

# Intelligent Tutoring System For Mysql (Mysql-tutor)

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**Abstract** - Intelligent Tutoring System For Mysql is a windows application that tutors the users to learn basics in MySQL Query Language. MySQL Query Language has been one of the important aspects a student in the computers science department or those who want to be in the software industry should be aware of, most of the people were unable to understand the errors in MySQL thus leading to a slow-paced learning process. This Application has two levels of tutoring. In level one, the application able users to write queries by dividing the query into parts, by following this methodology the application can easily identify the part of the error in the query and gives the message to the user accordingly. In level two, the application gives the user a group of tasks and able the users to write the queries for it. In level two, the application follows the principle called personalised adaptive learning which means learning through the mistakes, so here the user gets resourceful feedback containing the areas where the user needs to improve.

**keywords** - Intelligent Tutoring System, Query Language, Personalised Adaptive Learning)

## I. INTRODUCTION

Every student who wanted to learn a MySQL language faces difficulty to understand & write proper syntax which is time taking because of un-proper tutoring. We have taken this project to make beginners free from fear and misconceptions. Our application tutors the users in the basics and thus makes them strong to be excel in MySQL query language. It also makes the users learn from their mistakes effectively. In addition to this, our system lets the user write a command by dividing it into parts, and thereby the user gets a clear idea. There are few lists of tasks assigned to them to perform execution in the query language and the application generates resource-full feedback based on the weak areas of the user. We had faced similar problems when we were beginners to this query language by learning MYSQL. We had taken a survey from the group of people who were willing to learn MySQL, the major problem faced by them was understanding the error generated by the tool and to use right syntax. Our team decided to develop a system to overcome the problems that we faced in learning query language and this is it.

## II. RESEARCH OBJECTIVES

To design a system to educate beginners in MYSQL, as stated in the introduction, the developed system will assist beginners in learning MYSQL and will strengthen their ability to learn syntaxes and write query statements. The proposed solution will alleviate the dread of query language while also making learning enjoyable and effective. In comparison to learning query language through lectures, the tutoring system will cut the total time required to learn a query language.

The following are the objectives of the project

- To provide a portable Intelligent Tutoring System for MYSQL that is both easy to use and efficient to learn.
- To ensure that the learning process moves at a faster pace than traditional lecture-based learning.
- Able to show the error in user understandable way.
- To implement the concept of Personalised Adaptive Learning in level two tutoring.

## III. PROJECT SCOPE & DIRECTION

The main intention of our project is to make a student able to write a query on their own and make them syntactically strong. Many tutoring systems which are developed earlier weren't available to everyone or many of them are not open-sourced applications. We are developing this system to make a student strong in using MySQL and make it available to everyone in the world who is willing to learn MySQL(open-sourced).

The following are our project scopes

- The target groups of this system are students in computer science and related department, faculty who teach DBMS in a educational institution.
- The application is made as a Windows application anyone with a windows laptop or computer having MySQL in it can use this application.
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## IV. IMPACT, SIGNIFICANCE AND CONTRIBUTION

Many tutoring systems that exist nowadays are lack efficiency in performance, portability, and information sharing. Therefore, in this project, we try to eliminate those limitations and some other improvisations are as follows

- Students will be more confident and knowledgeable concerning MySQL. This can be done by practicing our application and solving all the exercises provided in the application.
- The institution receives students with rich quality in their knowledge. This can be achieved using technology along with self-study and human supervision.
- The application can operate on any device with windows operating system at any location as long as their system is supported and have the MySQL tool in it.
- It saves a lot of time and money for people who are paying for learning MySQL.
- The system is also time effective because all calculations are automated.

## V. HISTORICAL DEVELOPMENT PRIOR TO THE PROJECT

Back in the years, MySQL was learned through the websites like w3schools, geekforgeeks, javatpoint, MySQL Documentation, etc. This has been proved as not efficient as not everyone is interested in reading a huge text present on a screen, compared to the MySQL documentation the other websites are somewhat useful and to the point for beginners. For query writing ability there is no tutoring system for MySQL. Later some tools come into the market but end up with a lot of limitations.

## VI. SYSTEM REQUIREMENTS

For the smooth working of the application,

- Hardware Requirements
  - RAM: 4 GB or higher
  - Processor: Obtain Better Performance in i3 or above and Ryzen 3 or above
  - Hard Disk
- Software Requirements
  - Operating System: Windows Family
  - MySQL Command Client

## VII. SYSTEM ENVIRONMENT

- Python MySQL Connector  
To get enter “pip install MySQL-connector-python” in your cmd(command prompt), MySQL connector is a python module that is used to establish a connection between the program and MySQL command client. We have designed questions for which the users are supposed to write the queries and all queries are compiled and checked by MySQL software present in their systems, whatever the error the MySQL gets, it will be presented to the user understandable way in GUI(Graphical User Interface). For every question, the application creates a table required for the query processing, thus it is the main aspect of our project without which our tutoring can't be realistic.
- Tkinter  
We have developed the Front-End using Tkinter, it is a python module widely used for creating GUI supported in all operating systems like windows, Linux, etc. Python has many other modules for GUI among all Tkinter is widely used and easy to develop applications using it.
- Matplotlib  
Matplotlib is an excellent visualization library in Python for 2D arrays. Matplotlib is a multi-platform data visualization library built on the NumPy array and designed to work with a wide range of SciPy stacks. We chose this library because we had an idea to add an accuracy rate in query writing for the users, for which we use python dictionaries. Using dictionaries, it is easy to plot a graph. Matplotlib contains many platforms such as lines, bars, scatters, histograms, etc. Our system likely uses bars for plotting.

## VIII. SYSTEM DEVELOPMENT

To describe this application in terms of development, it contains three mainframes which are the home frame, level one frame, level two frame (keep in note that in Tkinter we put everything which is part of a particular task in one frame). In the home frame see in Fig.1, it contains the information about the application, sources to get MySQL into the system, and a form that takes the user's MySQL credentials to establish the connection between the application and the MySQL tool. The form intake credentials of the user, for this I have written a two parameterised function which are the username and password, after verifying the credentials through the MySQL connector the system opens a frame to start learning in level 1 and level 2. The frame which appears after entering correct credentials contains only 2 buttons that take the user to level one tutoring if the user clicks the level 1 button and level 2 if the user clicks the level 2 button you can see it in fig.2.

### 1. Level One

Level one tutoring is all about making the user aware of the basics of Data Definition Language (DDL), Data Manipulation Language (DML), clauses, and aggregate functions you can see it in fig.3. For these topics, we have included a task for it which might influence the basic knowledge of the user in MySQL query language and the user needs to write the query for it, so for the query writing, the user needs to just fill the blanks of the answer, for every query the user gets some of it already written by us, all users need to do is to view the topic in the provided information which can be accessed by clicking View in Detail button. In the level one tutoring, we have included 23 questions solving upon which it creates a clear idea of the basics. Each question in level one is a frame and viewed upon clicking a button provided on the right side of the level one frame. The elements in the

question frames are the "Run Query" button, "Reset" Button, "View Solution" Button, and a few labels that display the related information. The run query button upon clicked calls the function with parameter as the question number for all the questions there will be a single function that executes the query written by the user and displays the user understandable error messages if there are any and takes the user in a direction in which he gets the idea of what is the syntax, where he did the mistake and how to correct it.

Elements in the level one frame:

- Run Query Button – Runs the query written by the user.
- Reset Button – Reset the information in the entry boxes provided for the user to default.
- View Solution – This button displays the correct solution to the user.
- Home Button – Takes the application to home page
- Next Button – Takes the application to the next topic to the current one
- Previous Button – Takes the application to the previous topic to the current one.
- Topics list – It contains a total of 23 buttons and each button display a topic upon clicking it.

The main aspect of level one tutoring is displaying the error to the user and making him understand what is the mistake and how to rectify it. The function run query joins all the content gathered from the entry boxes and joins it into a statement as the query is a statement. The Tutoring happens here with the simple python conditional statements, so to tutor a user on writing a solution we need to collect all possible mistakes a user can make and put them into conditional statements in the code, so there by if a condition matches then that particular body will be executed and tutors the user. This technique fails if a question has a multiple solution. For example, declaring a primary key in the schema we can achieve this task in various ways. To get rid of this certain information also provided in the labels to reduce the problem ambiguity.

## 2. Level Two

Level two tutoring is all about Personalised Adaptive Learning, it is a technique nowadays widely been used, this concept is about learning from the mistakes, for example, take an application which is used by children for learning mathematical operations, if the system implemented this technique of personalised adaptive learning it works in a way like if the child fails to perform multiplication operation the system analyses the child way of solving the problem and find the weak areas of the child and trains the child on the areas where the child needs to be trained such that he excels in solving the math problems. This technique allows the entities to have self-based learning which means no instructor is required for the tutoring. Talking about how this application works with this concept, in level two tutoring the user will be given a set of tasks to perform under a question, and in the background, the system analyses the user solutions and develop feedback on the areas the user needs to develop, once the user clicks the feedback button it displays the prepared information to the user along with an accuracy rate. The accuracy rate is calculated as the number of times the user did a task correctly divided by the number of times the user encountered the task after starting the session. These two things will be stored in a dictionary and using both the values a separate dictionary is created and have the same keys with values as their division operation. For example, the user encountered create table task 10 times and he/she did a mistake 6 times which means he/she completed the task correctly 4 times, so the accuracy ratio will be 40 percent. In the feedback provided by the feedback button, the user can identify his/her areas that need to develop and can use level one for that. The feedback was even generated accordingly. Level two works on identifying the mistakes, displaying accuracy rate, letting a user write queries for real-world scenarios.

### IX. ADVANTAGES OF THIS SYSTEM

- This application makes its users syntactically strong.
- The users will have self-based learning.
- The users can know their accuracy in writing the queries for real-world scenarios.
- User-Friendly interface
- No prior environment required to run this application like Java, python.
- The query will be executed only in the MySQL command client.
- Free of cost tutoring, the aim of this project is to make the users strong in their basics of MySQL.
- Dynamic usage of the storage (uses the storage while working and doesn't occupy storage if not)

### X. DISADVANTAGES OF THIS SYSTEM

- Level one tutoring is made on the question which have unique solution.
- To use this application the user machine should have MySQL command client successfully installed.
- Works fine only in Windows family, application is not compatible with macOS and Linux.

### XI. ACKNOWLEDGEMENT

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### XII. CONCLUSION

The application was successfully able to help beginners who are willing to learn the MySQL Query Language through the multiple levels of tutoring. Before the development, many limitations were faced using the older versions but this application

eliminates many of the limitations and provides a free and portable version of the application. The application also succeeded in working with run-time database access.

### XIII. REFERENCES

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Figure 1  
Home Page User-Interface

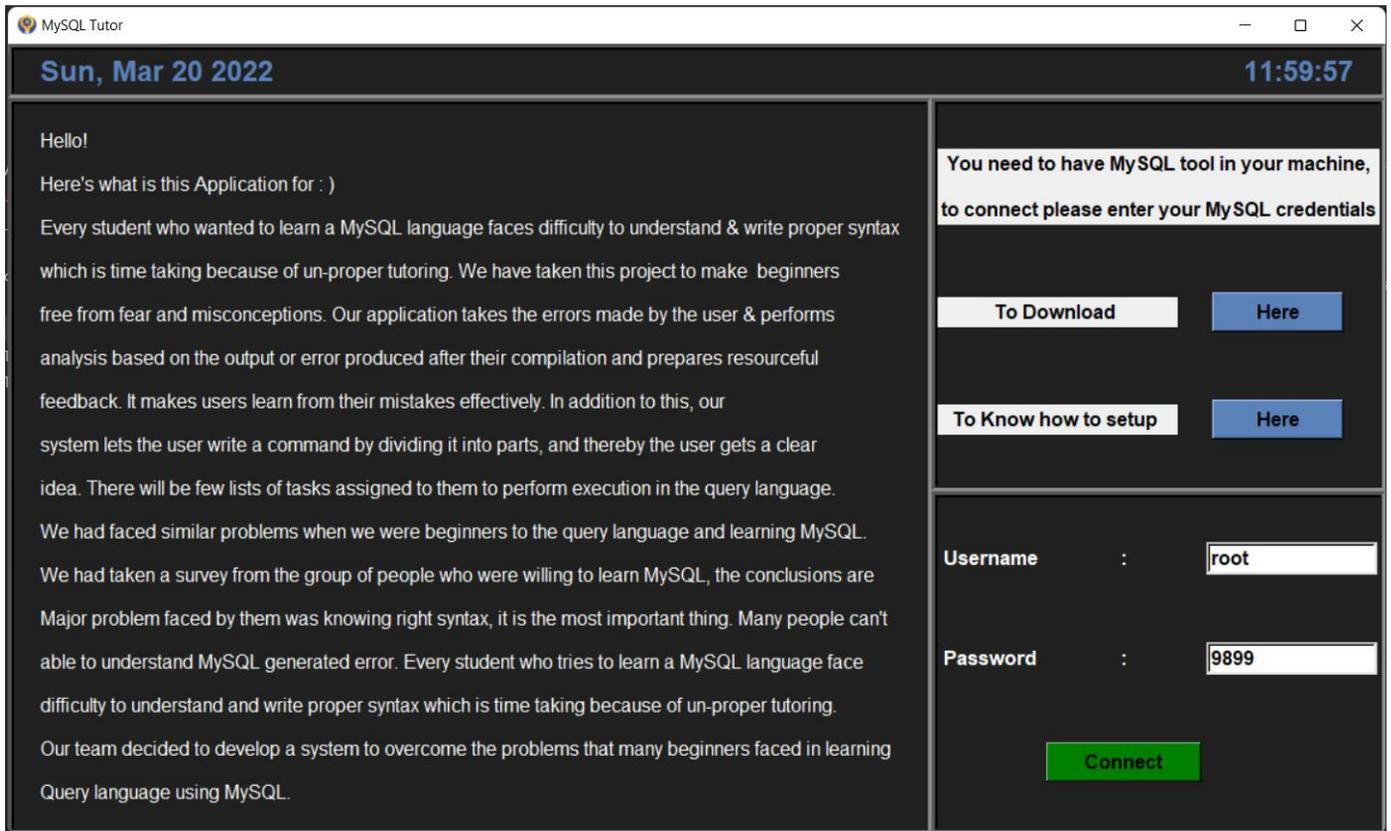


Figure 2  
Home page User-Interface  
After successful MySQL connection

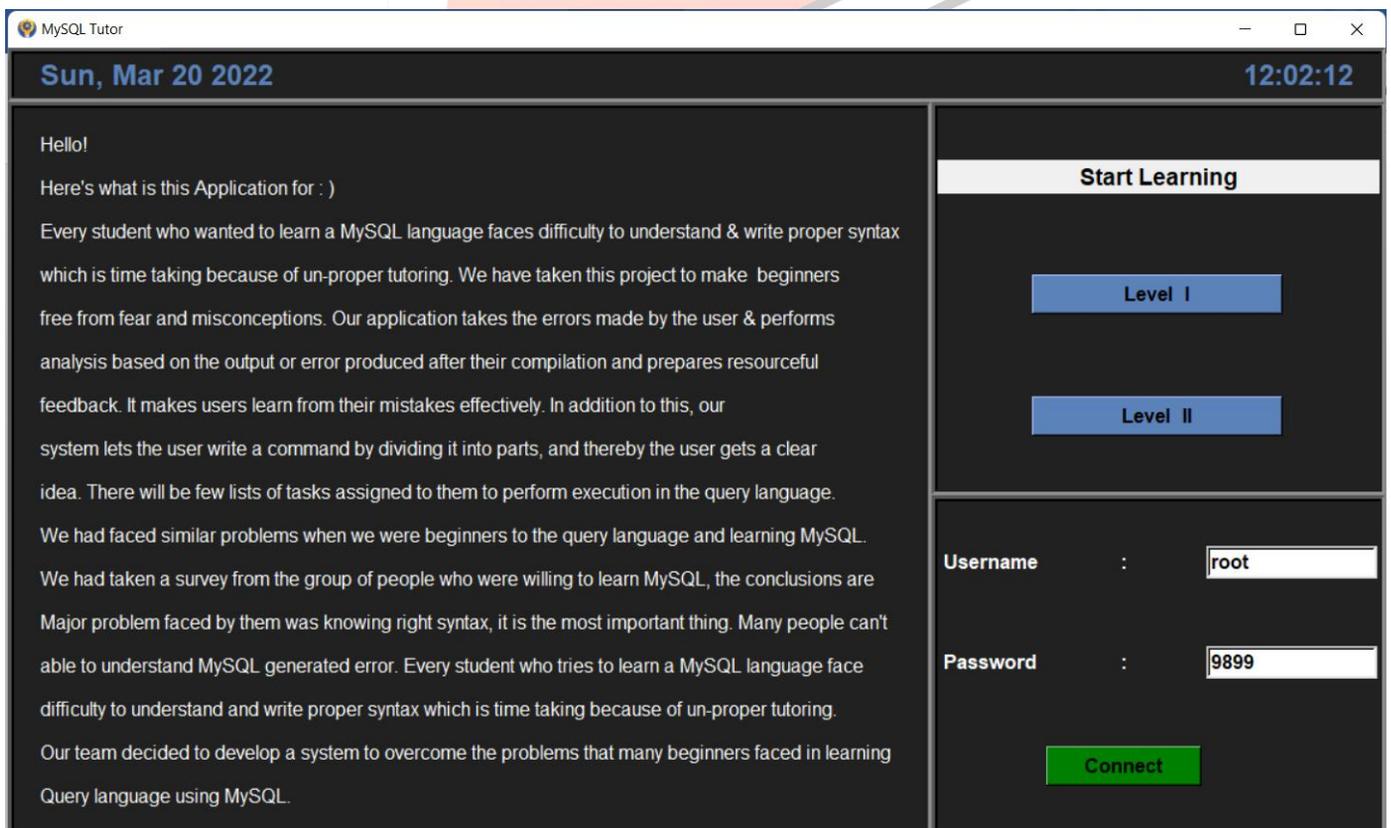


Figure 3  
Level 1 User-Interface

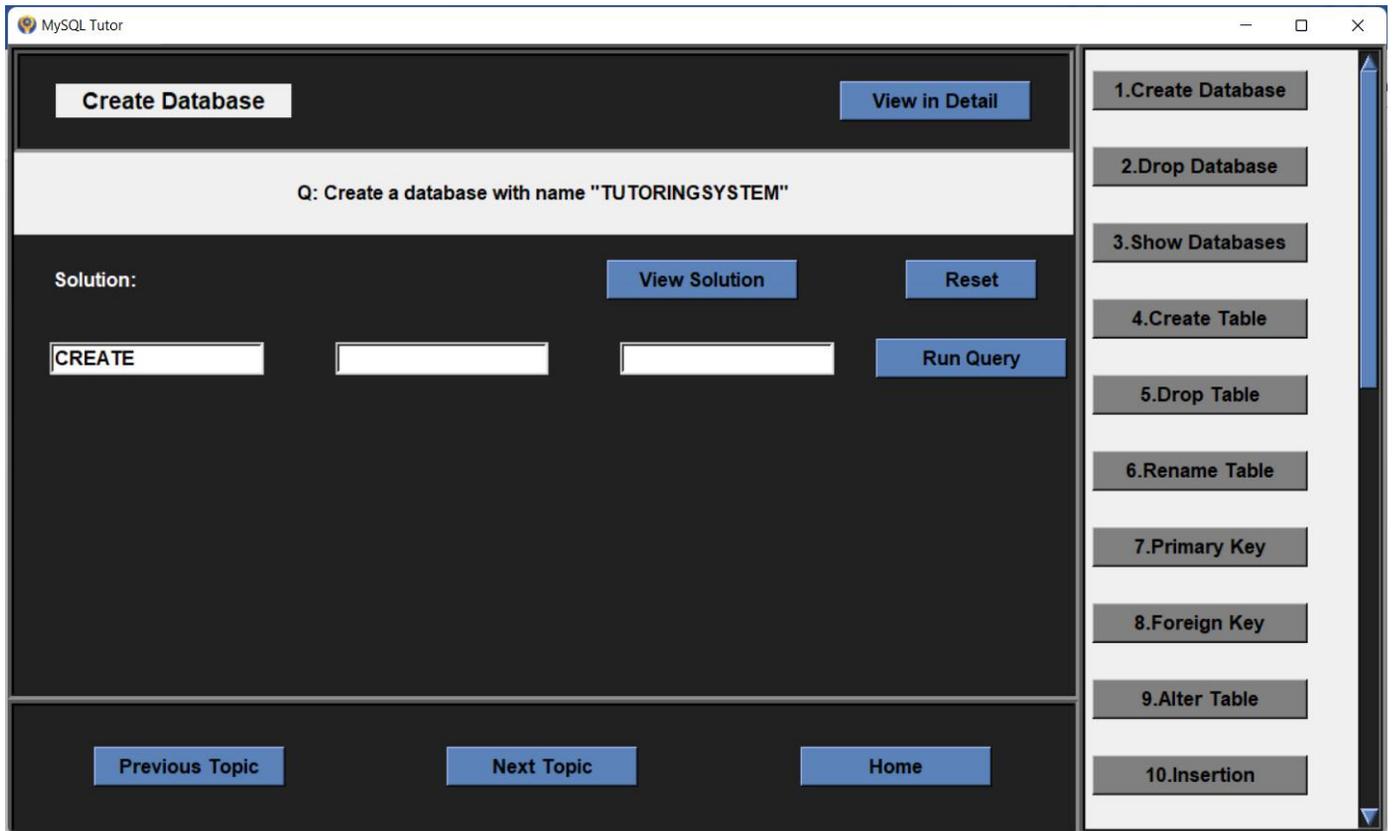


Figure 4  
Level 2 User-Interface



Figure 5.1  
Level 1 Working

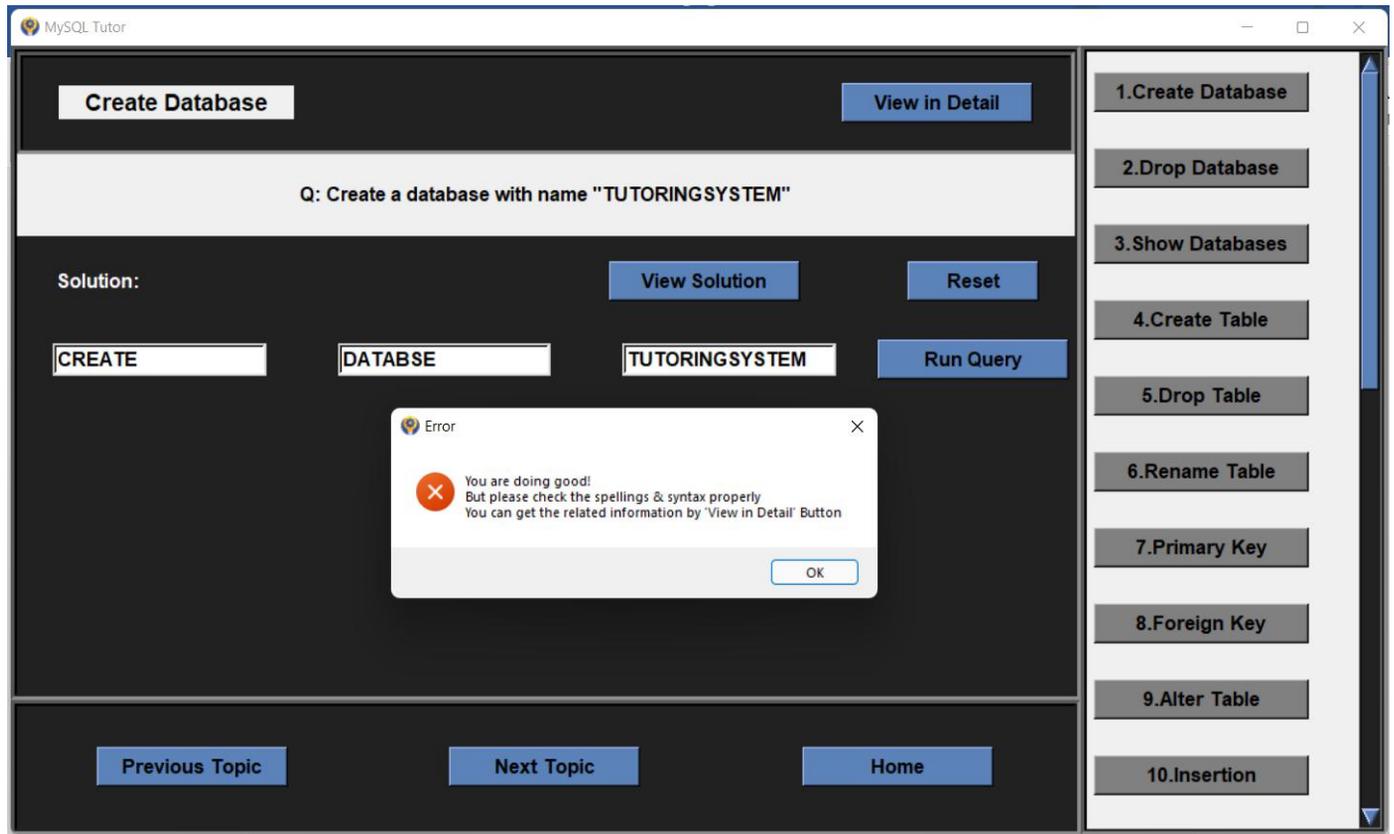


Figure 5.2  
Level 1 Working

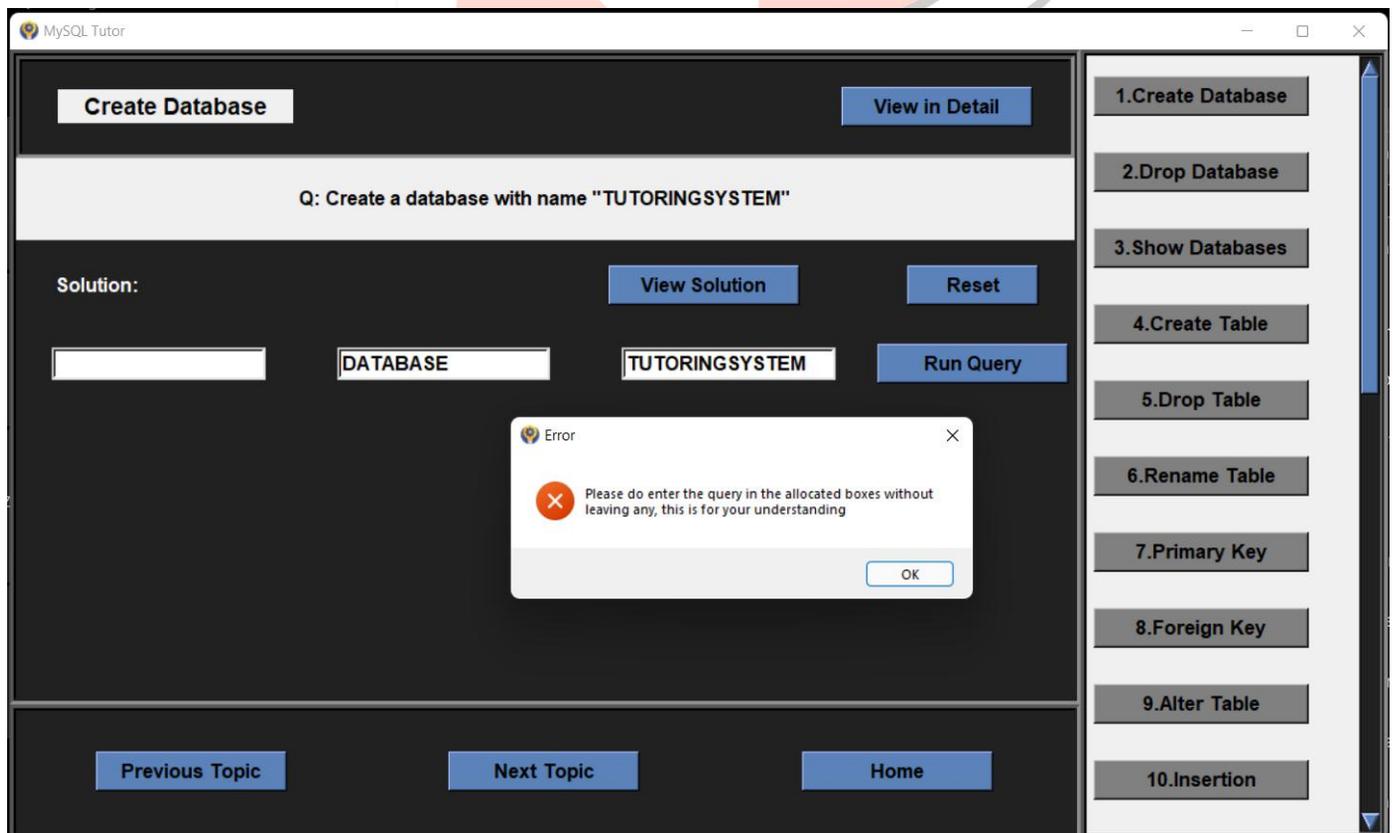


Figure 5.3  
Level 1 Working

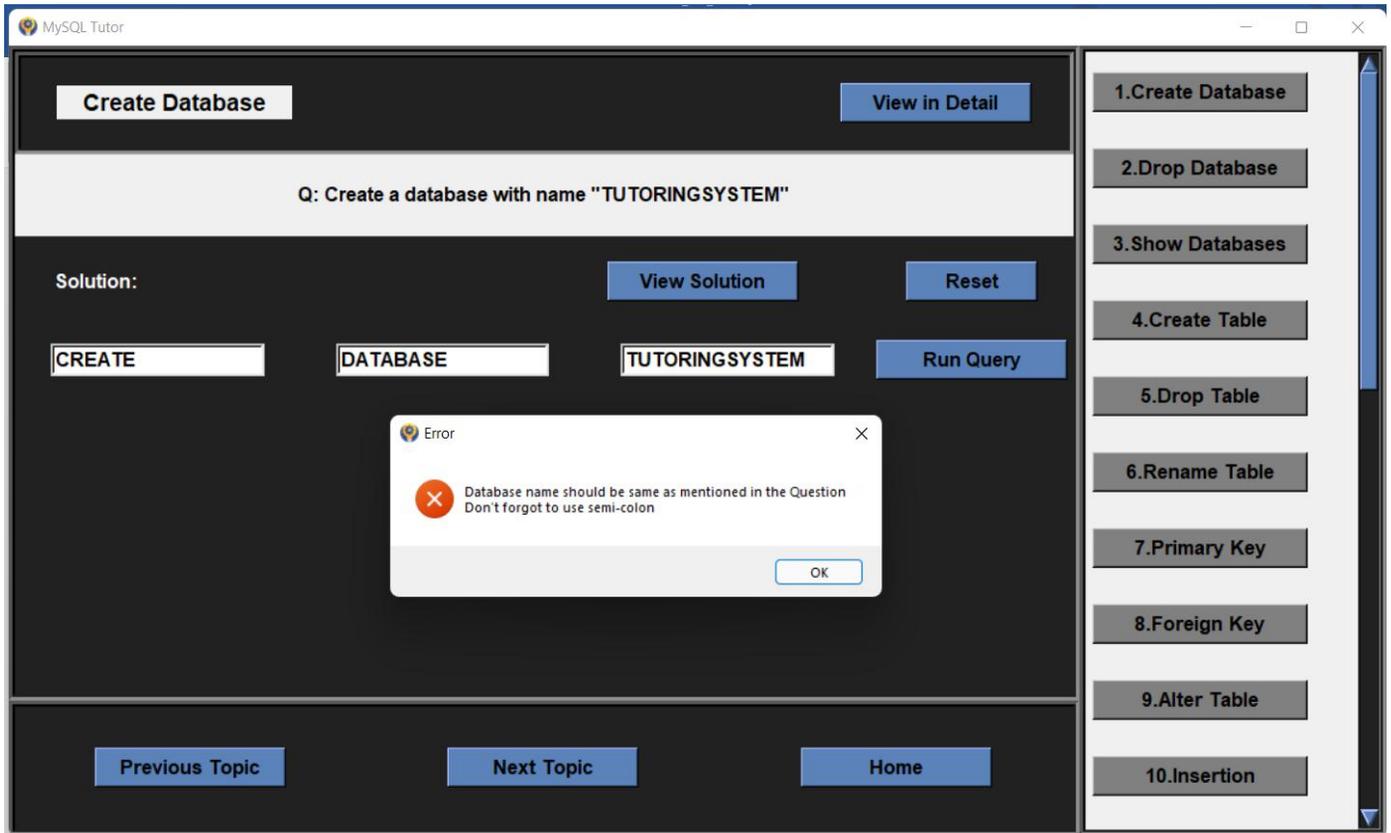


Figure 5.4  
Level 1 Working

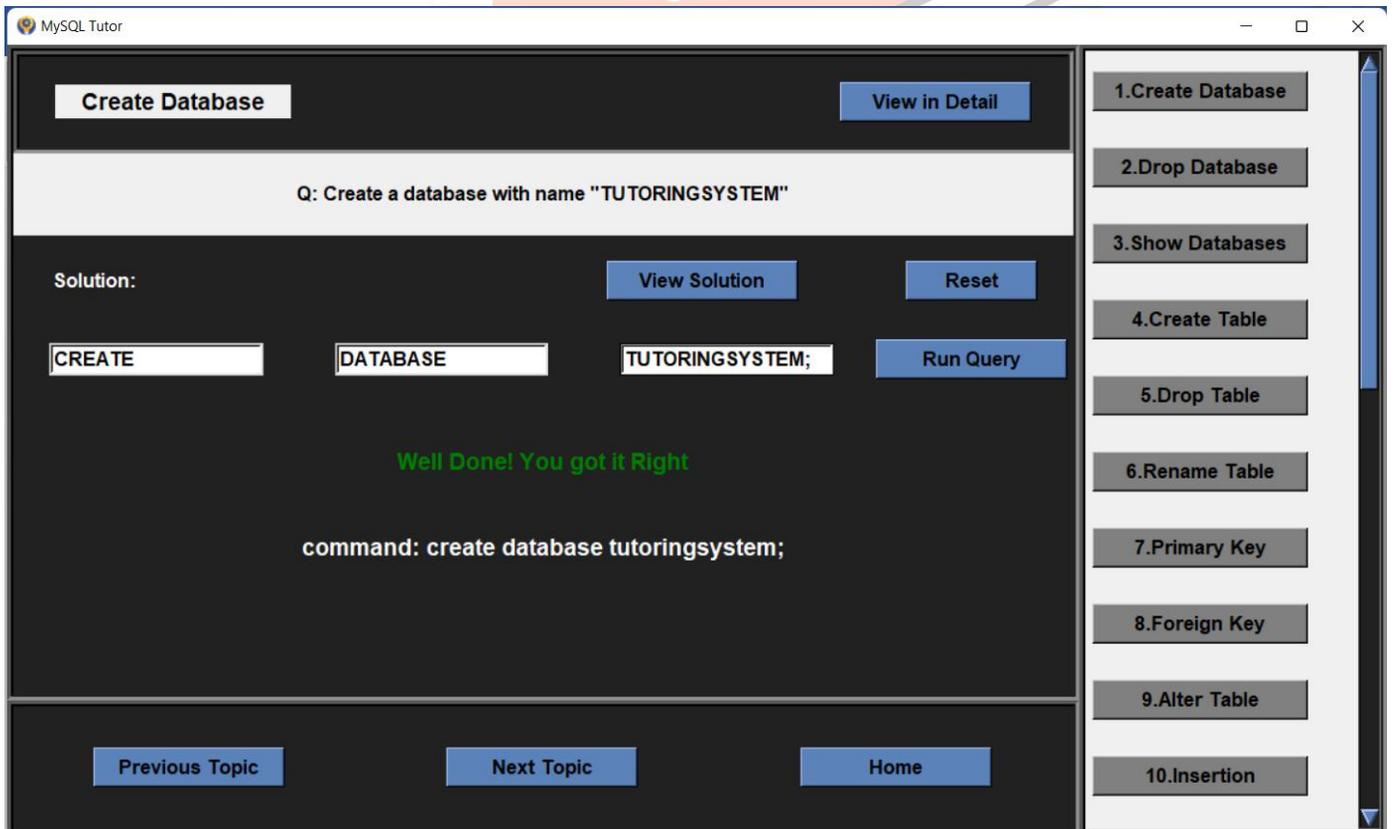


Figure 5.5  
Level 1 Working

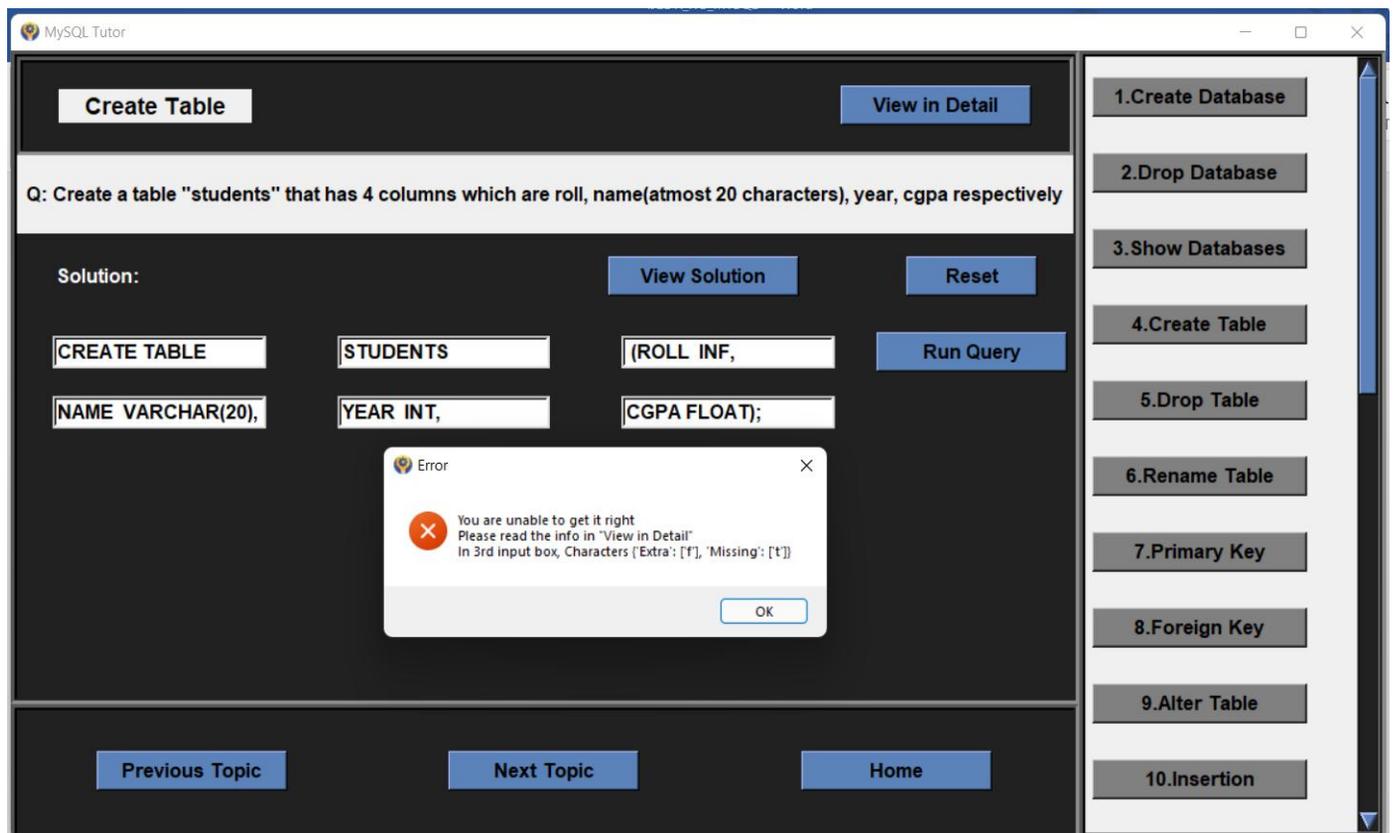


Figure 5.6  
Level 1 Working

