Python based Personalized Learning Management and Tutorial System for Programming Introduction

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*Abstract*—Since technology is improving further and further, a need for technical professionals arose. Industries are in high demand for high tech professionals. That’s why the group aimed to accomplish in creating a python program using a tutorial system that measures a user’s level. Specifically, how knowledgeable they are about programming. By identifying their level, a proper reviewer is given to them. This can help people have prior knowledge about programming.

Keywords—Tkinter, programming, GUI, code, Python

# Introduction

Another decade has passed since we entered the 21st century, and since then society and our technology have been continuously evolving; A wider variety of people are accepted, machines have made work easier for everyone, communication has never been easier, data about everything is stored in everyone’s pocket and education has been deemed much more important, accessible and obtainable by everyone. But with this, why are there still so many students that are struggling with their schooling? People have evolved, but our methods somehow have stayed the same. Old methods no longer work. Kids nowadays have a shorter attention span wherein the old-school uniform lesson planning will jar them from staying attentive. Another reason is the difficulty of one teacher having to accommodate an entire class. Not all students are of the same learning capacity and when some students are left behind by the lesson, they become utterly disconnected, not being able to understand further topics. These are only some of the pressing reasons why the traditional “one size fits all” classroom method less superior than an interactive personal lesson that aims solely to help a specific student with his specific needs. A personalized learning system empowers a student to work on his own pace and focus on the topics he struggles with without being left behind. The student is in control with what he understands and therefore they should be in control with what they should be learning.

With the exponentially growing number or students in need of education, there is no way that we will be able to pair all of them with a teacher to help guide them personally, that is where the programming aided learning comes in. Programming languages such as Python, C and JavaScript have been used to create many things in society; For entertainment in listening to music, playing games and editing software, and for the great of the community with convenient apps, informal sites and programs anyone can use to find data of any information like internet browsers or educational apps. Programming has become such a large influence in the world that wherever you go and whenever you see someone on their phone or a pc, they are most likely using apps and programs that have been created by professional programmers to help make menial tasks in life much more manageable. Some examples of this are: Uber, Netflix, Facebook, Photoshop, Google, the list goes on, all of this because some people wanted something, and because they wanted it, they worked to create something to obtain t it and so others can get it easier. This shows the potential of automated teaching software to help individuals and create a personalized workspace for them to study. American inventor and artificial intelligence scientist, Danny Hillis had something to say about the use of technology in creating an automated teacher in his book “Aristotle”:

“…consider what kind of automated tutor could be created using today's best technology. First, imagine that this tutor program can get to know you over a long period of time. Like a good teacher, it knows what you already understand and what you are ready to learn. It also knows what types of explanations are most meaningful to you. It knows your learning style: whether you prefer pictures or stories, examples or abstractions. Imagine that this tutor has access to a database containing all the world's knowledge. This database is organized according to concepts and ways of understanding them. It contains specific knowledge about how the concepts relate, who believes them and why, and what they are useful for. I will call this database the knowledge web, to distinguish it from the database of linked documents that is the World Wide Web.” (Hillis, 2004)

With the use of Python programming language, we envision to be able to make and apply a personalized learning management and tutorial system to not only help individuals intimately work in a timely manner supporting their individual needs, but specifically to teach them and introduce them the basics of programming a. This will also improve on their problem-solving skills using computers and develop in them an appreciation on how things work.

# Methodology

## Setting the tools

Before making our program, the group investigates ways on how to build the program using GUIs (Graphic User Interface). Out of all the tools available, the group chose TkInter as a solution. “Tkinter is Python's de-facto standard GUI (Graphical User Interface) package.” It is the most used tool for GUI. [1] Tkinter is a tool used by Python, a high-level programming language made by Guido van Rossum. Together with Python and TkInter making GUIs is possible.

## Making the Survey

The group made a rough draft of what would be the survey. The survey would be called the Personalized Learning System. It consists of 10 questions and includes three reviewers at the end. The survey will be answered by users to determine their level of knowledge on programming. To start, the survey is divided into three levels, mainly beginner, intermediate, and expert. Depending on the score of the users, the survey will then show what level the users fall under. If a user gets a score of eight or above, then the user gets the expert rating. If the user gets a score less than or equal to seven but greater than five, they get the intermediate rating. If any lower, then they get beginner.

## Building the Program

To start the code, the group begins by importing Tkinter. It is important to import all the necessary tools first. Next, the group divides the work by using functions to divide each specific task. Otherwise, the program would look messy. Functions like “nameAndSection” takes names and sections as input, and “survey” has statements that have questions and given choices. After all the questions are answered, accumulators tally up the score and conditional statements are used. Depending on the score the users get, they get a unique reviewer based on their rating (beginner, intermediate, and expert). A unique button is shown. Pressing it opens a window to the reviewer.

In addition, buttons are programmed to close the window it was packed in and opens another one. That way, the survey stays neat. Accumulators are declared and used to store the total score of users. To make the survey more appealing, the survey itself use GUIs. Windows close when the Enter button is pressed.

## The Questions

These are the question found in the survey:

1. \_\_\_\_\_ are arrays of bytes representing Unicode characters.
2. A \_\_\_\_\_ is a storage location in memory that is represented by a name.
3. \_\_\_\_\_ is a whole number, positive or negative, without decimals, of unlimited length.
4. \_\_\_\_\_\_ is a number containing one or more decimals.
5. A \_\_\_\_\_\_\_ is shows a diagram of how a program's process take place.
6. Errors caused by improper use of commands and functions are called \_\_\_\_\_\_.
7. Which one of these is NOT a programming language?
8. TRUE or FALSE. Does the operator 'a+=b' mean 'a=a+b'.
9. TRUE or FALSE. The XOR operator, or \"Exclusive OR\", is a Boolean operator wherein the value is TRUE if p and q are both true and FALSE if one of them is false.
10. What is the keyword for making loops?

As the user moves on to the next questions, the level of difficulty gets higher.

## Finalization

After debugging and rerunning the program, it is ready to be used by anyone. To run the whole program, compile and run all kernels. To prevent any crashes, it is strongly advised not to edit the code without any prior knowledge about coding.

# Recommendations and conclusion

Survey is required to be remodified, including the reviewers. Ideally, making it more user-friendly. GUIs also need to be user-friendly, with larger buttons and better font. Nonetheless, it met requirements.

In conclusion, users need to be exposed to personalized learning to see how effective or ineffective it is, based on the outputs made by programmers. While it was difficult creating a program to make ratings. It can be improved, nonetheless.

# Project documentation

The group had taken time stamps of when content was added to the program.

* March 4, 2020 – Added rough draft of project documentation with introduction and references.
* April 8, 2020 – Submitted rough but finished program of the group’s survey using GUI.
* April 25, 2020 – Created three reviewers for each level (beginner, intermediate, and expert).
* April 28, 2020 – Finalized reviewers and added it to main program.
* May 6, 2020 – Added unique buttons that open a specific reviewer depending on the level given.
* May 7, 2020 – Improved order of main program by using functions. Included destroy commands to quit windows and move another window.
* May 8, 2020 – proofing of final codes and recording of video demo.

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