

LESS HELL WITH SHELL

AN EDUCATIONAL GAME
FOR SHELL SCRIPTING

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INTRODUCTION

BACKGROUND OF THE STUDY

In this technological age, the teaching and sharing of knowledge has become relatively dependent on the growing usage of educational games, or what is called “game-based learning”

BACKGROUND OF THE STUDY

Shawn Conrad, Michaela LaVan, Michele Pratusevich, Emma Tolley, David Zou
11.127/252/CMS.590 Digital Game Final Report
12 May 2011

Terminus: A Text Adventure Game To Promote Learning About Terminal Command Line Interfaces

You are player dropped into the mysterious land of Terminus! By exploring your surroundings and acquiring magic spells, you are destined to defeat the dark wizard plaguing the local citizens.

Who is the audience for your game and why did you choose this audience?

The intended audience is anyone who is interested in learning about using a command line interface, but the game can also be enjoyed by those who already know terminal commands. The game was created to be entertaining and informative to an audience of college-aged players, but also for younger

```
Welcome! If you are new to the game, here are some tips:
```

```
Look at your surroundings with the command "ls".  
Move to a new location with the command "cd LOCATION"  
You can backtrack with the command "cd ..".  
Interact with things in the world with the command "less ITEM"
```

```
If you forget where you are, type "pwd"
```

```
Go ahead, explore. We hope you enjoy what you find. Do ls as your first command.
```

```
>pwd  
You are in Home.  
>
```



STATEMENT OF THE PROBLEM

Shell scripting, although is relevant in the programming industry, faces a scarcity in professionals who possess the necessary experience in the market, despite the booming demand for it (Sethi, 2019). Generally, the skill in mastering shell scripting is rather unpopular among others, in the field of programming.

STATEMENT OF THE PROBLEM

Quora

Python Vs. Java Shell Scripting Learning Java Learning Python

Computer Programming Advice Python (programming language) Java (programming language)

Learning to Program Programming Languages Personal Question

I am learning shell scripting and find it even more difficult than Java and Python, is this normal?

Quora

Learning About Computer Science Shell Scripting Beginning Computer Programming Advice


Computer Programmers Learning New Things Learning to Program Computer Programming

Why is shell scripting so hard to learn?

STATEMENT OF THE PROBLEM

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Shell Programming and Scripting

Should I learn bash scripting or is it going obsolete?

Tags

shell scripts



SIGNIFICANCE OF THE STUDY

The process of shell scripting is a concept in Computer Science which is generally not tackled much, nor taught thoroughly to students. To help students and developers in grasping the skill in shell scripting, one way is through a method which most people enjoy: a game.

GENERAL OBJECTIVE

The general objective of the study was to create an educational game that teaches shell scripting, particularly bash (Bourne-Again Shell) scripting, to be able to help and encourage people, especially students and developers, to learn more about the concepts of shell scripting through a method that is both entertaining and educational.

OBJECTIVES OF THE STUDY

- design a storyboard which made use of a word-type and multiple choice-type games to introduce concepts and terms in shell scripting, and a coding game where users can experience shell scripting firsthand

OBJECTIVES OF THE STUDY

- develop a desktop game application that teaches shell scripting

OBJECTIVES OF THE STUDY

- evaluate the usability and performance of the game through the use of pretest and posttest approach, as well as a game usability testing questionnaire

SCOPE AND LIMITATIONS OF THE STUDY

The application only ran in a Linux-based desktop operating system, and covered shell scripting topics. Also, the expected respondents were students, particularly those who were taking computer programming courses.

MATERIALS AND METHODS

DEVELOPMENT SYSTEM



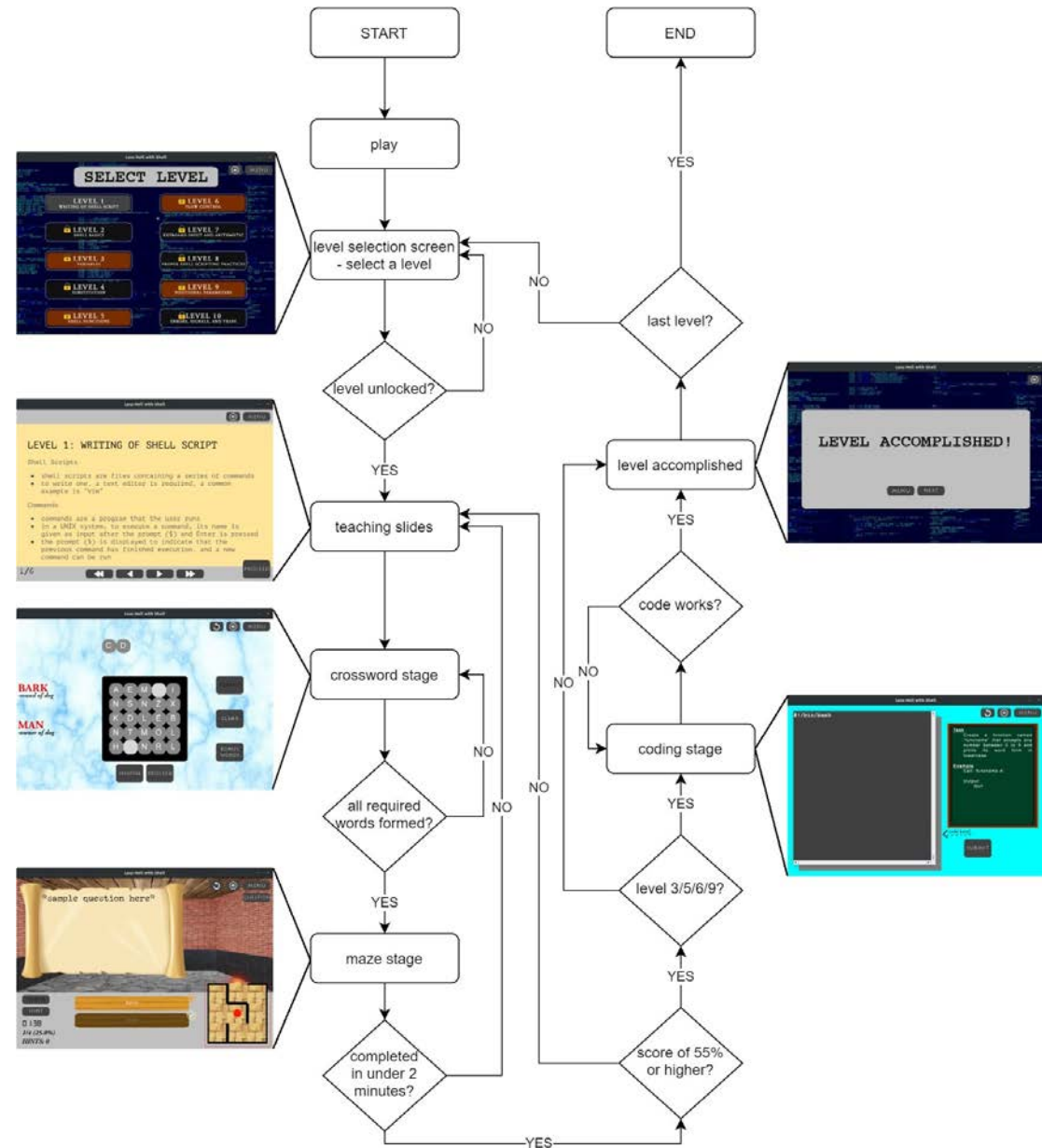
OpenJDK



SHELL SCRIPTING CONCEPTS

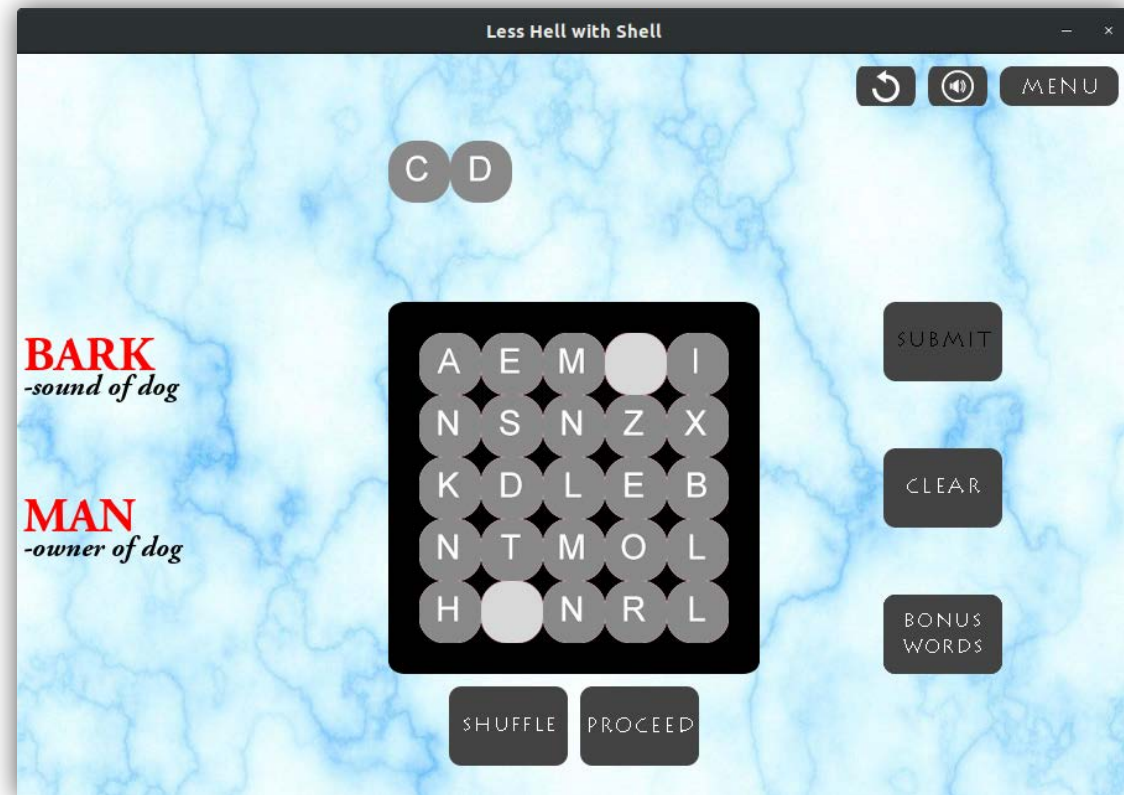
- writing a shell script
- shell basics
- variables
- substitution
- shell functions
- flow control
- keyboard input and arithmetic
- proper shell scripting practices
- positional parameters
- errors, signals, and traps

GAME STORYBOARD



FINAL OUTPUT

Crossword Stage



FINAL OUTPUT

Maze Stage



FINAL
OUTPUT

Coding Stage



RESULTS AND DISCUSSION

PRETEST AND POSTTEST RESULTS

What is a shell script? *

- ☐ a blueprint or prototype from which objects are created
- ☐ a file containing a series of commands
- ☐ a file containing hash strings

What is the command to make a shell script executable? *

- ☐ chmod 775
- ☐ chmod 69
- ☐ chmod 755

What is the symbol used as command separator, indicating where one command ends and another begins? *

- ☐ .
- ☐ !
- ☐ ;

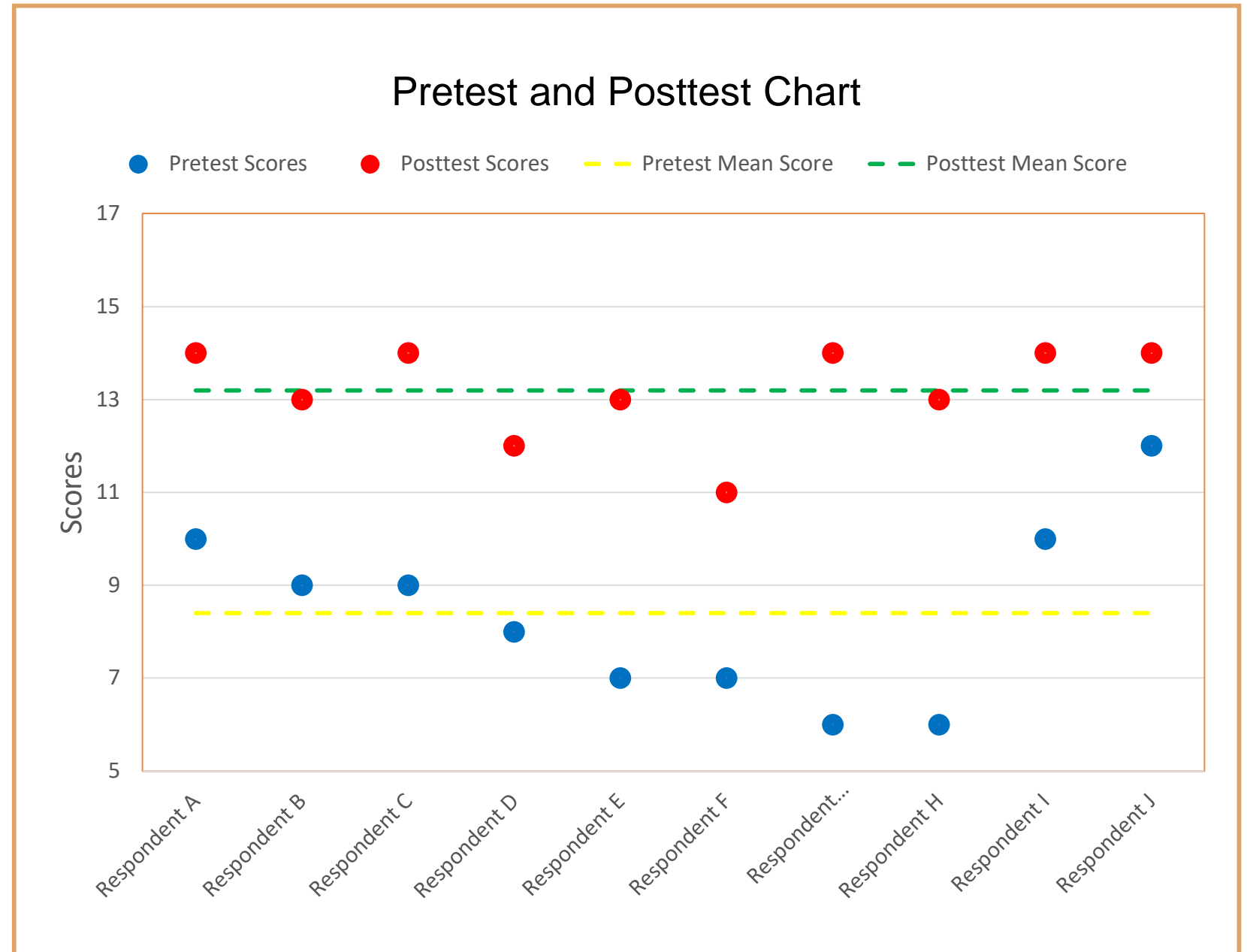
PRETEST AND POSTTEST RESULTS

Before application testing, a total of 10 respondents were given a pretest questionnaire to gauge their prior knowledge before application testing. From May 31 to June 5, the respondents were given 5 days to play the game. A posttest questionnaire was given thereafter.

PRETEST AND POSTTEST RESULTS

The posttest and pretest questionnaires had identical questions. The questions in the posttest questionnaire were shuffled, for triviality. The questionnaires had a total of 17 questions, where 15 of these were multiple-choice type, and were tested for reliability.

PRETEST AND POSTTEST RESULTS



PRETEST AND POSTTEST RESULTS

With a pretest mean score of 8.4, and a posttest mean score of 13.2, with the highest score being 17, it can be concluded that there was a 57% increase in the scores of the respondents after playing the application.

PRETEST AND POSTTEST RESULTS

“Cronbach’s alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach’s alpha is one way of measuring the strength of that consistency.”

-Chelsea Goforth, Statistical Consulting
Associate, University of Virginia Library

PRETEST AND POSTTEST RESULTS

The computed value of the Cronbach's alpha was 0.910861. In convention, 0.7 is the minimum acceptable value for Cronbach's alpha so a value of 0.91 implied an excellent internal consistency of items.

GAME USABILITY TESTING

| CRITERIA | MEAN RATING | TOTAL POSITIVE* | TOTAL NEGATIVE** | TOTAL COUNT |
|---|----------------|--------------------|---------------------|----------------|
| Game Playing | | | | |
| The game is simple. | 5.1 | 70.00 | 30.00 | 10 |
| The game is challenging. | 5.2 | 70.00 | 30.00 | 10 |
| I was able to complete the tasks and scenarios in the game. | 5.1 | 70.00 | 30.00 | 10 |
| It was fun playing the game. | 5.5 | 80.00 | 20.00 | 10 |
| Overall, I am satisfied with the game. | 5.8 | 80.00 | 20.00 | 10 |
| Average for Game Playing | 5.34 | 74.00 | 26.00 | |
| Game Software Technicality | | | | |
| The interface of this game is suitable and functional. | 5.6 | 80.00 | 20.00 | 10 |
| The background music/sound is appropriate. | 5.7 | 80.00 | 20.00 | 10 |
| The information provided in the game is clear and easy to understand. | 5.6 | 80.00 | 20.00 | 10 |
| The game has all the functions and capabilities I expect it to have. | 5.5 | 80.00 | 20.00 | 10 |
| Drawing and scenes incorporated in the game complement each other. | 5.1 | 80.00 | 20.00 | 10 |
| Whenever I want to go back to a particular segment of the game, I could do so easily and quickly. | 5.5 | 80.00 | 20.00 | 10 |
| Average for Game Software Technicality | 5.5 | 80.00 | 20.00 | |

COMMENTS AND SUGGESTIONS

- Adaptive screen resolution
- More levels or stages
- Varying background music
- More maze rooms
- Button click and hover sounds
- More maze backgrounds

COMMENTS AND SUGGESTIONS

- Lesser file size, if possible
- User creation functionality
- Varying difficulty
- Clear all data functionality
- Additional coding exercises

CONCLUSION

After having overall satisfactory results yielded from the surveys, it can be concluded that the developed application “Less Hell with Shell” is an ideal tool that could be used to help people, especially those who take programming courses and degrees, and those who are inclined to programming.

CONCLUSION

The application is especially useful and convenient for situations like the current pandemic, where platforms like this would serve as a tool for education, as a counter to the hindrance that the COVID-19 disease had caused the country.

RECOMMENDATIONS

It is recommended to further develop the game using common and modern game engines like Unity and such. Optimization would also improve the application, for better execution without sacrificing the resources required and the load on the machine and memory. Also, better graphics, sprites, and assets could be made for the application if there are dedicated creative artists involved in creating it.



THANK YOU!