



TEXAS TECH UNIVERSITY SYSTEM™



OnlineLPK12

**Title: Advancements and Enhancements in the
OnlineLPK12 Project**

Date: Dec 6th (Wednesday)
Time: 9:30 to 10:30am CST

Location: department of computer science room 104 (inside dept office)

Presenter's Name:

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Siva Naga Brahmam Vuyyuru
Susmitha Reddy, Bodam

Introduction



- This project is a continuation of Early work done By Professor Yuanlin, Zhang and other grad students.
- Main objective of the project is to design and develop an effective Logic programming-based system with deep integration of computation thinking and STEM education for K-12.
- LPK12 achieves deep integration by building models for problems through Answer set programming – a modern LP paradigm.



Objectives and Goals

- Understand the existing system.
- Setup the existing system in local computers.
- Test the existing system and validate the functionalities.
- Fix any issues or bugs found.
- Populate the system with new lessons, assessments and quizzes.
- Enhance the existing system design.
- Update the database to store and validate the quiz answers.

Understand & setup the existing system



- Team has wade through the documents related to existing system
- Understood the design and architecture of the system
- Clarified the doubts and gaps on the system
- Installed required software's for the system to run successfully in local systems.
- Updated the installation document with challenges faced and the solutions to solve the issues faced.



Test the existing system and validate the functionalities

- Tested and validated the content of existing lessons.
- Identified the bugs in Sparc editor and fixed them.
- Identified the existing lessons content was not properly aligned and enhanced the content.
- Found that there were no validations applied to the assessment or quizzes and we have implemented the validations.
- Observed that the GIF's used in the existing system are not working as expected and fixed them.

Enhanced the existing system design (Login Page)



Before

Online LPK12 Course



A central graphic features an open book from which various educational icons emerge, including a globe, a graduation cap, a lightbulb, a calculator, a pencil, a test tube, and a diploma.

Online LPK12 Course

Login Account

Username

Password

[Forgot Password?](#) [Create New Account](#)

Enhanced the existing system design (Login Page)



After



Online LPK12

New to Online LPK12? [Create an Account](#)

User Name
svuyyuru

Password
...

[Forgot Password?](#)

[Login](#)

OR

Continue with Google

Enhanced the UI of existing lessons



Before

Welcome to Online LPK12 Course

sbodam

Logout

Extend Our Model for Parent of Peter -- 1

- Extend your model:
 - Assume the relation you will use is
 - $\text{parent}(P1, P2)$ means that person P1 is the parent of person P2.

- Write your knowledge as a comment

- Represent your knowledge as a fact

Previous

Next



Enhanced the UI of existing lessons

After

Knowledge on “Dad”

- Who is the dad of Peter?
Joh
John
- Knowledge
 - We manually added all facts about dad although we have all information about the father relation already in the model.
 - Can we reuse the information about father in our abstraction?
 - As human beings, once we know the father relation, we know the dad relation because we have the knowledge:
- A person is the dad of another person if he is the father of the other.

[Previous](#) [Next](#)

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[Previous](#) [Next](#)



Design of new home page

Before

← Welcome to Online LPK12 Course nav1008 Logout

Click below links to view the lessons:

- [Click here to View Lesson 2!](#)
- [Click here to View Lesson 3!](#)
- [Click here to View Lesson 4!](#)
- [Click here to View Lesson 5!](#)
- [Click here to View Lesson 6!](#)
- [Click here to View Lesson 7!](#)
- [Click here to View Lesson 8!](#)
- [Click here to View Lesson 10!](#)
- [Click here to View Lesson 11!](#)
- [Click here to View Lesson 12!](#)
- [Click here to View Lesson 18!](#)
- [Click here to View Lesson 4.1!](#)
- [Click here to View Lesson 1!](#)
- [Click here to View Lesson 6.1!](#)



Design of new home page

After

Get Started with These Lessons:

A diagram showing a family tree model. Nodes include "ancestor", "me", "John", "William", "Colin", and "me". Relationships are indicated by arrows: "ancestor" is the parent of "me"; "me" is the son of "John"; "John" is the son of "William"; "John" is the brother of "Colin"; and "Colin" is the son of "John".

Extend the family model
Lesson 2

[View Lesson](#)

A graphic of a laptop screen displaying a database table with several columns of data. A magnifying glass is positioned over the screen, focusing on one of the rows.

Variables and Queries
Lesson 3

[View Lesson](#)

A graphic showing a person's arm and shoulder pushing a large yellow puzzle piece into a matching slot in a green puzzle piece.

Modelling Dad using rules and variables
Lesson 4

[View Lesson](#)

A detailed molecular model showing a complex network of blue spheres connected by thin blue lines, representing atoms and bonds in a crystal lattice or molecule.

Model Periodic Table-Chemical Symbols
Lesson 5

[View Lesson](#)

A close-up photograph of a periodic table chart, showing the arrangement of elements based on atomic number and chemical properties.

Model Periodic Table-Aromatic Number
Lesson 6

[View Lesson](#)

A diagram of an atom illustrating its internal structure. It shows a central nucleus composed of protons and neutrons, with electrons orbiting the nucleus in concentric elliptical paths.

Model Proton Numbers
Lesson 7

[View Lesson](#)

A diagram illustrating the calculation of mass number. It shows three particles: a red neutron (labeled "Number of Neutrons"), a blue proton (labeled "Number of Protons"), and a red proton (labeled "Number of Protons"). An equals sign between the first two is followed by another equals sign and the third particle, labeled "Mass Number".

Model Mass Numbers
Lesson 8

[View Lesson](#)

Enhanced the UI of existing lessons



Before

Welcome to Online LPK12 Course

sbodam

Logout

Recall the family

- What we know
 - John is the father of Peter
 - John is also the father of Sara and Linda
- Questions
 - Old ones
 - Is John the father of Peter?
 - Is John a parent of Peter?
 - Who is Peter's father?
 - Who is Peter's dad?
 - Is Joaan the mother of Peter?
 - Who is Peter's mother?
 - Who is Peter's mom?
 - Is Joaan a parent of Peter?

[Previous](#)

[Next](#)

Enhanced the UI of existing lessons



After

Welcome to Online LPK12 Course

nav1008 Logout

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 - Is Joaan the mother of Peter?
 - Who is Peter's mother?
 - Who is Peter's mom?
 - Is Joaan a parent of Peter?

[Previous](#) [Next](#)



Modified the design of Register page

BEFORE

Online LPK12 Course

Register Account

UserRole:

FirstName

LastName

UserName

Useremail

Password

Already have Account?

Online LPK12 Course



Modified the design of Register page

AFTER

Sign up

First Name

Last Name

User Name

Email

Password

A cartoon illustration of a person with glasses and a blue shirt sitting at a desk, looking at a computer screen. The desk is covered with various colorful geometric shapes like circles, triangles, and stars, suggesting a creative or educational environment.

Populated the system with new lessons



Welcome to Online LPK12 Course

nanumolu

Logout

Lesson 12:

Modeling Proton Numbers

Next

Welcome to Online LPK12 Course

nanumolu

Logout

Atomic number and Proton Number

- What is the atomic number of an atom?

The atomic number of an element is the number of protons in the nucleus of an atom.

- What is the proton number of an element?

The proton number is the number of protons in the nucleus of an atom.

1

H

Hydrogen

1.008

Previous

Next



Added Assessments in New Lessons



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nav1008

Logout

Learning outcome 1

- **Question:** What is the atomic number of Carbon?
- **Intended Specification:** atomicNumber(E, N) means the atomic number of element E is N

- **Objects** Write your objects below:

k

- **Variables/Unknown Objects** write your variables below

k

X: the atomic number of carbon

- **Relation Instance in atomic use form:**Write your relation instances below

;

atomicNumber(X, hydrogen)

Previous

Next

Introducing New Table: QuizQuestionAnswers



Student Answering
question

Knowledge on “Dad”

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[Previous](#) [Next](#)

- Unique identification for each answers.
 - Specialized place in software where all the answers given by the user during quizzes are kept safe and organized.
- Introduction to the quiz answers storage system.
 - Every time someone submits an answer to a quiz question, our system gives a special number that no other answer has. This is like giving every answer its own badge so we can tell them apart easily.

Sample Record Table



Automatically Generated
QuestionAnswerId based
on student submission of
answers

Validation on whether answer is correct or incorrect will be done in UI based on student submission

New API Endpoint for Quiz Submissions



POST /api/Student/{userId}/quizresults

Parameters

Name Description

userId * required
integer(\$int32)
(path)

Request body

application/json

Example Value | Schema

```
{  
    "quizQuestionAnswerId": 0,  
    "questionId": 0,  
    "questionName": "string",  
    "answerText": "string",  
    "correctOrIncorrect": true,  
    "timestamp": "2023-12-05T17:51:22.570Z",  
    "userId": 0,  
    "userRole": "string",  
    "lesson": 0  
}
```

Responses

Code	Description	Links
200	Success	No links

