

INTRODUCTION

The purpose of this study is to develop a mobile application for patients with Alzheimer's and Dementia. The mobile application is called Mind's Eye and is a variation of a famous card game called Shake Loose a Memory². The data is collected on the mobile application is the user's choices for each card. The choices are Yes or No and the card asks a real life scenario question, like if the individual has ever driven a car, or perhaps went to the movie with a friend. The answer choices are then saved to a database. The answer choice, the date, and time are all saved onto the database and can be accessed at a later date by the patient or a medical professional. The mobile application is programmed in Java and includes various libraries such as the MySQL database, the Random library which allows for cards to be randomly generated, and many more libraries and functionalities. The mobile application is also programmed using the software Android Studio. My personal background includes in programming and technology. I have also taken numerous college classes in Computer Science and Engineering throughout my freshman, sophomore, and junior year at numerous colleges such as the College of Westchester, Monroe College, and NYIT. The data collected is choice from the card, the date and time, and the previous choice and date of the card question.

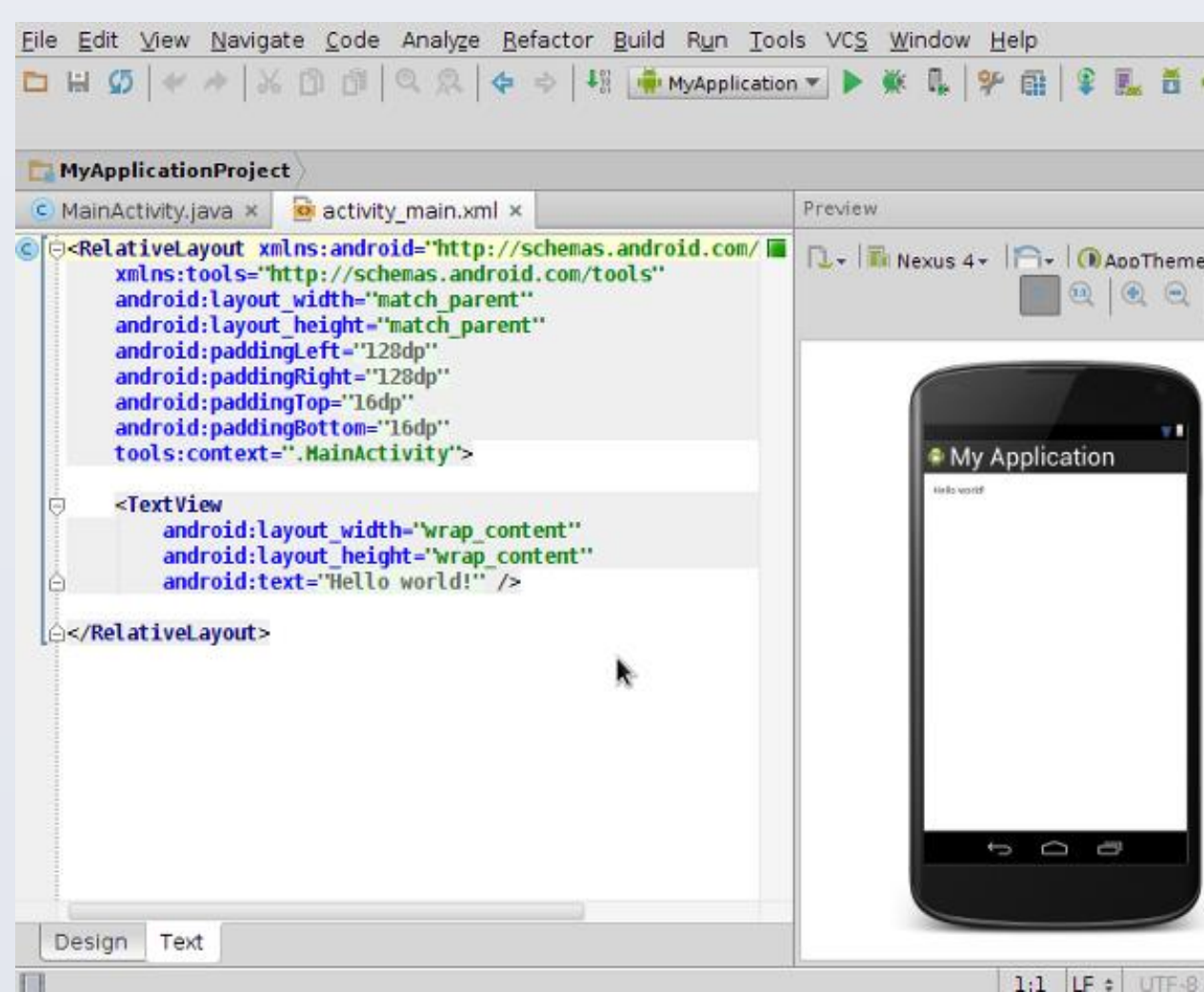
OBJECTIVES

Did you know that over 5 million Americans age 65 and older may have Alzheimer's disease?³ My project is to develop a mobile application called Mind's Eye using Android Studio and the programming languages of Java and XML. Android Studio is a very useful software to use because it allows for the developer to have a large amount of customization and it also has a built-in emulator to test the functionality of the mobile application¹. This research and project can benefit society in so many different ways it will allow for patients to be able to relax and enhance their memory. This project will also allow patients and medical professionals to determine whether an individual may be progressing into a early-stage of Alzheimer's using the data collected through the mobile application.

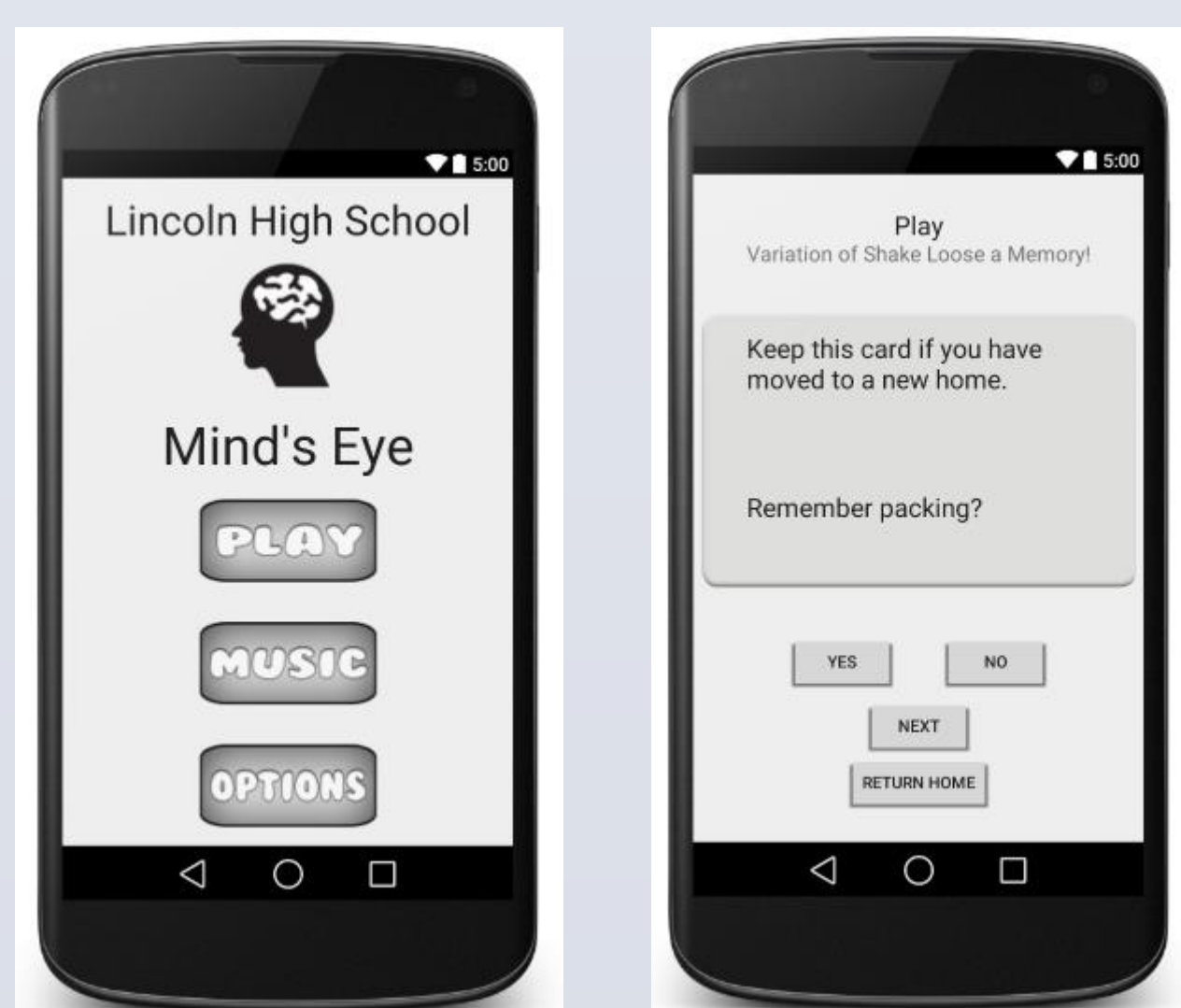
The objective is to develop a mobile application that relaxes the mind of the Alzheimer's and Dementia patient, and be used a medical device. The mobile application includes various functionalities such as the ability to listen to music while playing the game, and the ability to change the color schemes from either Tropical, Clouds, or Nature which are all color schemes that we developed. The dependent variable that is measured is the answer choices from the cards, and as well as the date and time of when the question was answered. The variables are then collected and processed through our database, this will allow for data to be collected, measured, and sorted.

MATERIALS AND METHODS

As mentioned briefly in the project description and in the background of the project I will be using the Android operating system for the mobile application. The android operating system is currently the largest phone operating system used. To conduct my research I will be using the programming language of Java and the software Android Studio. I will also as mentioned previously use various popular Java libraries to allow for various functionality such as developing an algorithm to allow for cards to be randomly generated. The analysis I plan to conduct is to contrast and collect data from using the mobile application and the answer choices, date and time the question was answered. Answers will be compared from a period of 3-6 months to analysis whether an individual may be in the process of developing early-stage Alzheimer's



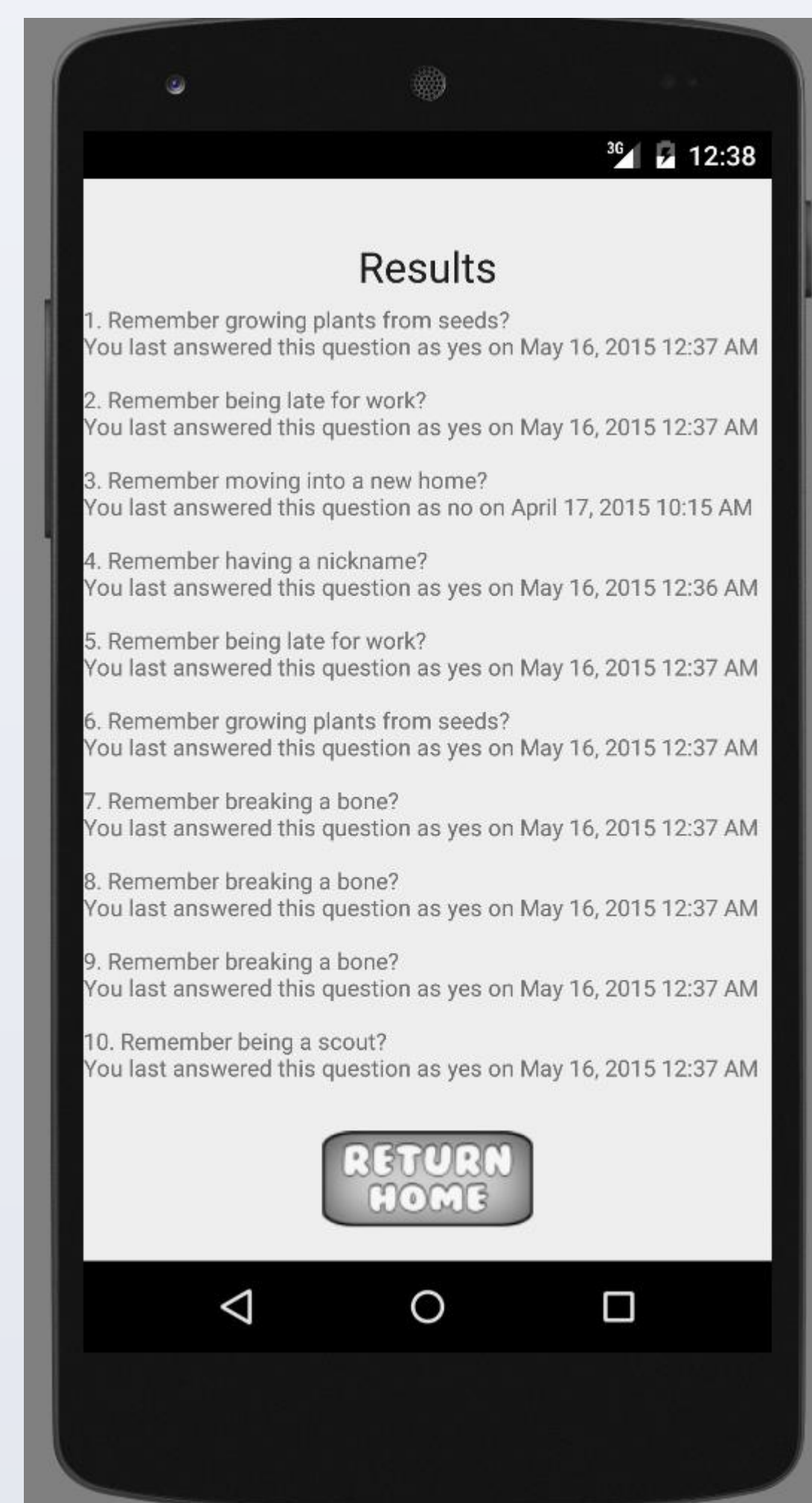
The photo above is Android Studio which is used to develop the mobile application, using the programming languages of Java and XML..



Here are some photos of the mobile application. On the home page we include three simple buttons called Play, Music, and Options to prevent from overwhelming the patient. The second photo is a result if the individual selected the Play Button.

RESULTS

The photo below shows the result, once the patient answers 10 questions they will be asked whether they want to continue playing or be taken to a results screen. The results screen to the right shows the question they were asked, the choice they selected, and the date and time.



Patients:	Patient 1	Patient 2
Cards Given on Real-Life experiences (Both patients are given the same set of questions)	Given 10 cards, asking questions about real-life experiences	Given 10 cards, asking questions about real-life experiences
Results (6 months before)	Patient 1 answered 7 cards as Yes and 3 cards as No.	Patient 2 answered 4 cards as Yes and 6 cards as No.
Results (6 months after)	Patient 1 answered 2 cards as Yes and 8 cards as No.	Patient 2 answered 5 cards as Yes and 5 cards as No.
Conclusion	Patient 1 doesn't remember the experiences and cards given 6 months prior.	Patient 2 remembers the experiences and cards given 6 months prior.

From the table above with Patient 1 and Patient 2 we can come to a conclusion that Patient 1 may have difficulty remembering experiences from the past and that Patient 2 remembers the real-life experiences asked from the set of questions. With this data Patient 1 should consider to consult with their doctor on the possibility of developing Alzheimer's and should look into further evaluation and testing.

CONCLUSIONS

My project findings are similar to the scientific literature I researched about Alzheimer's and dementia patients. Studies show that Alzheimer's patients prefer lighter colors, and that playing old music triggers previous memory experiences. Our findings compared to our scientific literature also show that if an individual is having difficulty remembering previous experiences and having totally different answers to the questions that they took 6 months ago can be a signal for that individual to consider going to their doctor and taking further tests.

REFERENCES

1. Android Studio Overview [Internet]. Google; [cited 2015 May 10]. Available from: <http://developer.android.com/tools/studio/index.html>
2. Shake Loose a Memory Game [Internet]. Alzheimer's foundation; [cited 2015 May 10]. Available from: <http://www.alzstore.com/shake-loose-a-memory-game-p/0339.htm>
3. Alzheimer's Disease Fact Sheet. [Internet]. National Institute of Health; [cited 2015 May 10]. Available from: <http://www.nia.nih.gov/alzheimers/publication/alzheimers-disease-fact-sheet>
4. What is Alzheimer's? [Internet]. Alzheimer's Association; [cited 2015 May 10]. Available from: http://www.alz.org/alzheimers_disease_what_is_alzheimers.asp
5. Can colors improve the mood of an Alzheimer's disease patient? What paintings or colors would most improve their mood? [Internet]. [Updated 2011 March 15]. Brightfocus Foundation; [cited 2015 May 10]. Available from: <http://www.brightfocus.org/questions-answers/can-colors-improve-the-mood.html>
6. Laurel M. Fisher, David M. Freed, Suzanne Corkin. Stroop Color-Word Test performance in patients with Alzheimer's disease. 1990;12:745-758
7. R. G. Thompson, C. J. A. Moulin, S. Hayre, R. W. Jones. Music Enhances Category Fluency In Healthy Older Adults And Alzheimer's Disease Patients. 2005;31:91-99

ACKNOWLEDGEMENTS

For my acknowledgements I would like to thank the Young Science Achievers Program for funding my original project. I would also like to thank Dr. Dean Saghabi for his mentorship and constant support throughout my entire project.

As well as Pace University for hosting the Mobile App Competition and encouraging students to learn about programming and developing mobile applications.

Thank you to IBM for providing membership to IBM Bluemix. As well as providing support throughout the research.