

Google Summer of Code 2022

Proposal for adding new activities to GCompris project under KDE

Proposal Title: Adding new activities to GCompris

Project: GCompris

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Abstract

GCompris is an educational suite that aims to teach the kids who are aged 2-10 year in the easiest way. It offers more than 150 reading, math, and science activities and has so many active users.

I wish to add value to GCompris by contributing to two activities which lie in mathematics and English domain.

The first activity is "Using 10's complement to add numbers," which helps understand a form of addition using complements. The second activity is "Grammatical analyse". This activity helps to improve the understanding of parts of speech.

Motivation for the proposal

I have been interested in open source contributions since my first year. I am very much influenced by the idea of practical learning, and open source is the best way for it. Everyone in the community is friendly and guides beginners to explore and learn new things. I have also participated in Season of KDE 2022 with GCompris, and from this, I learned so many things, and my interest increased in open source contributions.

I wish to participate in Google Summer of Code to apply my current learnings and gain new skills under the guidance of my mentors

Project Goals

My objective is to add two new activities to GCompris by the end of the GSoC coding period. The activities are

- Using 10's complements to add number ([T15276](#))
 - It is a form of addition that relies on the use of 10s to add numbers.
 - The "complement" is the number we add to make 10.
 - Example: Complement of 3 is 7, because we add 7 to 3 to make it 10.
- Grammatical analyse ([T15277](#))
 - This activity aims to teach grammar to the users.
 - Modern grammar in many languages recognizes four major word classes (**verb, noun, adjective, adverb**) and five other word classes (determiners, preposition, pronoun, conjunction, interjection), making nine-word classes (or parts of speech) in total.

Implementation Details

1. Using 10's complements to add numbers

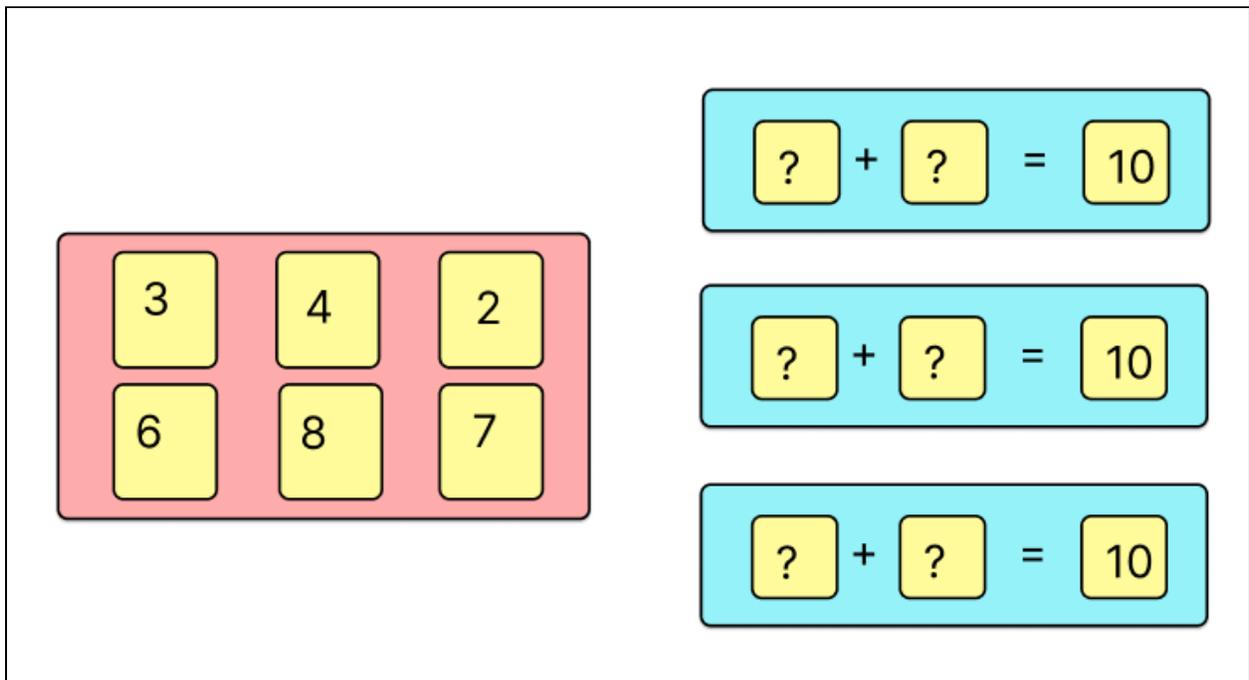
- There are two major components in this activity:
 - Pink container
 - Blue container

- Clicking on the number card in the pink container places them inside the blue container.

- **Level 1: Finding 10's complement.**

In this level, the user selects any number from the pink container as the first number, and the second number should be 10's complement of the first number.

Visual Representation for horizontal devices (Level 1) -



Representation on vertical devices for level 1:

The diagram consists of a large white rectangle containing four smaller containers. The top three containers are light blue and each contains the equation $? + ? = 10$ with yellow boxes for the numbers. The bottom container is light red and contains six yellow boxes arranged in two rows of three. The top row contains the numbers 3, 4, and 2. The bottom row contains the numbers 6, 8, and 7.

For example: let “a” be the first number and “b” be the second number.

- $a = \text{any number from the left container.}$
- $b = 10 - a.$

- **Level 2: Finding 10’s complement for a given number.**

In this level, the user must select the 10’s complement of the given number inside the blue container on the left-hand side.

The diagram shows a pink container with six yellow boxes containing the numbers 3, 4, 2, 6, 8, and 7. To the right, three light blue boxes show the following equations:

$$? + 2 = 10$$
$$? + 4 = 10$$
$$? + 3 = 10$$

- **Level 3: Finding 10's complement in an addition.**

In this level, the user can select any number from the pink container as the first number, and the second number should be 10's complement of the first number. Similarly for the third and fourth numbers.

Example: we choose 4 as the first number. Then the second number should be $10 - 4$. The third number could be any number from the box, say 2. Then the condition for the fourth number is $10 - 2$.

- a = first number, b = second number, c = third number, d = fourth number.
- a = any number from the box;
- $b = 10 - a$;

- c = any number from the box;
- $d = 10 - c$;

The diagram shows a math problem. At the top, a light blue rounded rectangle contains the equation: $? + ? + ? + ? = 20$. Below it, a pink rounded rectangle contains a 2x3 grid of yellow boxes with numbers: 3, 4, 2 in the top row and 6, 8, 7 in the bottom row.

- **Level 4: Breaking numbers for addition using 10's complement.**

In this level, the user is asked to add two numbers by breaking the second number into two new numbers such that the sum of these new numbers remains the same as the initial number, and one of the new numbers provides 10's complement of the first number.

Example: $7 + 8 = ?$

- $7 + \dots + \dots = ?$

- The user breaks 8 into 3 and 5 as 3 is the 10's complement of 7.

Technical Details

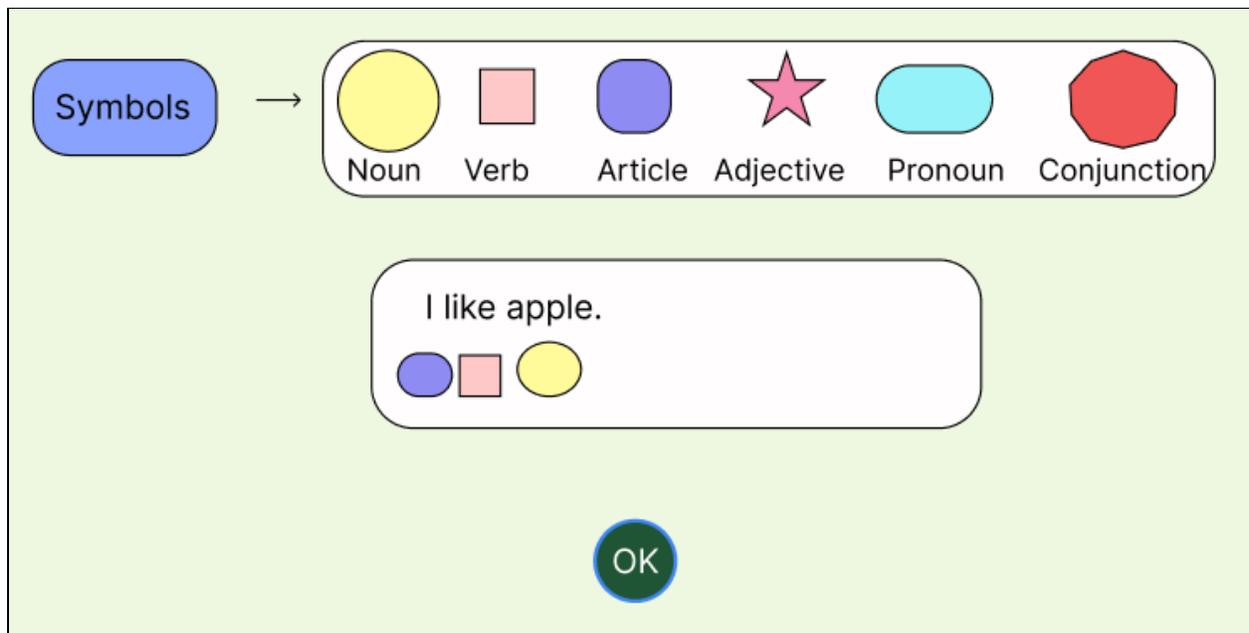
- *Rectangle* items will be used for pink and blue containers.
 - The “number card” will be created as a new item for multiple use cases.
 - For multiple datasets we will generate random numbers between maximum value and minimum value as required, for each level.
 - The numbers which have constraints on them to be correct will be checked by if the number inside the number card satisfies the equation or not.
 - In case of wrong selection, there will be an indication through animation that the number will not be placed at the position of the question mark and comes back to its initial position. This will be done with the help of states in Qt/Qml in pair with *PropertyAnimation*.
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2. Grammatical analyse

- The user selects for every word in the sentence in the white box, which is considered a “question box” whether this word is a noun, pronoun, verb, etc. Then select the correct shape associated with that.
- The selected shape is placed inside the white box, the “answer area”.
- The shape must be below the word for which the user is answering for.
- After placing the shapes for all the asked words, the user presses the “OK”.

- We will have multiple datasets, and they will have the difficulty level.
- We will start with smaller sentences and move toward the longer sentences as we move forward in the activity.

Visual representation of the idea.



Technical Details

- *Rectangle* items will be used for all (symbol, question, answer) the containers.
- When the user presses “OK”, the answer will be checked with the help of mapping of words with its correct nature..
- If the arrangement of symbols after pressing “OK” is incorrect, then the level restarts.
- The answer container is *DropArea*, a *DropArea* is an invisible item that receives events when other items are dragged over it.

Timeline

I plan to contribute to all the above tasks during my GSoC period. It is a medium project (175 hours), and the work duration is 12 weeks.

May 20 - June 12 -> Community Bonding Period

- During this time, I'll finalize the layouts for both activities by preparing mockups for all the levels in the activities and reviewing them with my mentors.
- Read the documentation and pre-written codes of other activities according to my needs to find Qt/Qml solutions to my problems.

Week 1 - 2 (13 June - 26 June)	<ul style="list-style-type: none">● Add a blog about Community Bonding Period.● Create a basic structure for the “using 10’s complement for addition”● Add click effects to the number card and animation for moving from one container to another.
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	<ul style="list-style-type: none">● Add a blog about progress so far for week 1 and week 2.
Week 3 - 4 (27 June - 10 July)	<ul style="list-style-type: none">● Make the components functional by adding the logic part for the number cards.● Complete the animation of the answer area to indicate they are solved as a green box.● Improving as per the mentor's reviews.● Write a blog about my progress for week 3 and week 4.● Test the activity for android devices.
Week 5 - 6 (11 July - 24 July)	<ul style="list-style-type: none">● Create a basic structure of components inside the activity for “grammatical analyse” (symbol container, answer container, and question container).● Implement the symbol container.

	<ul style="list-style-type: none"> ● Add the symbols associated with the grammatical nature of the word inside the symbol container. ● Add a blog about progress during week 5 and week 6
<p>Week 7 - 8 (25 July - 7 August)</p>	<ul style="list-style-type: none"> ● Add the drag and drop in the white box. ● Add multiple datasets to “grammatical analyse”. ● Add the logic part (identification of right or wrong answers) to the activity. ● Write a blog about my progress so far for week 7 and week 8. ● Test “grammatical analyse” for android devices.
<p>Week 9 - 10 (8 August - 21 August)</p>	<ul style="list-style-type: none"> ● Add the description to “add using 10’s complement”. ● Add the description to “grammatical analyze”.

	<ul style="list-style-type: none">● Start testing the activity manually and improve by reducing bugs and errors.● Add a blog about progress for week 9 and week 10.
Week 11 - 12 (22 August - 4 September)	<ul style="list-style-type: none">● Buffer time for further improvements.● Perform final checks in the activity for different screen sizes and devices.● Clean the code and make it ready to be merged.● Add blog about progress during week 11 and week 12.● Write a blog about my experience as a contributor to GCompris under GSoC.

Previous Contribution to GCompris

- I started contributing to GCompris in December 2021. I solved the issue of implementing the **undo-all button** in the chess activity.

Issue link - [here](#)

Merge Request - [link](#)

This was my first contribution.

- I participated as a contributor in **Season of KDE**, where I added “Left and Right clicks training”. The activity aims to teach which mouse button is the left button and which is the right.

My Season of KDE proposal - [link](#)

Issue link - [here](#)

Merge Request - [link](#)

I also wrote a blog about my progress during the **Season of KDE**.

1. [Season of KDE - Introductory blog](#).

2. [SoK'22 Week 4: Functioning of the Animal Cards](#)
3. [SoK'22 Week 8: Random and Uniform Placement of the Animal Cards](#)
4. [Sok'22 Week 11: Finalizing the Left-Right Click Activity](#)

This was my first major contribution.

About Me

I am Samarth Raj. I am a second-year engineering undergraduate at Kalinga Institute of Industrial Technology, Orissa, India. My major is Computer Science. I have an interest in open source. I started contributing to open source in my first year and have consistently done since then. I believe open source is a great way to learn how to solve real-life problems and contribute to something that people use in their day-to-day lives.

PROGRAMMING EXPERIENCE

- I started programming in my first year and learned C++ as my first language. I am passionate about Problem-Solving and Competitive Programming through which I learned Data Structure and Algorithms.

- I have participated in HacktoberFest 2021, which is a month-long celebration of open source software run by DigitalOcean in partnership with GitHub and Twilio.
 - I have participated in 30 days of Google Cloud 2021. A beginner-friendly program by google to educate students about the cloud.
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Other Commitments

During my summer break (June - July), I'll be devoting up to 3 hours daily.

And after my college reopens, from 7 August to the end of the coding period, during the weekdays, I'll be working 1-2 hours and on weekends I'll be working 2-3 hours.

Other than this, I don't have any other commitments.