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# Maintaining 12 activities

## Sugar Labs GSoC 2022 Proposal

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### Basic Details

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- **Primary Languages:** English, Hindi, Punjabi
- **Location and Timezone:** India (IST)

### Why Sugar Labs?

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I am a first-year undergraduate student pursuing Computer Science at Birla Institute of Technology & Science, Pilani. I am fascinated by the idea of open sourced projects, and how anyone can access and contribute to the project's code. I liked Sugar Labs' approach that gives you a platform to provide educational opportunities to children. I also tried testing sugar activities with some primary school students, with help of my friends at [NSS](#) (BITS Pilani).

### Past work on open source projects

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- I have been contributing to [Manim](#) (community edition) for the past year, a community-maintained Python framework for creating precise mathematical animations programmatically, as demonstrated in the videos of [3Blue1Brown](#).

[Here](#) is some of my past work related to this.

- I have been contributing to Sugar Labs for the past month, trying to constantly improve sugar activities and get the hang of the codebase. My past work till now includes contributions to:
  - [TurtlePond](#)
  - [Recall](#)
  - [Yupana](#)
  - [Flip](#)
  - [BlockParty](#)

## Project Details

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**Type:** Large

Sugar has a lot of activities, with 250+ on GitHub, and more elsewhere. I would like to improve and maintain 12 sugar activities (or more), fixing various bugs and adding features to improve the user experience. To shortlist few, I would like to take up the following activities:

- **Math Hurdler**

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- Improve the horse sprite and add proper running animation to it.
- Horse remains in the air once you click on the correct answer. Fix by increasing the speed of the hurdle once answered correctly.
- Add textures for grass and sky.
- Add highscore system and difficulty levels.
- Improve overall UI.
- Update release on ASLOv4.

- **Tic Tac Toe**

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- The UI of the activity does not look appealing and feels glitchy.
- Remake activity in pygame.
- Add animations for the grid board, and (X, O) to make it feel better.

- Add AI to play the game with 3 varying difficulties.
- Release activity on ASLOv4.

- **Sonic Jump**

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- Add mouse tap support.
- Add textures for obstacles and background.
- Add difficulty levels which will vary the speed of game.
- Add 3 lives on easier difficulty, and 0 on hardest difficulty level.
- Release activity on ASLOv4.

- **Ball and Brick**

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- Radomize direction of ball by a small angle when it hits paddle.
- Add a subtle smooth shake effect when ball hits the obstacle.
- Add multi-balls mode, where the number of balls slowly increase, however there should be atleast 1 ball alive to not lose. This mode will make activity unique and fun.
- Release activity on ASLOv4.

- **Flappy Bird**

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- Add a parallax effect for the background. To add the parallax illusion, background needs to be scrolled at a slower pace as the game proceeds.
- Add an option to choose difficulties to vary the gap between the upper and lower pipes.
- Add mouse button for tap functionality.
- Update release on ASLOv4.

- **Block Party**

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- Draw a gridlines, that will indicate where exactly the block is going to drop.
- Improve on the "speedup on down key held" mechanic I added in a past [PR](#), as the speedup begins in next tick which resulted in a bit of latency.
- Improve overall UI.

- Update release on ASLOv4.

## • **Number Rush**

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- Requires porting to python 3.
- Add a gravity effect to the falling balls, making them look more realistic.
- The paddle currently, snaps to 4 places only. Add a feature to make it move smoothly, something similar to paddle in [Atari Breakout](#) game.
- Improve the UI by adding textures for ball and a background.
- Release activity on ASLOv4.

## • **Jumble**

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- Fix the question image at a corner and avoid overlapping of images on the question image.
- Add time taken as the score.
- Add difficulty level which varies the number of images to be shown in clutter.
- Release activity on ASLOv4.

## • **Follow Me**

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- Fix [#14](#) and [#13](#).
- Centralize the game grid.
- Release activity on ASLOv4.

## • **Colgadito**

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- Port to GTK 3.
- Update sugargame.
- Complete python3 port.
- Release activity on ASLOv4.

- **Recall**

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- Centralize the UI elements.
- Add some basic alerts/instructions so that the user knows what to do in each mode.
- Add a difficulty selector which will increase the number of images slowly or more rapidly in subsequent levels.
- Update release on ASLOv4.

- **JAMath**

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- Numbers seem to blend with the background, a circular background mask can be added to the numbers to provide better contrast.
- Add feature: Type on the keyboard to answer instead of having to point and click.
- Update release on ASLOv4.

These are some of the ideas and features I want to implement which may change during discussion with the community and the mentor. If all these goals are completed in time, I can pick more activities to improve in a similar way.

## **Tools and technologies:**

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Python, PyGame, GTK 3, other activity specific modules.

## **How will it impact Sugar labs?**

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This project will provide users with a better overall experience and also help to keep the code up to date for at least 12 fully functional activities with strong pedagogical values. Also, as Python 2 is no longer supported, porting activities to Python 3 will help to release them on ASLOv4.

# Timeline

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## Community Bonding Period

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During this period, I will interact with my allotted mentor and look at the code for these activities and parts of code I can improve on. Also, in this period, I will try to understand the codebase in-depth and tinker around more.

## Coding Period

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I may change the order in which activities are taken after informing the mentor.

- **Week 1 & 2 (June 13 - June 27)**
  - Work on Math Hurdler and Jumble activities.
  - Discuss the bugs and features planned with the allotted mentors and community. For example, speeding up of hurdle once the correct answer is selected. The new animation for horse and textures for sprites, etc.
  - Implement in code according to discussion.
  - Resolve any unforeseeable errors.
- **Week 3 & 4 (June 27 - July 11)**
  - Work on Tic Tac Toe and Recall activities.
  - Discuss the pygame remake for tictactoe and the animations.
  - Work on recall and the AI for tic tac toe.
  - Take feedback for improvements from community and mentor.
- **Week 5 & 6 (July 11 - July 25)**
  - Work on Number Rush and Block Party activities.
  - Port activity to python 3.
  - Implement gravity to the balls, by incrementing velocity each frame by some constant making the balls accelerate.

## Phase 1 Evaluation

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By this time, I aim to complete 6 activities implementing all the features and bug fixes.

- **Week 7 & 8 (July 25 - August 8)**
  - Work on JAMath and Follow Me activities.
  - Resolve bugs and implement features as described.
  - Take feedback about any other improvements that can be done.
- **Week 9 & 10 (August 8 - August 22)**
  - Work on Flappy Bird, Ball and Brick activities.
  - Add parallax effect to background and tap to jump in flappy bird.
  - Discuss ball and brick activity features and implement accordingly.
- **Week 11 & 12 (August 22 - September 5)**
  - Work on Sonic Jump and Colgadito activities.
  - Do the porting work and add textures as described.
  - Test and finalize the activities for evaluation.

## Final Evaluation (September 5 - September 12)

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I aim to complete all the activities by now.

- Following such schedule, 12 activities can be worked upon in the span of 12 weeks.
- This project will provide users with a better overall experience and also help to release more activities on ASLOv4 with up to date code.

## Schedule

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- My awake hours would usually be between 10 AM IST (4:30 AM UTC) to 1 AM IST (7:30 PM UTC) and I'm comfortable working anytime during this period.
  - During this period, I will have mid-semester examinations between June 29 - July 02 and end-semester exams between August 03 - August 13. I may not be that active around this period. Exam dates for the next semester are not known yet, but I will inform at the latest.
  - To report the progress between evaluations, I will create a GitHub markdown for the relevant contributions I made to the activities.
  - After GSoC, I wish to continue contributing to various activities and try to keep them up to date.
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