How To Become a Physics Pro

Proposed by:

Team Curiosity

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Problem Statement

Let's be for real: Physics can be one of the most challenging subjects for Grade 8 students. Don;t deny it, many students struggle to understand concepts such as ***motion, force, speed, work, energy, gravitational laws, and heat transfer*** because the topics are way too complicated and require the strongest abstract and critical reasoning.

Did you know: Students often rely on memorisation (stock-knowledge) rather than dedicated understanding. When dozens of formulas, units, and scientific terms accumulate, scholars lose confidence and stimulus. This results in well a low scores, frustration, and a weaker appreciation of how physics can be such a fun subject.

We interviewed **Katara, an 8th grader from 8-Camia**, who communicated that she finds physics “too heavy” and wishes for a study method that explains the concepts thoroughly, makes learning interactive, and helps her review without stress. Her very experiences are what grade 8 students face, and let’s be real, that summative assessment exam for the grade 8’s would really be an entire list piled up all together.

Create a software that can be a viable study method for students, whether they use a premade quiz for a topic or they make their own quiz to help others! Students often struggle to find effective and interactive study methods tailored to their individual learning styles and their own academic needs. Pressure builds up when the entire school year’s topic of numerous subjects is going to be the final decision maker of whether you will be a Director’s Lister.

Through this project, we can create an engaging way of studying or a collaborative way of learning for Physics. This is the project **“Gravity pulls with Curiosity.”** Where limited ideas are taken into software with no limits.

Project Objectives

Pressure builds up: When faced with an exam that shows your efforts, you don’t want to fail it, duh! I, Edgar, am a Physics geek. I want to show my peers how Physics can be an engaging subject, for them to understand why I cherish it so much.
But let’s be honest: Memorising thousands of terms can feel overwhelming, it turns us into a dictionary that doesn’t even have definitions, which is why

This project aims to:

1. Provide a platform for **Physics** quizzes focused on Grade 8 topics, such as:
    - Motion and Speed
    - Force and Friction
    - History of Gravity
    - Newton’s Laws of Motion
    - Work, Power, and Energy
    - Laws of Gravity
    - Heat and Temperature

2. **Allows students to create physics quizzes**, helping critical thinking for questions strengthen.
3. **Improve students' comprehension** by giving feedback, hints, and corrections in real time.
    - Offer clear and well-structured explanations on the validity of the answer; this is why you were correct/wrong.
4. **Encourage collaboration,** allowing a friendly-competitive atmosphere.
5. Make learners appreciate physics, allowing them to understand that physics can be less intimidating and easier to understand.

Planned Features

Through this **software**, students can venture into these features:

- **Creating your own quiz**: Just like how you can generate your own quizzes in Kahoot, you can do it here, too!
- **Take premade quizzes**: In this feature, we can use our provided SGs about Physics for an efficient way of making these premade quizzes.
    - If you get it **correctly**, you will get an explanation of why it is correct. This is to take your knowledge onto the spiritway of curiosity, or in simpler terms, to add to what you know.
    - If you get it **incorrectly**, you will get an explanation on why it is wrong. But it doesn't mean you can't take the question again, just like in Duolingo, the question comes back. If you get the question wrong, you will have a .25 deduction, so you can keep taking the question until it's correct! Scores can be an integer or a floating-point number.
- **Collaborative**: In this software, we will implement a leaderboard system, where we can see who got all the answers correctly! Through this, we can ask for tutoring from this Very Important Person! It also engages the mind to do its best to achieve a score.
- **Review Correct and Incorrect:** In this software, the user will be able to review what answers they got correctly and what answers they got wrong to focus on. We can also implement an AI to give definitions, why the answer was incorrect, what the correct answer is, and primarily explain!

Planned Inputs and Outputs

User Interface:

Welcome to Gravity Pulls With Curiosity

User Choice (Main Menu) - Input

Upon starting the program, the user will be given two choices:

1. **Take a Quiz**
2. **Make a Quiz**

The user inputs **1** or **2.**

If the User Chose **“Make a Quiz”**

Inputs:

The user is then asked to provide the following information.

- Select Difficulty
    - Easy - 5 Questions
    - Medium - 10 Questions
    - Hard - 20 Questions
    - Limitless - The user decides

- “**What is the question?”**
- **“Type of Question”**
    - **“What are the choices?”** (A, B, C, D)
    - “**True or False?”** (Modified or Not?)
    - “**What is the Correct Answer?”**

To simplify the process, the user may also **import a file** containing prewritten quiz items.

Outputs:

- A confirmation message that the quiz has been saved
- A preview of the question has been added
- A message notifying the user that their quiz is ready for use

If the User Chose **“Take a Quiz”**

Inputs:

The user is then asked to select a physics topic:

- Select Topic

The user is then asked to select the difficulty.

- Select Difficulty
    - Easy - 5 Questions
    - Medium - 10 Questions
    - Hard - 20 Questions
    - Limitless - The user decides

The user inputs answers

- For each question, the user chooses an answer by clicking (A, B, C, D, True, or False)

Outputs:

A question will be displayed on the screen, containing:

➔ **Question Text**

➔ Choices (A - D, **Multiple Choice)**

➔ True/False or

➔ Modified True or False

1. If the question were a multiple-choice, the user would be given four choices to answer from.
    a. If they get it correctly, the software will congratulate them, and it will also explain how the answer was correct.
    b. If they get it incorrectly, the software will motivate them and give them hints, and the software will explain why it’s wrong.

2. If the question were a modified true or false question, they would just input true if it's true; else, if it's false, they have to explain why.
    a. If they get it correctly, the question will be explained.
    b. If they get it incorrectly, the question will be explained, they are given a chance to answer again, but they just have to choose true; if they answered false (modified) or if they answered true, they have to explain why it’s false.
3. If the question was true or false, the same rules from the multiple-choice test will be applied.

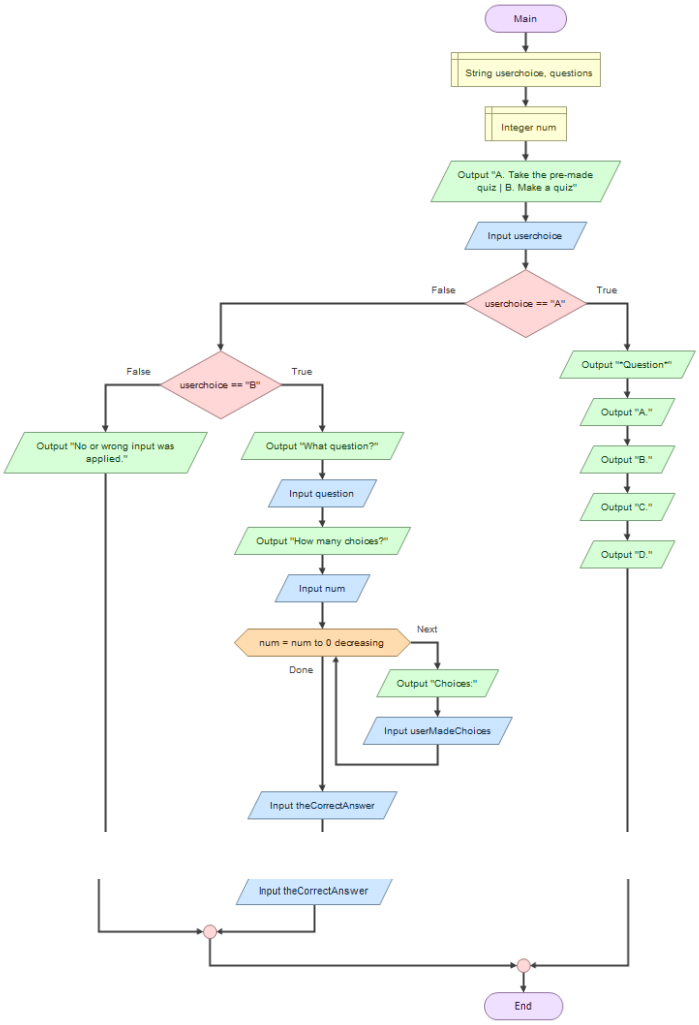
LEADERBOARD SYSTEM

➔ A competitive atmosphere, friendly of course, creates an engaging and motivating study method for students. But instead of chasing the victory, they must focus on their studies, which is why we have the:

REVIEW PAGE

➔ Be able to check your data from past quizzes, where you went wrong, right and learn from the explanations.

Logic Plan


Main
String userchoice, questions
Integer num
Output "A. Take the pre-made quiz | B. Make a quiz"
Input userchoice
False
userchoice == "A"
True
Output ""Question""
Output "A."
Output "B."
Output "C."
Output "D."
False
userchoice == "B"
True
Output "No or wrong input was applied."
Output "What question?"
Input question
Output "How many choices?"
Input num
num = num to 0 decreasing
Next
Done
Output "Choices:"
Input userMadeChoices
Input theCorrectAnswer
Input theCorrectAnswer
End

START PROGRAM

DISPLAY:

1. Take Physics Quiz
2. Make Physics Quiz

USER_INPUT == choice:

IF USER_INPUT == 1:

LOAD physics topic categories (Motion, Energy, Forces, etc.)

USER_CATERGORY == category:

\\ Choose Category

DISPLAY “Easy, Medium, Difficult, or Limitless+ more

USER_DIFFICULTY == difficulty:

EVERY QUESTION +1 + 2 + 3 + 5

` SCORE ACCUMULATION PER CORRECT

EASY = +1

MEDIUM = +2

DIFFICULT = +3

Limitless= +5

PAUSE

FOR each question:

DISPLAY question + choice

USER_ANSWER = input

IF USER_ANSWER == correct:

DISPLAY “Correct!” + explanation

SCORE += ‘score_category”

```
                ELSE:
                    DISPLAY “Incorrect.” + explanation + hint
                    Score -= 0.25
                    ALLOW retry
        DISPLAY final score
        ADD to the leaderboard
        IF USER > USER_2
            // USER goes up USER 2
        GO TO review page

ELIF USER_INPUT == 2:
        ASK user to input physics question
        ASK for choices
        ASK for the correct answer
        ASK for an explanation
        SAVE to the database
        // FILTERS & CENSORS

ELSE:
        DISPLAY “Invalid Input”

END PROGRAM
```

or/

```
FUNCTION one() // Take Quiz
   PRINT("Your topic is: *Topic*")
   PRINT("* Question*")
```

```
    PRINT("A: Choice")
    PRINT("B: Choice")
    PRINT("C: Choice")
    PRINT("D: Choice")

    SET questionAns = INPUT("Enter your choice: ")

    IF questionAns == "A" // Comparing input to the correct choice key
        PRINT("Correct!")
        // The flow keeps going
    ELSE
        PRINT("Incorrect.")

FUNCTION two() // Make a Quiz
    PRINT("Your topic is: will be insert *Topic*")
    PRINT("*Insert Question*")
    PRINT("A: insert Choice")
    PRINT("B: insert Choice")
    PRINT("C: insert Choice")
    PRINT("D: insert Choice")
    PRINT("What is the correct answer?")

    SET correctAns = INPUT("Enter the correct answer key (A/B/C/D): ")
    // The flow keeps going

FUNCTION main()
    PRINT("1. Take Quiz", END="")
    PRINT("2. Make a Quiz")
```

```
    SET userChoice = INT(INPUT("Enter your choice: "))
    RETURN userChoice

// Program Execution Start
SET userSelection = CALL main()

IF userSelection == 1
    CALL one()
ELSE IF userSelection == 2
    CALL two()
ELSE
    PRINT("I'm sorry, wrong input.")
```

Conclusion

In conclusion, "**Gravity pulls with Curiosity**" is an engaging software program designed to simplify and make learning easier by providing an interactive and collaborative platform for our fellow students to engage with various topics about physics through quizzes and other features. By allowing users to create and participate in quizzes, our platform aims to develop curiosity, create creativity, and exemplify critical thinking while promoting academic excellence. With features such as creating your own quizzes, taking premade quizzes, and collaborating with different people for a study session, testing the user's knowledge. This software has the potential to make learning fun, accessible, and effective for students.

By empowering users to both create and participate, the platform actively works to foster **curiosity, spark creativity, and develop critical thinking skills**, all while encouraging academic excellence. Key features, including quiz creation, access to a library of premade content, and facilitated study collaboration, position this software to make learning **fun, accessible, and profoundly effective**.

"Gravity pulls with Curiosity" can help bridge the gap between knowledge and application, contributing to the development of a more informed, engaged, and curious community. Now our students can take that Summative Achievement Exam with ease, for Physics, relieving a big burden!

Team Curiosity!

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