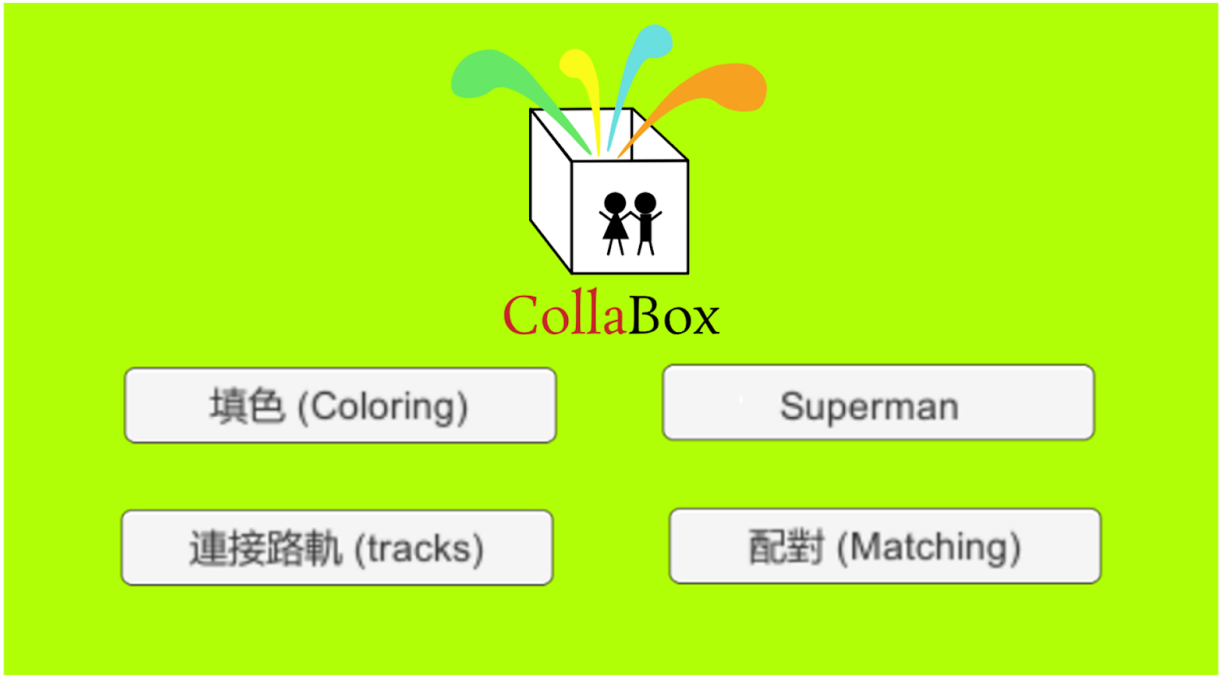
NEW DIRECTION FOR CollaBox

Over the summer, we decided to expand the CollaBox collaborative video game from just a matching pairs game to multiple arcade games, each with multiple levels. Experiments with graphics and background music have been undertaken to find ways of engaging students and maintaining attention. The final product now contains:

1. Menu screen
2. Matching game
3. Colouring game
4. Move and Collect Superman game
5. Rotating puzzle
6. A story mode
7. Updated engagement and reward mechanism

1. Menu screen

The first screen that appears for the game. Players can choose whichever game they wish to play by clicking on the respective button with a mouse. It is not joystick controlled in order to prevent mistouch by the students.



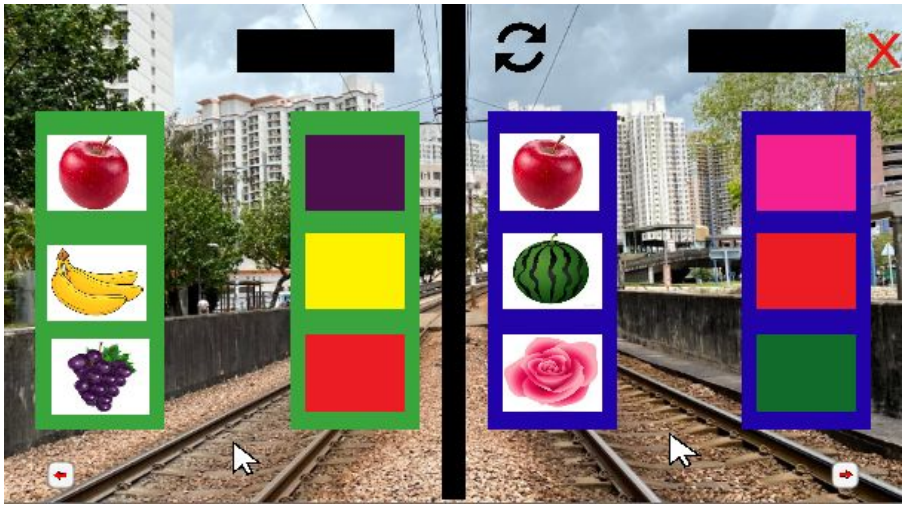
There is a moving animation of the CollaBox logo. In the opening scene, a box with the shadow of two people appears, then the cover of the box will be removed,

releasing the colourful splash out of the box and the words “CollaBox” will be displayed.

2. Matching game

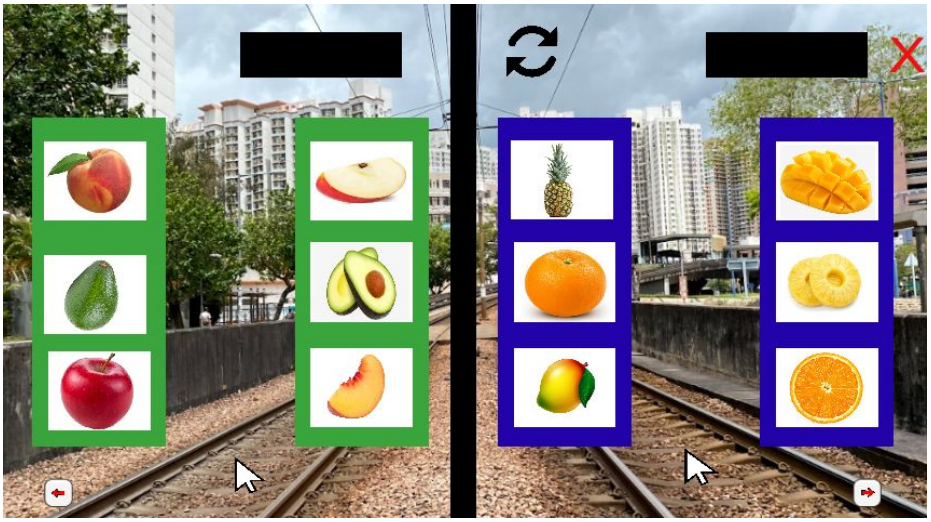
The matching game appears the same as it was, however, at the back end, the pairs are now automatically generated from a “resources” folder inside of the game. This way, we need not design each level manually by placing pieces, but instead they are automatically placed in their positions with the right dimensions. Each time the scene is refreshed, there is a new set of questions randomised- therefore keeping the game fresh and exciting with every play.

2 levels of matching game made currently- matching fruits to colour, and fruit to cut pieces. More levels may be added soon with more themes. Currently 2 levels are embedded within a storyline.



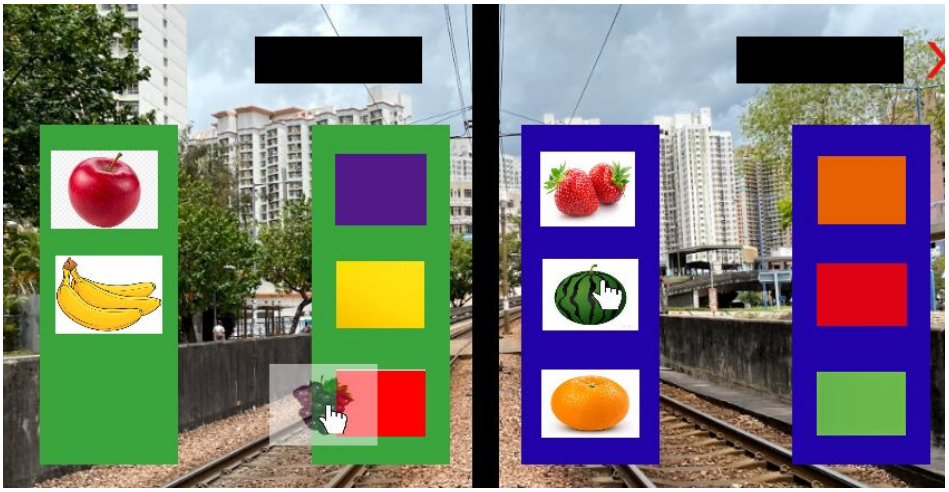
Level 1

Resource folder which the code recognises and randomises from



Level 2

The players now control the game totally with their joysticks. There is a cursor that is used for selection. Upon selection, the cursor changes to a hand to indicate the focussed object.

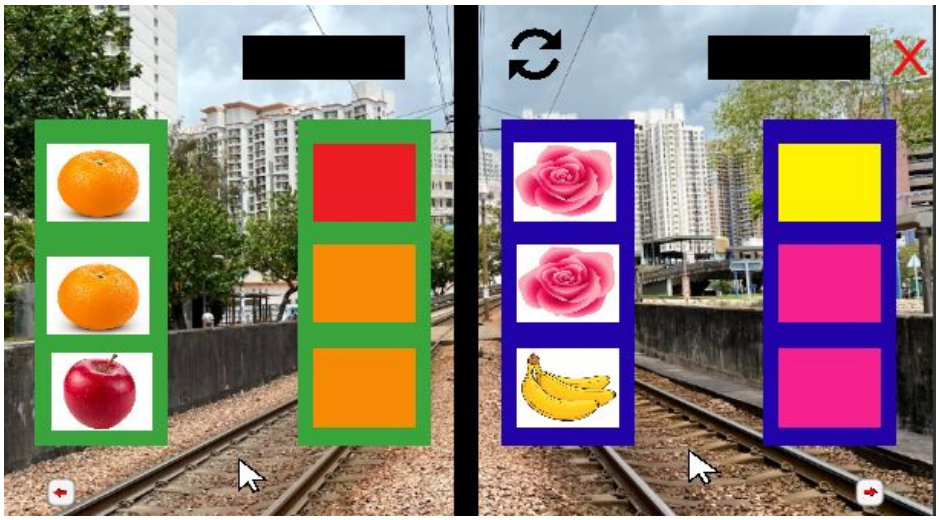


Object turns transparent when matched incorrectly and regains its opacity when it is taken away from the wrong response.

Sound effects for these gimmicks are not added yet as we felt it might overwhelm them, however, we may add them later depending on the feedback received from students.

Even though randomisation of pairs provides more engagement, there is an unresolved issue with it whereby some question pairs might be repeated. We realise

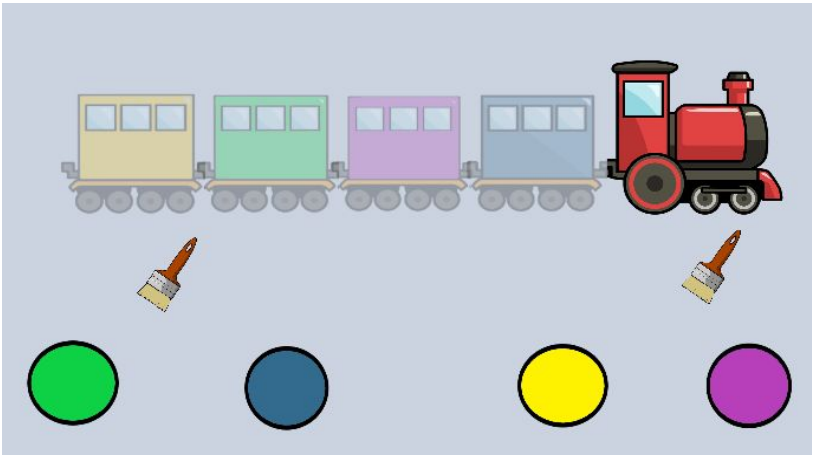
that randomisation alone will not help, but we need a better method that eliminates a taken image.



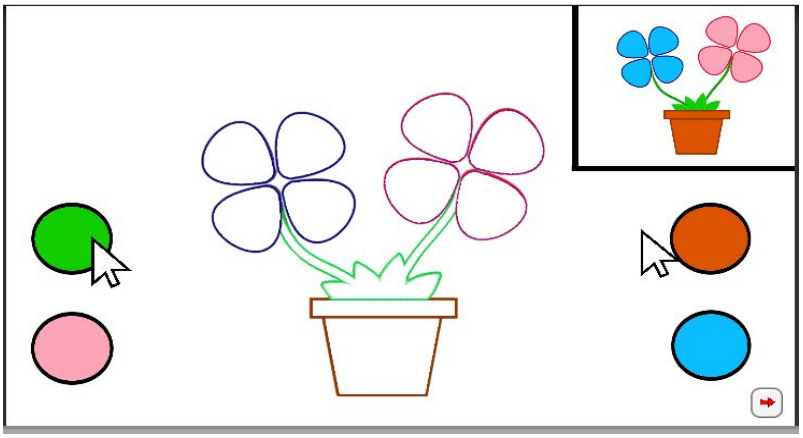
Chance when the computer randomly displays the same pictures

3. Colouring game

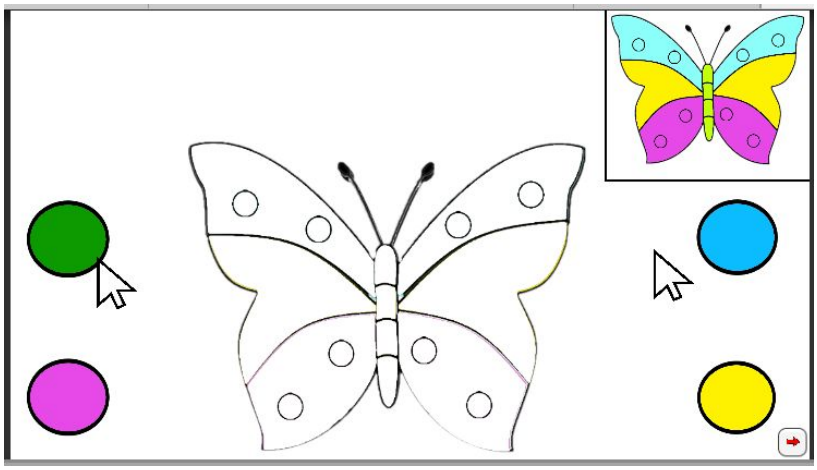
Colouring game is one of the most collaborative and engaging game that comes with CollaBox. It involves one big screen with a colorless photo and a coloured reference photo. There are 4 colours to be filled in. Each student is responsible for dragging the two colors on his or her side (2 each) to the correct spot.
There are 3 levels- Train, flower pot, and butterfly. The levels are of increasing complexity. All images after being completely coloured, animate and merge with the reference photo. Animations will include real-life sound effects, such as train engines and the sound of butterfly flutter.



Level 1 has slightly translucent colours on target as a guidance.



The second level has a reference photo but with a fairly easier and simpler image



Similar to the flower pot, but a more graphic image.

There is a final scene that links all the three coloured images in a seamless animation with vibrant colours and soothing music.

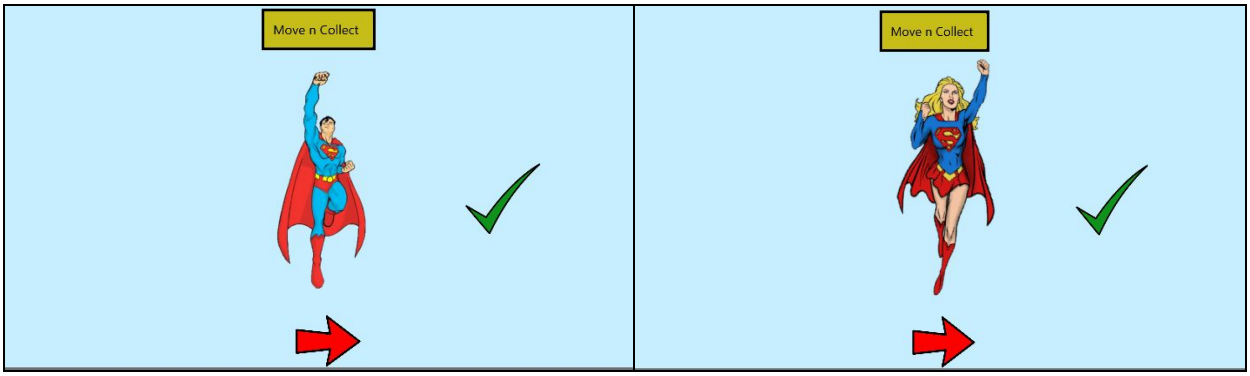
The idea of such a game appeared when the partner school presented their concern of the split screen model being too small to work on. Therefore, in this game, the field of work spans the whole screen but kids can access only the colours on their side of screen thereby making it collaborative as well.

In this colouring game, at first level, the target appears quite obvious with colours just dull but once they get familiar with the objective, we wish the kids try to diverge attention to a reference image and develop the skill to draw parallels between identical objects. This can be a good brain exercise for the target audience.

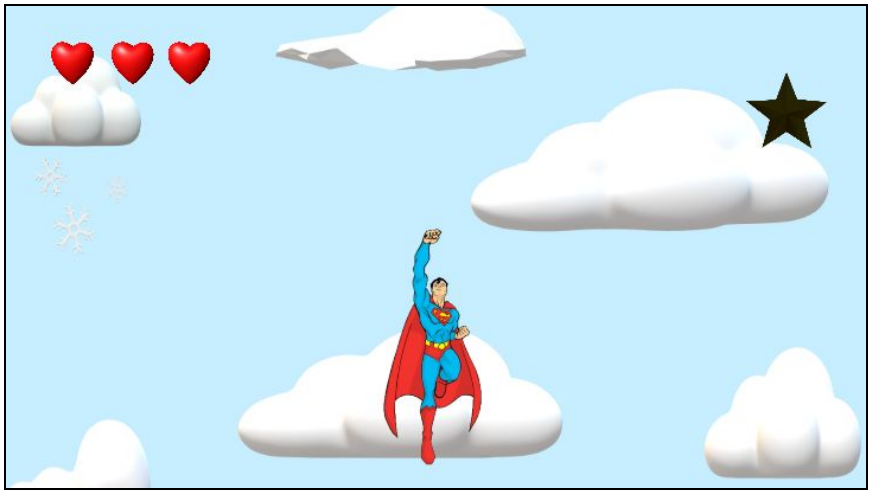
After testing, if we get a positive response on this game, we may try out different kinds of patterns instead of limiting to colours.

4. Move and Collect (Superman)

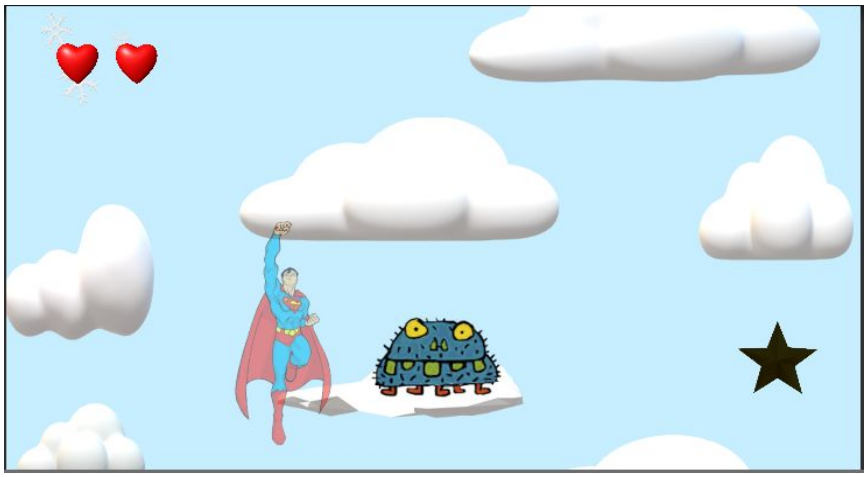
This game involves character selection between Superman or Supergirl. Then the character flies up amongst the clouds in order to collect stars whilst avoiding monsters. There is a final scoreboard that appears showing how many stars were collected in all.



Players may choose their character in this scene

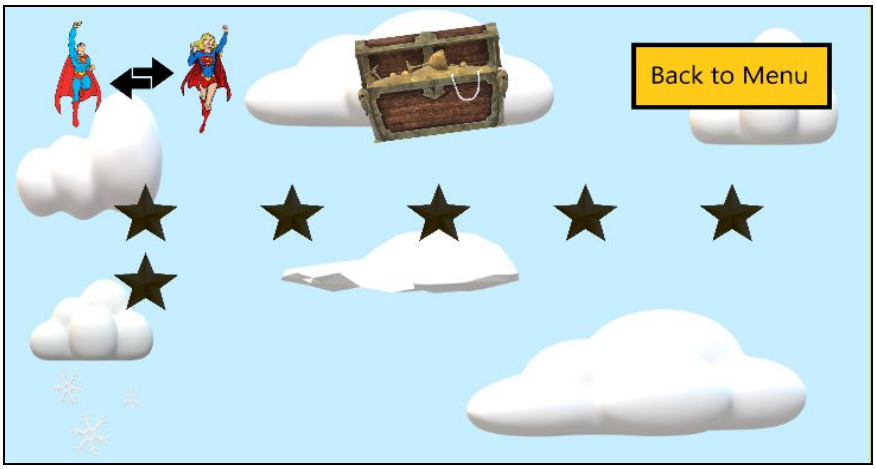


The player moves right and left in order to collect the stars



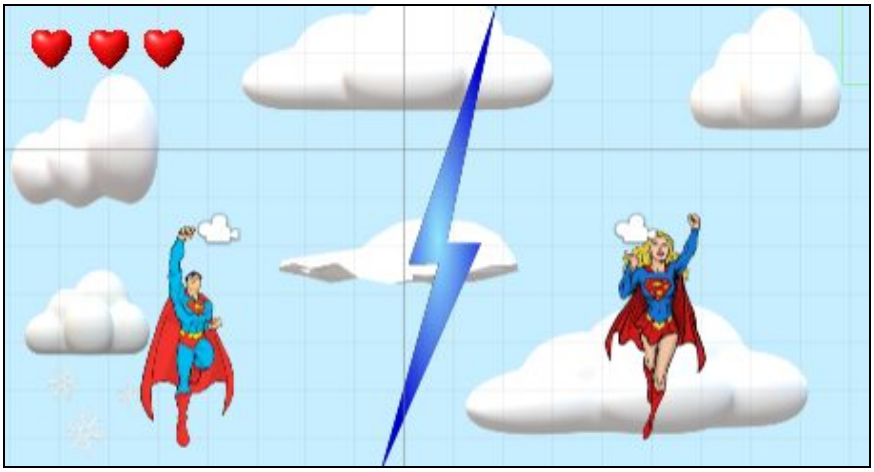
The player must avoid the monsters otherwise they lose a life. The character flickers in order to signify a respawn.

The final screen appears if all lives are over or all stars collected. The players will see a treasure box moving side to side.



Upon clicking the treasure box, the scoreboard appears. One may choose to replay with a different character or go back to the menu. The stars and treasure box are animated.

There is a collaborative mode with superman in split screen but we need to test if the movement would overwhelm the children.

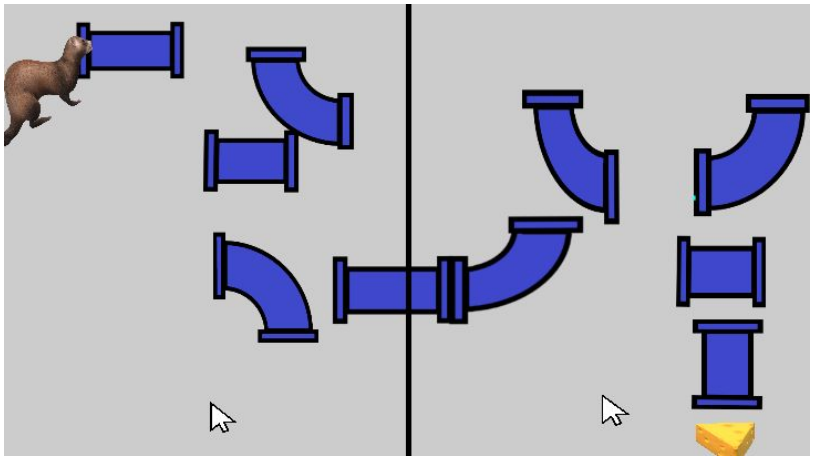


This game encourages students to respond to feedback and understand what is “right” and what is “wrong”. Different sound effects and visual effects are triggered for “right” and “wrong” touches. We also wish to develop dynamic dexterity among the students and test their reaction time. The speed of the falling objects can be adjusted to better fit the abilities of the target audience.

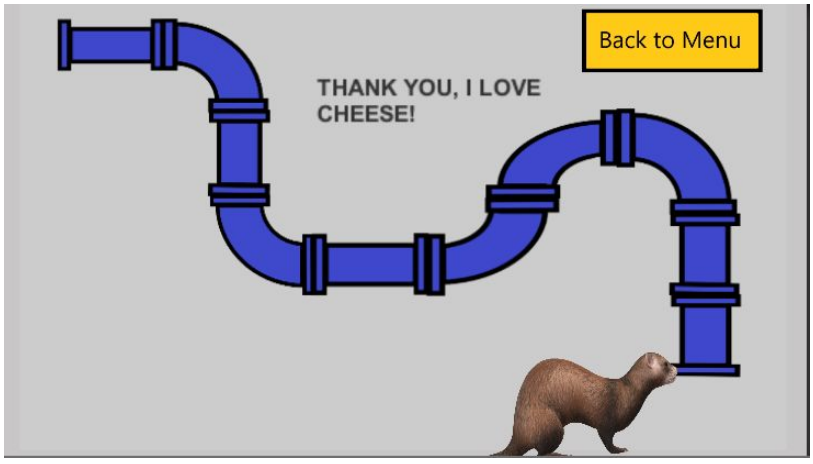
If we receive positive feedback on such a game, we wish to make it more educational by replacing ‘stars’ with a certain ‘right’ answer to a question cue. The character of superman/supergirl can be changed to any character of choice, hence there is flexibility in the game in case teachers wish to use the student’s own avatar.

5. Rotating puzzle

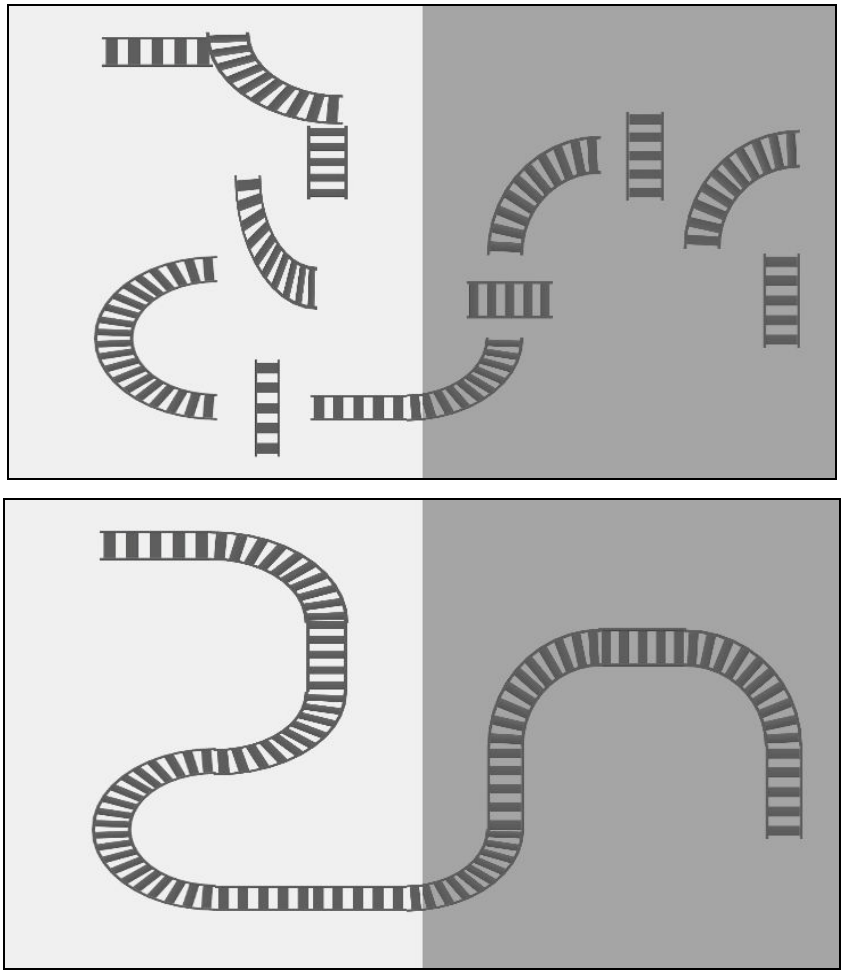
This is a common broken pipes puzzle variant. The students need to rotate the broken pieces in order to complete the puzzle picture. Dotted outline of the correct orientation will be given for guidance. This game has two levels- one being with broken pipes and one being thematically linked to the train setup- a broken track.



The player moves the cursor to the broken piece and clicks until the right orientation. With each click, the piece rotates 90°.



Once all pieces are arranged, the pipes will be connected and an animation plays.



6. Story mode

The story mode links all the 4 games previously described with one flawless story line. The story progresses with cartoon animations and as part of the story, in order to reach the goal, one must complete mini games - which are the aforementioned games.

The story starts with students having lessons in their classroom, and today they are learning about trains. Always being kept at school, the students do not know what trains are like, and how they move on the track. To let students gain more insight into trains, the teacher gives them a task - assembling train tracks, and they have to correctly assemble that to earn an actual physical train trip. **(Here comes the rotating puzzle game)**

The smart students are able to assemble the tracks, so they are being rewarded with a train trip around Hong Kong to explore new places and experience local culture. **(Matching game)**

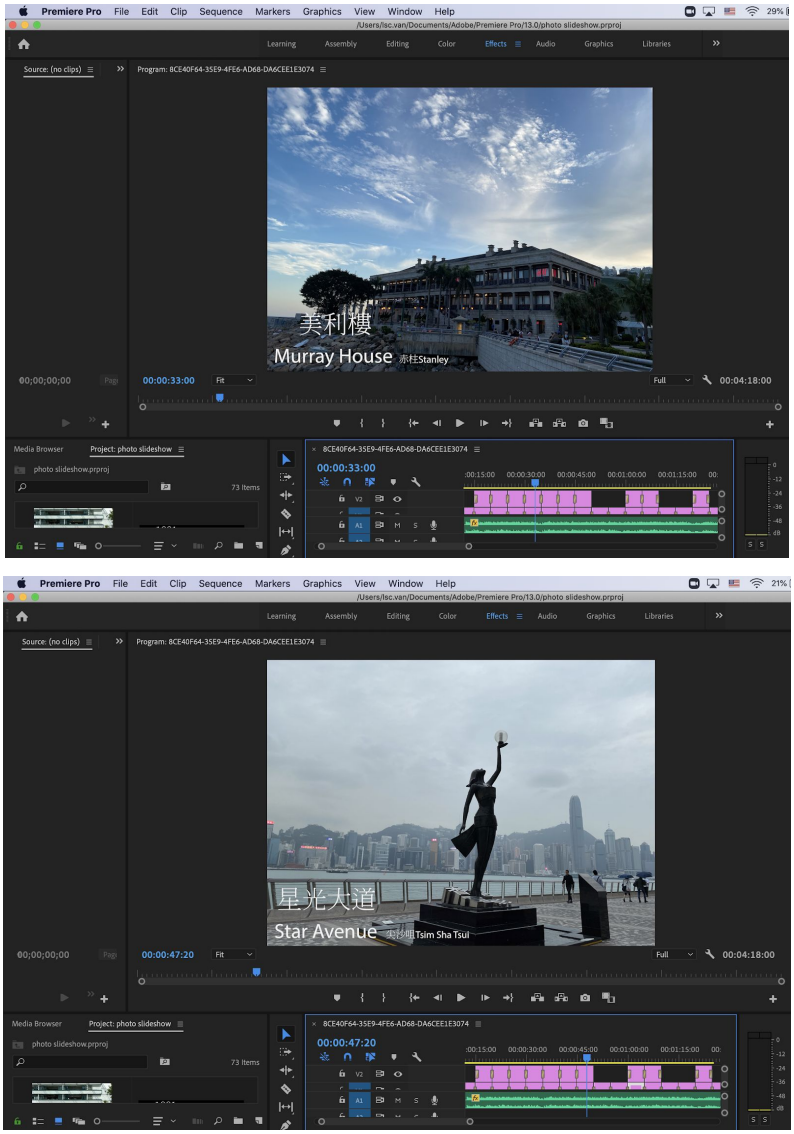
While touring around Hong Kong, suddenly a big fat ugly monster appears from nowhere. The monster not only blocks the students' way, it is trying to hurt them too. What can we do now? We need superman to come and defeat the monster to save everyone from danger!!! **(Move and collect - Superman)**

The monster is successfully being defeated, but it has created ruins around the city. Ashes are flowing everywhere and people are sad and angry. The whole city becomes dead and dull and lacks something that can cheer people up. Then one student comes up with the idea of painting colours onto different objects in the city to brighten up the atmosphere again. **(Colouring game)**

Everything is back to normal, and everyone is smiling again. The students are excited yet tired after this adventurous and dangerous journey. They have a lot of takeaway from today's visit, and hope to go on another trip again soon.

7. Updated engagement and reward mechanism

To engage students who are waiting for their turn to play the game or waiting for their partner to complete his/her part of the game, a photo slideshow displaying different places in Hong Kong will be played on the screen of the classroom. We have completed part of the video (it is stuck at encoding now though) but it would still take some time for us to include more Hong Kong places in the video as we do not think now is the right time to visit different places under COVID. We will continue our photo-taking work when the virus situation is more stable.



Screenshots of the video editing process

The new reward mechanism is solely relying on the train set we previously sent to the school. Instead of dividing the tangible reward into different levels based on the achievement of the students, we are now rewarding the students with a component of the whole train set (say a piece of the track) for each correct answer (matching/ colouring game) or completion of specific game (move and collect/ rotating puzzle). By the end of the game, students can assemble the components they have collected throughout the game and play with the trains. This can reduce confusion of the students and simplify the whole reward mechanism procedure, caretakers/teachers can handle the rewards more efficiently as well.

REMODELLING OF InBox.

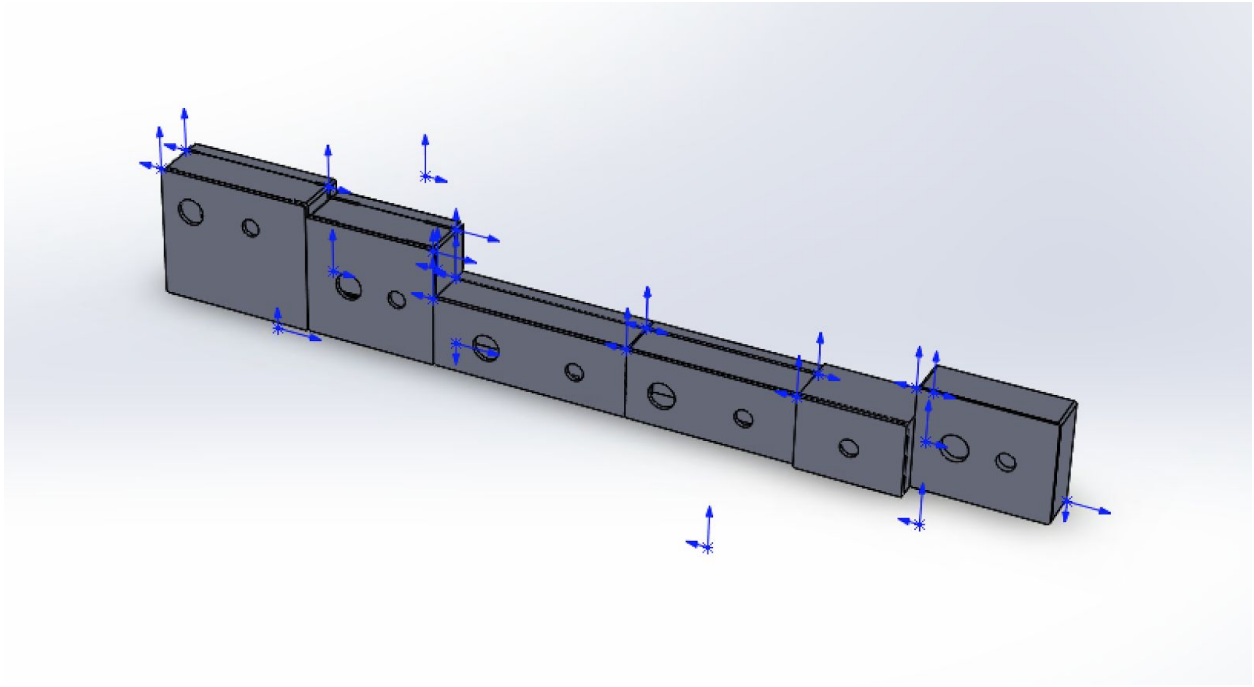
Safety is the first priority. The Team removed the option of Desk Mode. As the detachment risk increases with the number of layers, the Team eliminated the Base Layer and embedded the suction plates to the bottom of the Container Layer.

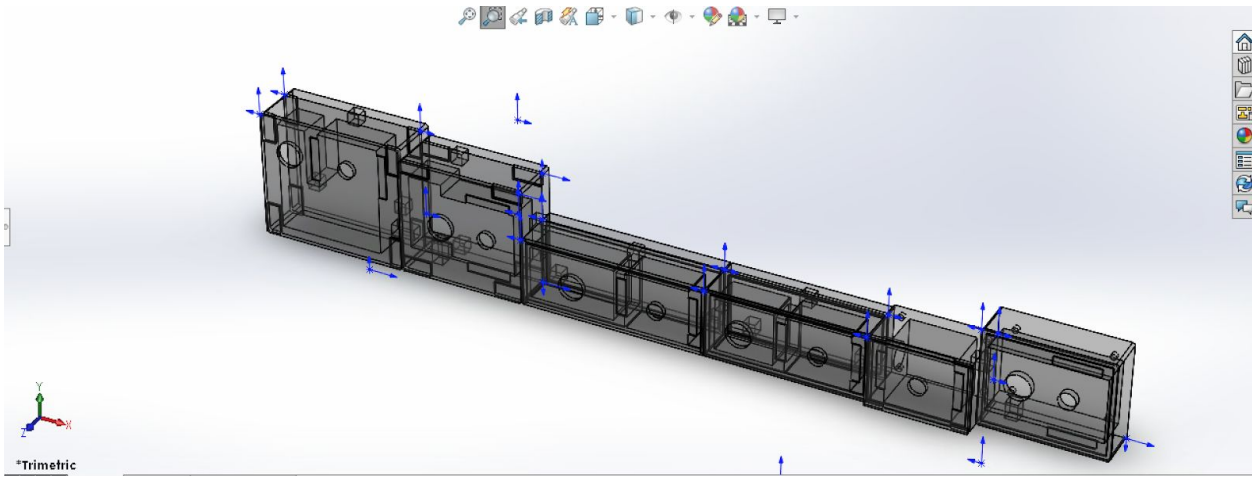
The Team aimed at InBox size minimization. The relocations of the joystick, the Uno board, and the button increases the space usage efficiency, therefore reducing InBox's overall volume by 53.5%. The volume reduction enhances users' convenience in storing the InBox.

The InBox uses smaller suction plates. According to the feedback of users from Lok Kan School, when the users attempted to detach the suction plates from the table surface, the InBox was broken and the internal wires were pulled out from the Uno board. The reason might be InBox using excessive suction power. Therefore, the Team decreased the diameter of the suction plates from 14mm to 7mm.

Comparison of versions

From left to right:





Version	height*length*thickness
Version 6.0	(175mm*150mm*66mm)
Version 7.0	(150mm*137mm*66mm)

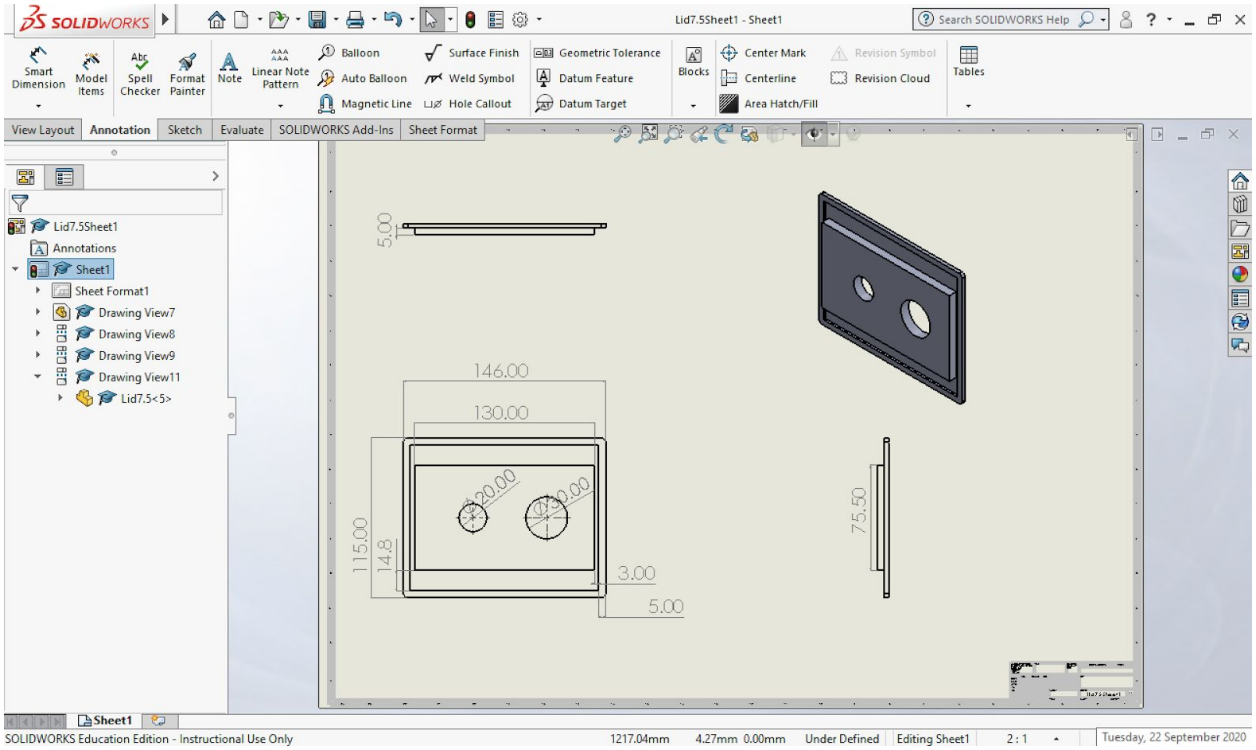
Version 7.1Mega	(220mm*80mm*64mm)
Version 7.1Uno	188mm*80mm*80mm
Version 8.0	115mm*83mm*70mm
Version 7.5	146mm*115mm*48mm

Please refer to the Dropbox link for the SolidWorks STL files.

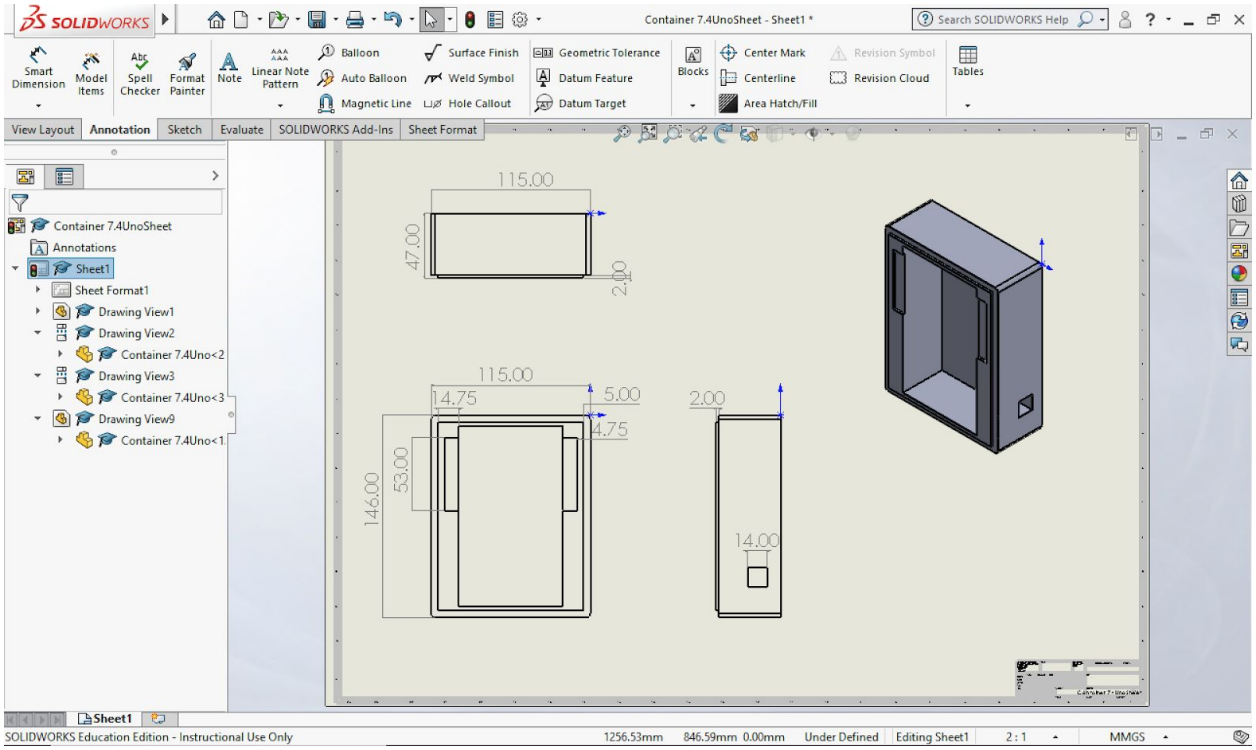
The current version

The present InBox version 7.5 with dimensions 146mm*115mm*48mm is the most optimised and the most compact version of consoles we have modelled yet.
The standard 3 side views and the model views are as below:

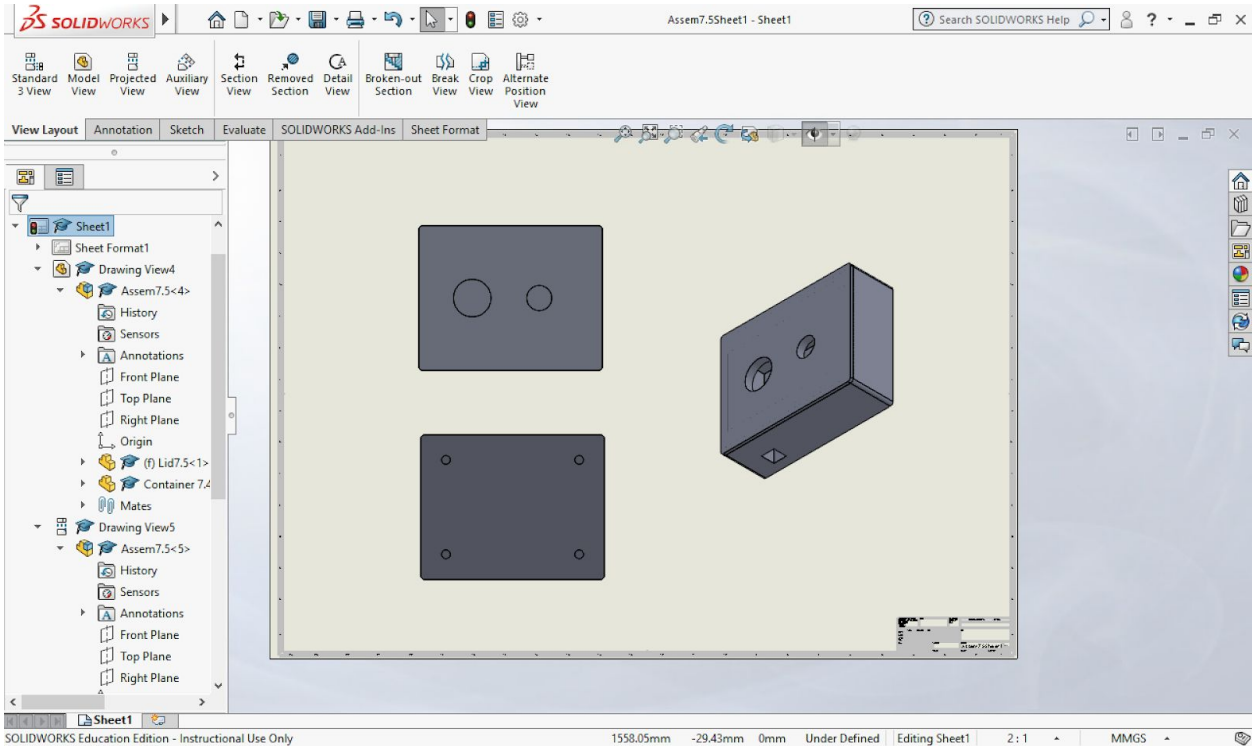
The Lid



The Container



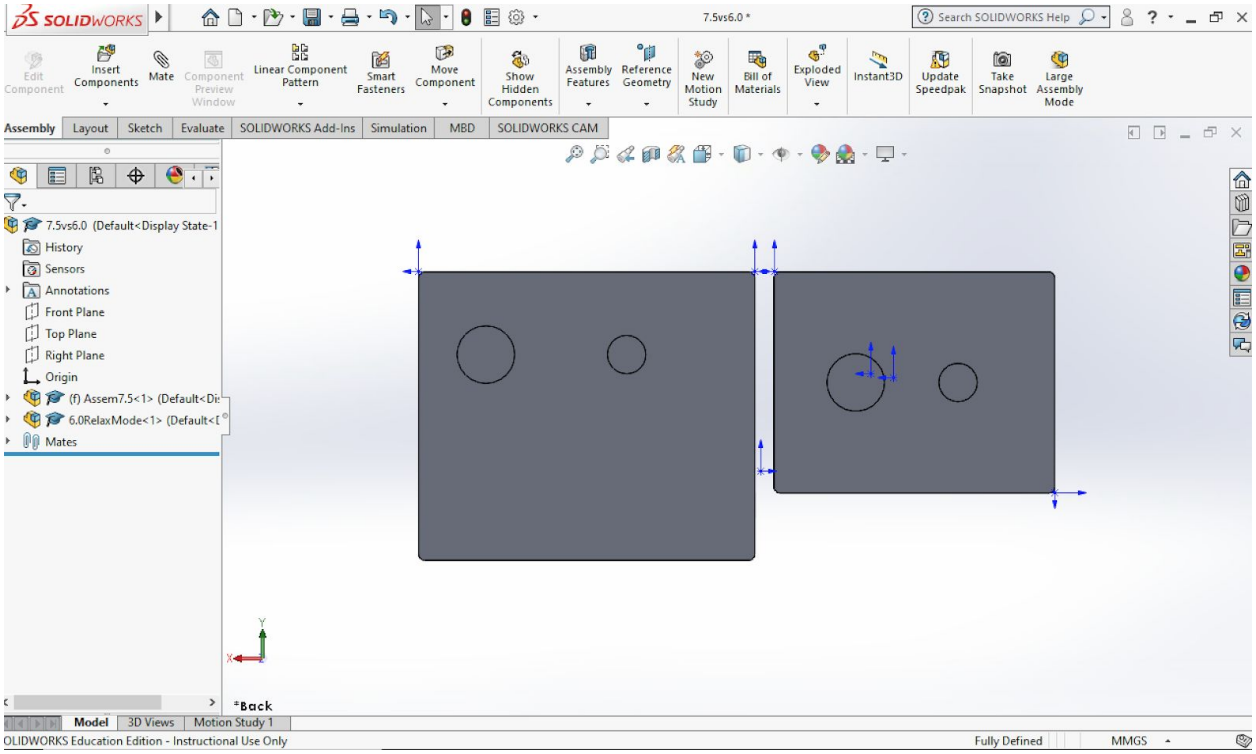
The Assembly



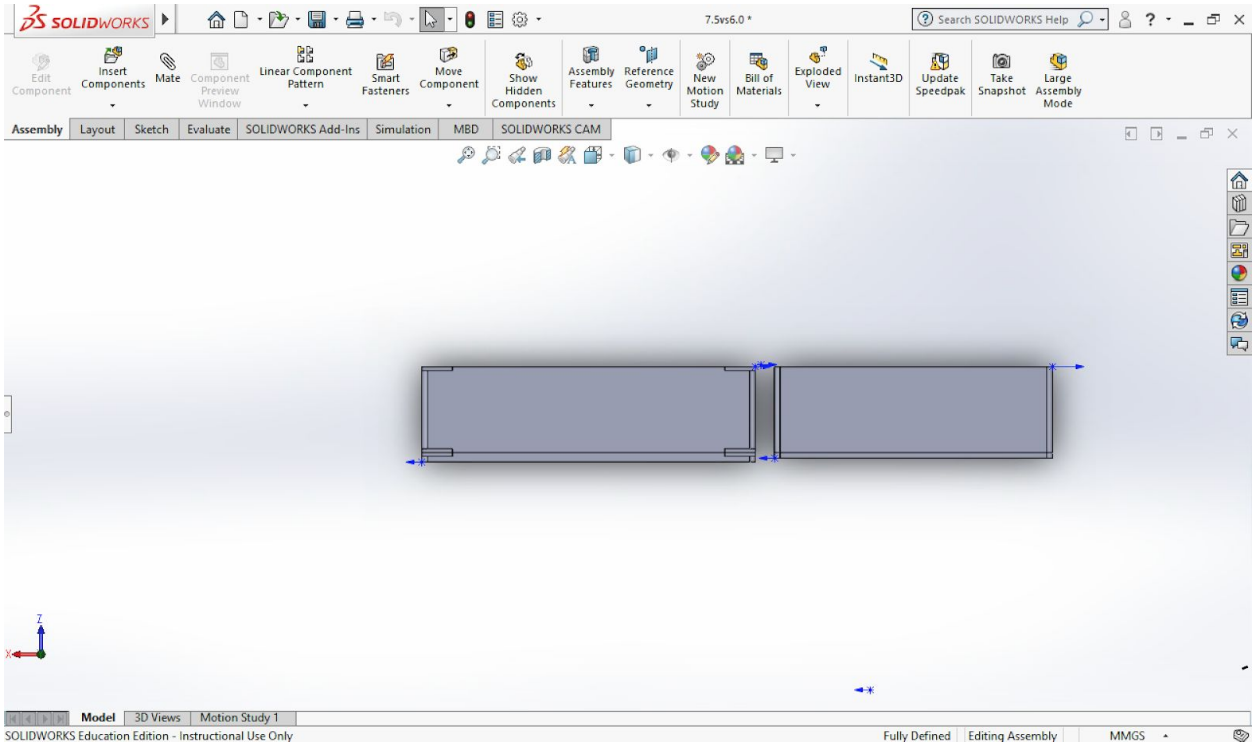
Comparison between vr6.0 and vr 7.5

Remarks: 6.0 is the previous version held by Lok Kan School.

Top view(left : vr6.0, right: vr7.5)



Front view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Move Component
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Assembly Features
Reference Geometry
New Motion Study
Bill of Materials
Exploded View
Instant3D
Update Speedpak
Take Snapshot
Large Assembly Mode
Assembly
Layout
Sketch
Evaluate
SOLIDWORKS Add-Ins
Simulation
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Model
3D Views
Motion Study 1
SOLIDWORKS Education Edition - Instructional Use Only
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Editing Assembly
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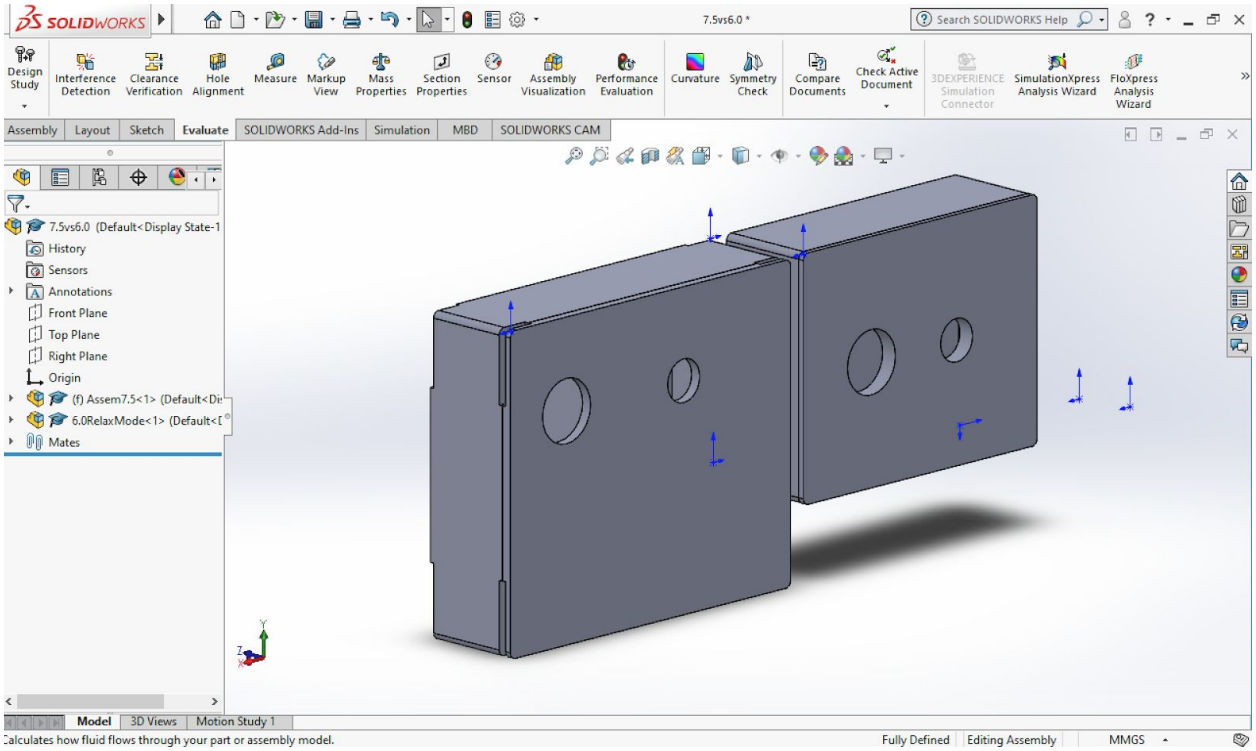
Side view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Design Study
Interference Detection
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3D Views
Motion Study 1
Calculates how fluid flows through your part or assembly model.
Fully Defined
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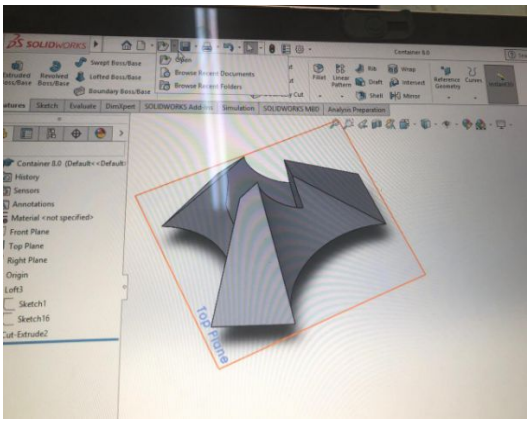
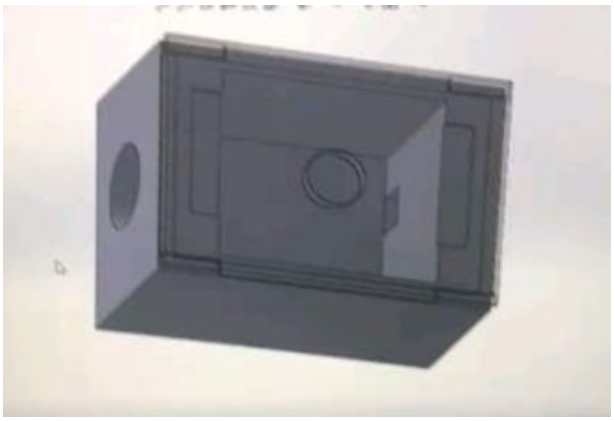
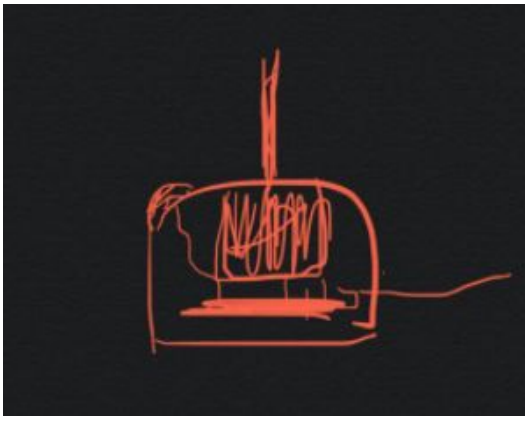
Other uncompleted versions

More complex versions of InBox were attempted, for example





And some as plain ideation such as



However we voted against them since they were not ergonomic for the target students.