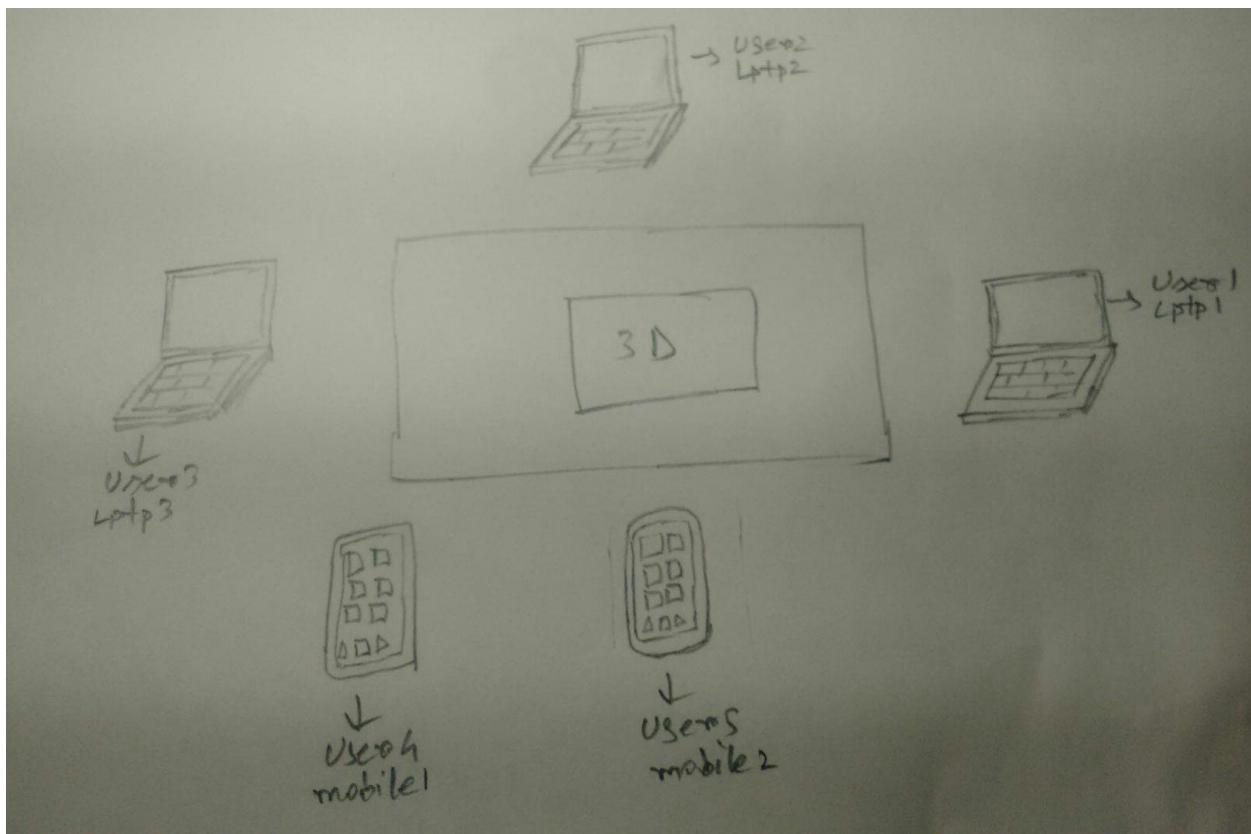
Options

- i. Using table top to display 3D model.
- ii. Users can wear 3D glasses to see the 3D model.
- iii. Holographic projector can be used to view the 3D model.

Sketches for Design Challenge 2:

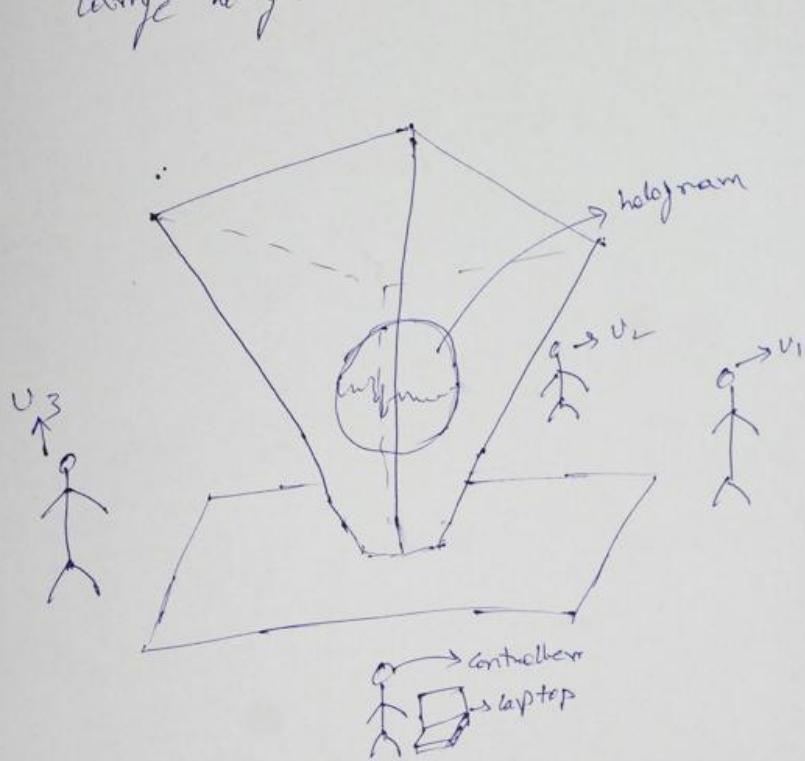


Each users can have own laptop to see individual content.



Users can use both laptop and mobile phones to see individual content.

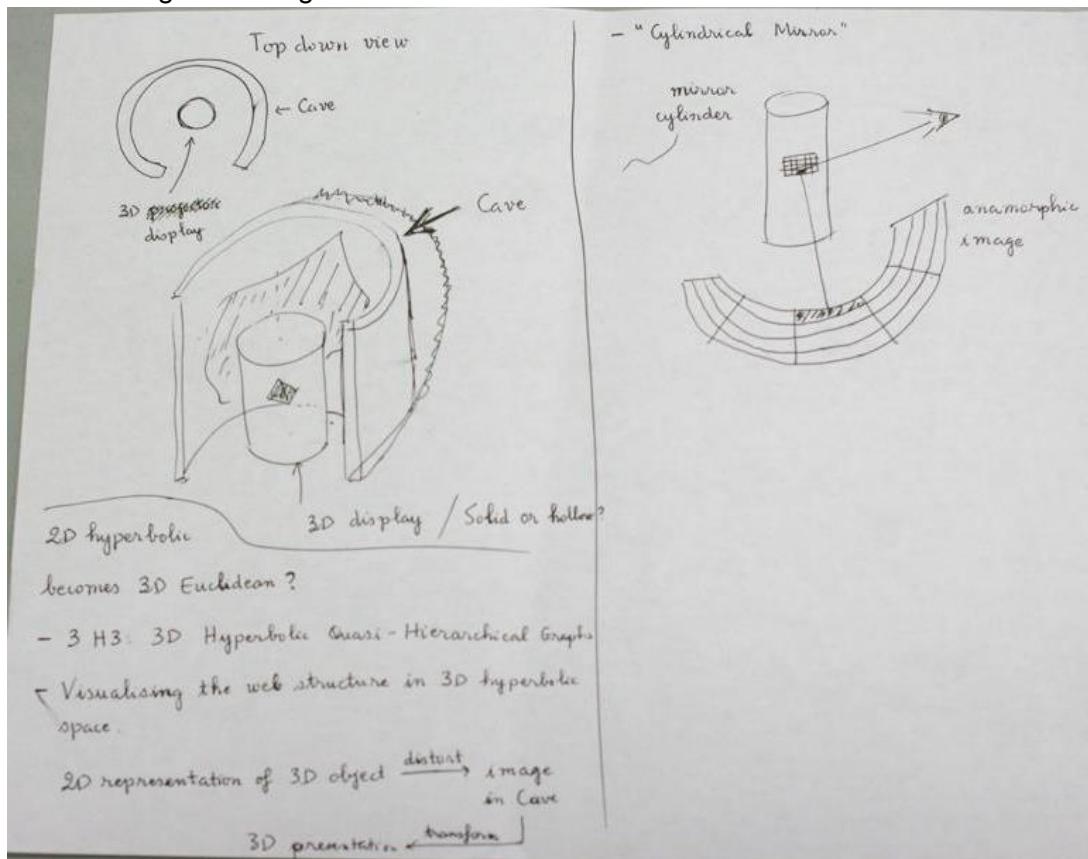
Sketches for Design Challenge 1,3(very large hologram):



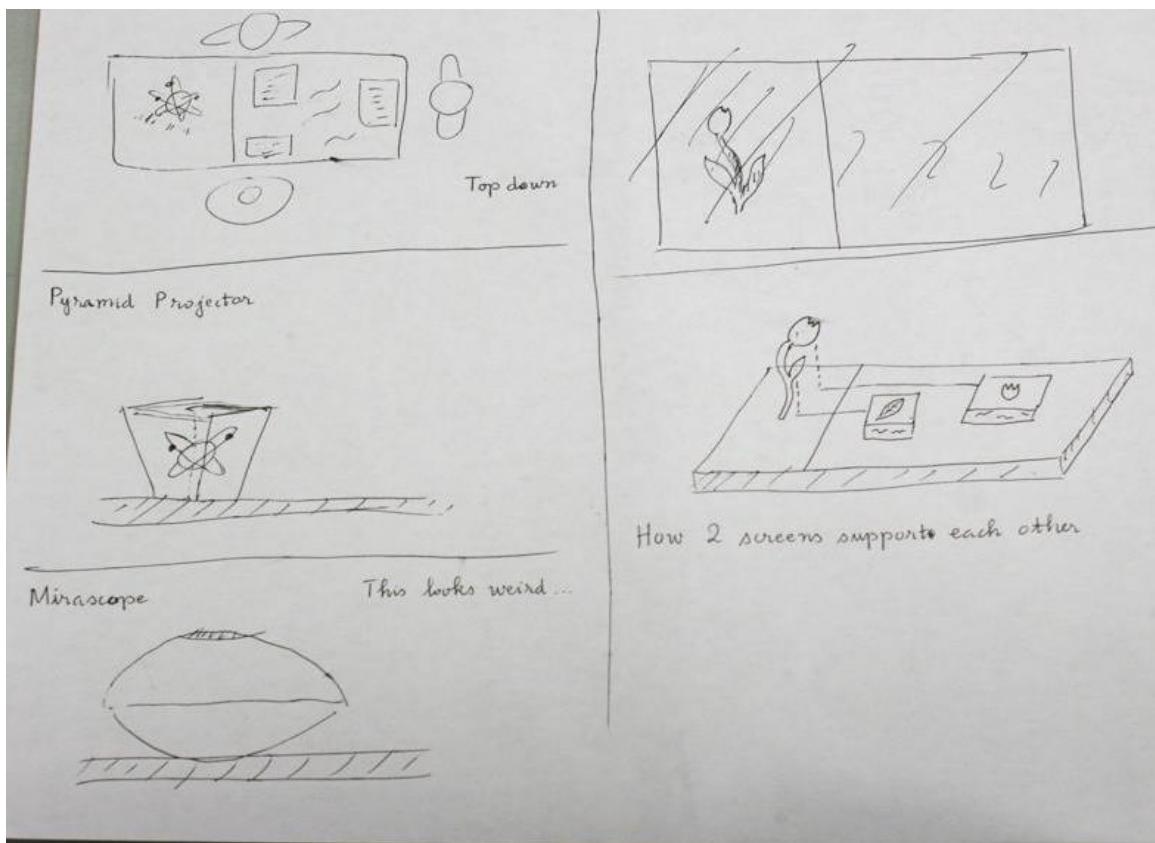
A room sized holographic projector can be used to display a 3D of content and a controller can control the hologram using laptop.

Hai:

Sketches for Design Challenge 1:

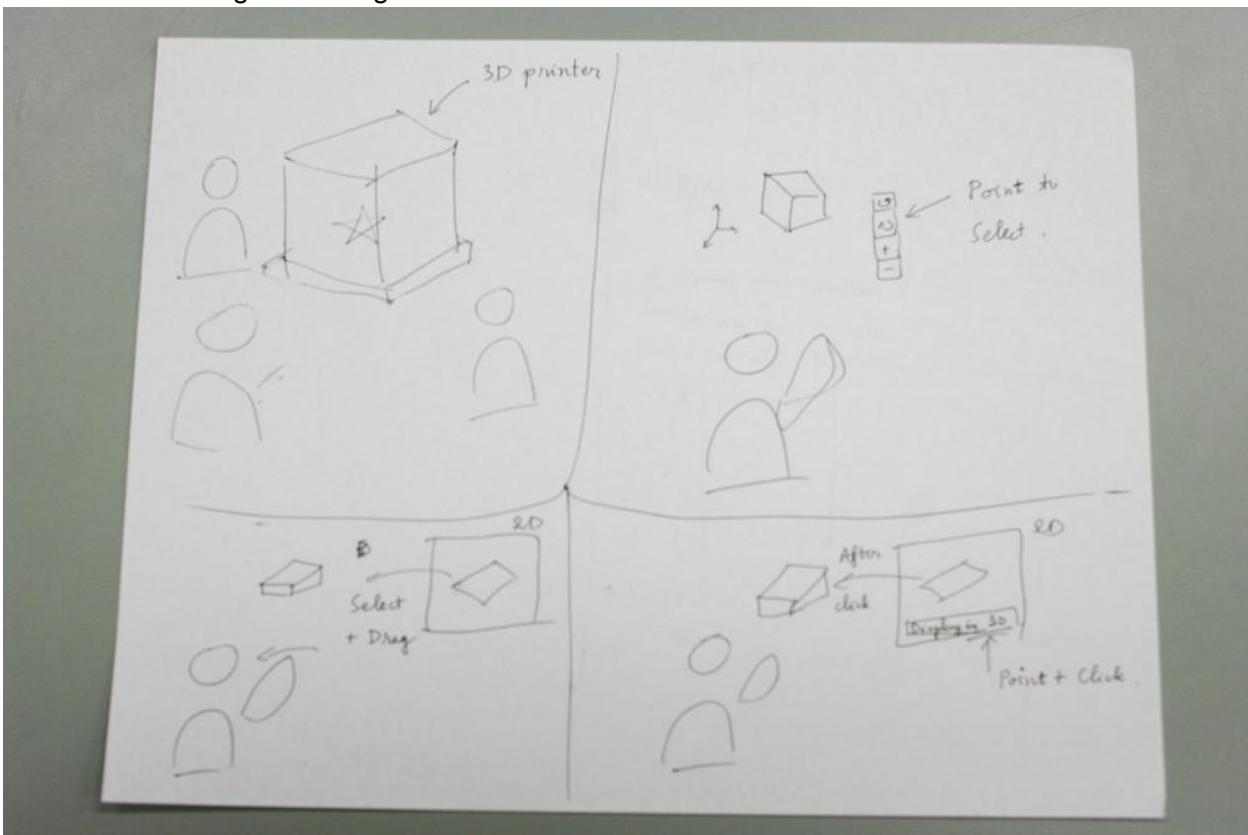


A combination of the CAVE 2 and a cylindrical mirror.

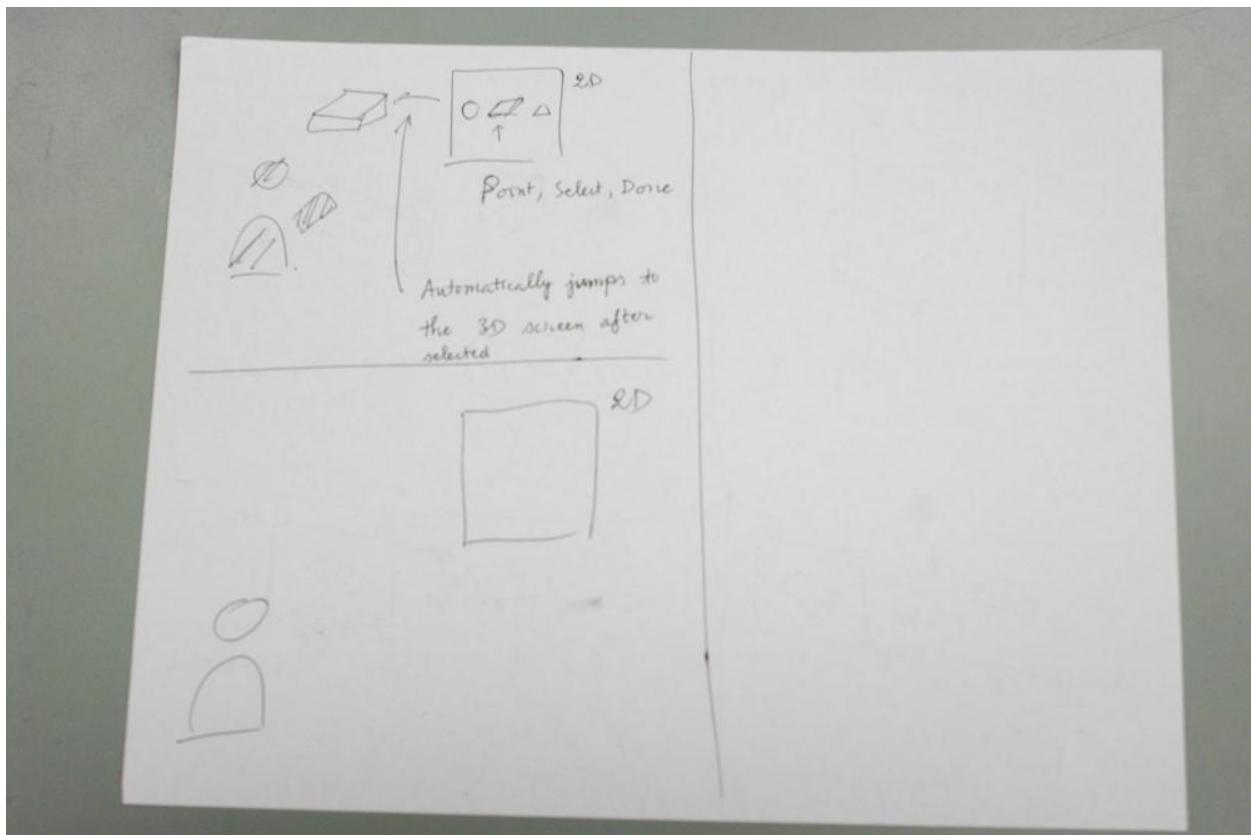


From top to bottom, left to right: (1) Overview of the tabletop design, (2) The pyramid-like holographic projector, (3) A Mirascope, (4) How the tabletop and the 3D visualization support each other.

Sketches for Design Challenges 1 & 3:

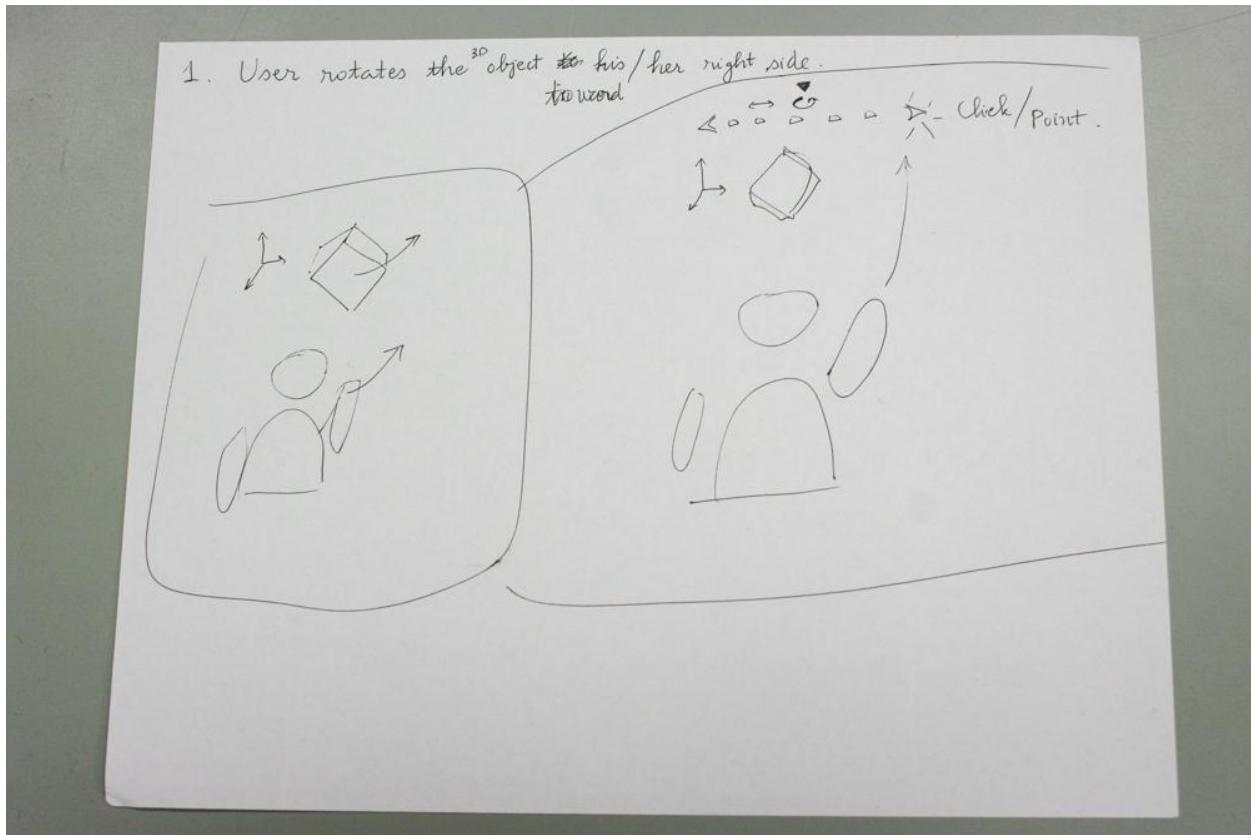


From top to bottom, left to right: (1) Demonstrate an object using a 3D printer, (2) Move an object from the 2D screen to the 3D projector using hand gestures only (select + drag), (3) Move an object using a combination of hand gestures and GUI (interactions are pre-defined as buttons in GUI), (4) A combination of 2 and 3 where the button(s) only appear when an object is selected.



Top: The object automatically appears in the 3D projector after being selected in the 2D screen.

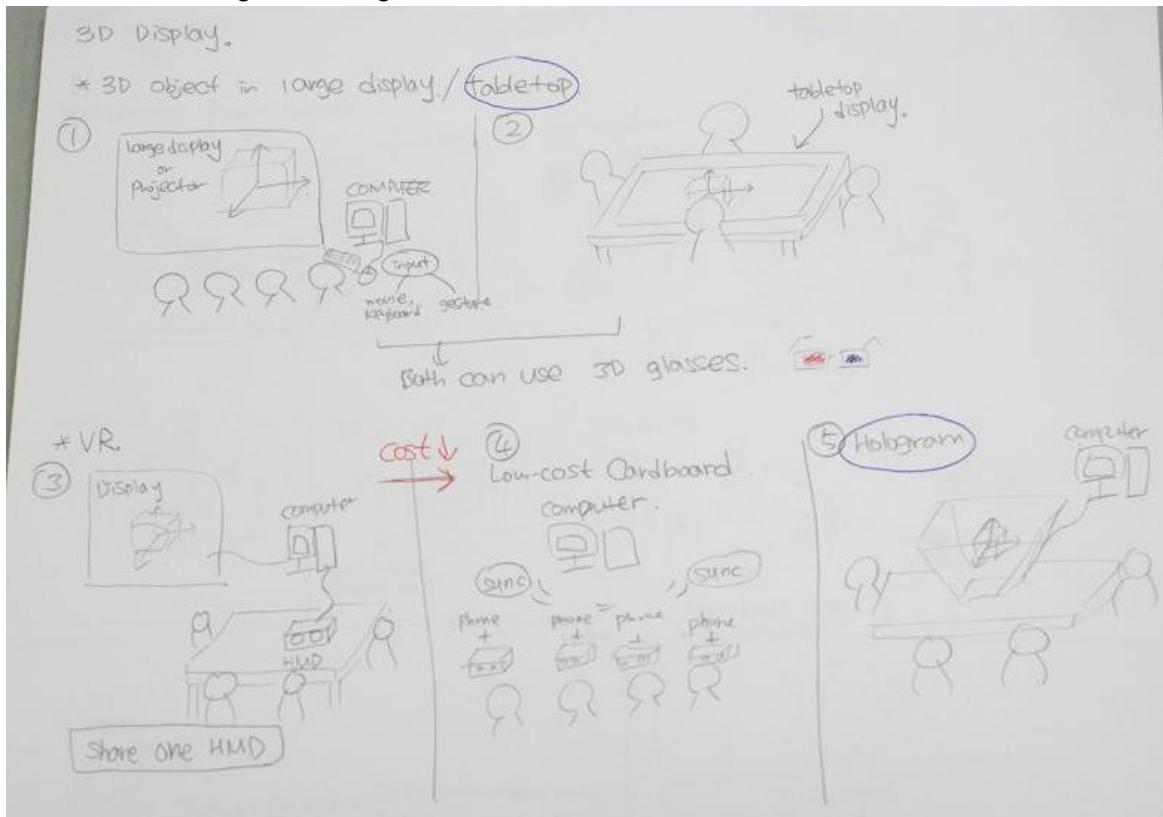
Bottom: unfinished sketch.



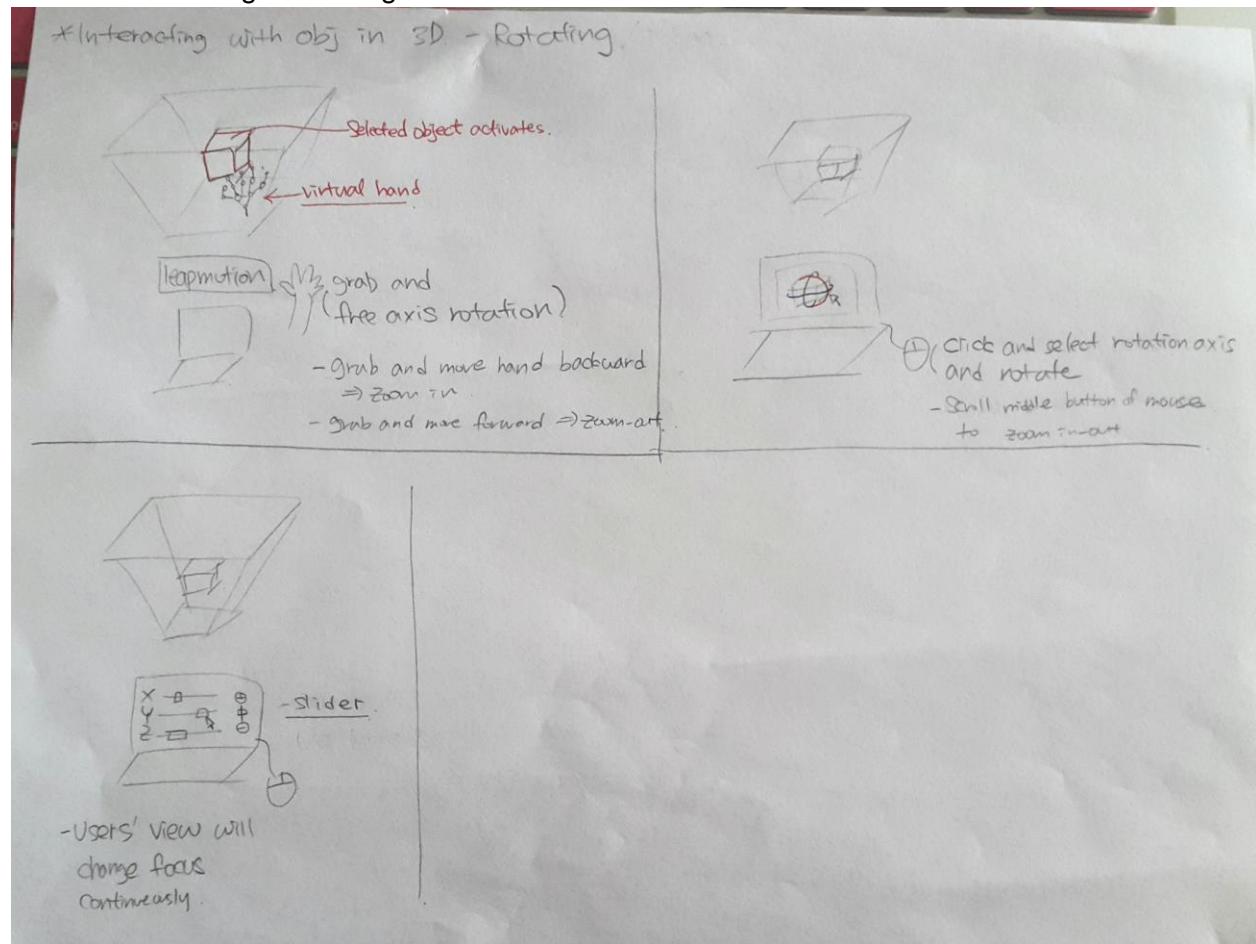
How to rotate a 3D object. Left: Rotate directly using hand gestures. Right: Rotate indirectly using supports from the GUI.

Ja Eun:

Sketches for Design Challenge 1&2:



Sketches for Design Challenge 3:



Conclusions for Iteration 1:

Design Challenges Concluded:

1. How to display a 3D object to a group of learners.

Final Decision: Hologram will be used to display

Design Challenges Continued for next iteration:

1. How will the system allow learners to see an individual view of the content and a shared view of the content being discussed?
2. How to interact with the 3D object (Hardware to use and Rotation and Zooming)?

Iteration 2

After picking the '*holographic projector+large 2D display*' or '*tabletop display*' as 3D display, we started to design the detailed system architecture and the interaction ways with these displays.

Design Challenges Continued From Iteration 1:

1. How will the system allow learners to see an individual view of the content and a shared view of the content being discussed?
2. How to interact with the 3D object (Hardware to use and Rotation and Zooming)?

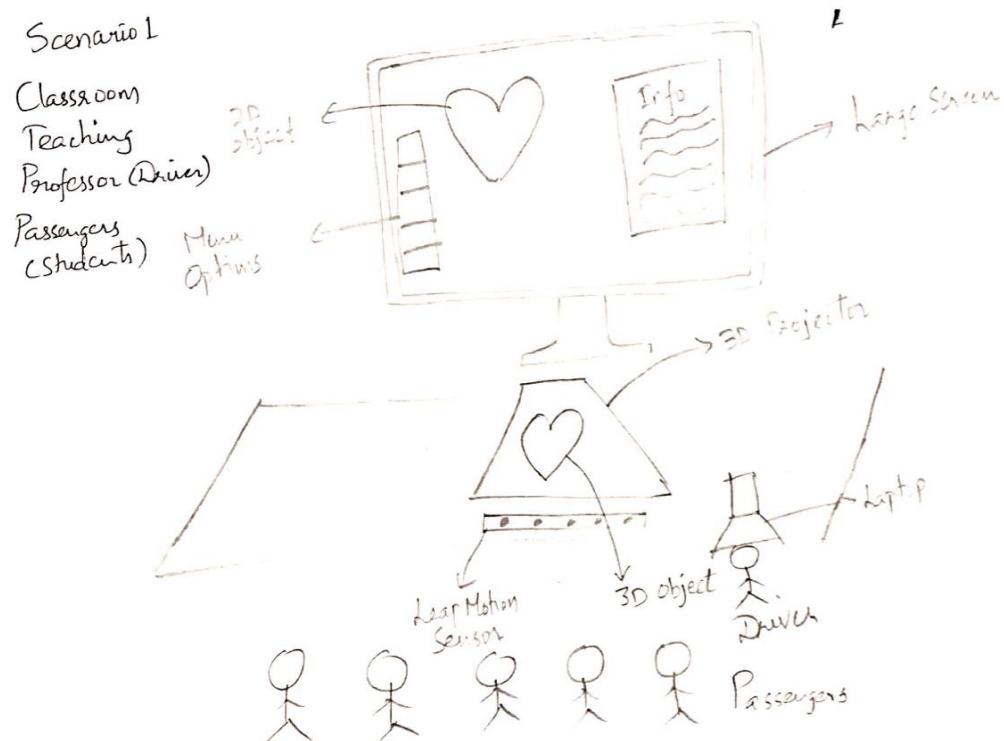
New Design Challenges Discussed:

3. How to bring an object from the shared 2D screen to the 3D display (and vice versa)?
4. Should the system provide users with an individual view of the content ?
5. How to display object parts which can be marked and how a driver can mark or point to an object part which is currently being explained?
6. How can group members share/transfer control of the 2d screen?
7. How to allow user to pull up more information about an object on shared screen or individual display?

Sketches:

Ramkiran:

Sketches for Design Challenge1:

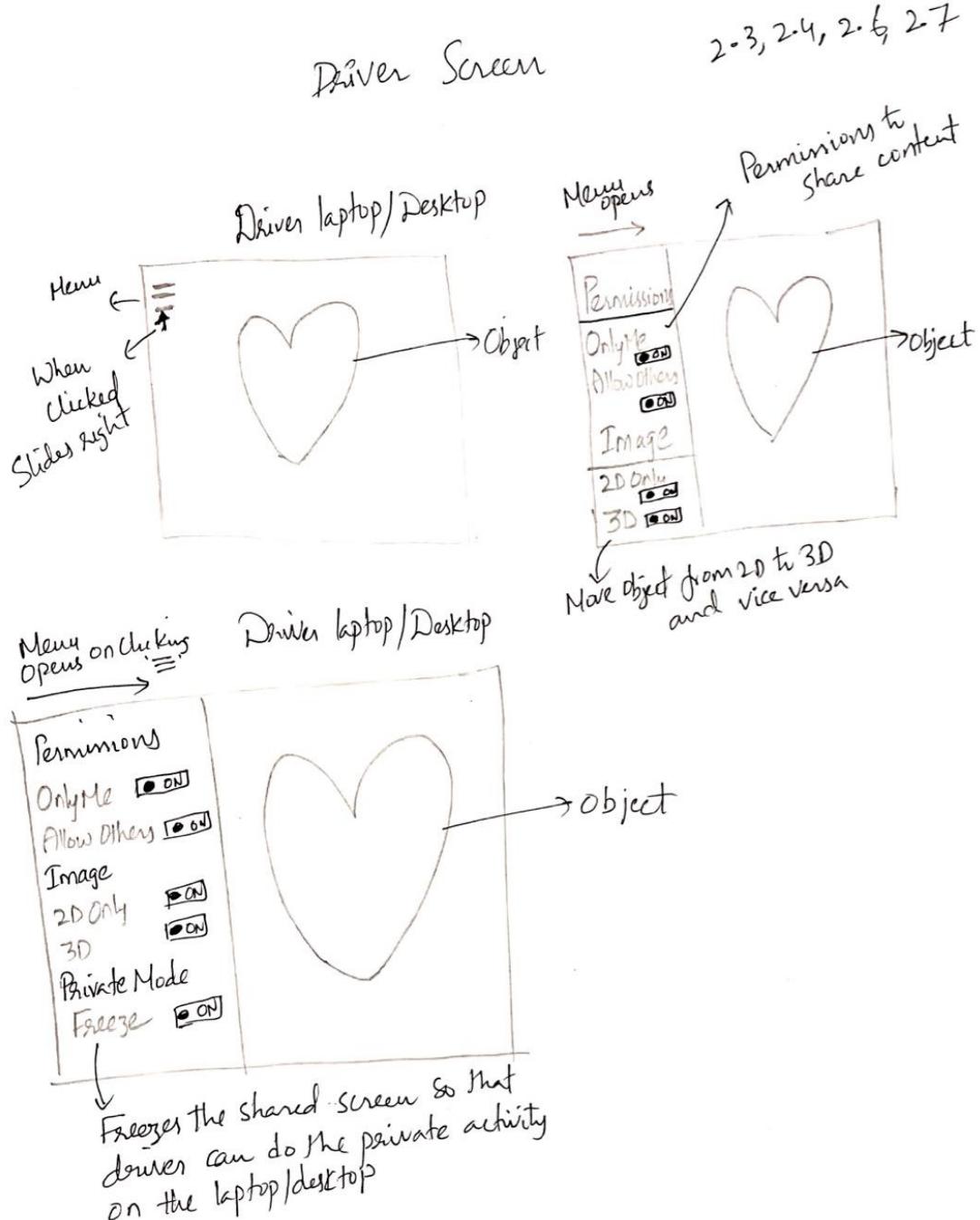


Scenario 2

Group discussion
Collaborative learning
among friends
One of the four can be driver
Other three passengers.

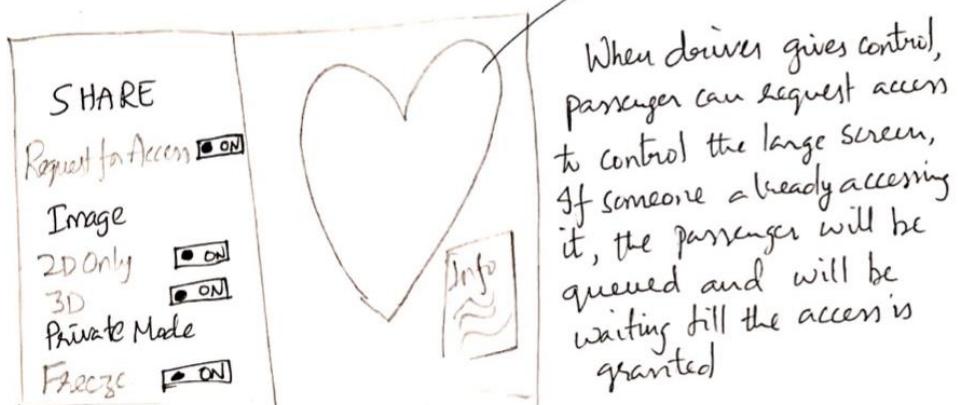
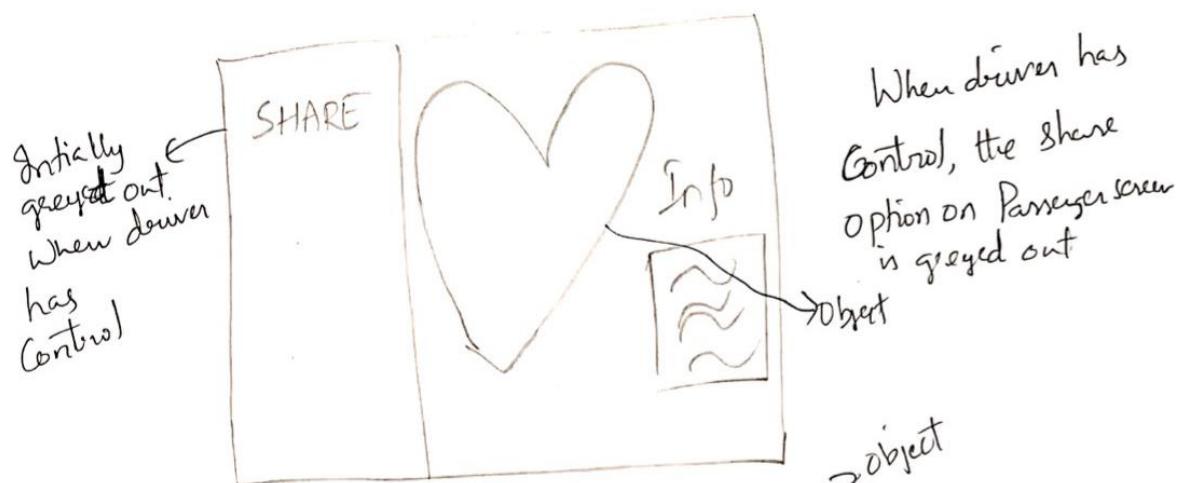
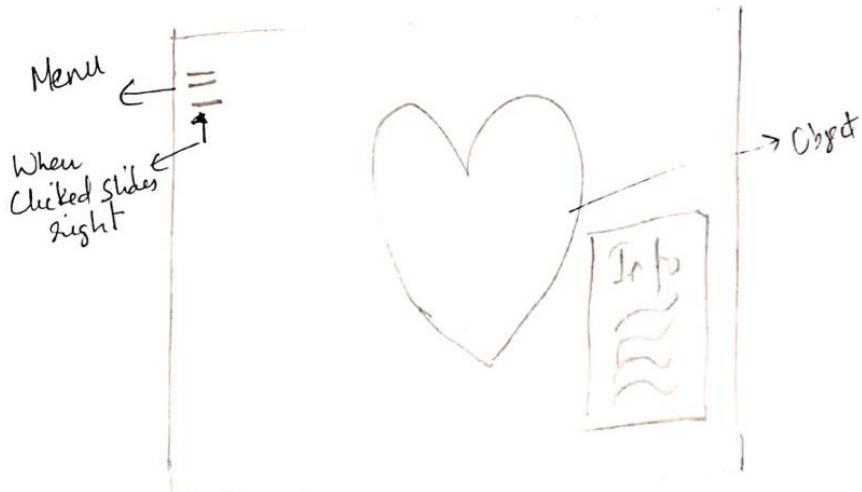


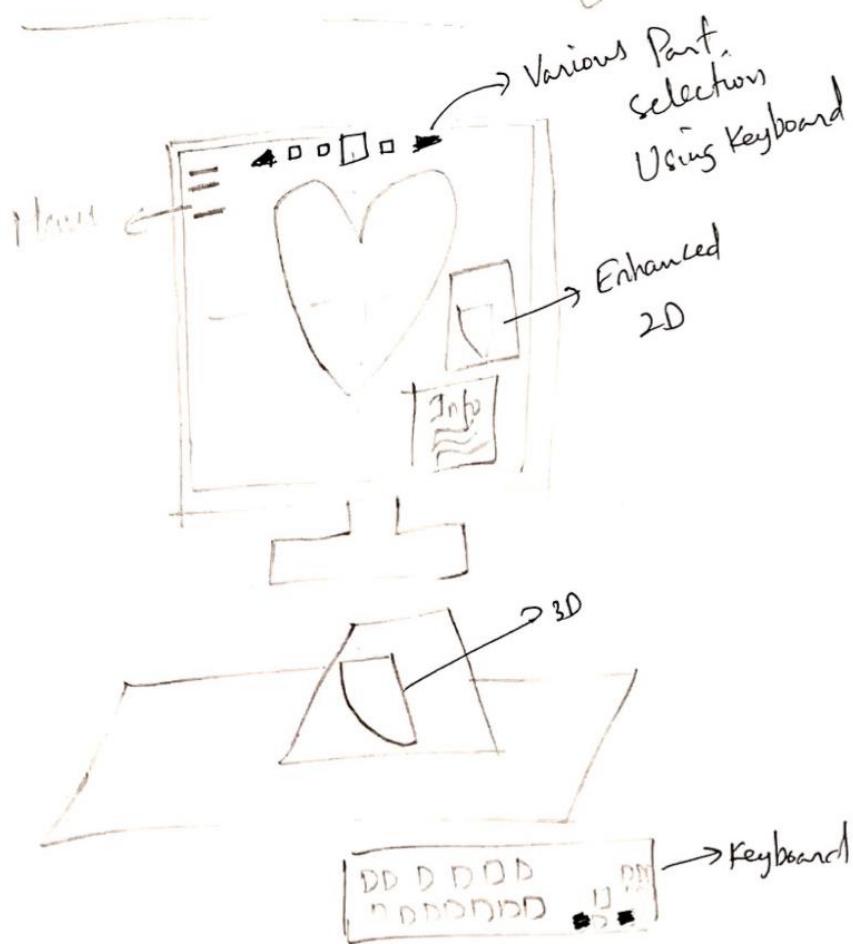
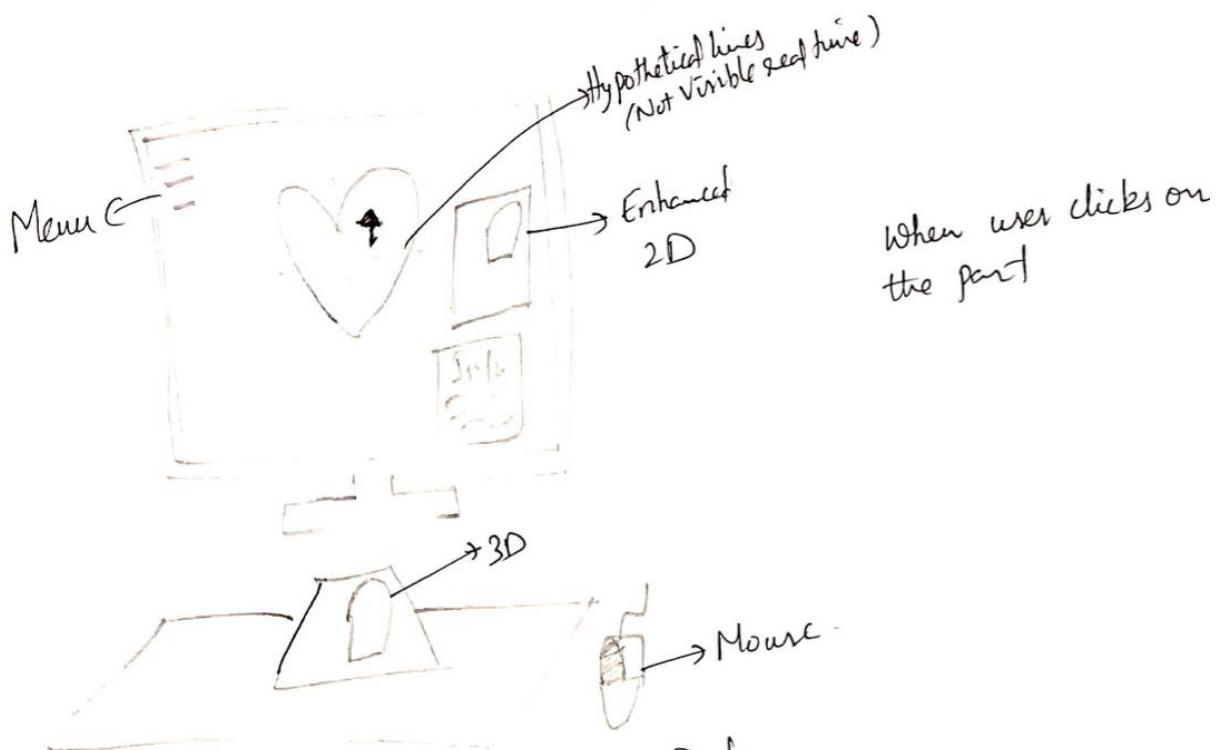
Sketches for Design Challenge 2, 3, 4, 6, 7:



Passenger Screen

2.3, 2.4, 2.6, 2.7

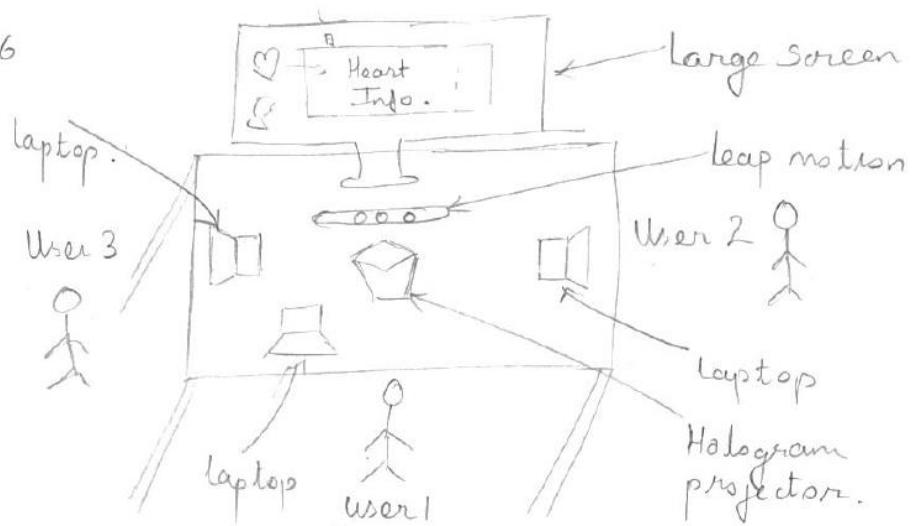




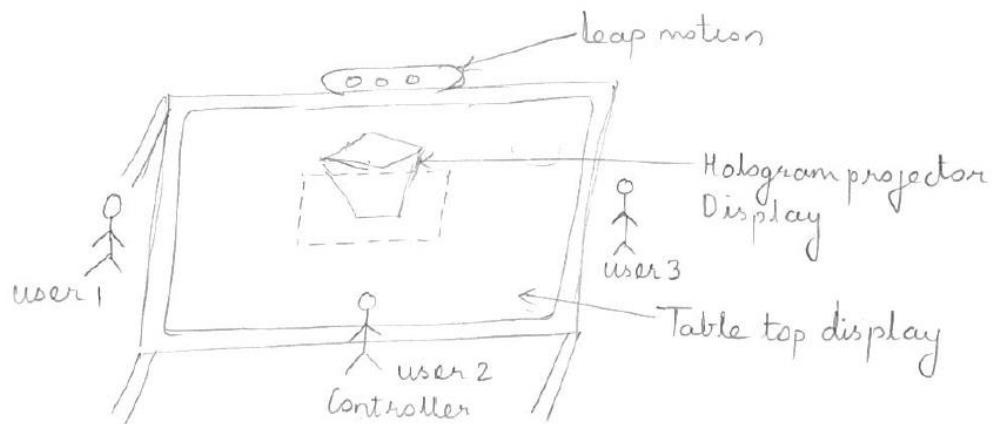
Shreyas:

Sketches for Design Challenge 1:

Sketch 6



Sketch 5



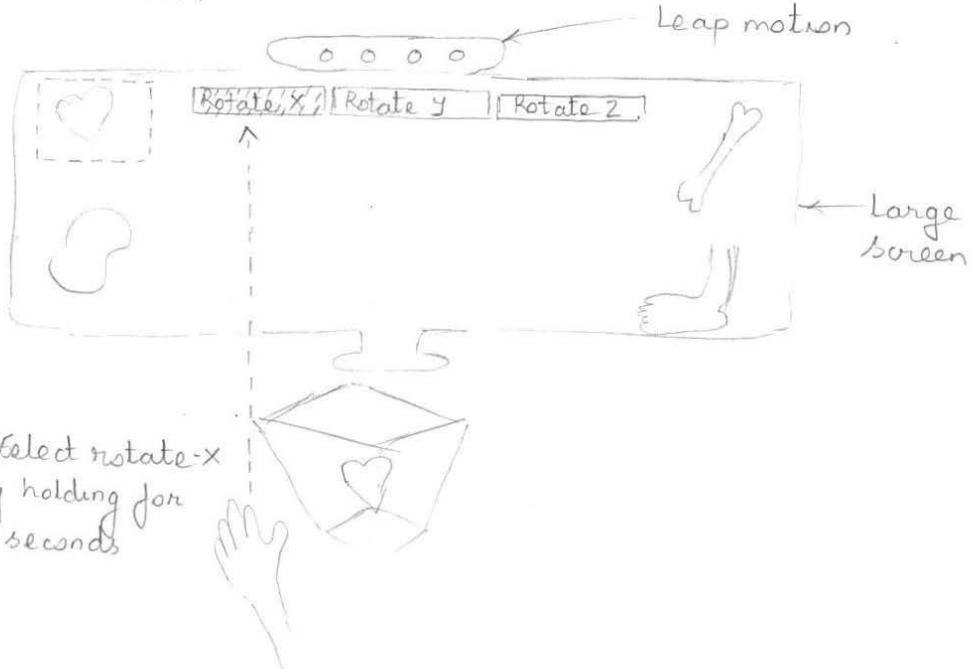
Sketches for Design Challenge 2:

How to Interact with 3D object

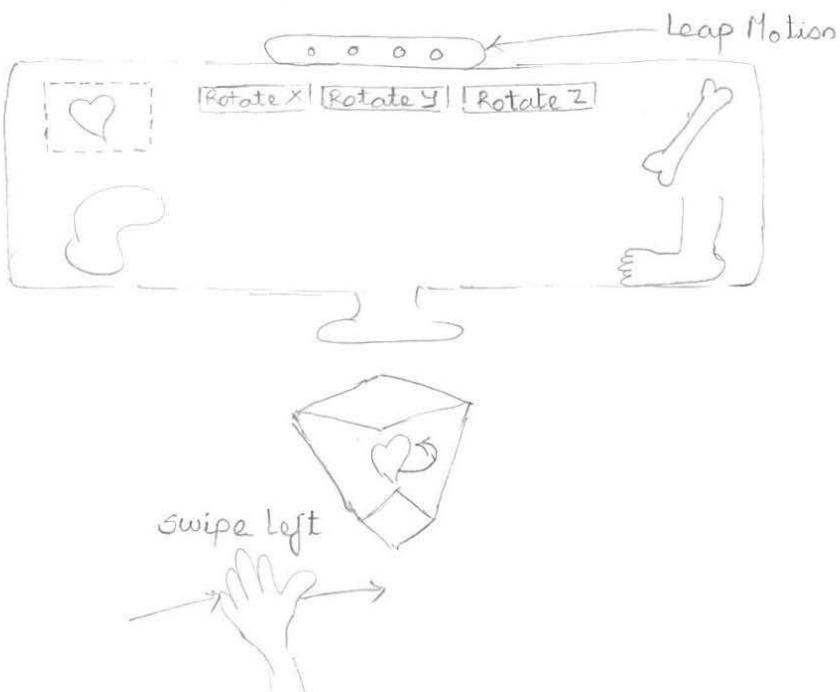
↳ Rotate 3D viz.

Sketch 1>

step 1>



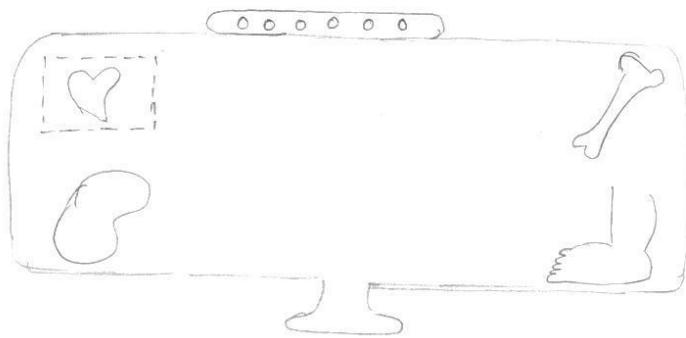
Step 2>



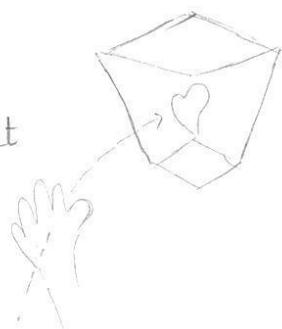
Rotate V₁₂

Sketch 2>

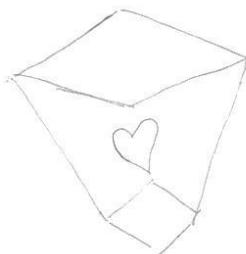
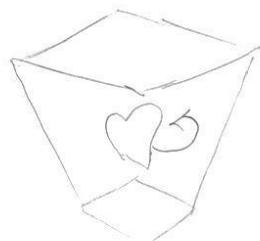
step 1



push the object in
hologram to select
it



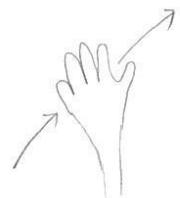
step 2>



Swipe up
to rotate around
y-axis



Swipe right
to rotate on
x-axis

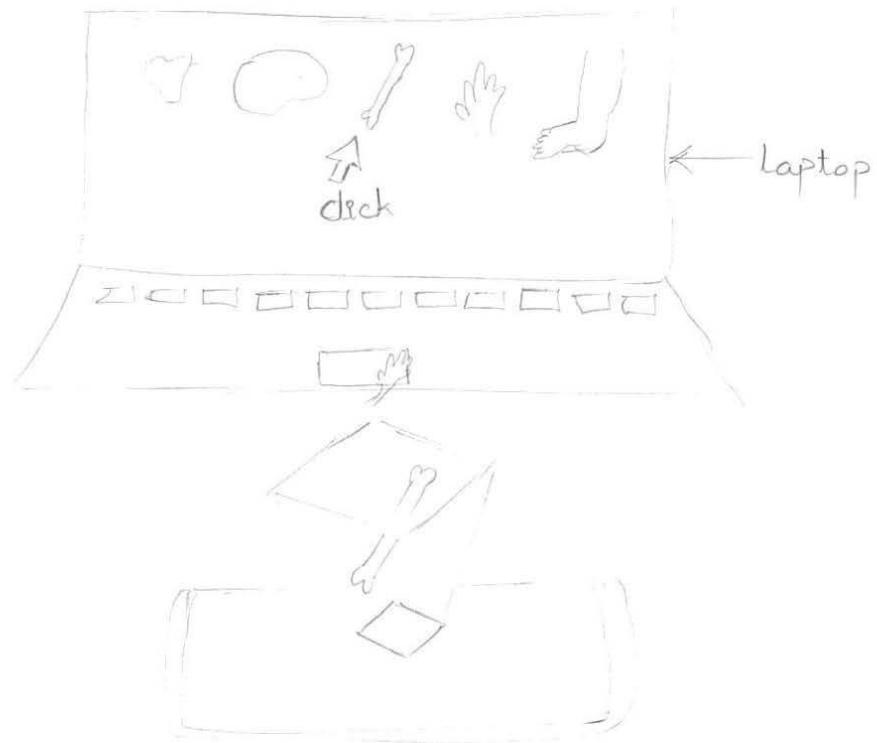


Swipe diagonally
to rotate z-axis

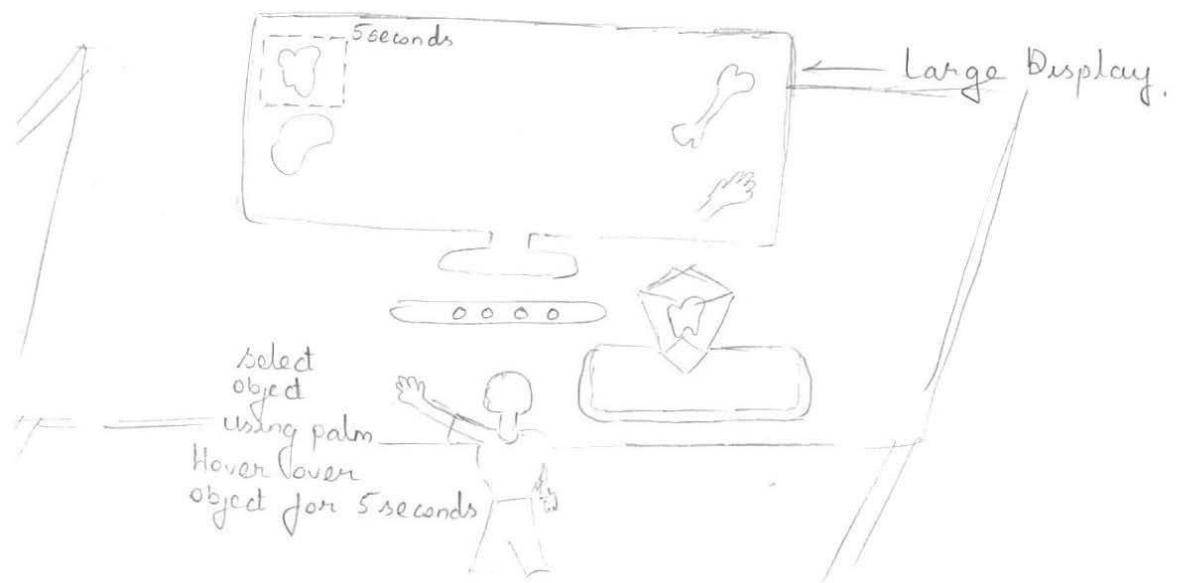
Sketches for design challenge 3:

How to Bring up 3D viz in hologram projector:

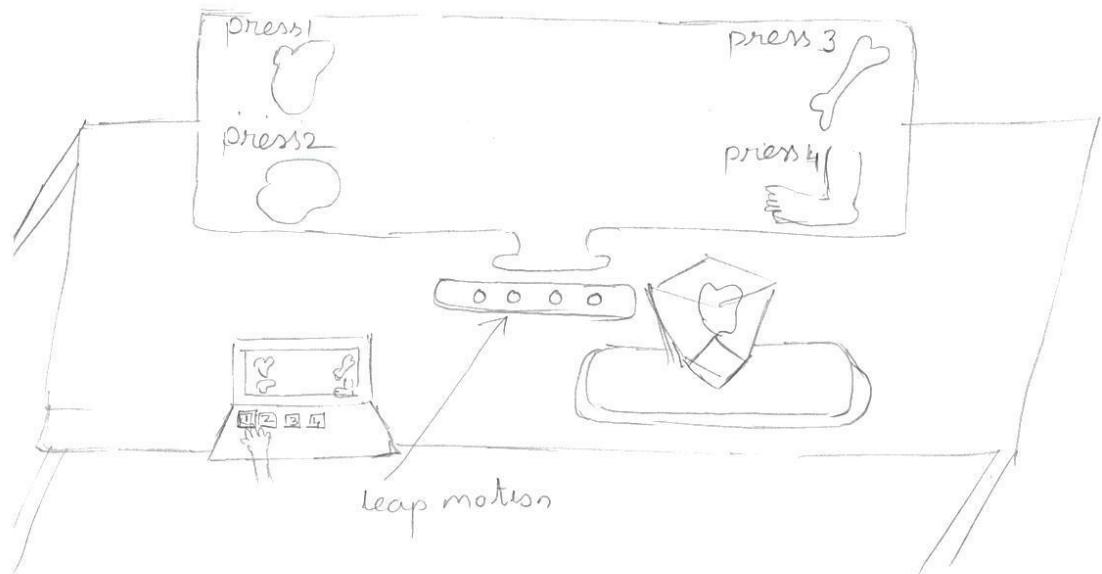
Sketch 1



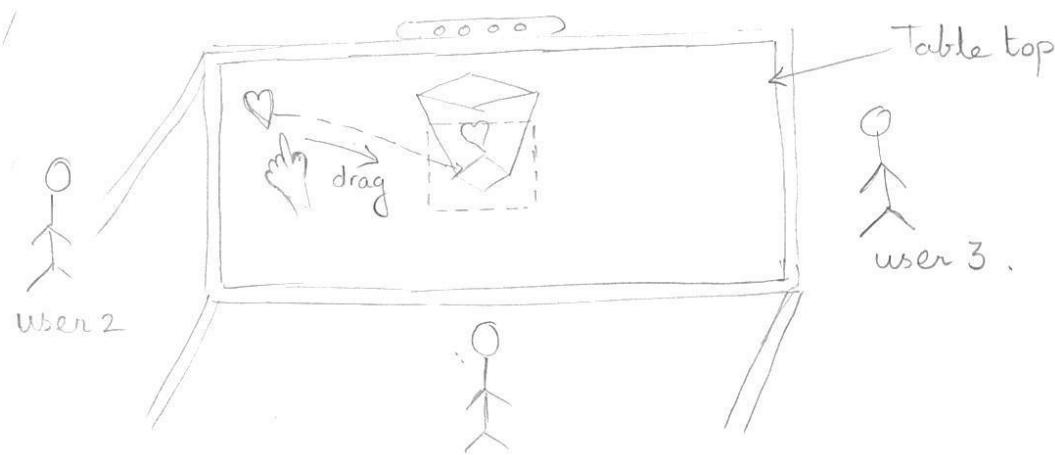
Sketch 2



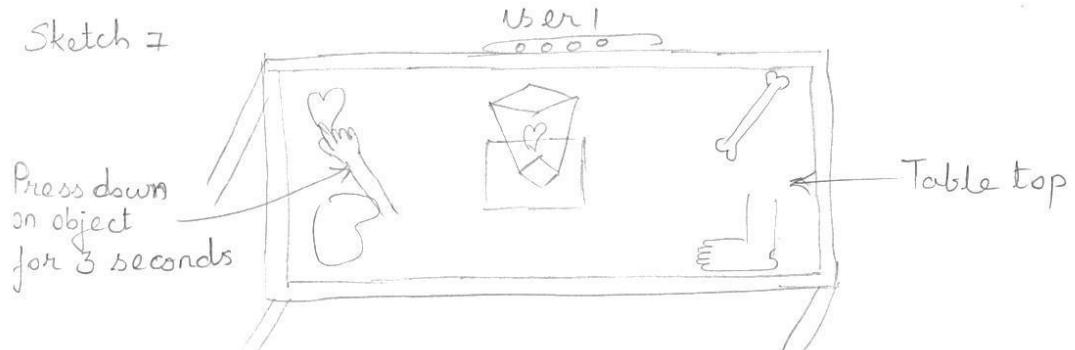
Sketch 5



Sketch 6

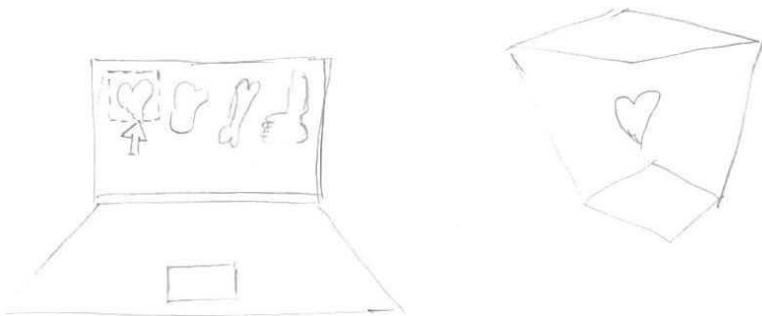


Sketch 7



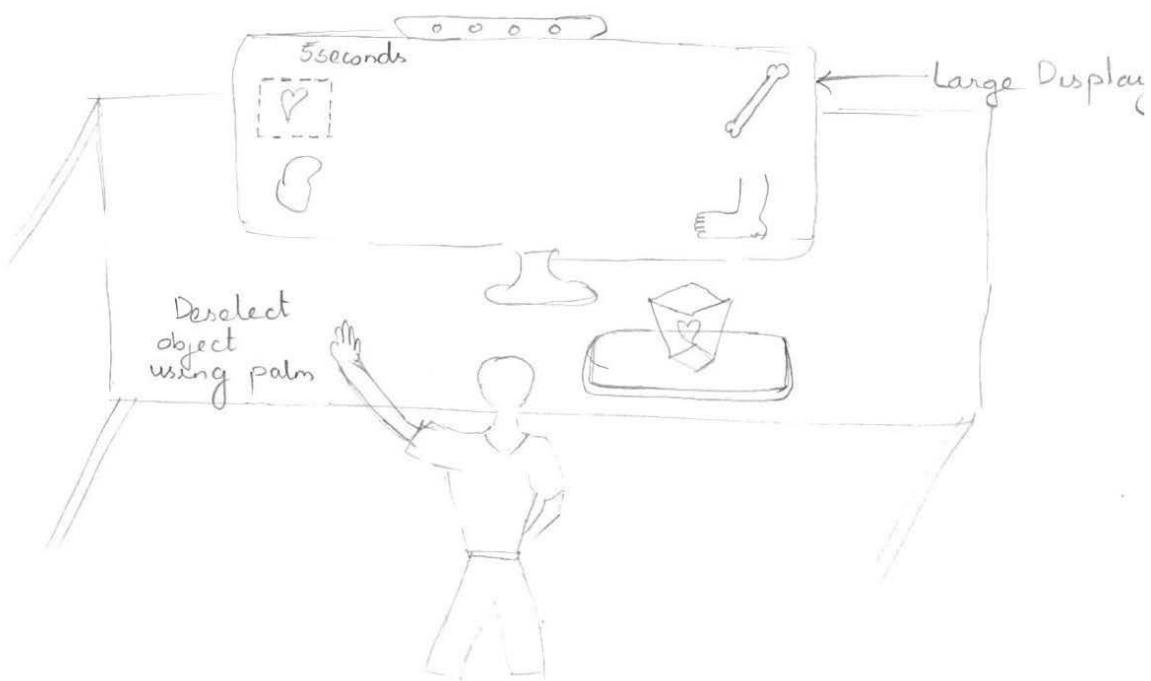
How to Remove An Object from the 3D Visualization

Sketch 1

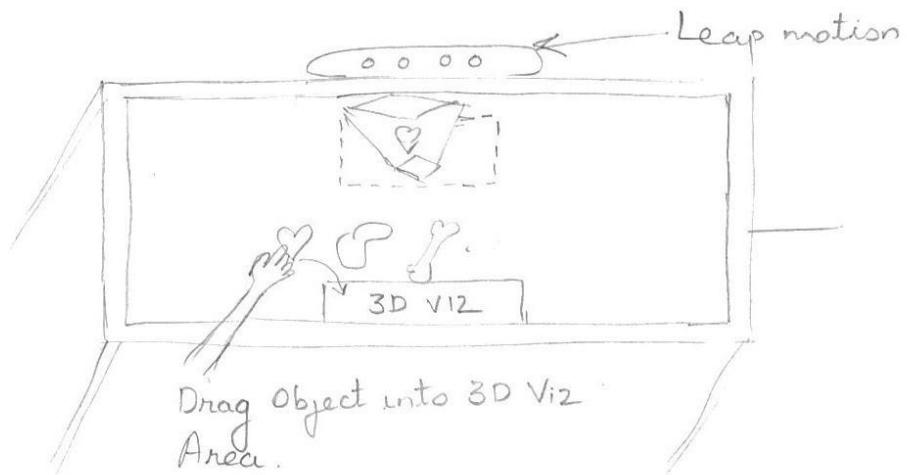


click on selected object
to remove from Hologram

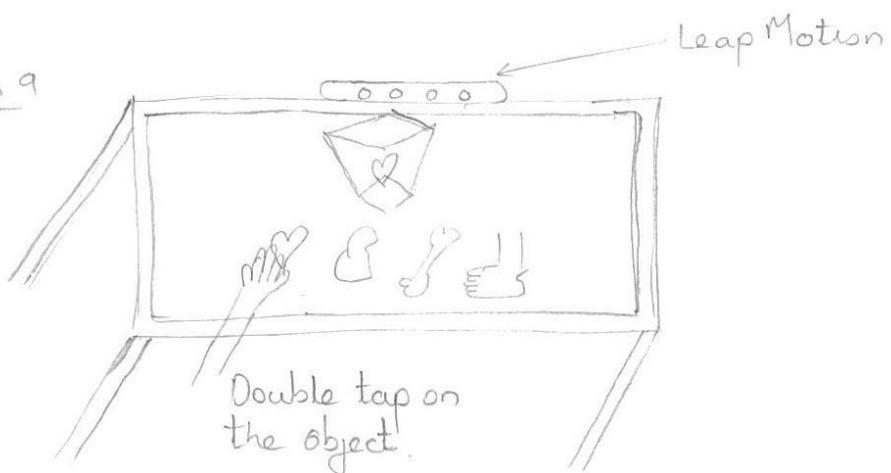
Sketch 2:



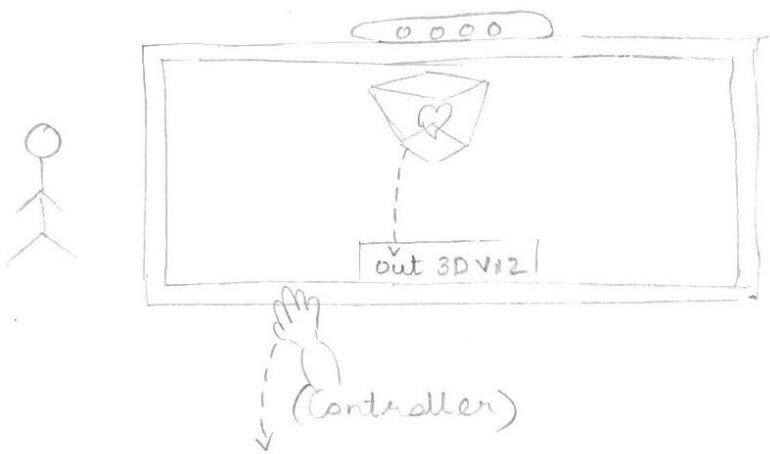
Sketch 8



Sketch 9

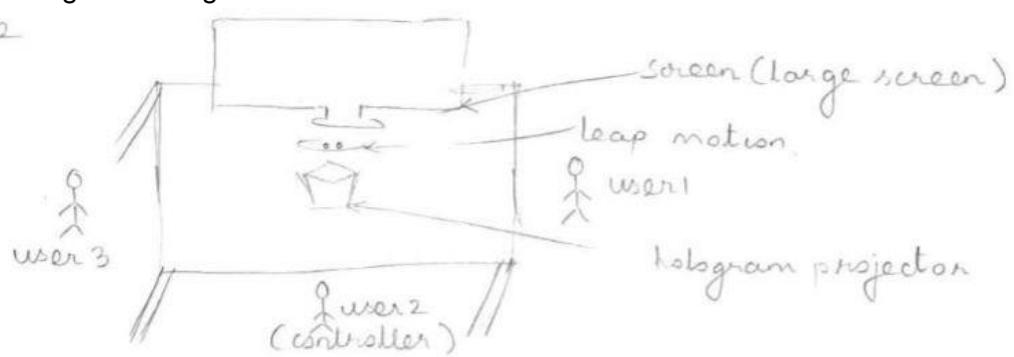


Sketch 8

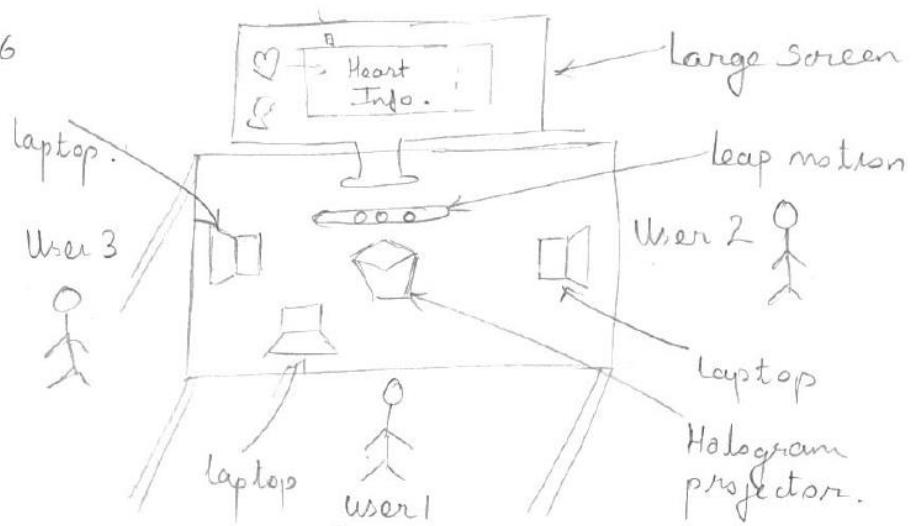


Sketches for Design Challenge 4:

Sketch 2

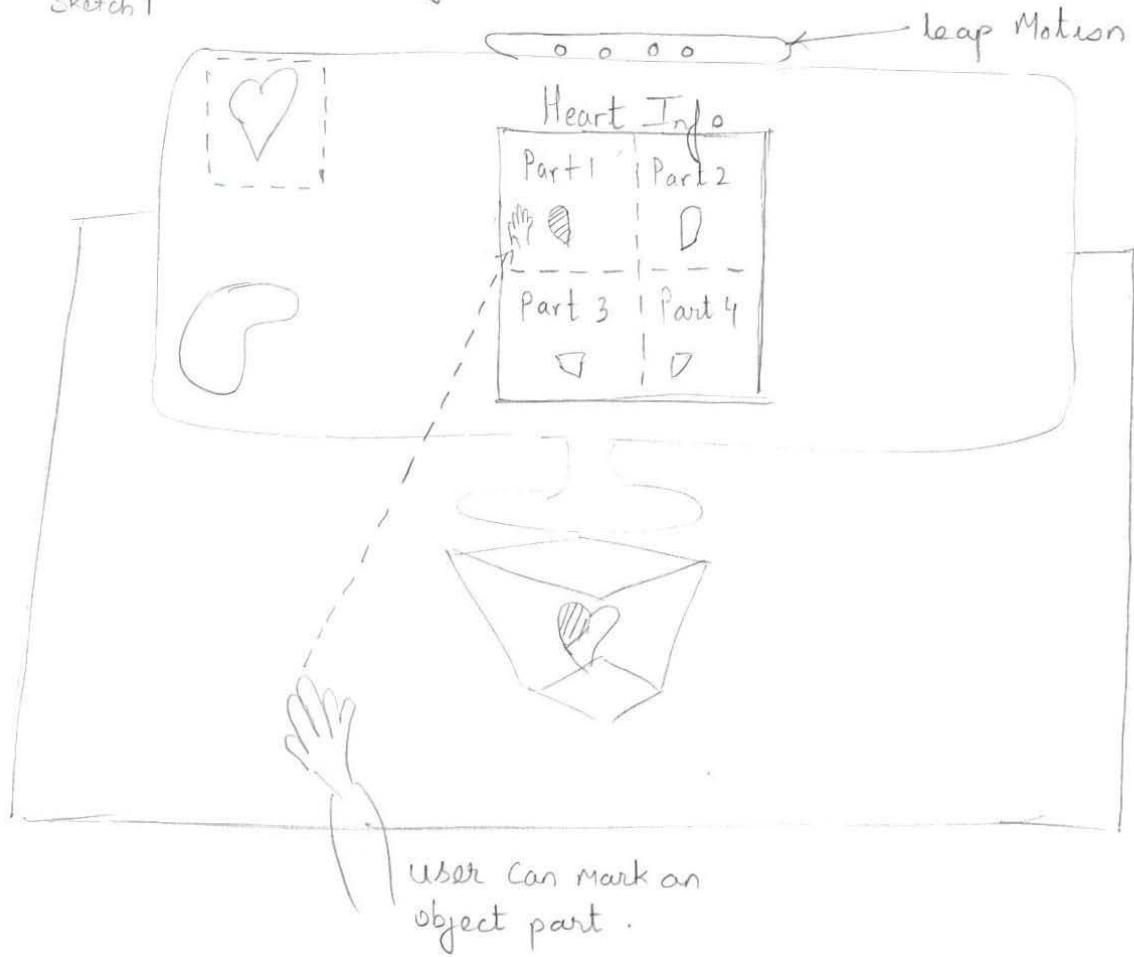


Sketch 6

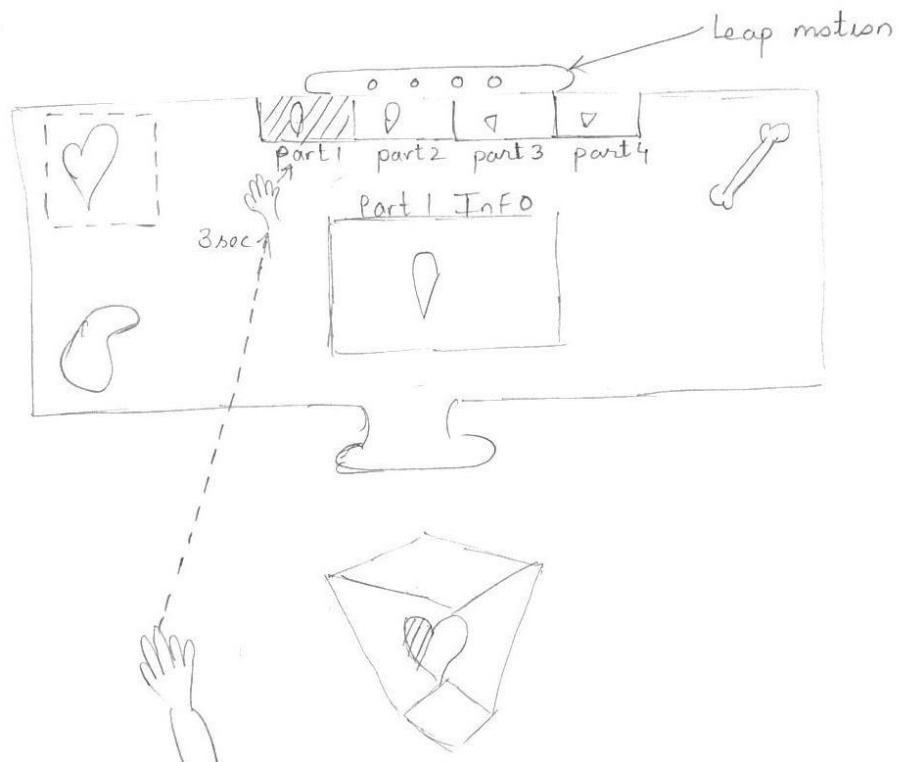


Sketches for design challenge 5:

How to Mark an object part - It3
Sketch 1

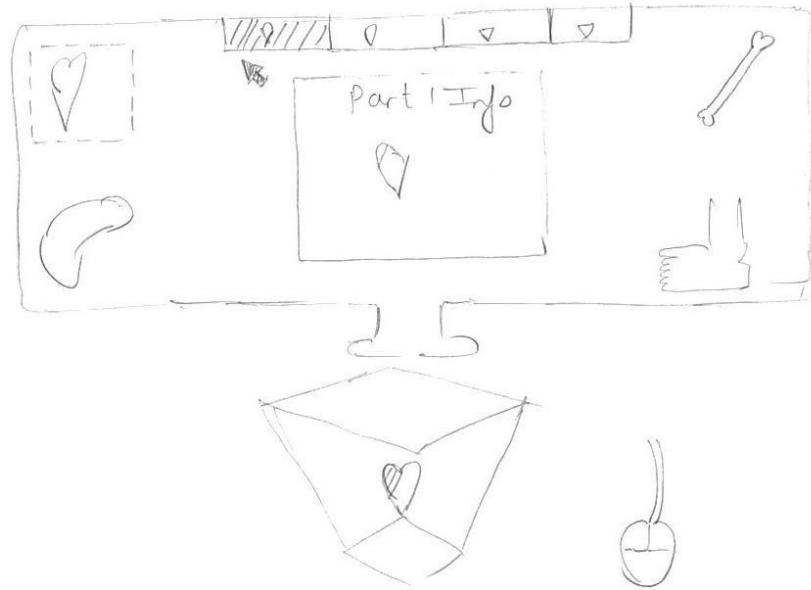


Sketch 2.



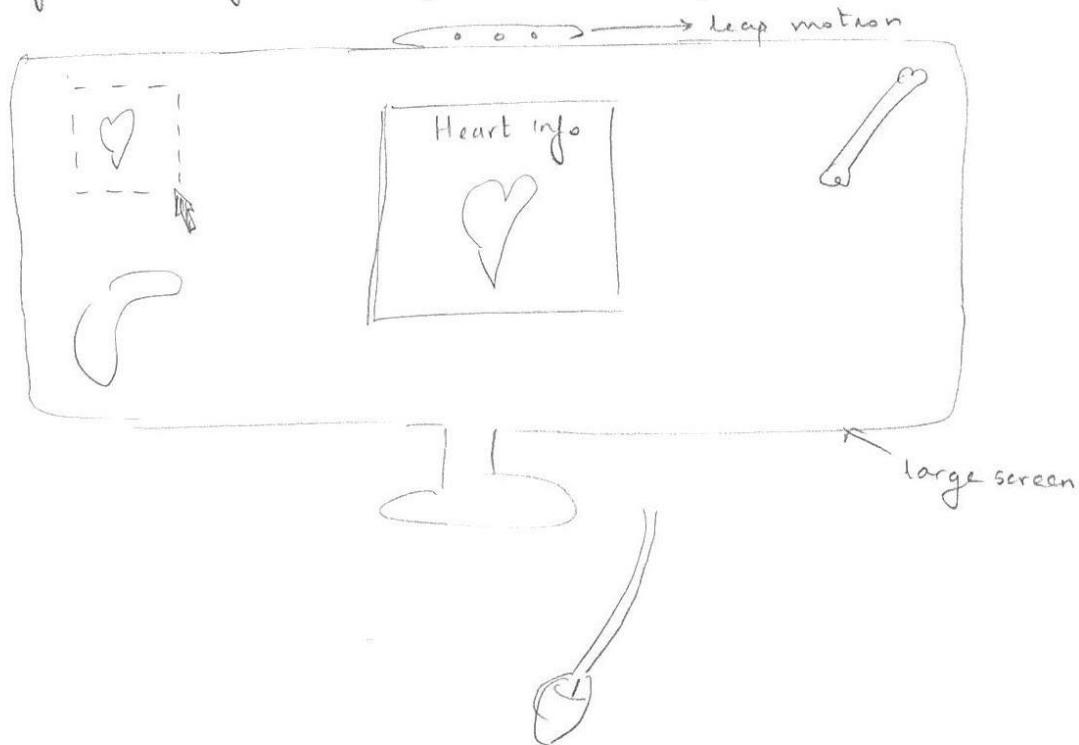
User can hover over a part for 3 seconds
to mark it

Sketch 3

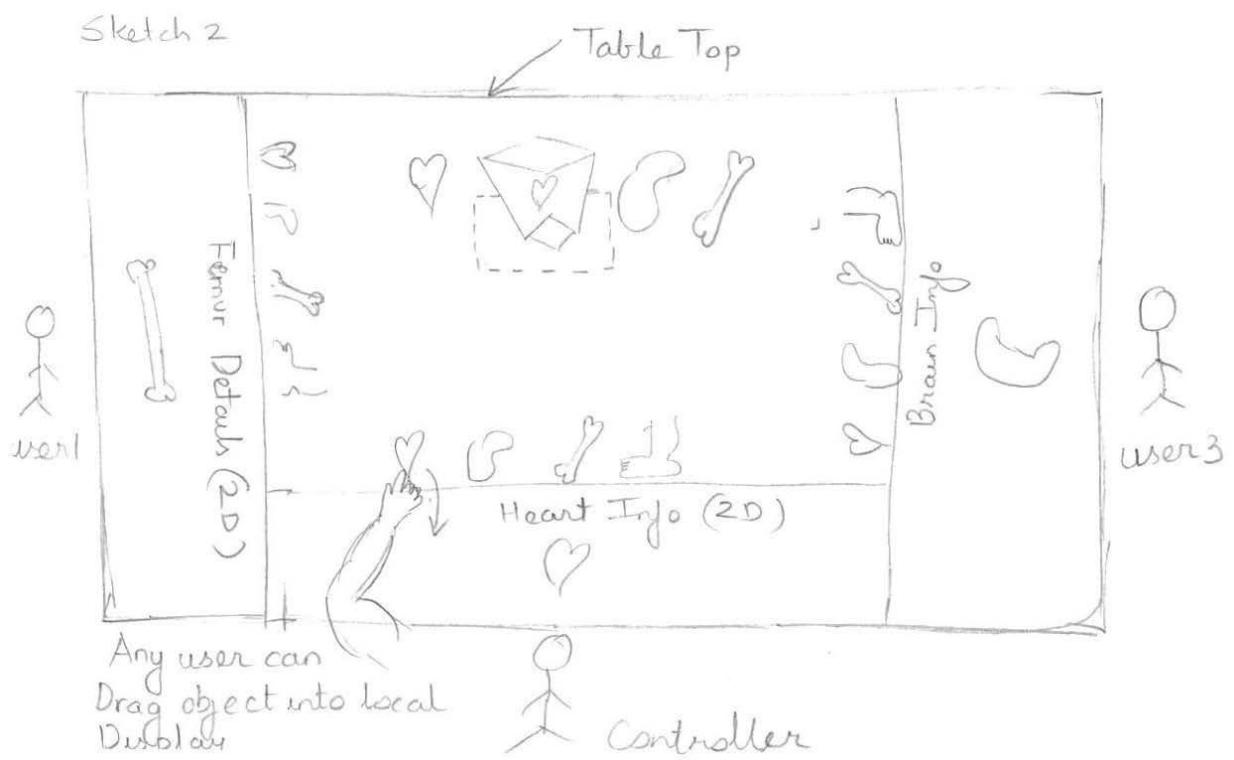
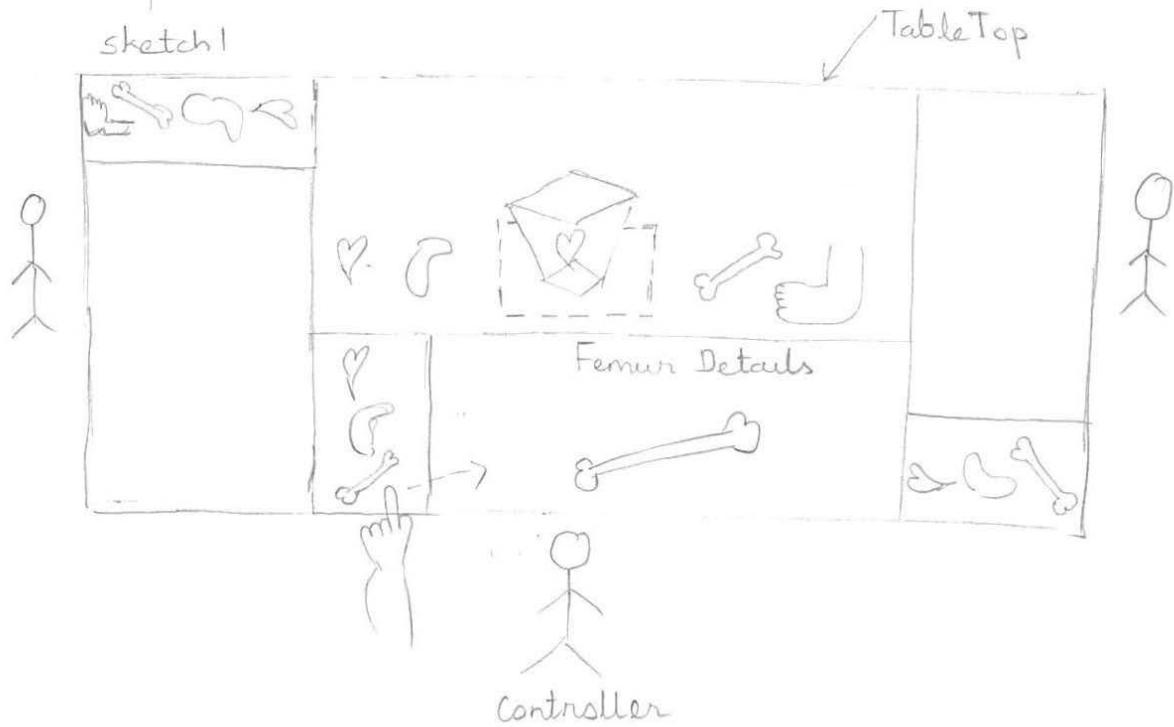


Sketches for design challenge 7:

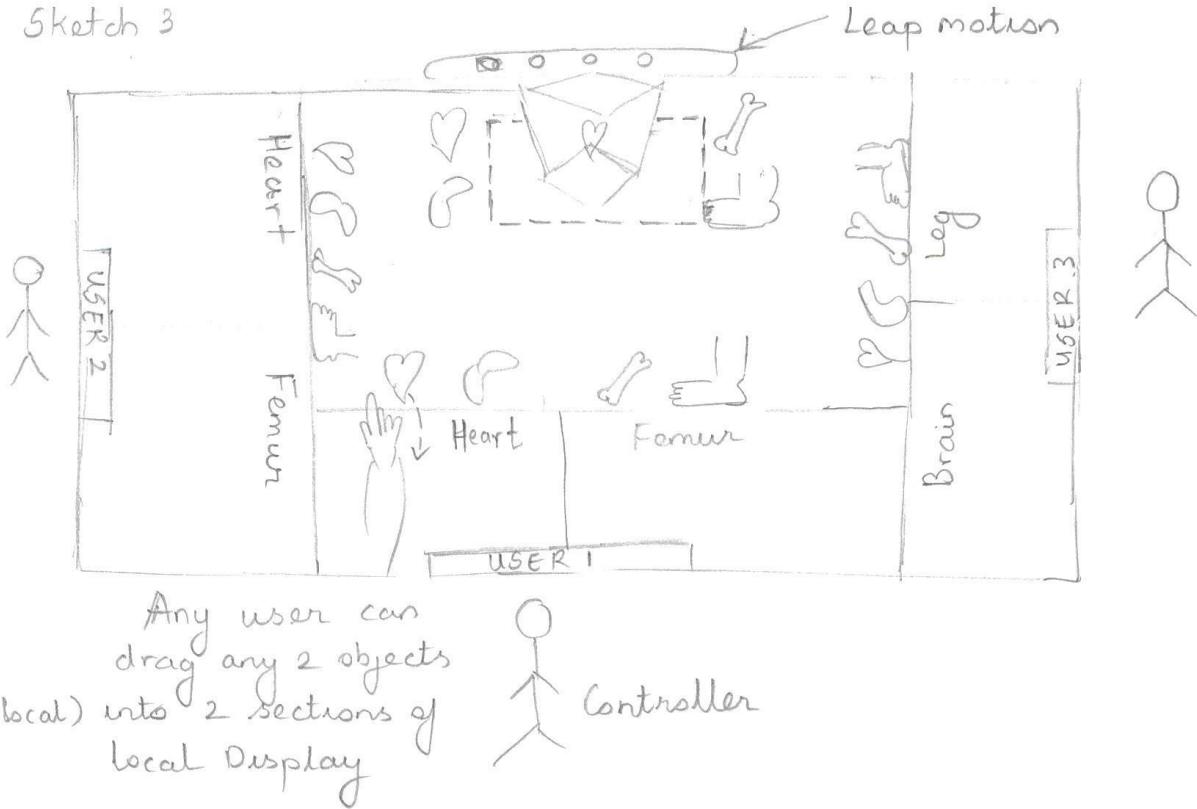
More Info about object on large screen display



Bringing up More Information about an Object on Tabletop
For a particular user



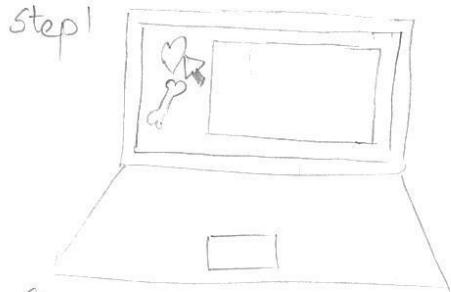
Sketch 3



Bring up More Info of object on Individual Display

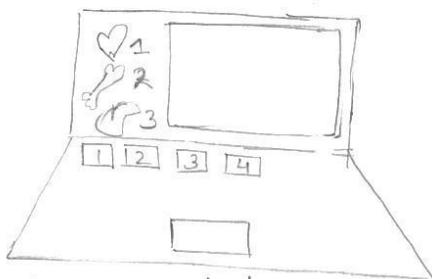
Sketch 1

Step 1



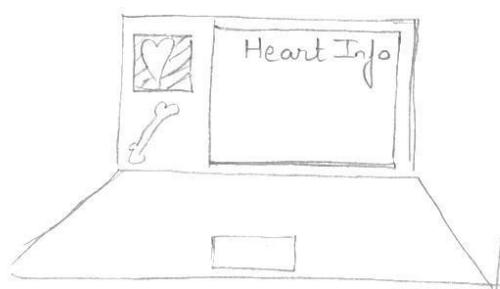
Any user can click on object

Sketch 2

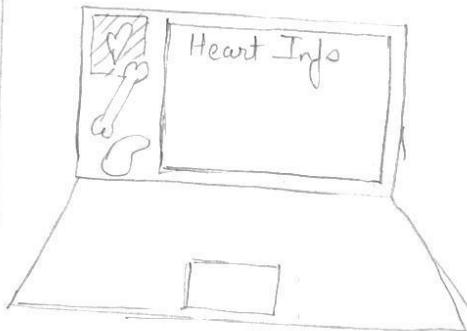


User can click any key associated with an object.

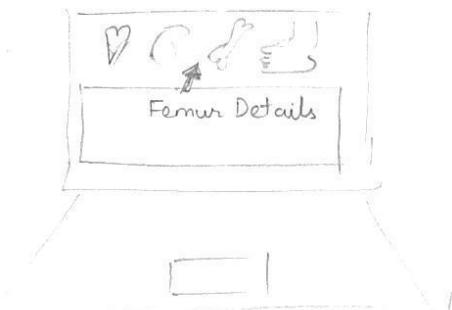
Step 2



Step 2

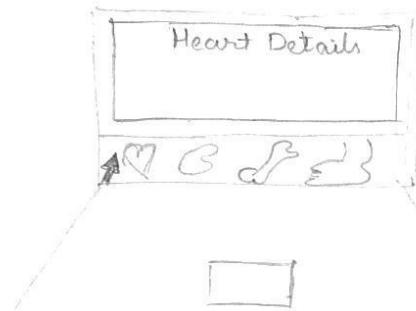


Sketch 3



User Click of mouse or Short cut key

Sketch 4



User Click or short cut key

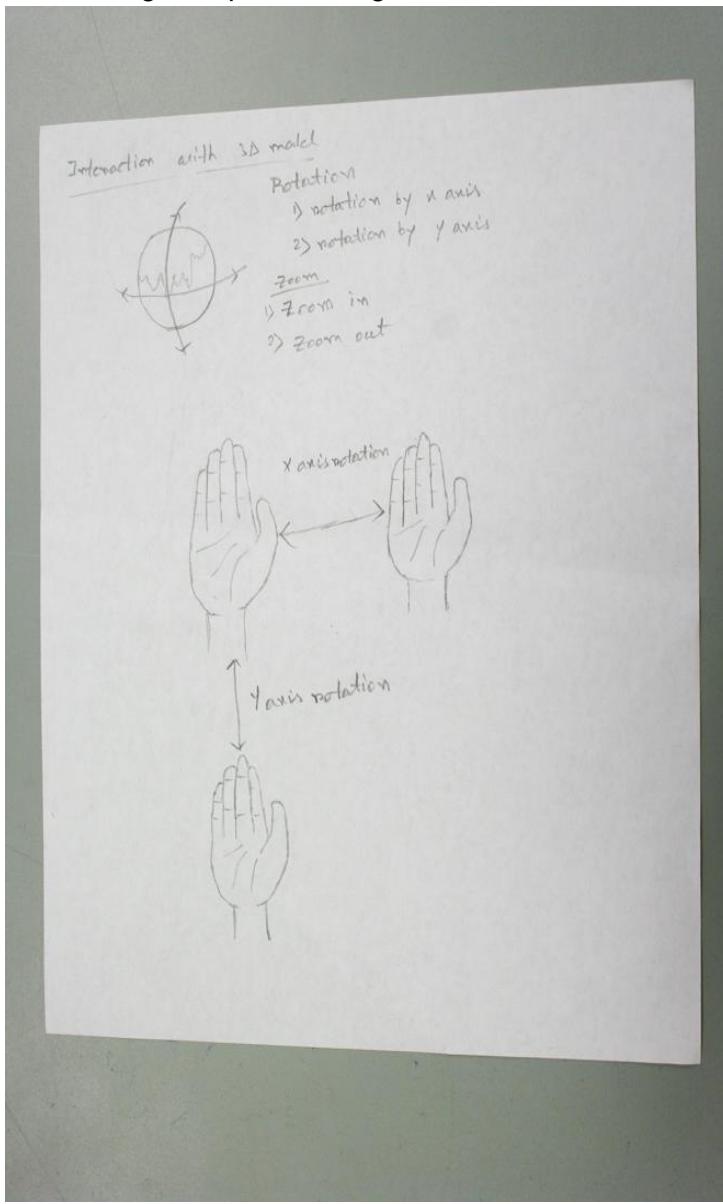
Sudipta

Interaction with 3D hologram(Design challenge 2)

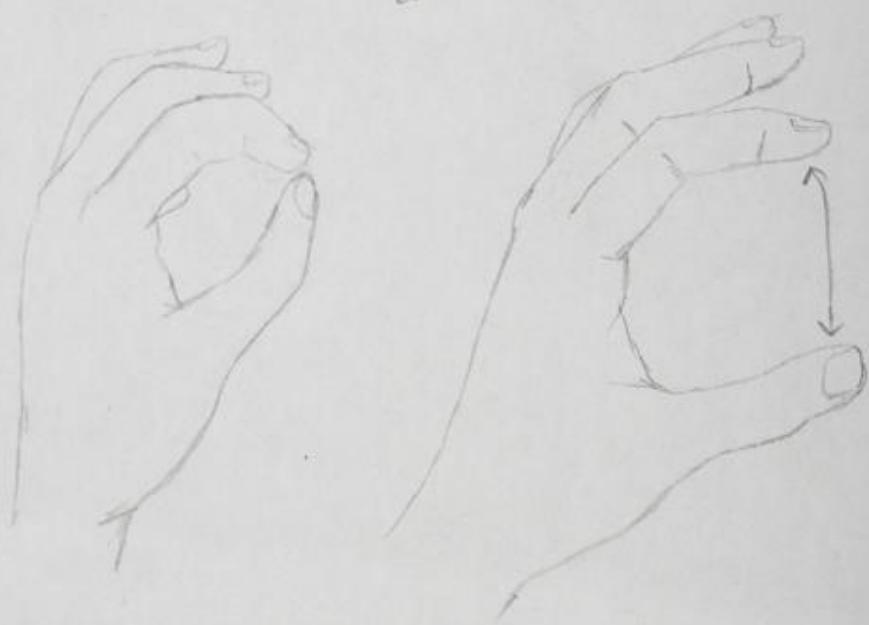
Interaction with the 3D hologram will involve below actions:

- i. Rotation
 - a. X-axis rotation
 - b. Y-axis rotation
- ii. Zooming
 - a. zoom in
 - b. Zoom out

Below images depicts hand gestures for rotation and zooming.

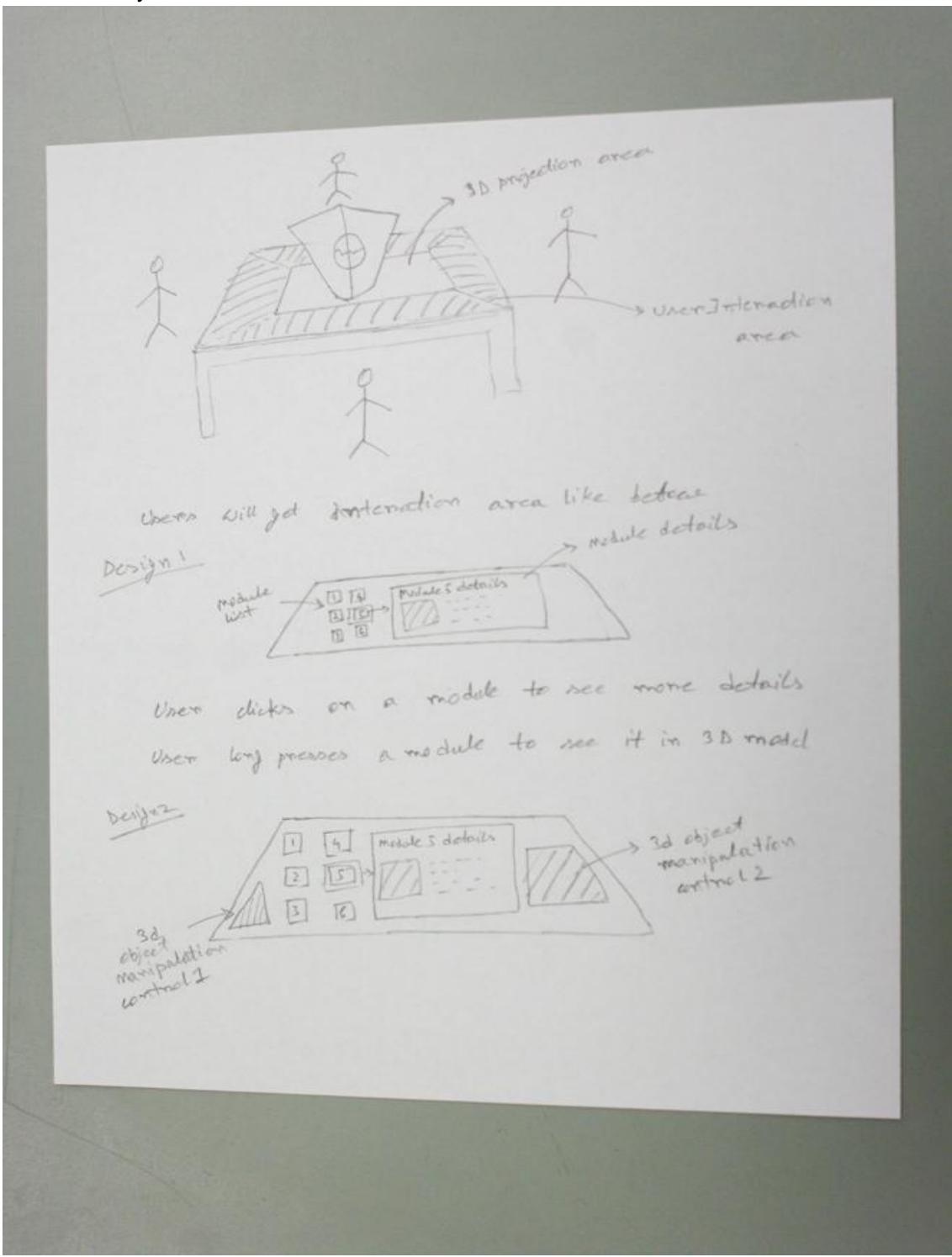


zoom in/out



Design challenge 1,3,4,5,7

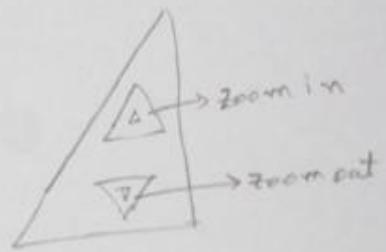
We can use a tabletop display for both 3D projection and user interface. Middle portion of the tabletop can be used for 3D projection and the sides for user interaction. Next pictures depict this feasibility.



3d object manipulation control 2



Control 1



Users can control 3d object using 2 hands

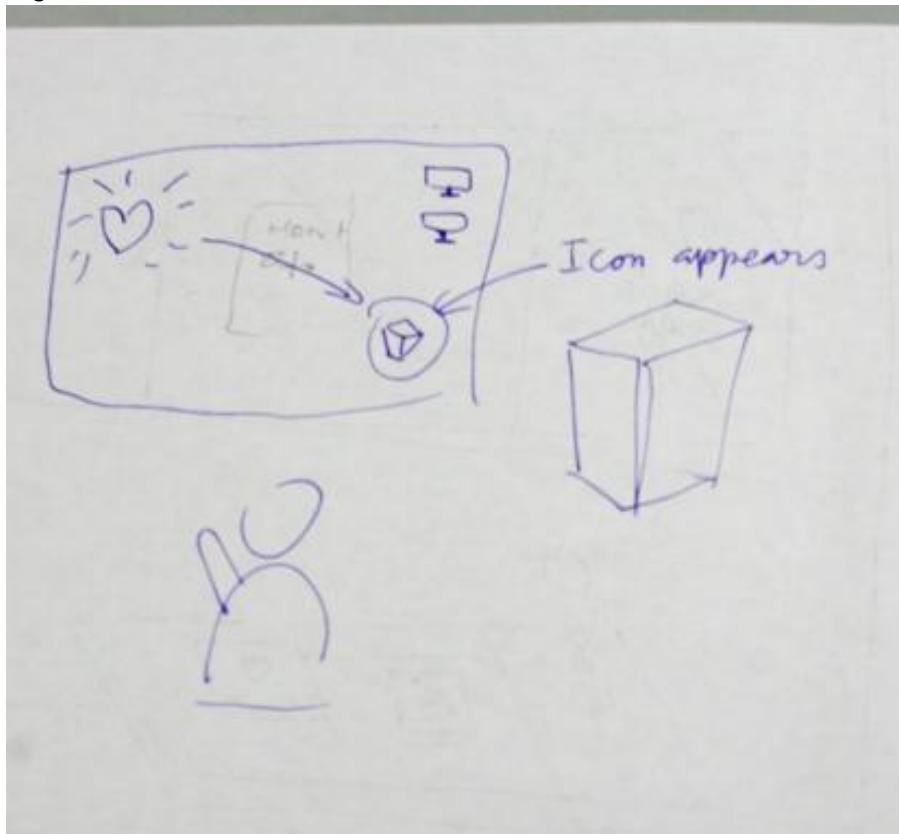
In user interaction section portion will allow users to have individual view of the content. Users will also be provided buttons to interact with 3D model. Up, down, left, right buttons will rotate the hologram. Zoom in/ zoom out buttons are for zooming and reset button to reset the 3D hologram to previous state.

In the user interface there will be list of each modules of the content. Users will be able to select modules for details view.

A long press in a module will bring the 3D model of the module in holographic display.

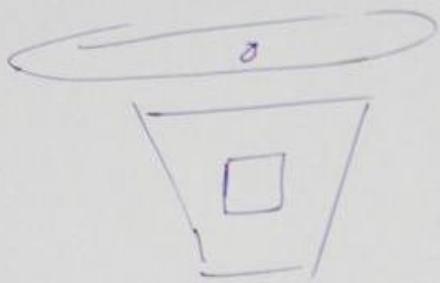
Hai

Design Challenge 3



When an object on the 2D screen is selected, an icon representing a container will appear at the corner of the screen. User can drag and drop the object into the container; the object will then appear in the 3D projector.

①



①



rotate hand clockwise to
rotate the object clockwise

② rotate hand anticlockwise
to rotate obj anticlockwise

②



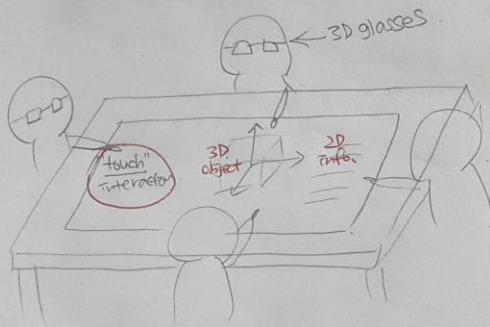
→ swipe right to ~~rotate~~ object.

Ja Eun

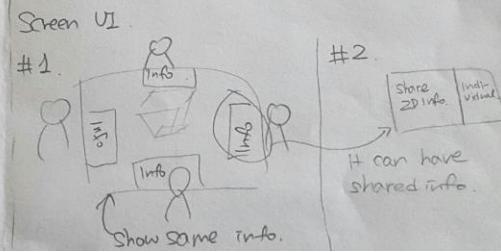
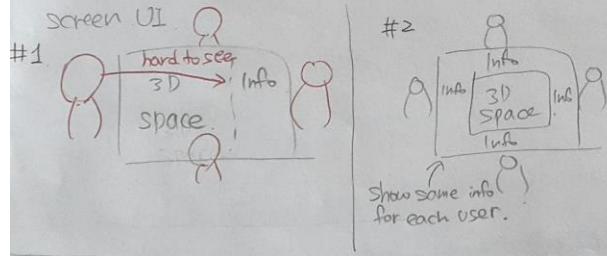
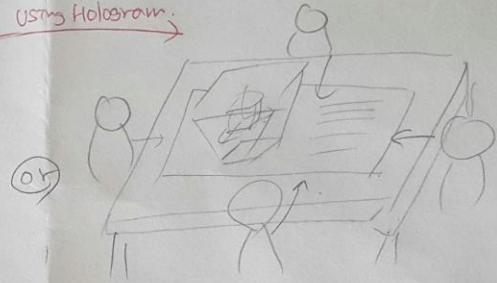
Sketches for Design Challenge 1:

- Shared Screen.
3D.

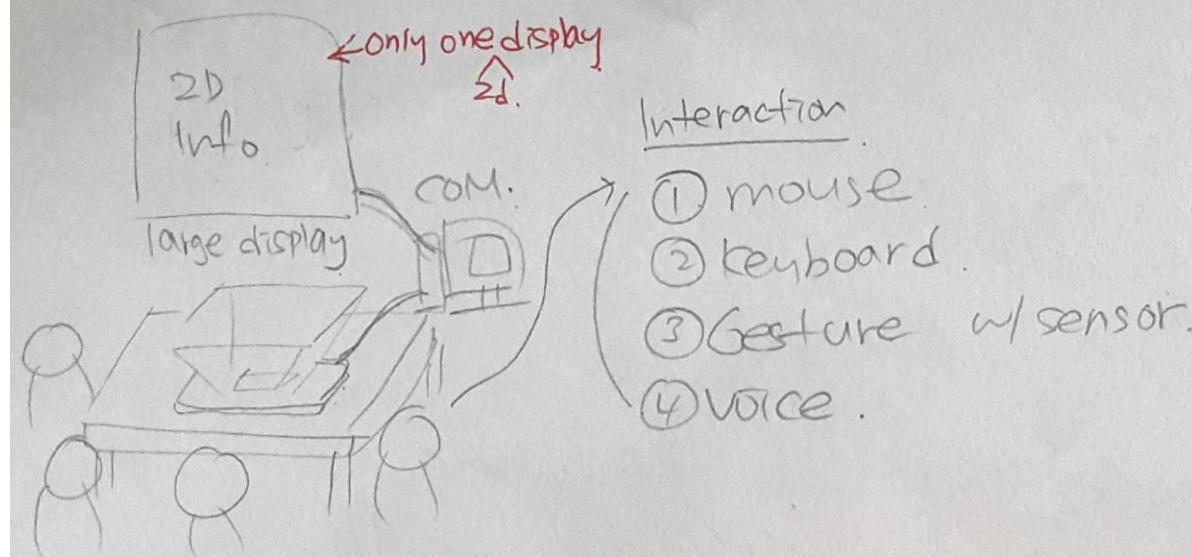
① Tabletop touch screen.



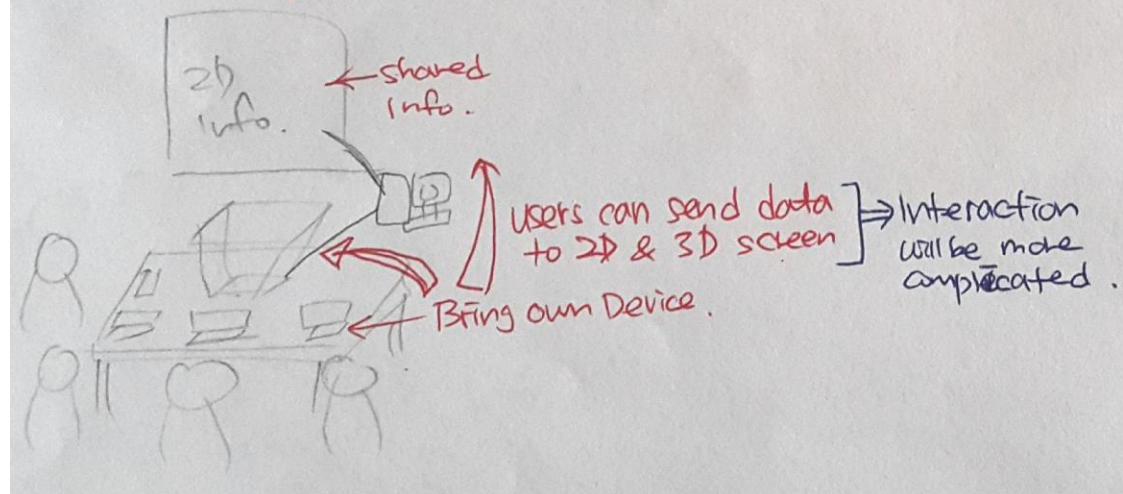
No glasses.
using Hologram.



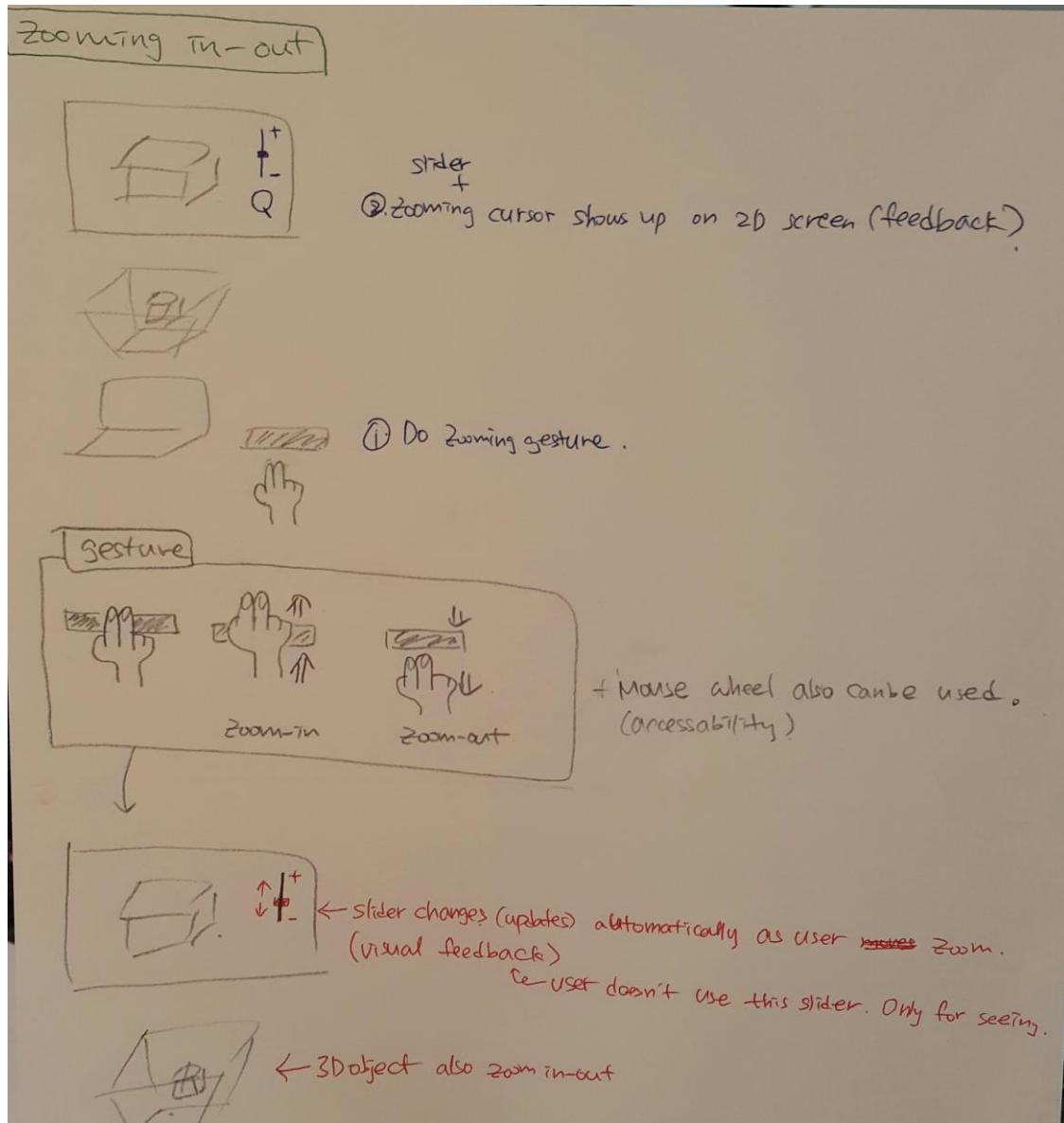
- Shared 3D screen (2) Hologram



+ Bring Own Device.

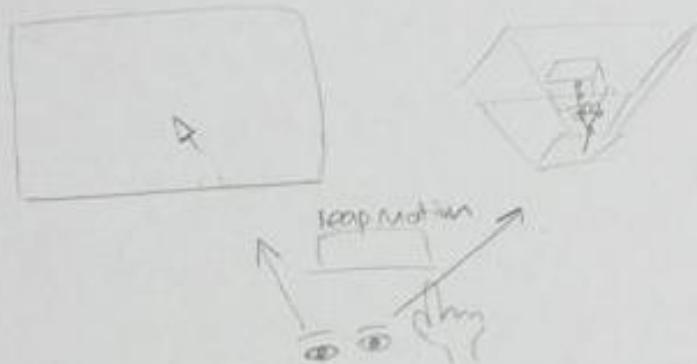


Sketches for Design Challenge 2:

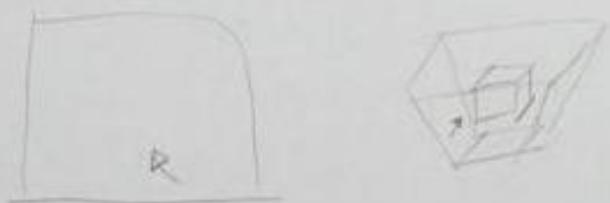


Sketches for Design Challenge 5:

* How to point to a particular object to explain.

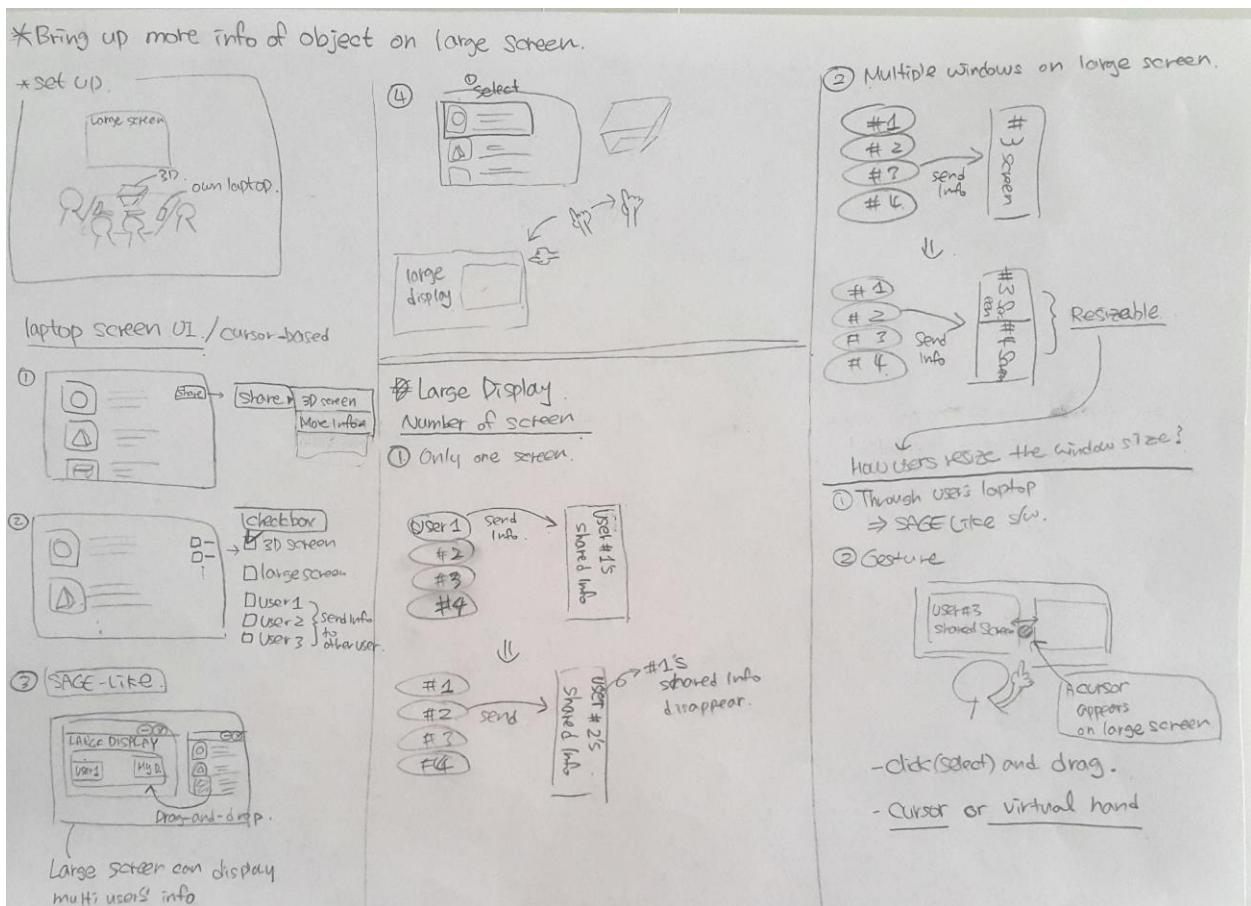
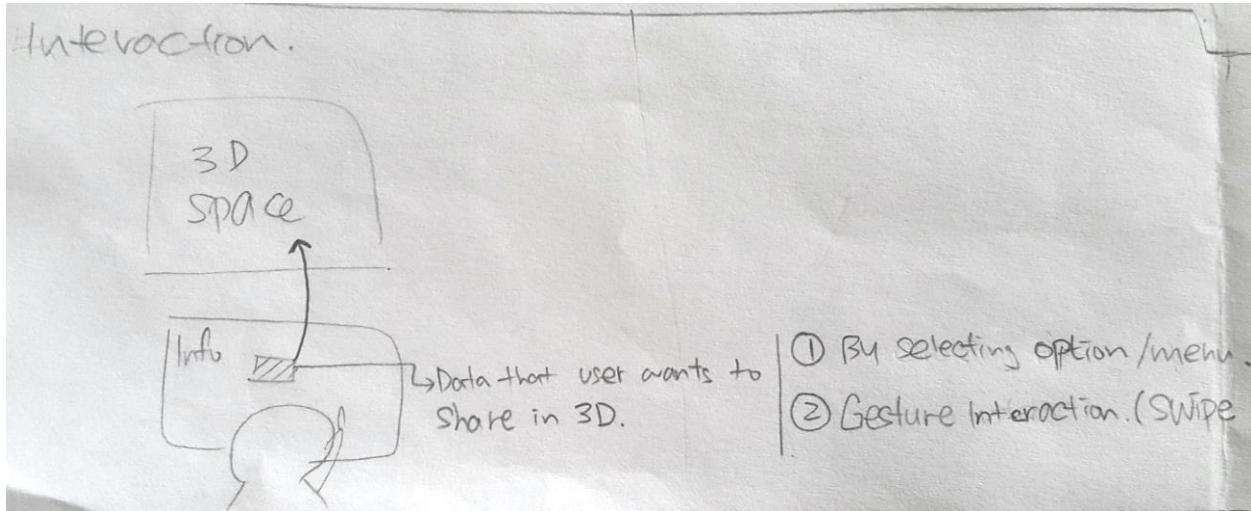


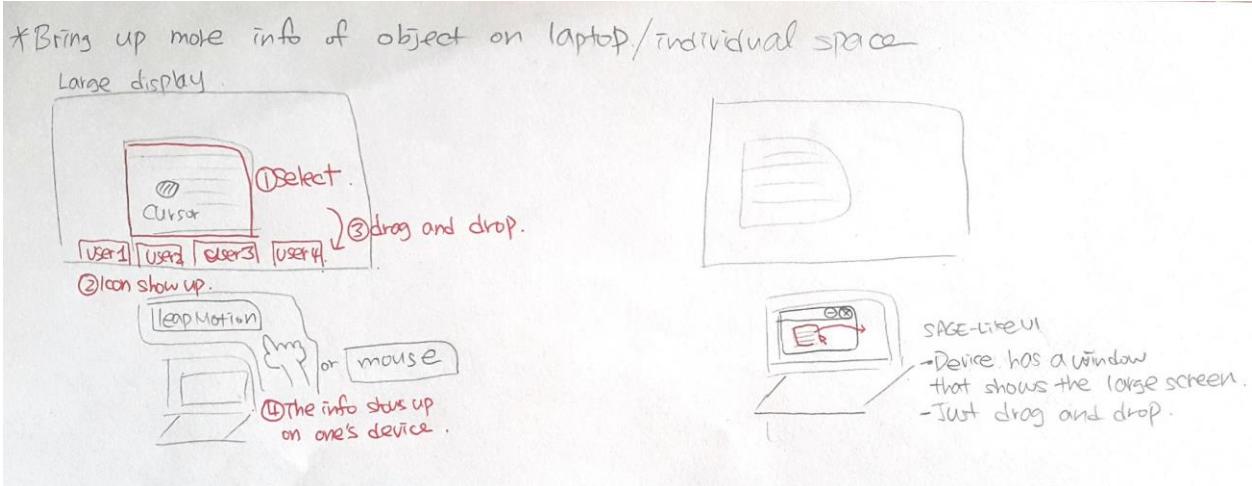
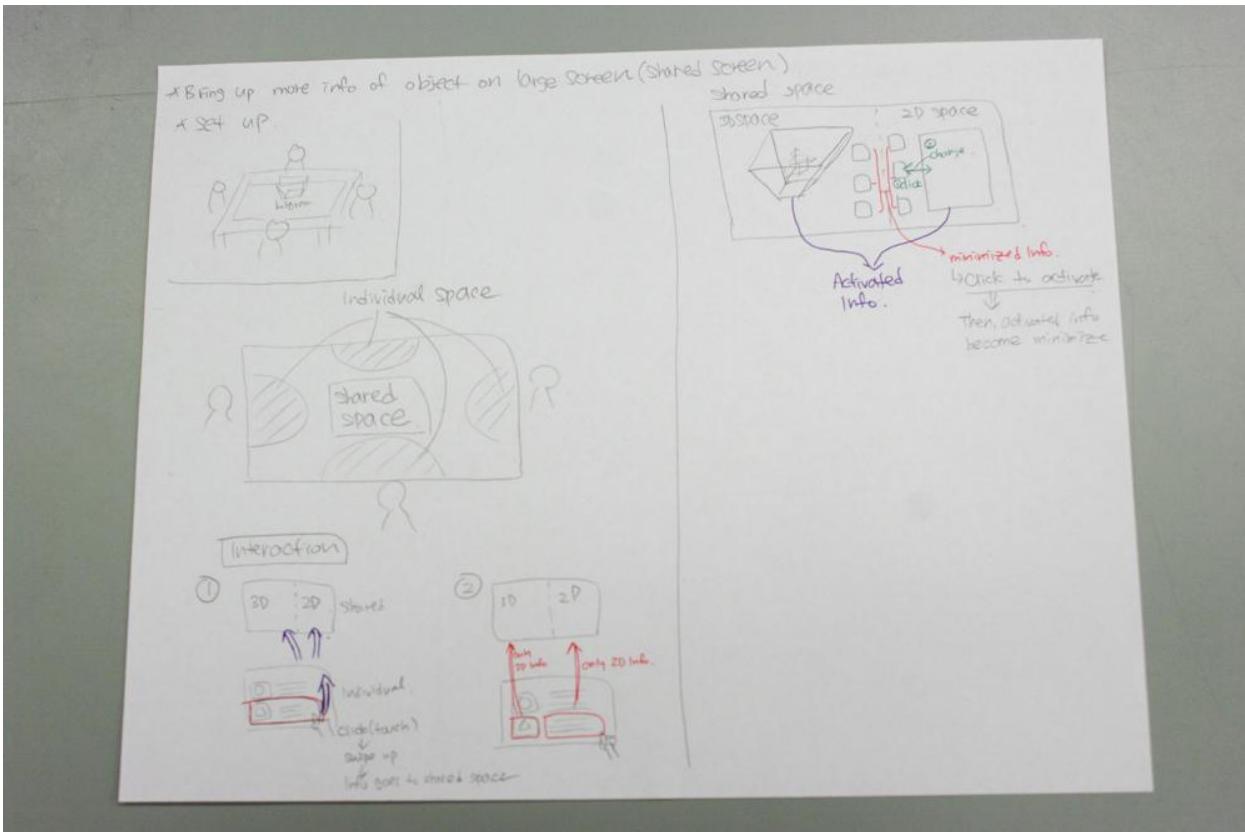
- cursor or virtual hand shows up to point
the place when the user wants to point
and explain.



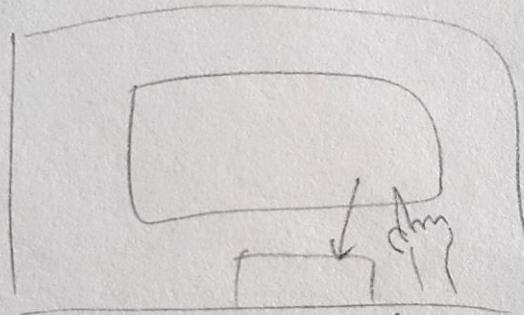
- A cursor is used to point. The user see his/her own device to move the cursor.

Sketches for Design Challenge 9:





If we use tabletop display.
we can just use drag - drop.



Conclusions for Iteration 2:

Design Challenges Concluded:

1. Should the system provide users with an individual view of the content ?
2. How can group members share/transfer control of the 2d screen?
3. How to allow user to pull up more information about an object on shared screen or individual display?
4. How will the system allow learners to see an individual view of the content and a shared view of the content being discussed?
5. How to interact with the 3D object (Hardware to use and Rotation and Zooming)?

Design Challenges Continued for next iteration:

1. How to bring an object from the shared 2D screen to the 3D display (and vice versa)?
2. How to display object parts which can be marked and how a driver can mark or point to an object part which is currently being explained?
3. How to allow user to pull up more information about an object on shared screen or individual display?

Iteration 3

Design Challenges Continued From previous iterations:

1. How to bring an object from the shared 2D screen to the 3D display (and vice versa)?
2. How to display object parts which can be marked and how a driver can mark or point to an object part which is currently being explained?
3. How to allow user to pull up more information about an object on shared screen or individual display?

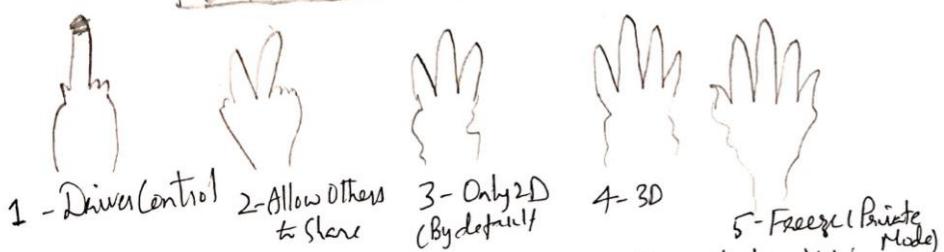
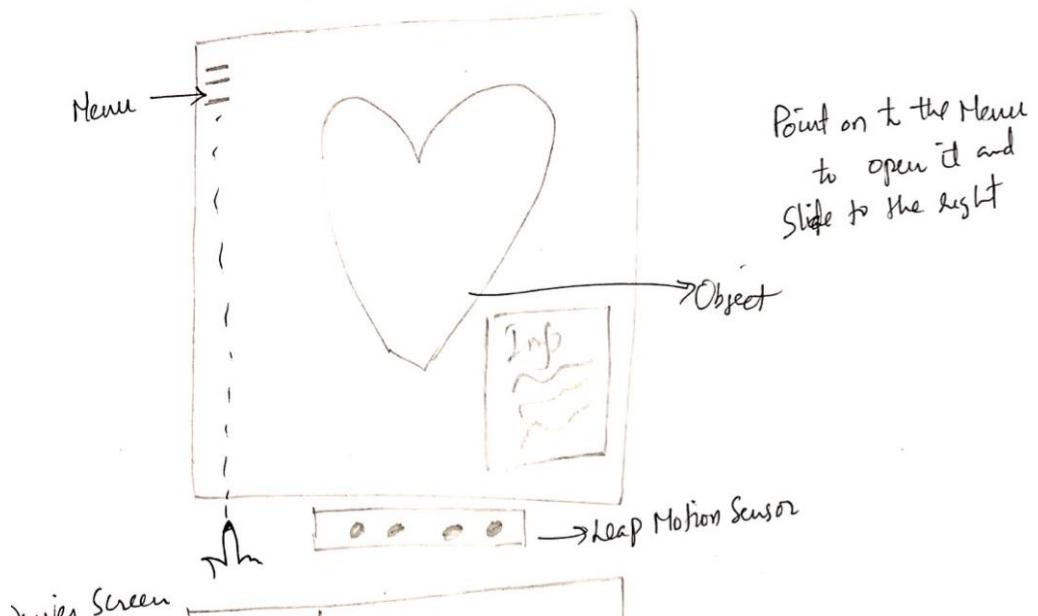
New Design Challenges Discussed:

4. GUI of Client Application?
5. GUI of Shared screen?
6. How will the gestures made using leap motion and mouse and keyboard interactions with the system be made discoverable to the drivers?

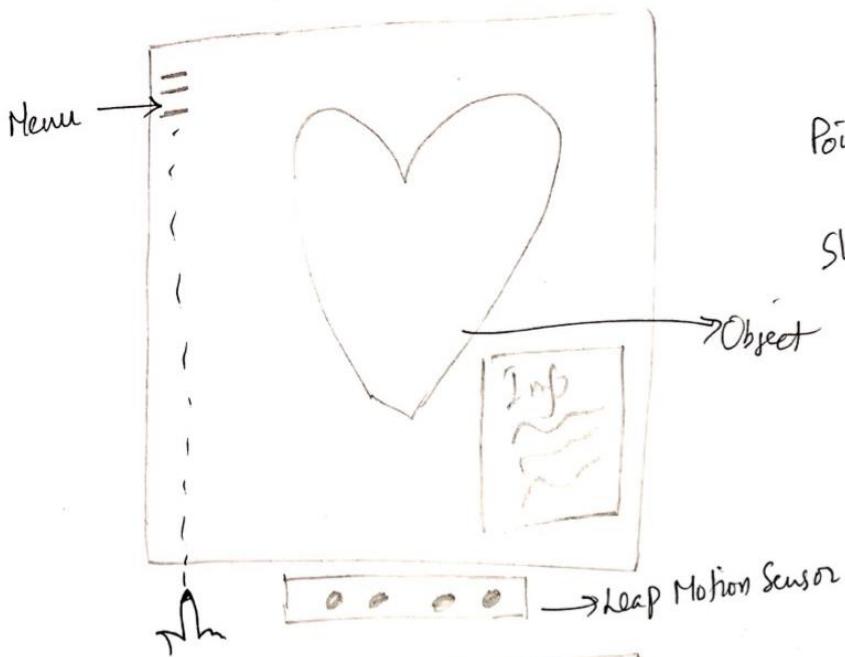
Sketches:

Ramkiran

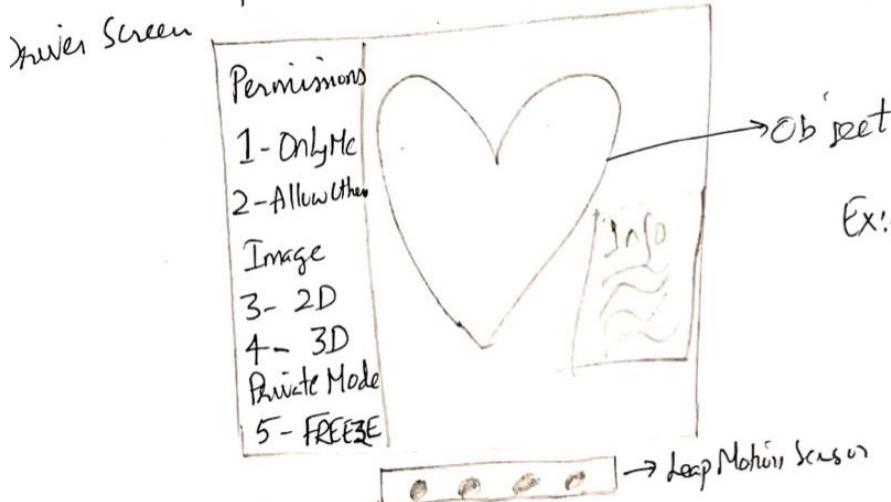
Design Challenge 1,2,3,4,5,6:



Indicates number of fingers to be shown to leap Motion sensor to select functions



Point on to the Menu
to open it and
slide to the right

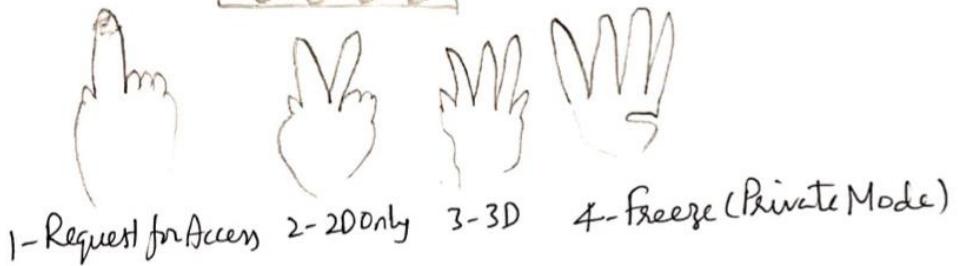
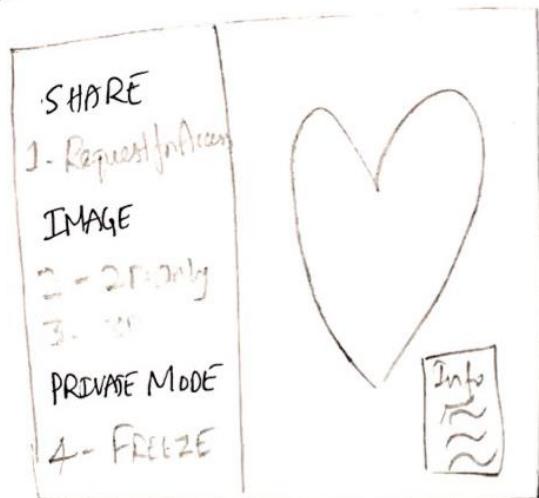


Ex:- Show 3 fingers to
Only display 2D.

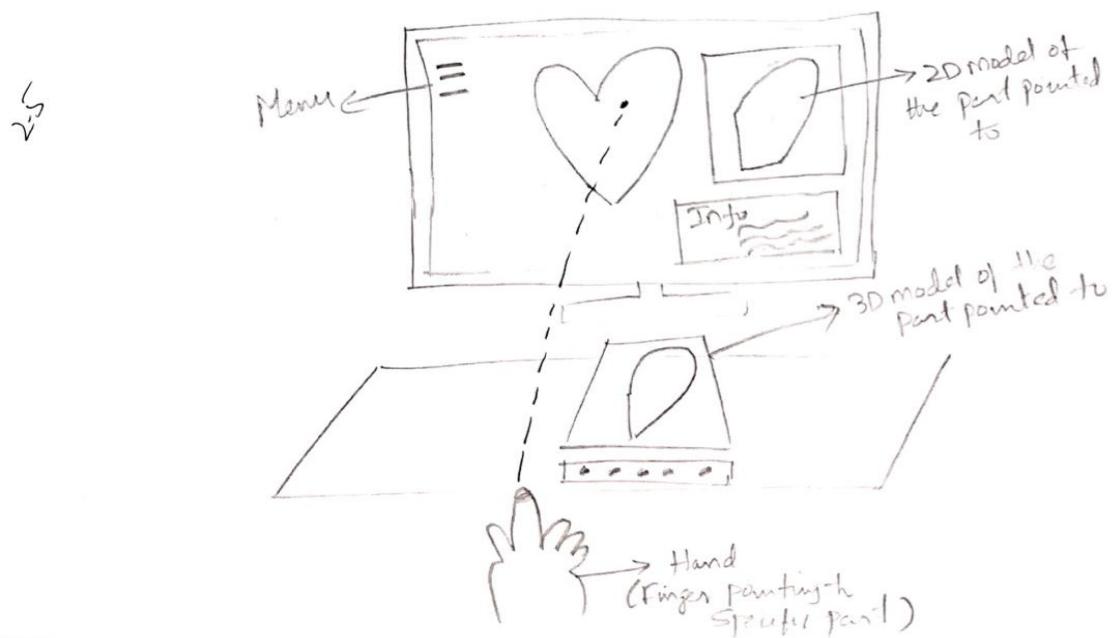


Indicates number of fingers to be shown to Leap Motion sensor to select function

Passenger Screen



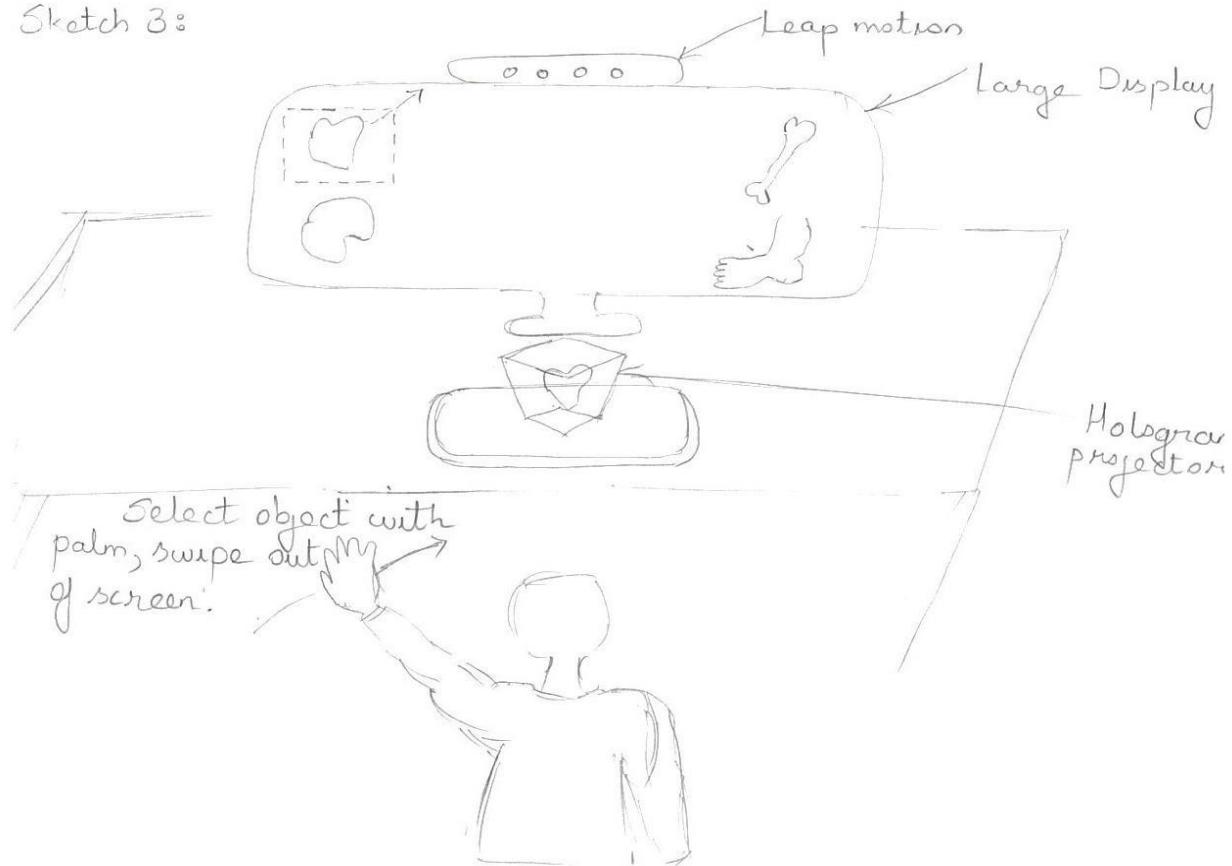
Design challenge to point to a part of the object :-



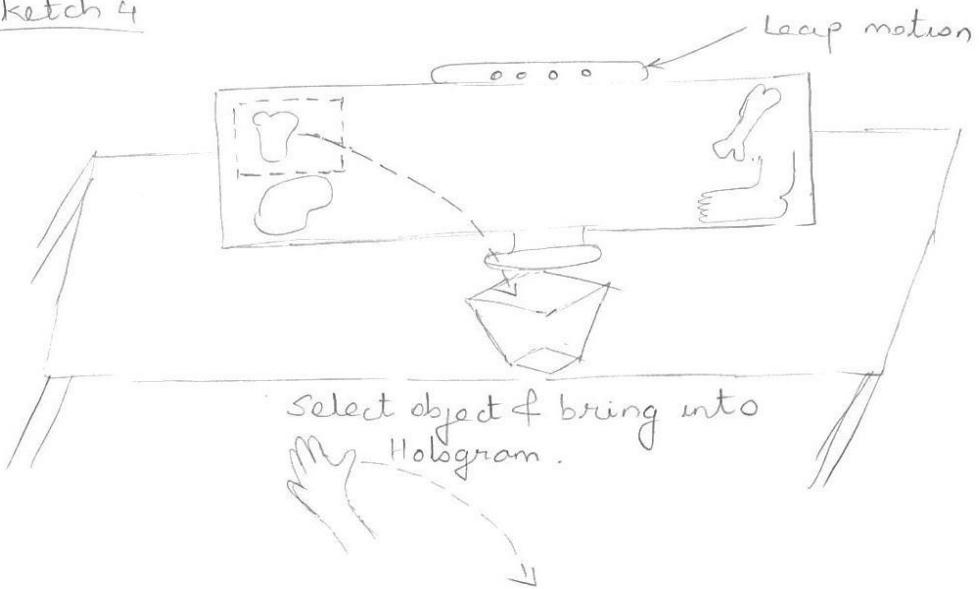
Shreyas:

Design Challenge 1:

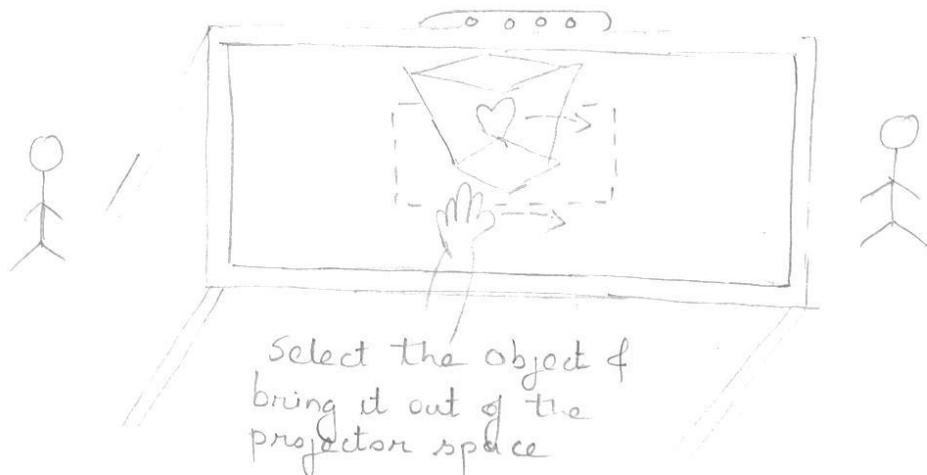
Sketch 3:



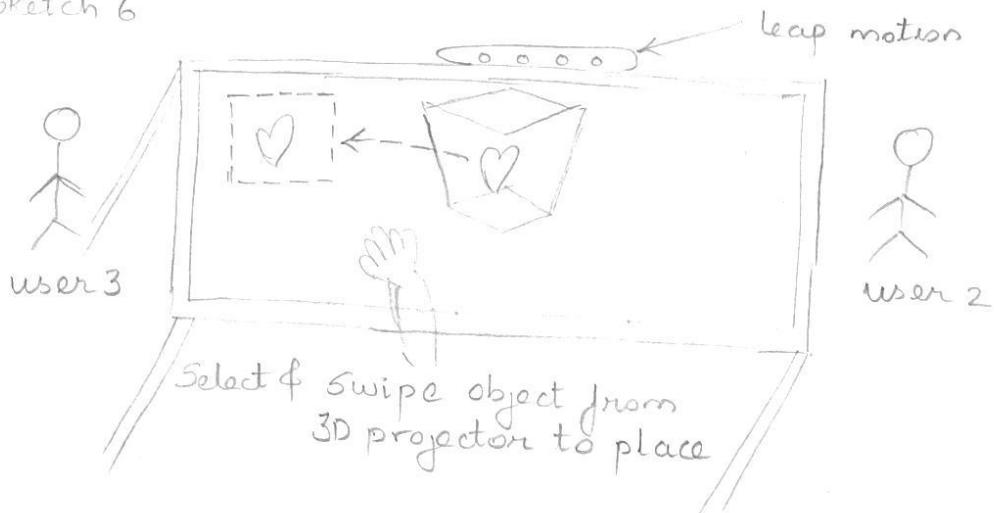
Sketch 4



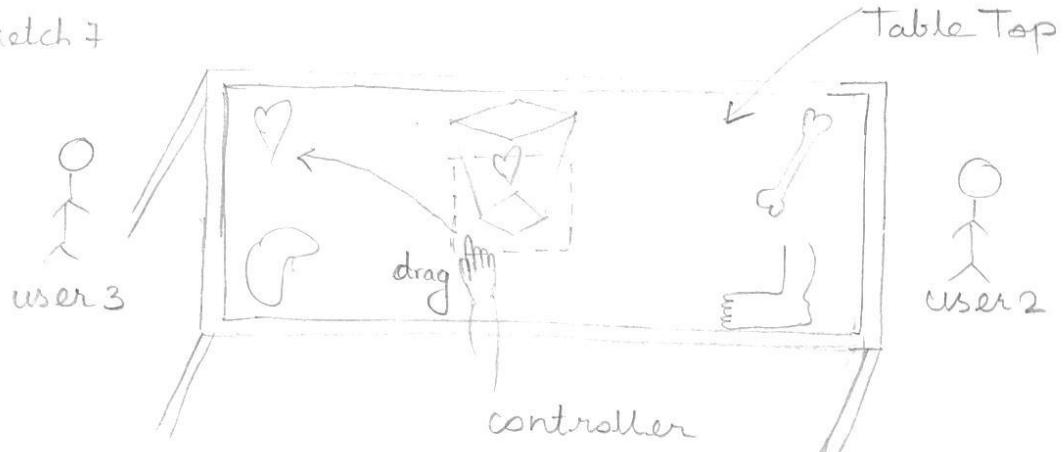
Sketch 5



Sketch 6

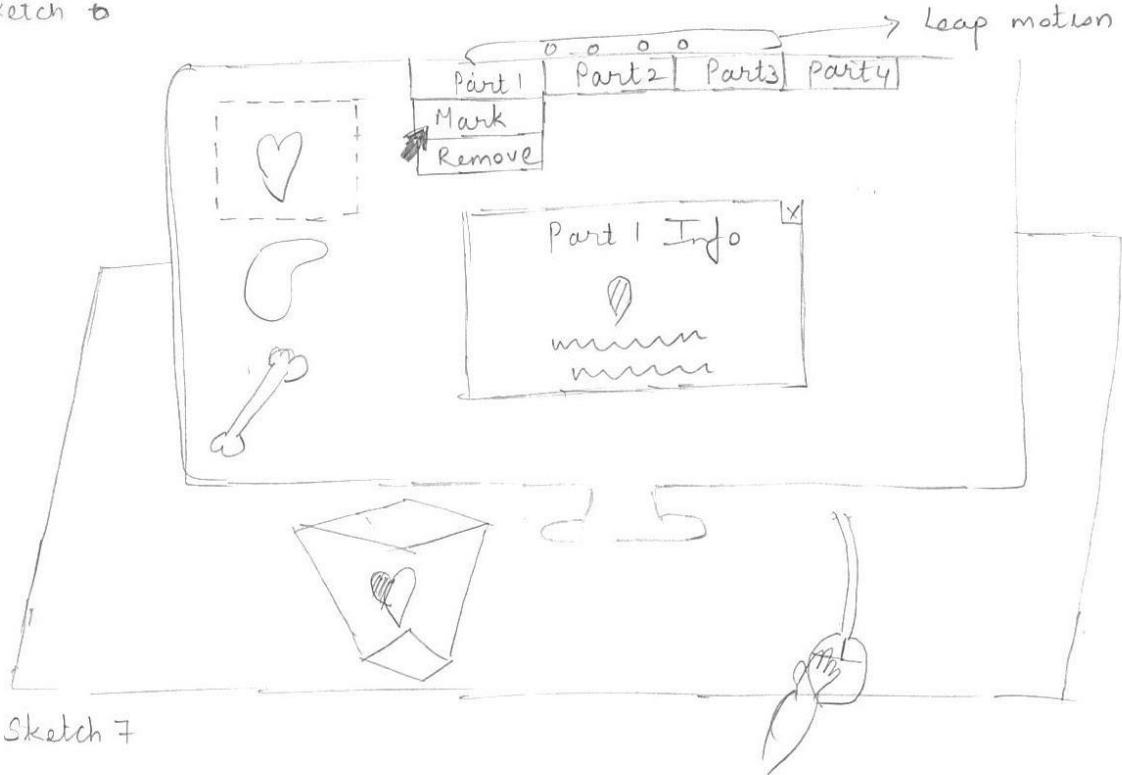


Sketch 7



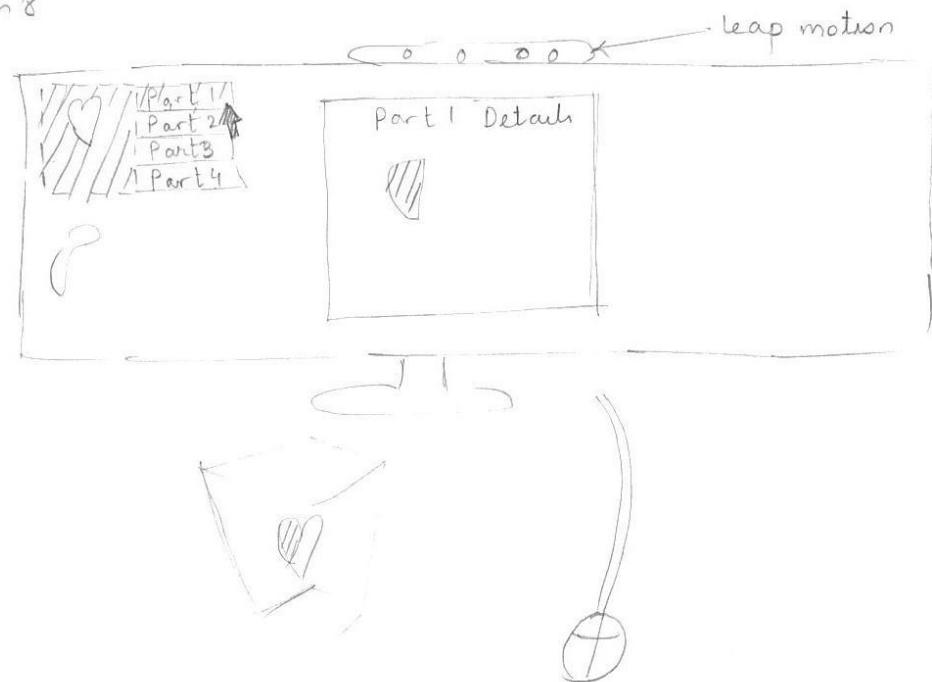
Design Challenge 2:

Sketch 6



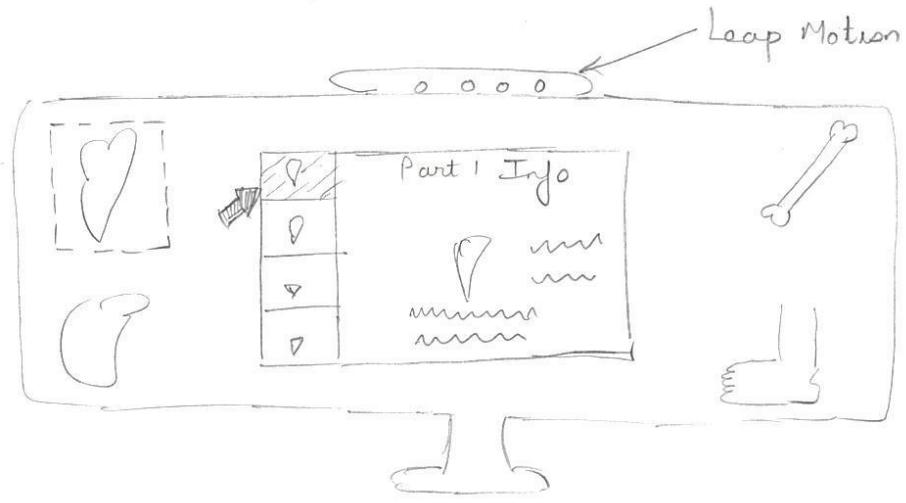
Sketch 7

Sketch 8

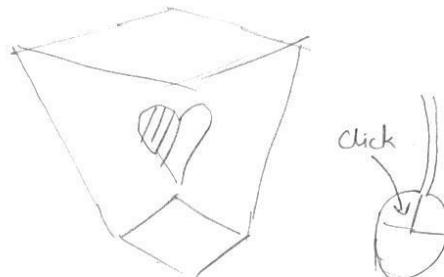


How to Mark an object part

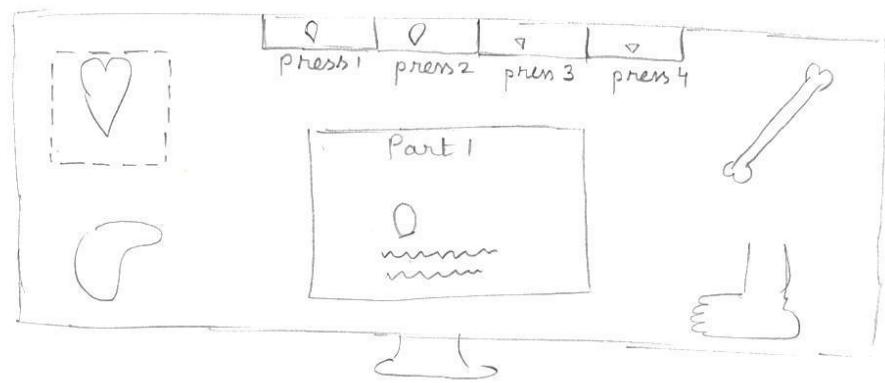
Sketch 4



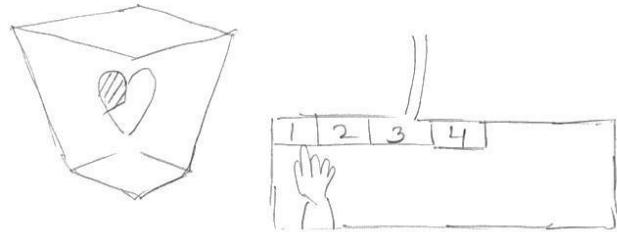
2 5



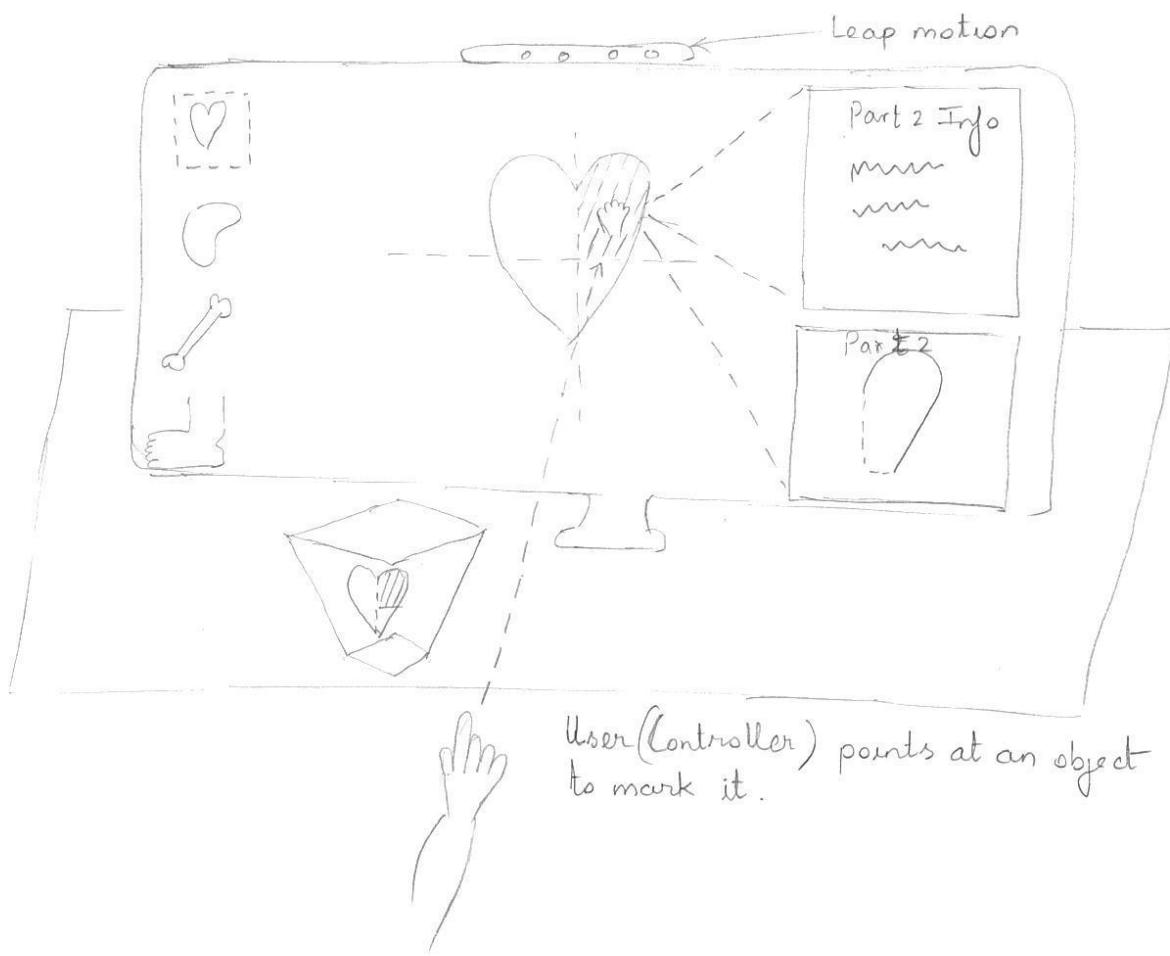
Sketch 5



2 5



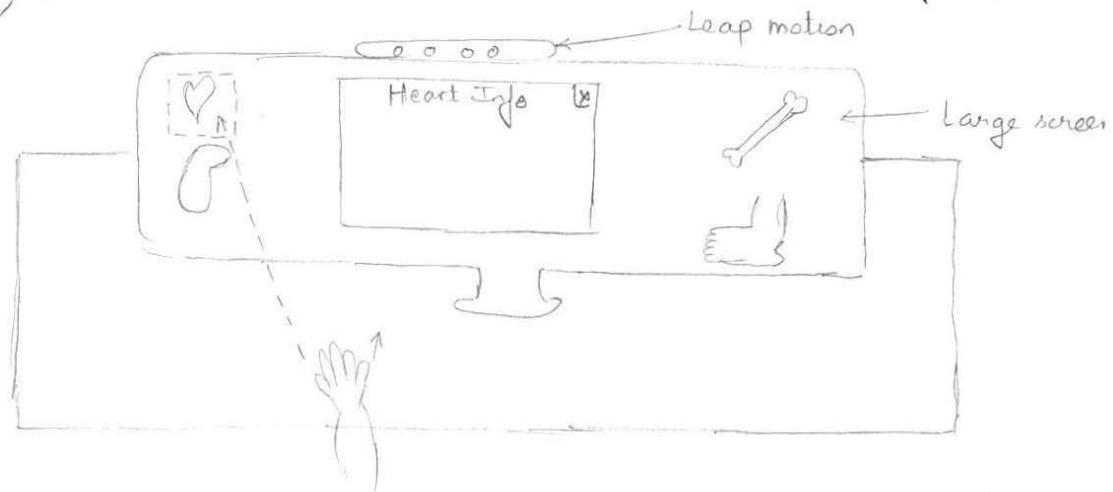
Sketch 9 - Final Iteration



Sketches for Design Challenge 3:

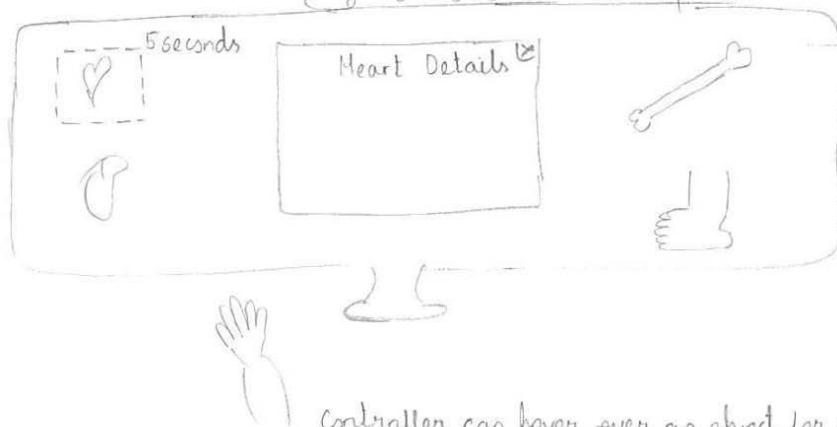
How to bring up more information about an object on a common display

Sketch 1)



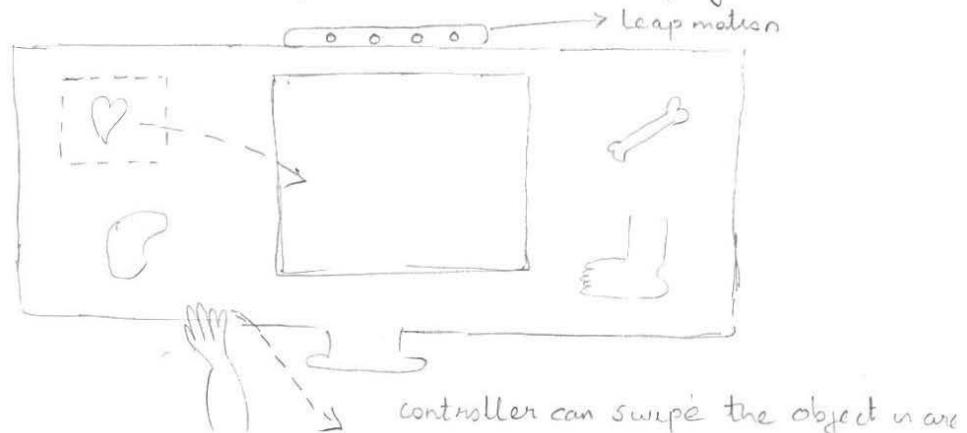
Controller selects the object by pushing it.

Sketch 2



Controller can hover over an object for 5 seconds to place it in the common Display

Sketch 3



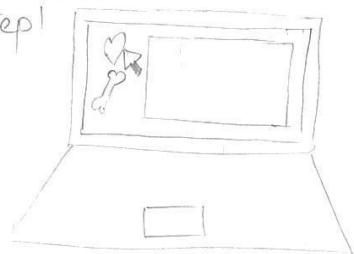
controller can swipe the object in arc

Sketches for Design Challenge 4 and 5:

Bring up More Info of object on Individual Display

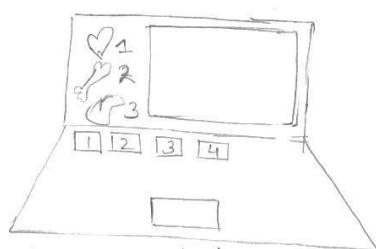
sketch 1

Step 1



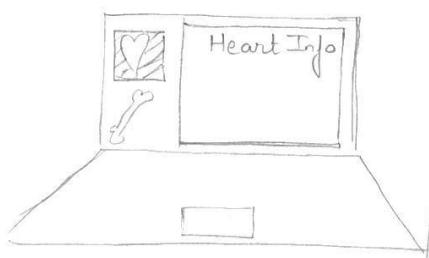
Any user can click on object

Sketch 2

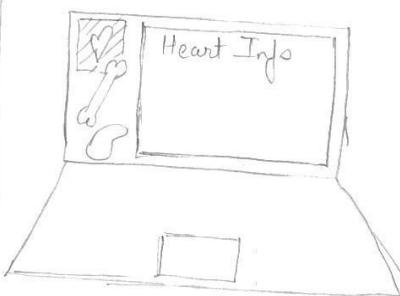


User can click any key associated with an object.

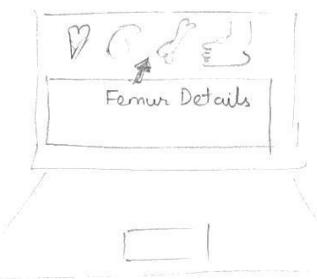
Step 2



Step 2

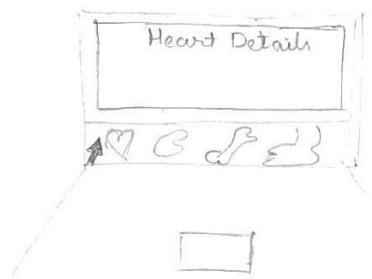


Sketch 3



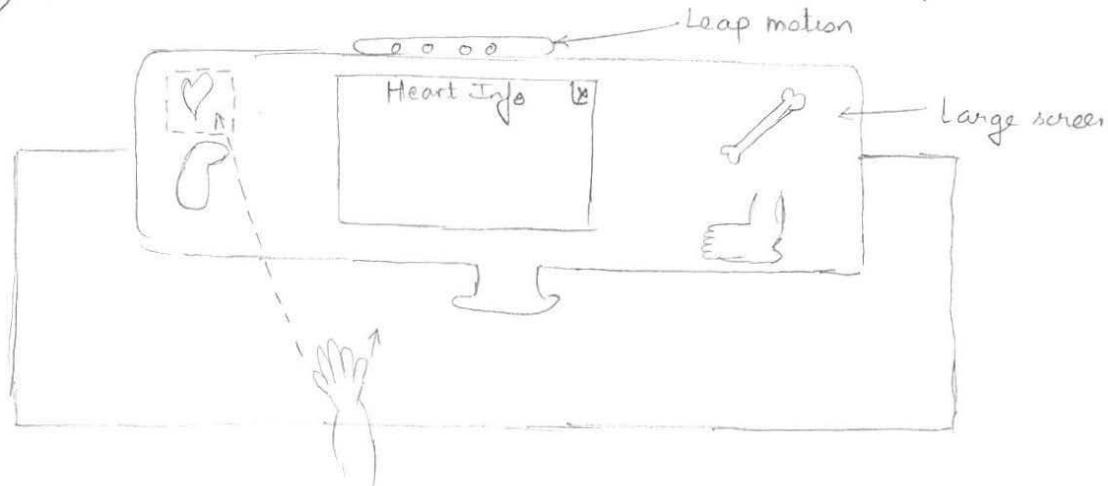
User Click of mouse or Short cut key

Sketch 4

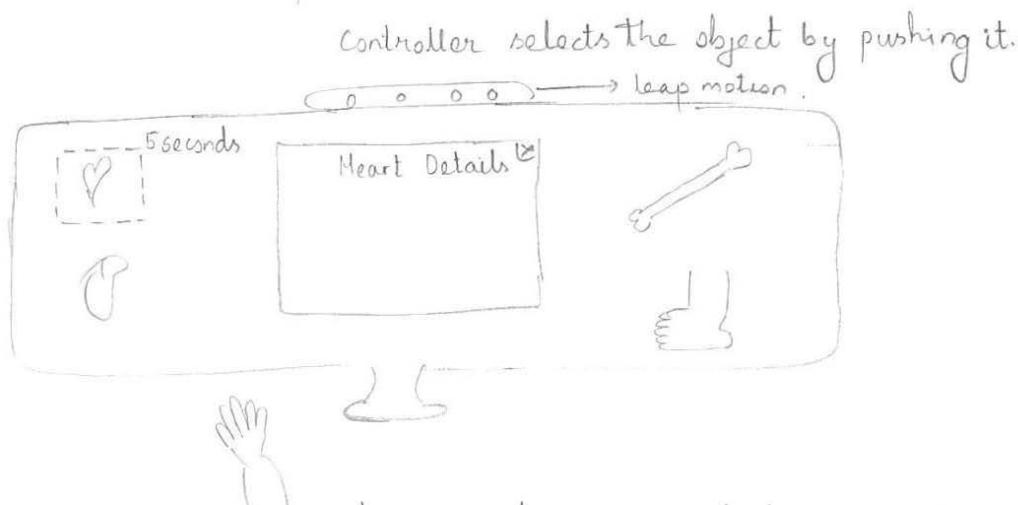


User Click or short cut key

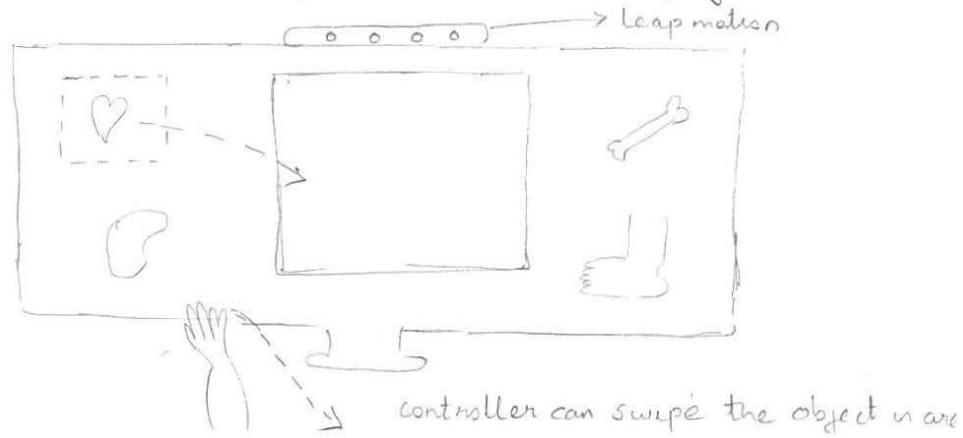
How to bring up more information about an object on a common display
Sketch 1)



Sketch 2

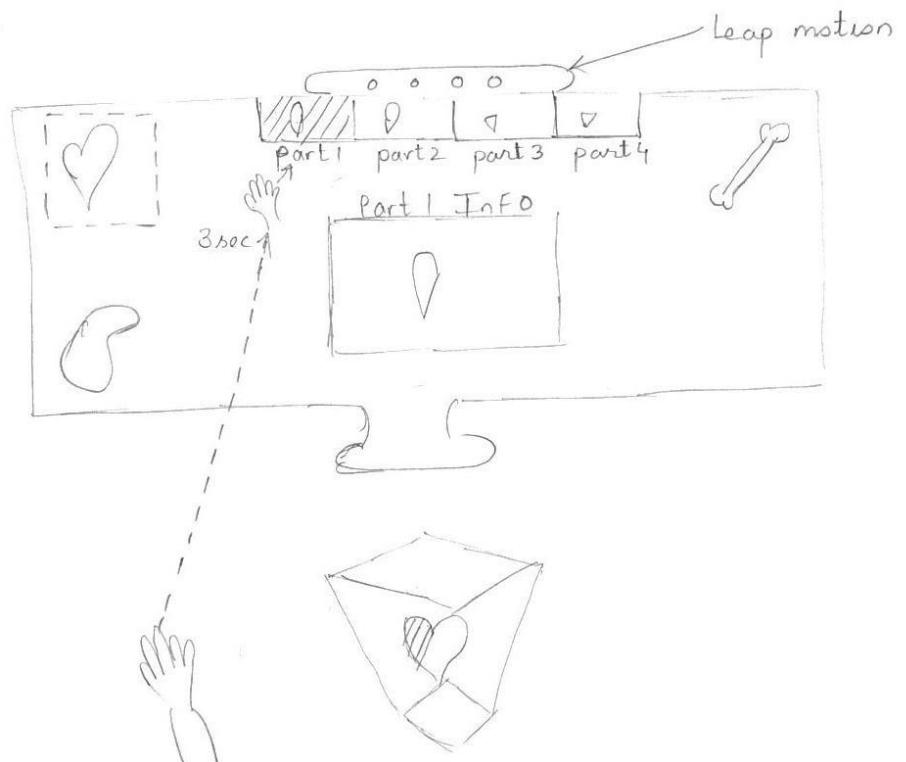


Sketch 3



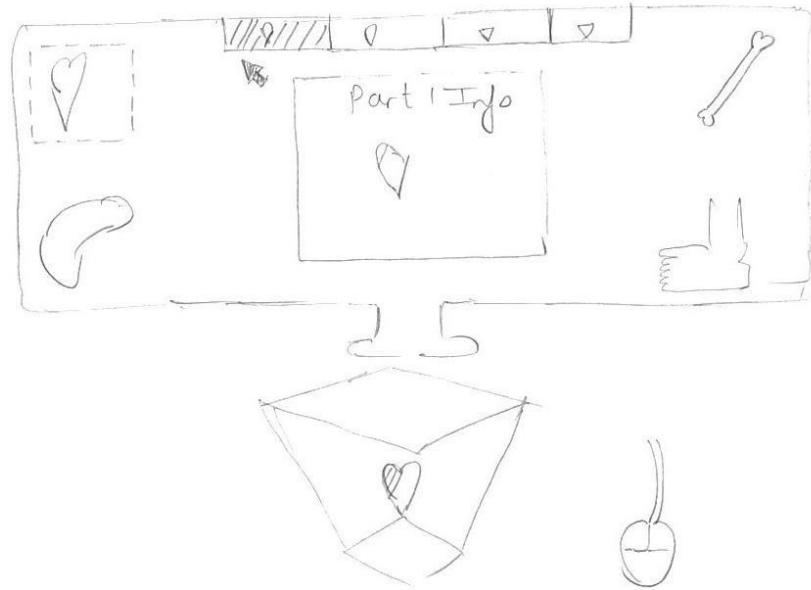
controller can swipe the object in air

Sketch 2.



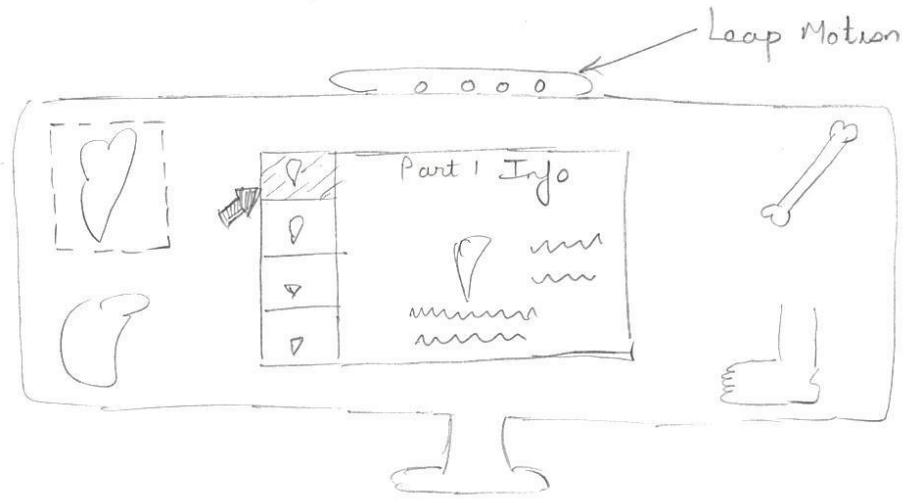
User can hover over a part for 3 seconds
to mark it

Sketch 3

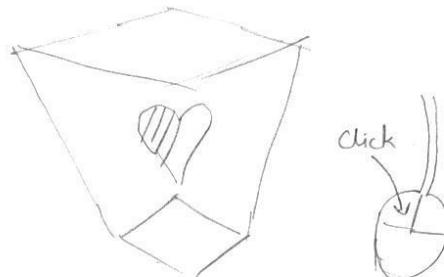


How to Mark an object part

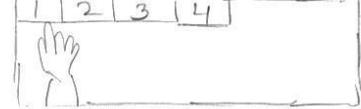
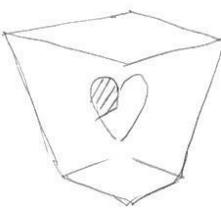
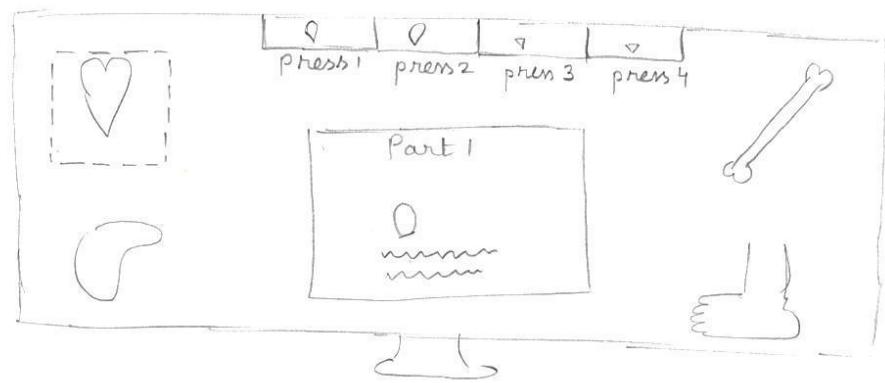
Sketch 4



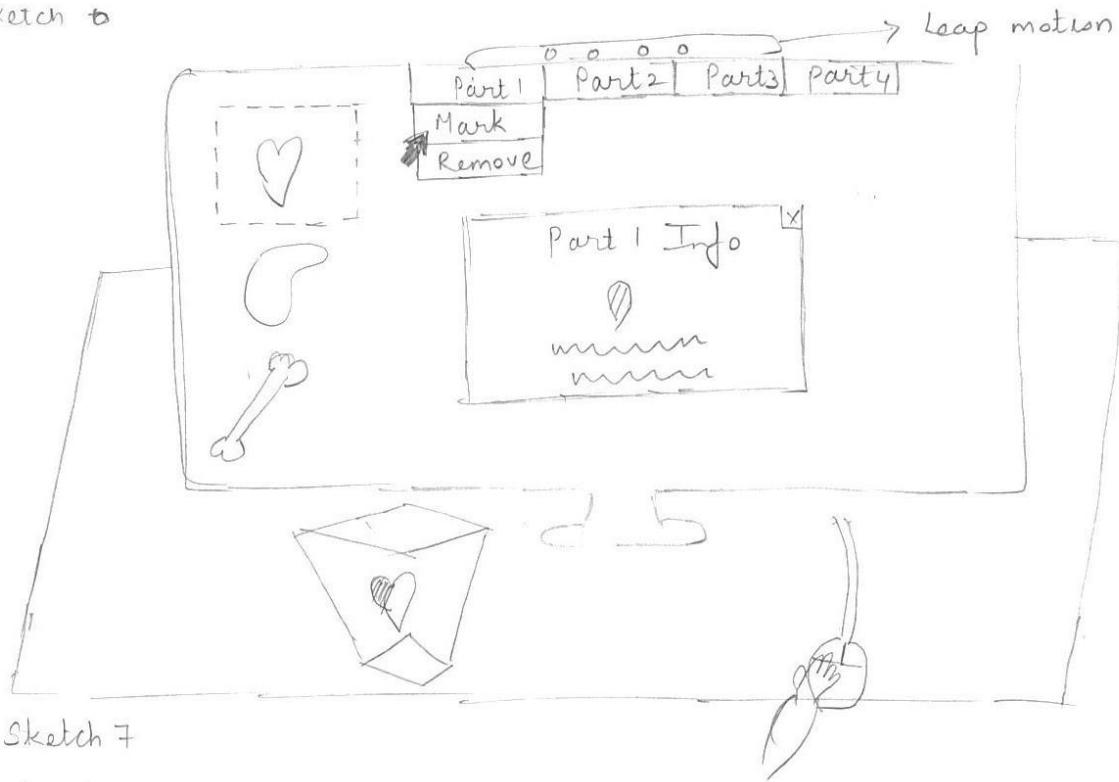
2 5



Sketch 5

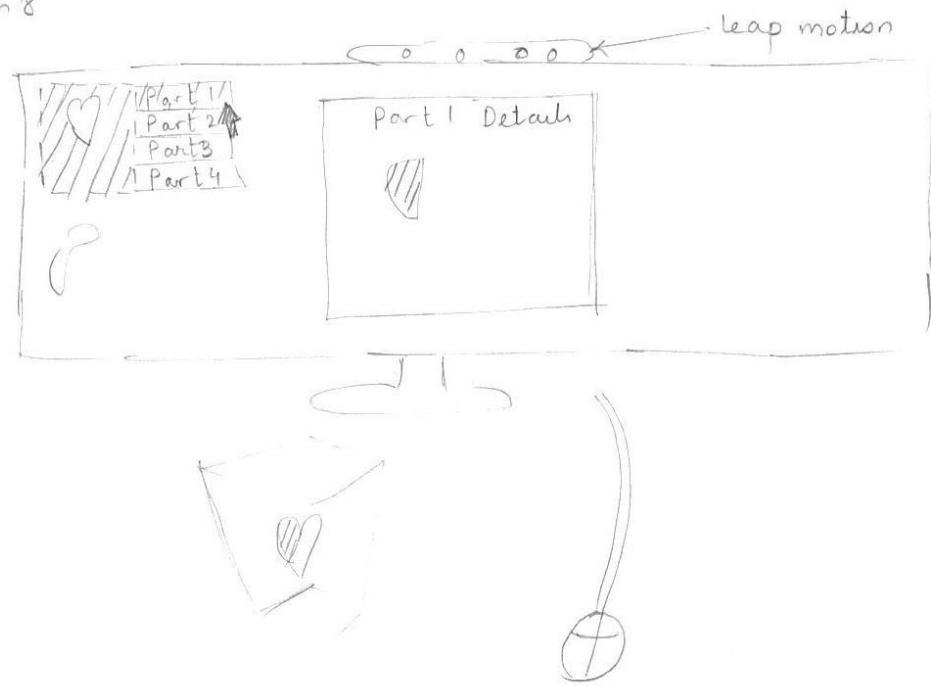


Sketch 6

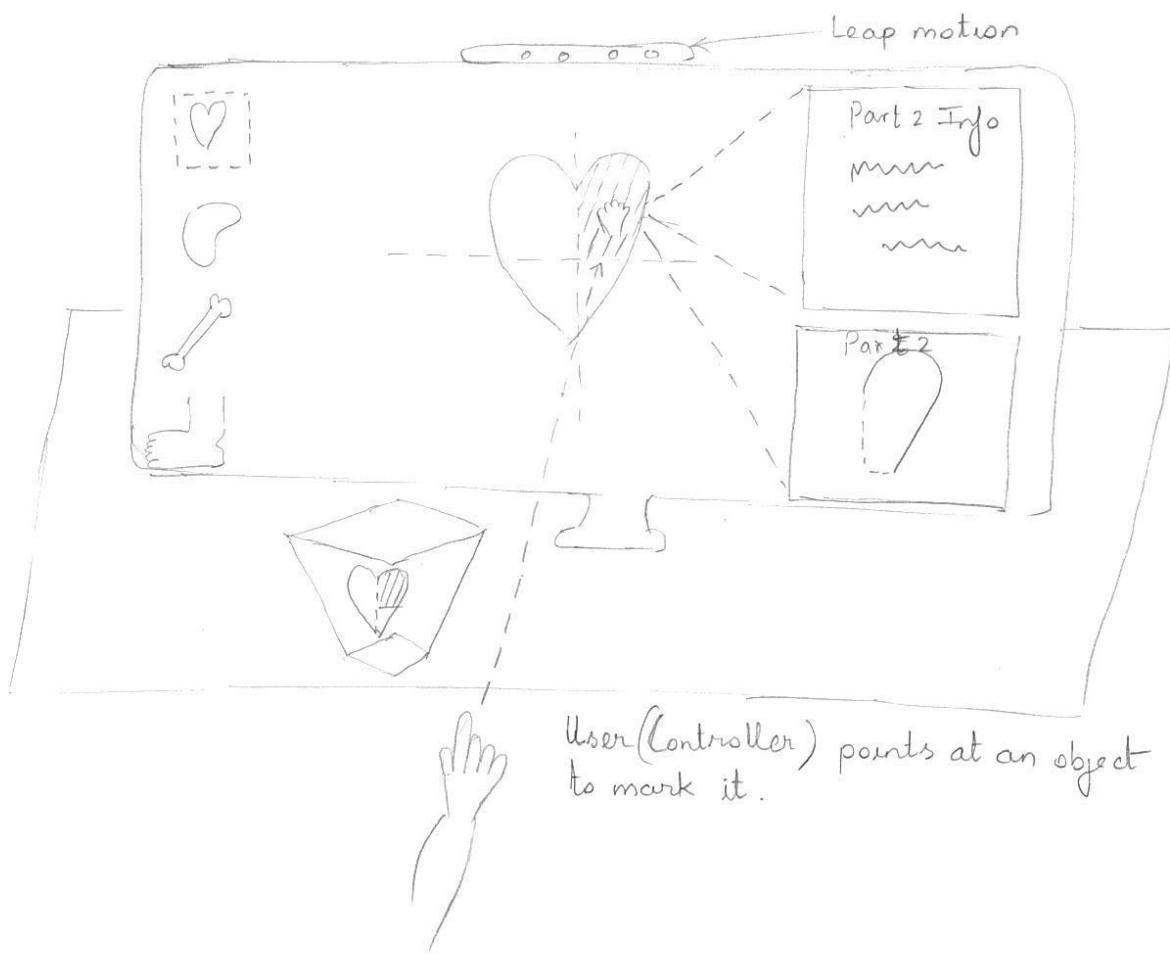


Sketch 7

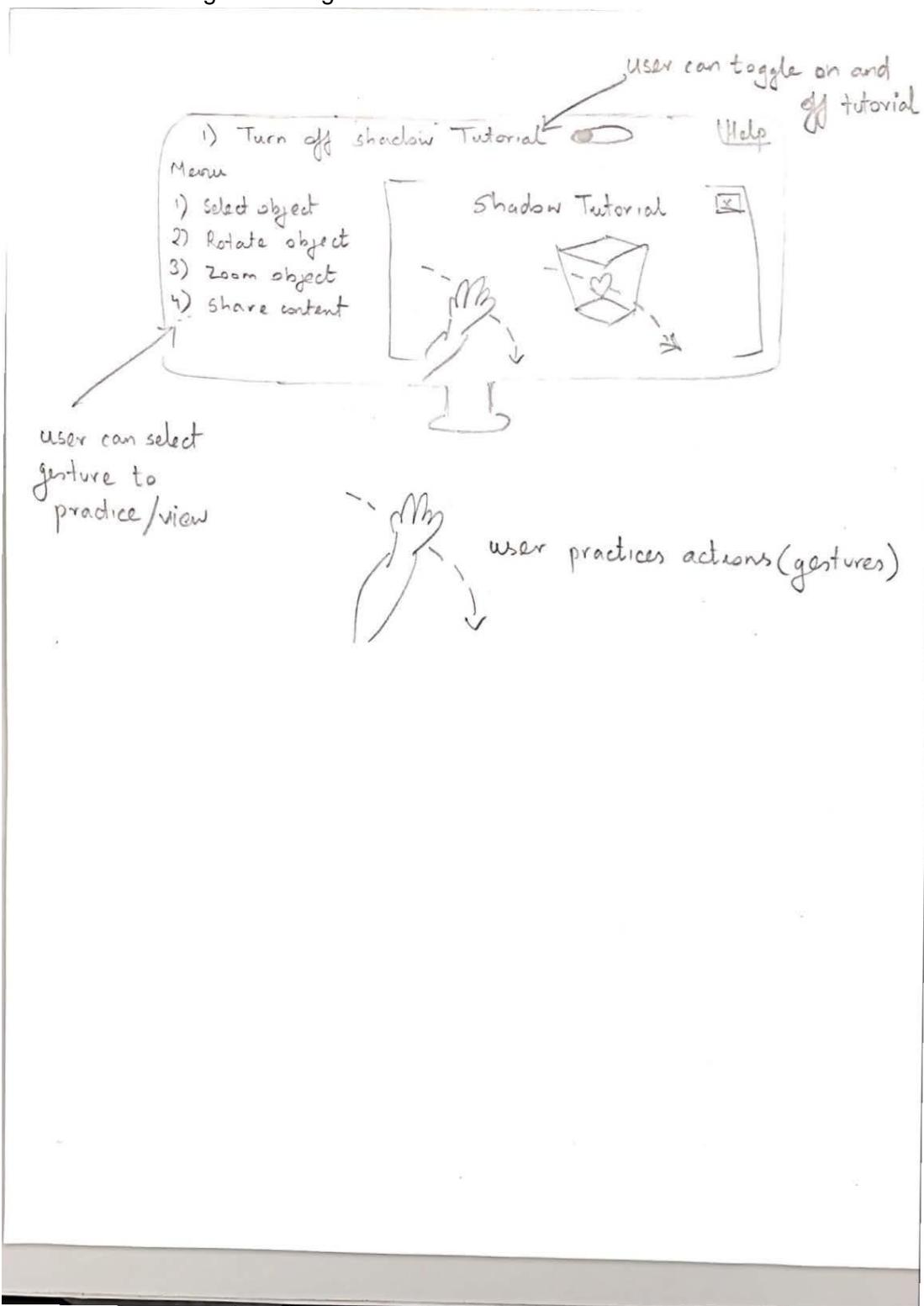
Sketch 8



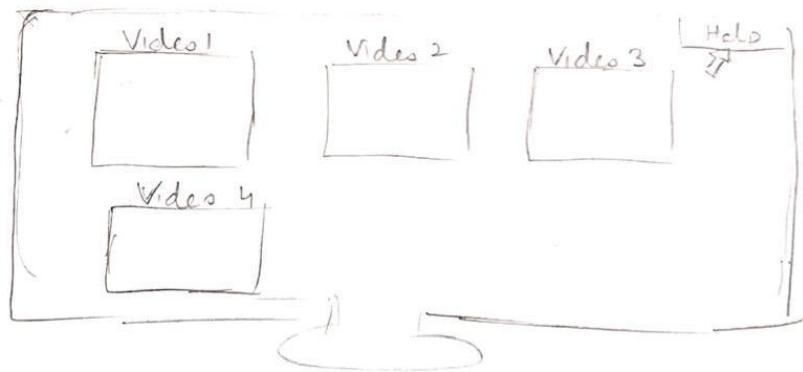
Sketch 9 - Final Iteration



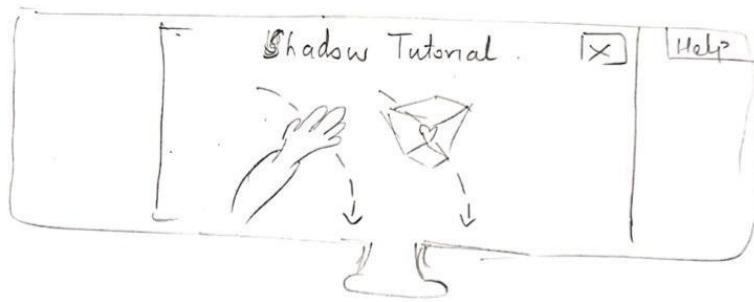
Sketches For Design Challenge 6:

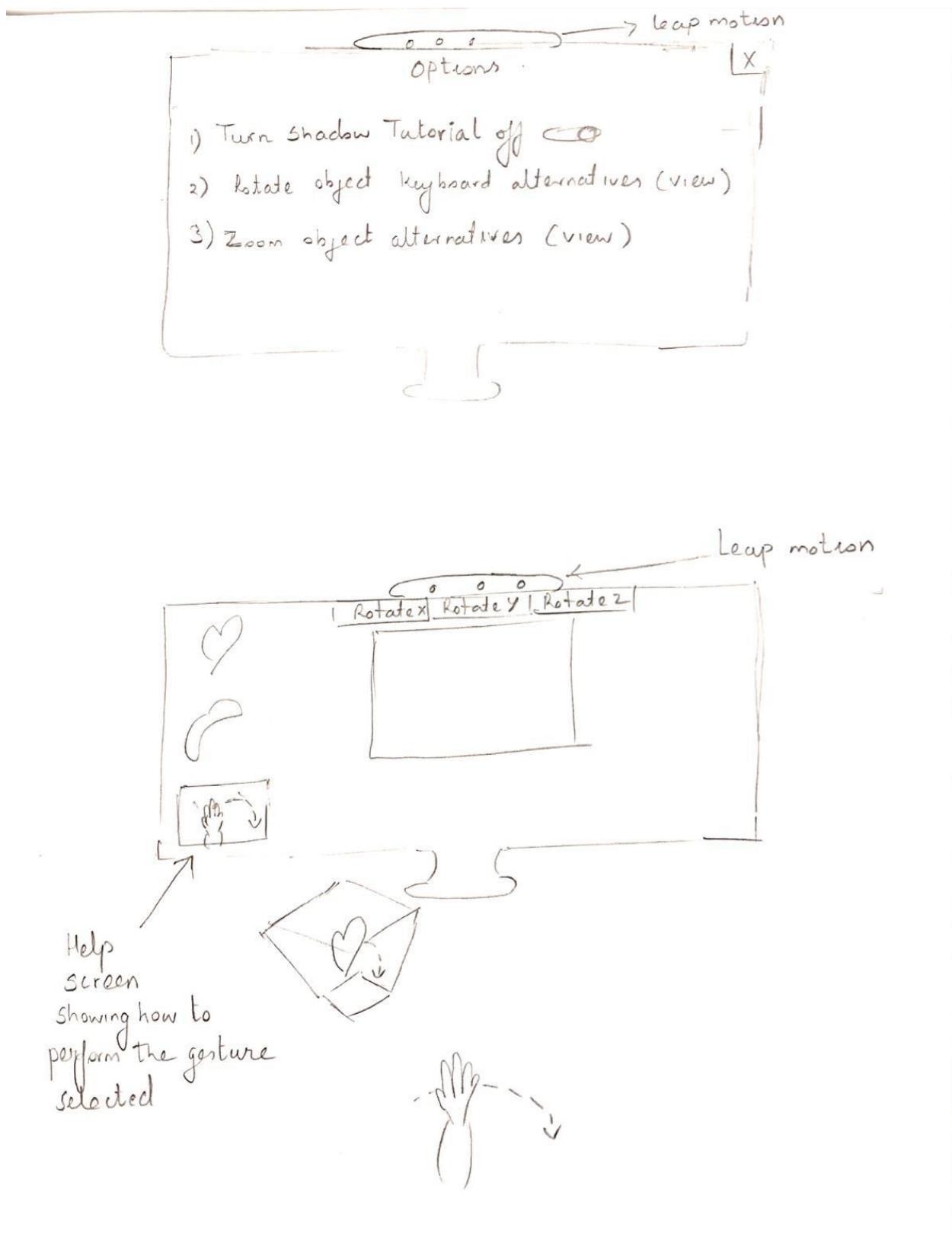


sketch 1



sketch 2

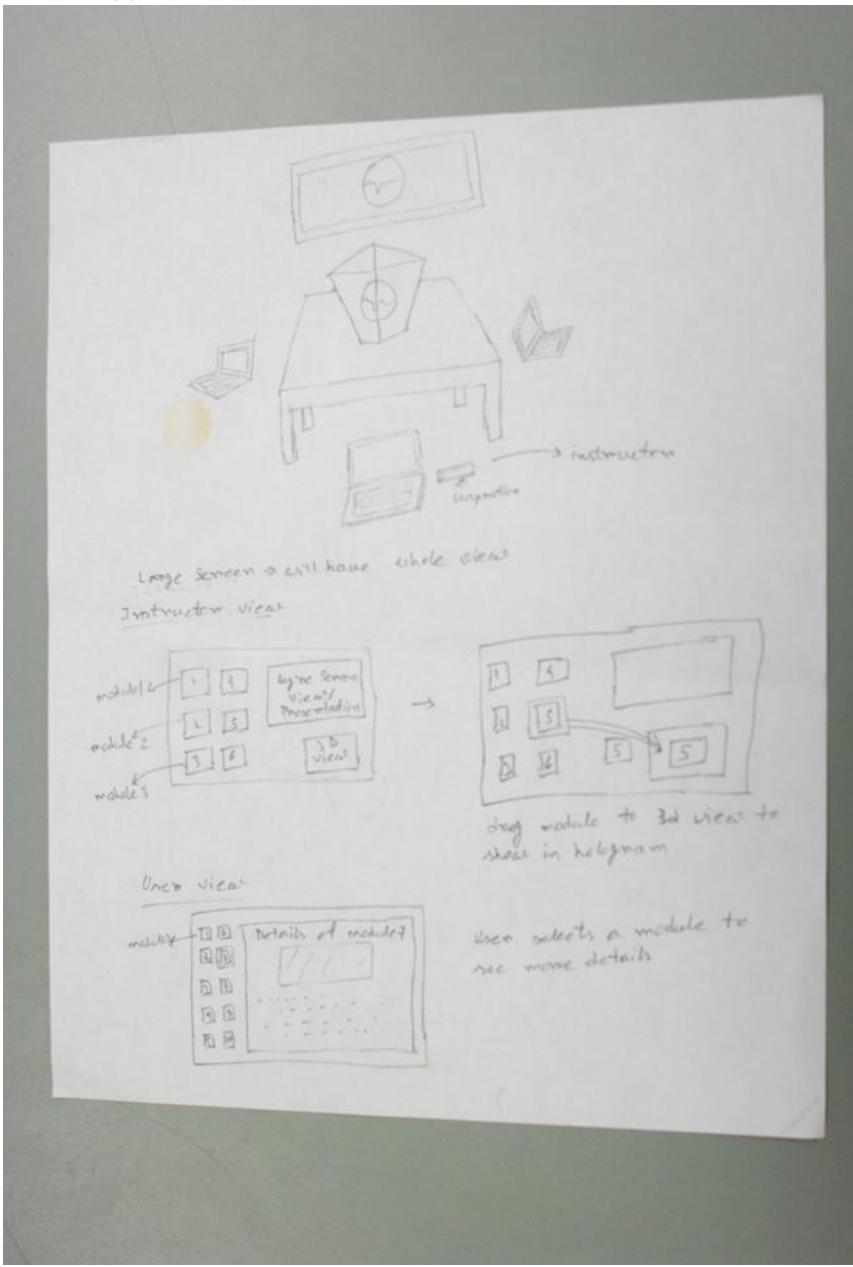




Sudipta

Design challenge 1,2,3,4,5

GUI of application(driver and user screens)

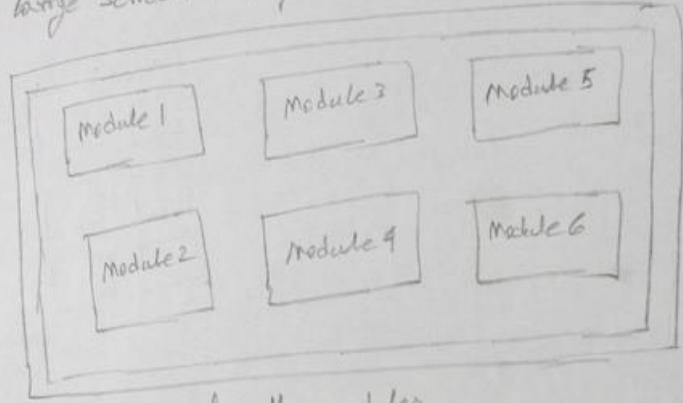


Driver will have all modules of content listed and can select an module to be displayed in large screen or in hologram.

User will have list of all modules and can navigate to details view of each module.

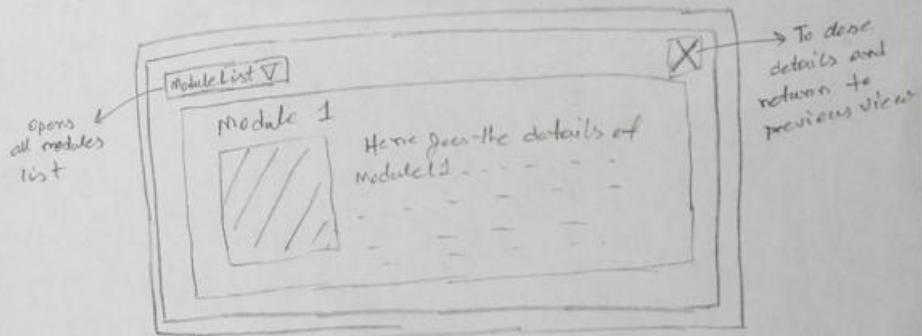
GUI of large screen display

large Screen Display



small details of all modules

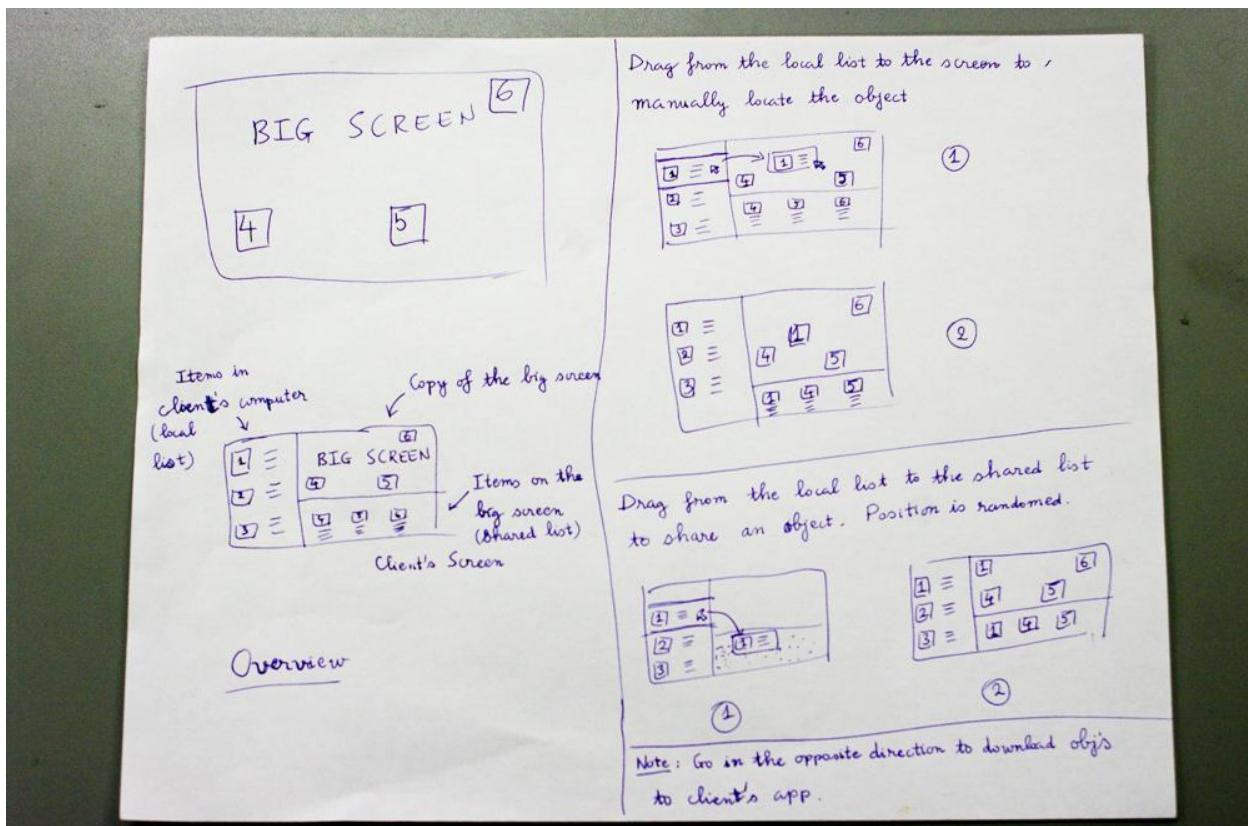
↓
Instructor can choose a specific module to show
more details of it in large screen.



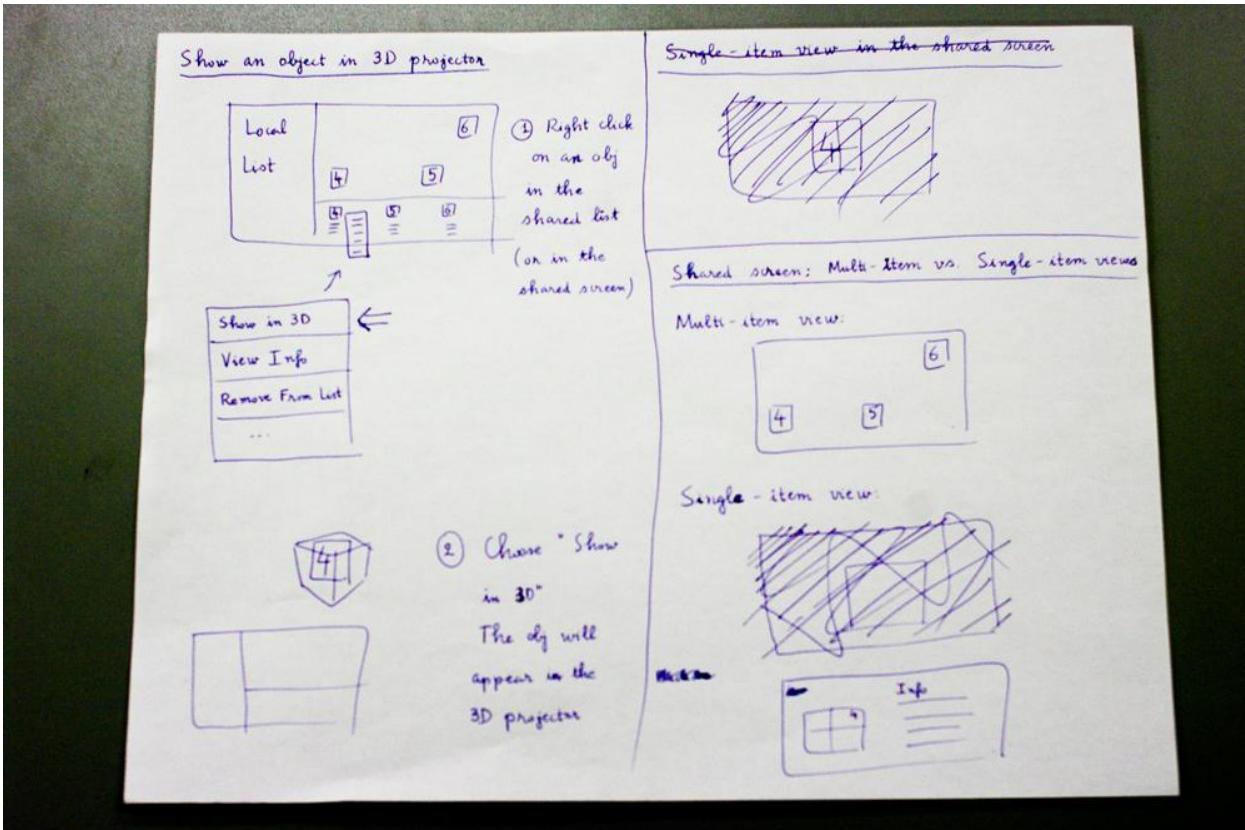
First large screen display will show grid view of each module. Instructor can select a module to open details view of the module. Second view will also have option to go back to previous view and will have a drop down menu of all modules. If an option from the drop down menu is selected then details view of that module will be opened.

Hai

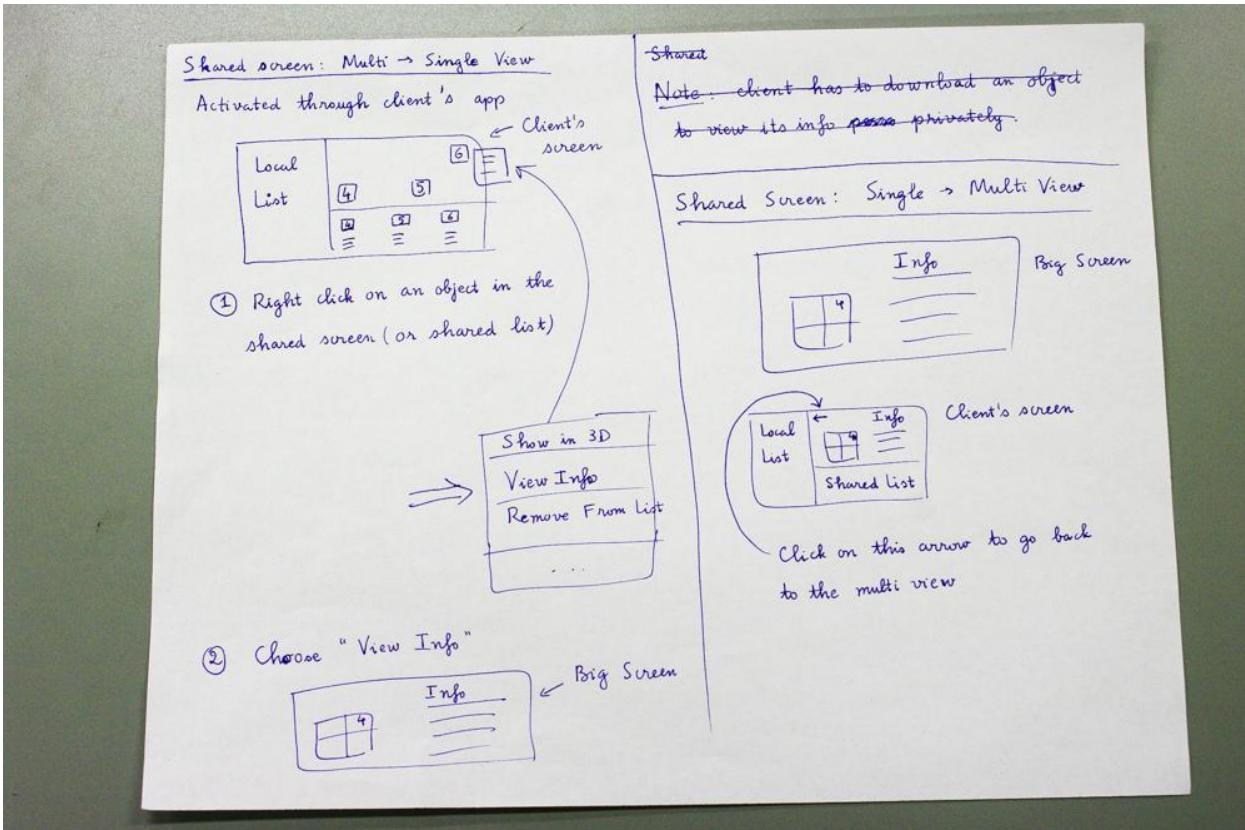
Design Challenges 4 & 5:



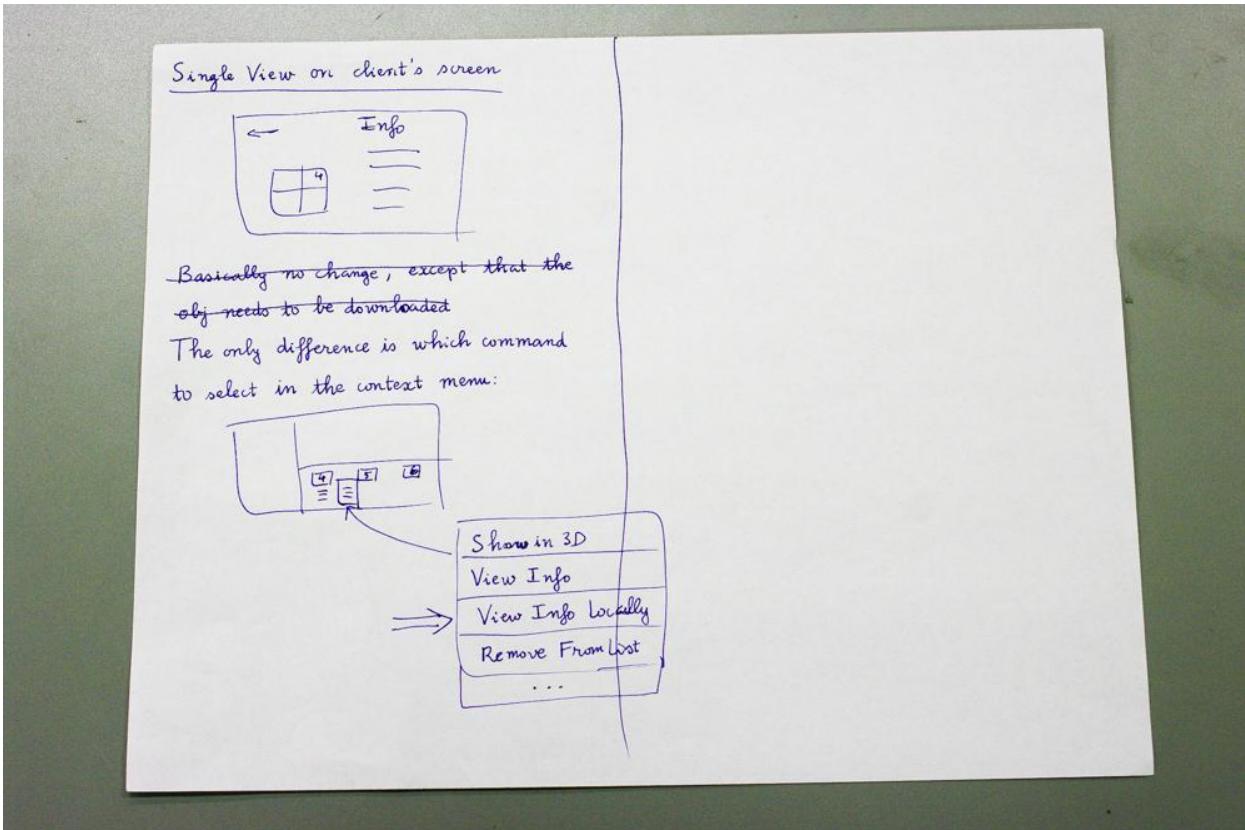
Top to bottom, left to right: (1) The big screen (shared screen) and the client's application. The client's app contains three modules -- left: list of objects in the local computer / top right: a mirror of the big screen / bottom right: list of objects being displayed on the shared screen. (2) Drag an item from the local list directly onto the shared screen to manually position the object. (3) Drag an item from the local list to the shared list to share an object. The newly added object will be randomly positioned on the shared screen.



Left: Send an object to the 3D projector using a context menu. Right: Multi-item view and Single-item view on the shared screen. As the names suggest, the multi-item view displays all objects that are currently existing in the shared list, while the single-item view shows information of only item in the list.



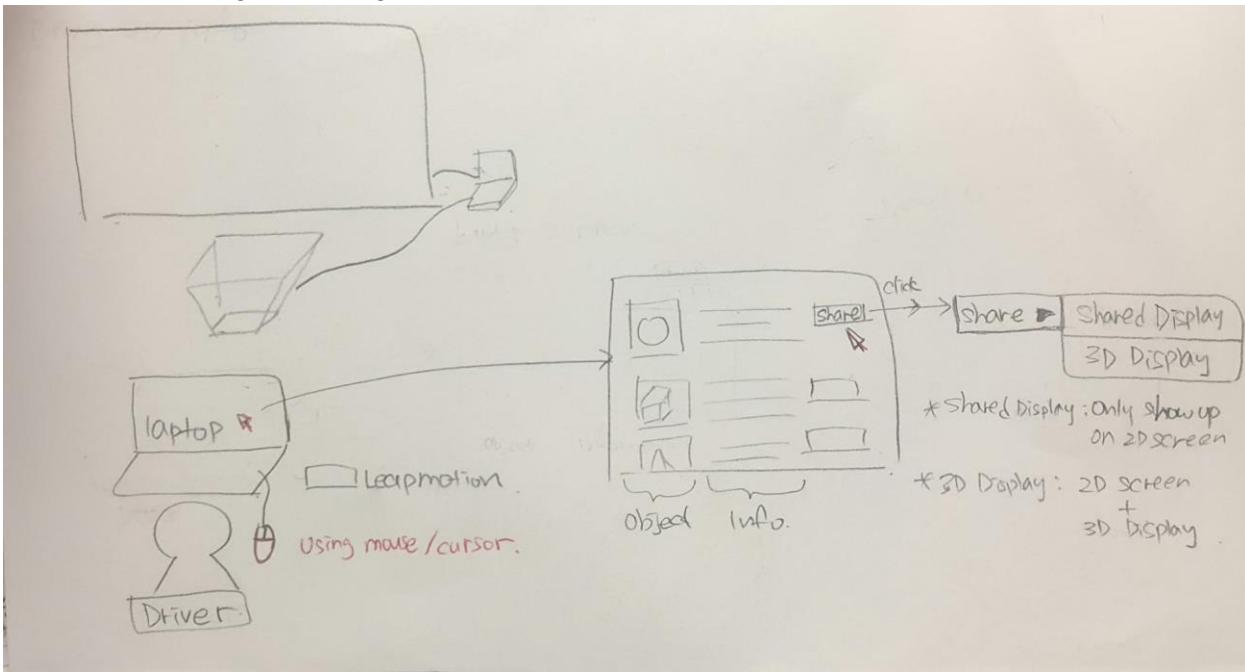
Switching between the two views. Left: Multi to Single view. Right: Single to Multi view.



Single view in client's app.

Ja Eun

Sketches for Design Challenge 1:



Sketches for Design Challenge 2:

