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# Extending Pedagogical Intervention using Scratch

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**Abstract:** Scratch is a visual programming environment that lets users create interactive, media-rich projects. Scratch contains working environment for users like operator to control the sprites and other options like motion, pen etc. People have created a wide range of projects with Scratch, including animated stories, games, online news shows, book reports, greeting cards, music videos, science projects, tutorials, simulations, and sensor-driven art and music projects. In our paper we made an animation game of Pythagoras theorem which will help the students to learn the theorem by doing using sprites.

**Keywords:** Operator, Sprites, style, pen

## I. INTRODUCTION

Scratch is a simple environment designed by the Kindergarten Lifelong Learning Group at MIT to introduce some basic programming concepts in a fun and interactive manner. In Scratch, sprites (objects) are manipulated on the stage (background) using various scripts (small program segments). Each sprite has its own set of scripts to control its behaviors and how it interacts with other sprites and events. Programming consists of snapping together individual blocks of preexisting actions to create a script. A program can be as simple as a single block or consist of multiple blocks stacked together that will run as a unit.

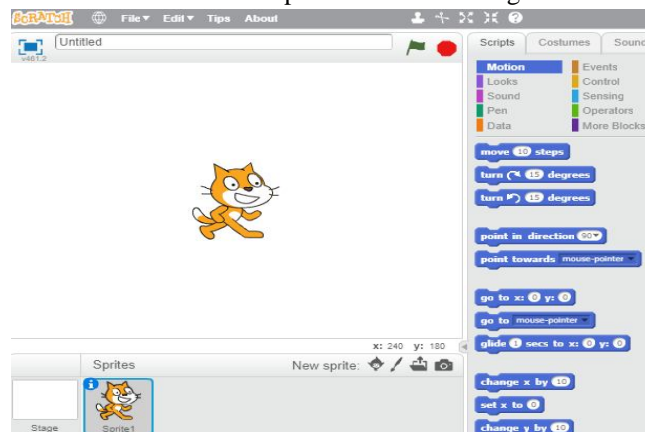


Fig 1: Working Environment

Scratch is translated into 70+ languages and is used in homes, schools, and after-school clubs in every country in the world. Scratch is often used in teaching coding, computer science, and computational thinking. Teachers also use it as a tool across many other subjects including math, science, history, geography, and art.

## II. EASE OF USE

### A. Literature Survey

Before we were developing different animation games like shark catches the small fish, flying parrot, watching dog, tom and jerry like but these games will not help to the students in studies so to help the students to learn different theorems in mathematics and science we have developed the animation game of Pythagoras theorem as students will learn the theorems by doing.

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs Pythagoras theorem gives explanation using this formula  $A^2+B^2=C^2$ .

### B. Existing System

Based on the literature survey we saw different animation games but in other reference papers we studied mathematics quiz, puzzle solving, addition and subtraction of values but we never found to apply scratch programming for the theorems. To overcome that we went through proposed work.

C. Proposed System

In our paper we have taken the Pythagoras theorem to understand the students by using scratch programming language. Here we have taken the variables as a, b & c. if we give the value of the variable a and b we will get the answer of hypotenuse c using different control and operates in scratch environment.

D. Equations

If a and b are the lengths of the legs of a right triangle and c is the length of the hypotenuse, then the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

This relationship is represented by the formula:  $a^2 + b^2 = c^2$

III. DESIGN & IMPLEMENTATION

Based on observations from modding practices in the wider Scratch community, along with results from experiments within the Scratch (e.g. workshops conducted in our college), the Scratch extension system was developed in order to allow easier additions to the functionality of the core programming language as well to solve the mathematical theorems. The affordances of the extension system allow for the augmentation of the vocabulary rather than the grammar, and hence, certain features that have been seen in mods (e.g. new control structures) are not implementable through the extensions system. This section covers the design and the trade-offs made, along with brief references to the implementation.

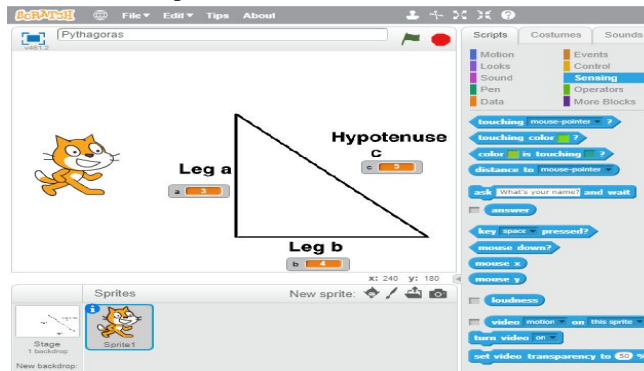


Figure 2 : Checking the result

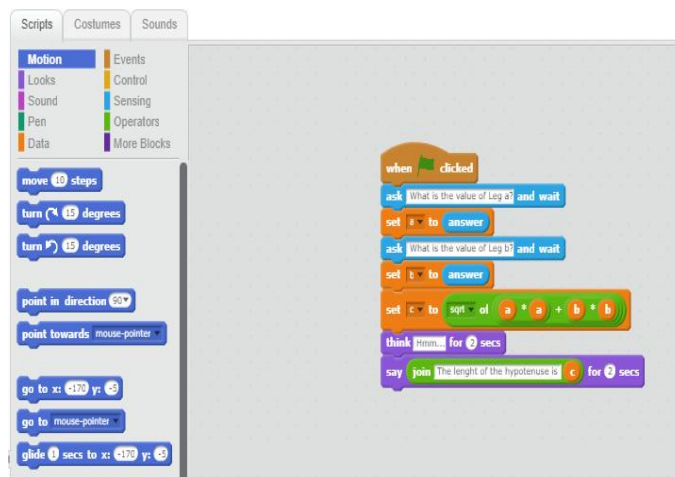


Figure 3 : Working Environment

IV. RESULT

Scratch is a wonderful tool to the users to do so operations like programming, designing, solving puzzles and creating an animation games. Here we used mathematical operation to solve the Pythagoras theorem by using control options, making a variables and operators. In our result we got the exact answer for input values as shown in the figure.

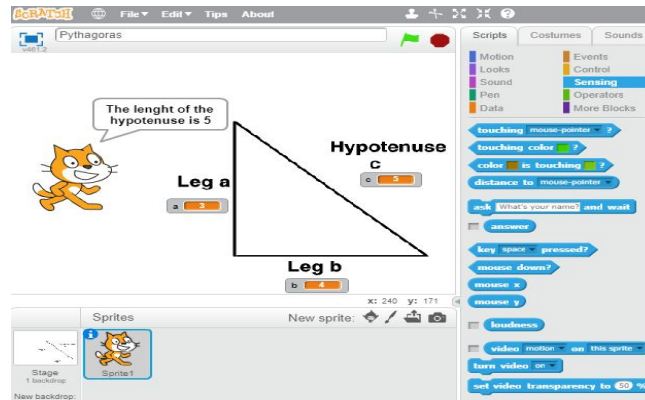


Figure : Simulation Result

## V. CONCLUSION

We present the Scratch programming ,a toolkit that enables anyone to extend the vocabulary of the visual Scratch programming language through custom programming blocks written in animation games. Scratch programming language helped us to find out the length of the legs in right angle triangle in Pythagoras theorem. The scratch programming tool allow us to develop different kinds of games which will help to the students to learn more things like how to operate and control the sprites this is designed to (i) enable innovating on the Scratch programming language itself, in addition to innovating with it through projects, and (ii) enable the creation of new interest-driven pathways into Scratch programming.

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