



sugarlabs

GSoC 2023 Proposal (draft)

PROJECT :

Improve and Maintain 12 sugar activities

BASIC INFO:

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WHY SUGARLABS

I first got to know about Sugarlabs in November 2022 and I have explored its projects since then, I started to get interested as a developer in Sugar during late January 2023 and made my [first proper contribution](#) in early February 2023, during this entire time I started to develop a personal interest in Sugar, as a developer, it was a fit for my interest in python development and game development and I had long running past experience working with pygame as well. Also, as a human, I was really interested in the idea of sugar and appreciated its efforts towards making pedagogical tools and fun activities for children easily available and open source. I also really aligned with the notion of OLPC and I really look forward to working on Sugar in future as well.

PROJECT GOAL

Sugar has a lot of activities, with 250+ on GitHub, and more elsewhere. These have scope for improvement; bugs, features, updated human translations, and release. This project will involve working on at least 12 activities to improve them.

Tools and Technologies

Python, pygame, Gtk, other modules as required per activity basis

Project Type

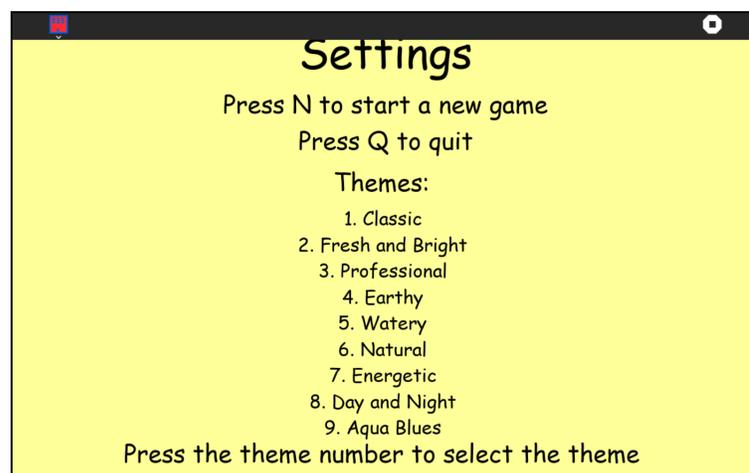
350 hours (large)

The 12 activities are explained from the next page onwards.

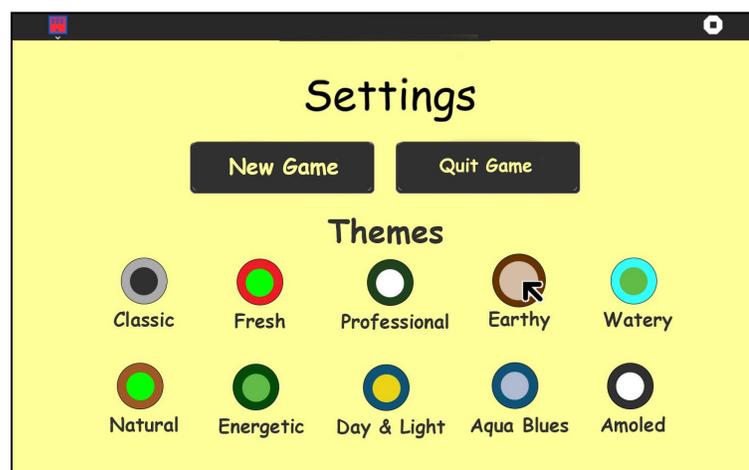
ball-and-brick-activity

- The game does not have any mouse support, in game or in the menu/settings, I intend on introducing mouse support and also intend on redesigning the settings and the home menu.

Below is a representation of what the final design might look like



Current design



Newer Design

Here, each theme also displays the color being used so the user already gets an idea of what each theme has to offer. Also this would be implemented by creating a class for theme_button and maintaining an array of these and mathematically calculating their coordinates so as to avoid hard coding every single theme button and making it easier for future contributors to add new themes as the themes would place themselves on the display automatically.

- Currently, there is no high score system in the activity and I plan on adding this feature by creating a pickle file score.pkl in the activity root directory, the high score will be displayed in the main menu.

sonic-jump-activity

- I wish to add a parallax effect in the background of this activity. This involves creating a multi layered background where each layer moves at a different speed giving the illusion of depth and three dimensional movement. This can make the game feel much more immersive and engaging.
- The blocks in the game are currently simple colored bars, I plan on adding some texture to these blocks so as to improve the appearance and overall atmosphere of the game.

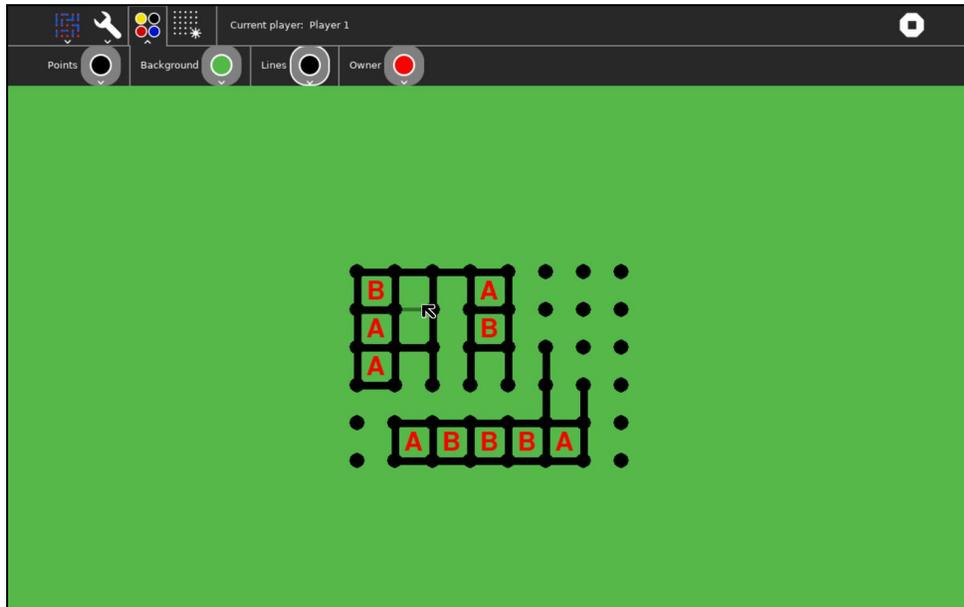
cellgame

- The game does not have mouse support at the menu screen or when opening the help menu, I intend on adding mouse support when starting the game and moving the help into the toolbar.
- There is overflow in the main game screen as the actual cell overflows out of the screen, this would be fixed in the redesign
- The activity is not complete and there exists a [to do list](#) of all that is required before this activity can become Beta. I intend on getting this activity to at least a beta release

dotsAndBoxes

- In the activity, whenever a line is placed, the line appears out of nowhere and there is no animation when the line is placed. I want to add an animated transition where the line appears as if it was drawn onto the board. Since there is already a class for box, I can change the functionality of draw_board method on Game class and add a draw method on box which would animate the line when drawing it for the first time, this would use the pre-existing up,left,down,right properties of the box class. Also when the game is initially started the dots would be drawn by animating them from top left to bottom right.

- I also plan on adding a ghost line to avoid mis-clicks, this has even happened to me so many times, I think the line would be placed somewhere and it gets placed somewhere else. This could be implemented as shown below :



Ghost Line

simulate-activity

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- The activity appears to be incomplete and frequently crashes, the end screen has no format to it and the game sometimes crashes sugar and the only way out is by pressing F6 to get out. I intend on fixing these problems and adding a proper end game screen to this activity.

- The activity is currently not in python3, I also plan on rewriting this activity in python3, the reason I say rewrite instead of port is that I also aim to restructure the code a little. So to put it simply, I plan on restructuring the code for this activity and also writing the code in python3.

flip

- The activity has a button with a “Question Mark” in the toolbar, this would indicate that it is a help button, which would describe how to play the game but instead it just solves the entire puzzle for you.
I plan on adding three separate buttons to the toolbar, this “Question Mark” can be repurposed as a Help button, secondly I’ll add a button for a hint which will only tell the player the next step and a third button for Solution, which solves the puzzle just like the current button does.
- The activity has slight overflow in the 6x6 board size, this can be fixed, not only for a given screen size, but universally, by making the sizes of the buttons adjust to the screen size and board size and thus making them always remain consistent.

jumble-activity

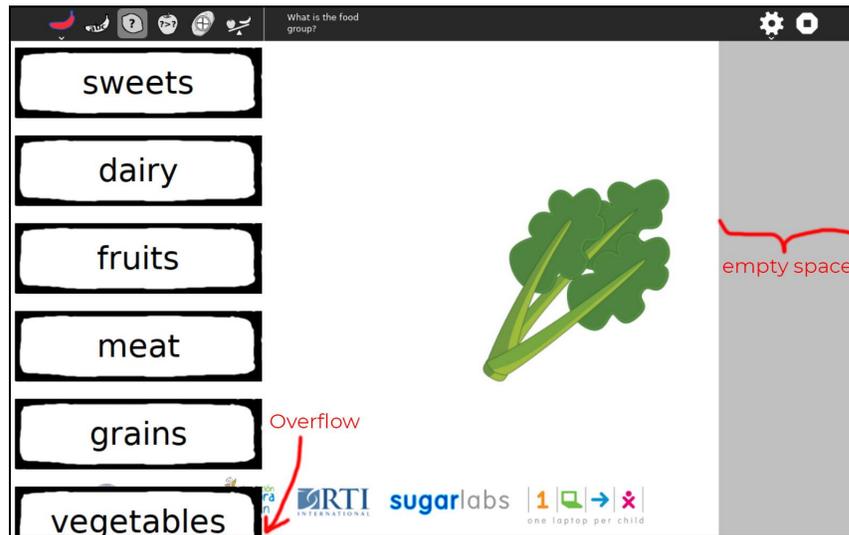
- The activity suffers through overflow (atleast at the screen resolution of 1280x800). There are no measures put in place for either adjusting to the screen size or adapting a general screen size. I plan to remove this overflow by either implementing a system such that the items are placed relative to the screen size or by adapting the activity to one fixed screen resolution.
- There are two buttons in this activity, Reset and Next but these are not visible and act only when clicked. I was not able to find the commit which introduced this bug but I plan on removing these buttons from the game screen completely as there is no proper place for them anyways and move them to the activity toolbar,
- The activity suffers through an issue where the cursor movement is laggy. I have made several attempts to fix this already but to no avail so I aim to find and eliminate the source of this issue sometime during the GSOC period.

reversi-activity

- As of now there is only 2 players mode in the game, that is, two players play on the same device, taking turns one by one. I plan on introducing a button in the toolbar, which would allow the player to switch between two players and “vs AI”. In the “vs AI” mode, I plan on implementing an AI to play reversi against the player, I’d employ the minimax algorithm with Alpha-Beta pruning to implement this, pruning being done to enhance the performance of the AI.

nutrition

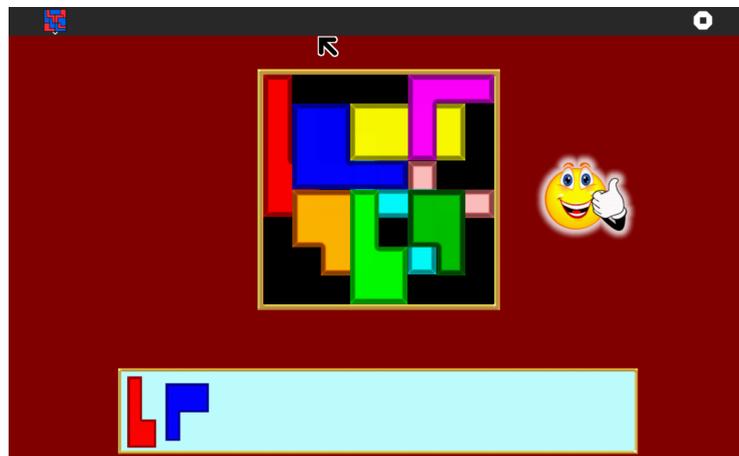
- There are some overflow and screen size issues as shown in the below screenshot, I plan on fixing these as one of my tasks during GSOC.



- I also plan on adding a new game mode to this activity, since the activity has its values in teaching children about nutrition and food intake, I feel like a game mode called “Healthy choice” would be a perfect fit for this activity.
 - This game mode will involve the child being presented with a choice between two (or more) food items
 - The child will win if he chooses the healthier options among the two given food items
 - This could be implemented by either having premade questions where the healthier choice will be coded in, or by adding a “Health index” property to the FOOD_DATA array in food.py so the food items may be chosen at random and the one with the best health index will be the correct answer, this would be doable as there are only about 70 food items in this array.

iq-activity

- This activity appears to be incomplete. Although it does have levels, there is no end-game screen, the only indication of having won is a smiley appearing to the right of the game board.
- On the topic of winning, there is no check in place to see if the player has actually won, as long as all pieces are fit into the board, the player is considered to have won and there also is not a check for not letting the player place tiles where there already are tiles (no collision) this results in situations as shown below



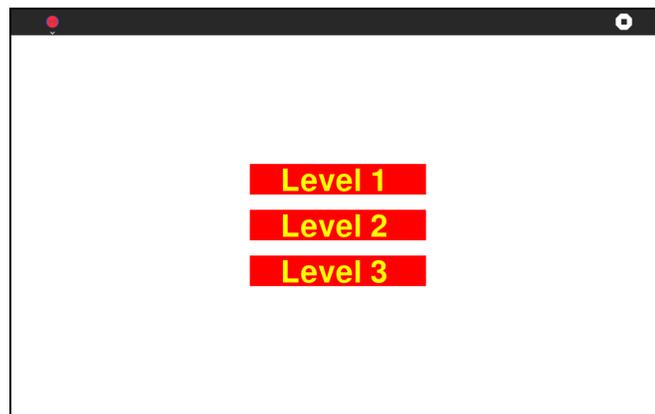
Game won screen despite that clearly not being the case, also overlapping blocks

- I plan on adding a help button to the activity's sugar toolbar, which would display a small description about the activity and a "how to play"
- I plan on adding a timer to the activity, thus providing an incentive to those who could solve the puzzle quicker.

- I also intend on adding a “solution” button to the Toolbar which would display a solution to the current level, the solution can be hard coded as there would be at least one solution to each level..
- I also think the levels would be better moved into the Toolbar thus making more space for the actual game board, though I am on the fence with this one and would like to consult others in the community before doing so.

hittheballs-activity

- The menu for this activity and other UI elements are barebones and could use a redesign, I plan on enhancing the UI as demonstrated by the images below



*Current UI, this is the main menu screen and the game
Begins immediately after choosing a level*



I plan on implementing the UI like this, the former image shows the main menu and the latter one shows the level selection screen which would only set a level and the game will start only when "Play" is clicked. I will also add a "Selected Level" indicator near the play button.

- Sometimes the balls can appear to be too dark for the text on them to be visible. I intend on creating a utility function which generates a random color only after making sure the color is bright enough that the text on it would be visible.
- I also intend on adding sound to this activity, sounds that I have planned include
 - Button hover sound
 - Button click sound
 - Correct answer sound
 - Wrong answer sound

triples

- The activity has no end screen, I intend on implementing this it would also show the time it took to solve the puzzle.
- I plan on adding a “Hint” button to the toolbar, which will reveal one answer. Using a hint will add attempts to your score. (The game is designed such that lower attempts translate to better score).
- Currently, the high score for this activity is not saved. I plan on storing this as a pickle file score.pkl in the activity root directory. Thus, I will store the minimum attempts and minimum time. And everytime either of these is beaten the player would be told “New best time” or “New best score”

TIMELINE

Community Bonding Period

4th May - 28th May

- Interacting and bonding with mentors
- Looking into the code bases further and developing in depth understanding of these activities and their code.
- Learning about sugar specific tools which I already am not aware of and understanding the general design patterns employed in sugar activities not only limited to the selected activities.

Week 1

29th May - 4th June

- Start working on the 1st activity ball-and-brick-activity and aim to complete its task.
- Assess mentor reviews and make necessary changes.

Week 2

5th June - 11th June

- Start working on the 2nd activity sonic-jump-activity and aim to complete its task.
- Test the work done in week 1 thoroughly to ensure no bugs/issues.
- Assess mentor reviews and make necessary changes.

Week 3

12th June - 18th June

- Start working on the 3rd activity cellgame.
- Design the graphics/textures/sprites for cellgame
- Aim to complete the coding tasks for cellgame
- Assess mentor reviews and make necessary changes.

Week 4

19th June - 25th June

- Start working on the 4th activity dotsAndBoxes and aim to complete its task.
- Polish cellgame new sprites, finalize and apply them.
- Assess mentor reviews and make necessary changes.

Week 5

26th June - 2nd July

- Start working on the rewrite of 5th activity simulate-activity.
- Assess mentor reviews and make necessary changes.

Week 6

3rd July - 9th July

- Start working on the 6th activity flip and aim to complete its task.
- Complete any remaining tasks for simulate-activity.
- Test activity 5 simulate-activity thoroughly to ensure no issues.
- Assess mentor reviews and make necessary changes.

Week 7 - Mid Term Evaluation

10th July - 16th July

- Start working on the 7th activity Jumble and aim to complete its task.
- Assess mentor reviews and make necessary changes.
- Document all necessities for evaluation.

Week 8

17th July - 23rd July

- Start working on the AI of 8th activity Reversi.
- test the AI and improve its performance as much as possible.
- Assess mentor reviews and make necessary changes.

Week 9

24th July - 30th July

- Start working on the 9th activity Nutrition and aim to completely develop the game mode within this week.

- Test the game mode and cross check the new data
- Assess mentor reviews and make necessary changes.

Week 10

31st July - 6th August

- Start working on the 10th activity IQ-activit.
- Assess mentor reviews and make necessary changes.

Week 11

7th August - 13th August

- Start working on the 11th activity Hit-the-ball-activity and aim to complete its task.
- Test the new UI elements for bugs and resolve them.
- Assess mentor reviews and make necessary changes.

Week 12

14th August - 20th August

- Start working on the 1st activity Triples and aim to complete its task.
- Complete any remaining work from activity 11, hit-the-ball-activity.
- Assess mentor reviews and make necessary changes.
- Check if any flake8 warnings were created due to the code contributed throughout the 12 weeks and resolve them.

Final Evaluation

21st August - 28th August

- Make sure at least a total of 12 activities are ready for the final evaluation.
- Complete any remaining tasks
- Prepare any documentation as necessary
- Document the entire work

PAST CONTRIBUTIONS TO SUGARLABS

Highlighting my past Pull Requests to various sugar activities

#35 Refactor: new class Juego_button & Bugfix: sound repeating when hovering on buttons

jamath-activity

#17 made the ball draggable with mouse : added grabbed property to Ball and _mouse_motion_cb to Bounce

fractionbounce

#19 Bug Fix : Updating colors makes the game state disappear

dotsAndBoxes

#9 feature: show correct answer after game over

numberrush-activity

#33 Made the toolbar show the currently selected tool

Bridge

#18 replaced TestGame entries with gameLoop() at new game and continue event

ball-and-brick-activity

#32 bugfix: score overflow at 4+ digits

block-party-activity

#30 Upgraded deprecated Gdk.color.parse to newer Gdk.color_parse

Block-party-activity

#121 updated 'btn' class to have cursor: pointer so that it feels interactable

browse-activity

#10 Added latest screenshot and added missing screenshots

numberrush-activity

OTHER COMMITMENTS

Sugarlabs is the only organization I'm applying at and thus have no commitment under GSOC or as a part of preparation of GSOC towards any other organization. My summer vacations align with the GSOC timeline thus I have no special commitments towards my college, no exams are scheduled during this period either. I have a minor project which needs to be made during this project but it won't be a hindrance to my GSOC contributions.

I would be awake 8:00 IST to 01:00 IST and would be completely reachable within these times.

No other commitments are worth mentioning, Any unforeseen events are not within the scope of this section.

POST GSOC PLAN

I aim to firstly keep these activities updated, the ones I worked on during my GSOC period and regularly maintain them. I also plan on continuing contributing to sugarlabs after my GSOC period, in other activities as well. In the future, I also aim to contribute to other products by sugarlabs besides sugar, especially sugarizer.