MSCS INTERNSHIP REPORT

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TERM: Fall 2016

Start Date: September 6, 2016

End Date: November 14, 2016

Sponsoring Faculty: Virginia Ille

Company Name: Sandbox Computers for Kids, Inc.

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Thousand Oaks, CA-91360

Supervisor: Tulasi Agina

Director, Sandbox Computers for Kids, Inc.

Position: Computer Instructor and Operations Associate

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Objective

The objective of this document is to describe all the lesson learned each week during the internship at Sandbox Computers for Kids, Inc. This report contains details about the company, my role, the job description, tools and software used during this internship. It also list the week to week activity during the internship period from September 6, 2016 to November 14, 2016. The company offered a role of a part time Computer Instructor and Operations Manager which is responsible for maintaining business information systems and store equipment to support operations. Responsibilities also include teaching students K-12 computer science courses.

Organization Background

Sandbox Computers focusses on STEM- Science, Technology, Engineering, and Mathematics. The mission is to make computer education fun, relevant and accessible to children. Leading providers of technology have partnered with us to develop a cohesive computer education curriculum.

Sandbox provides services in LA as well as Ventura County, offering classes at its Studio located in Thousand Oaks and on premises at Schools and Community Centers. It has currently partnered with Prestigious Schools and After-Schools like Pinecrest (Thousand Oaks, Moorpark, and Simi Valley), Lang Ranch Elementary School, Wood Ranch Elementary School, Big Springs Elementary School, Sycamore Canyon School and many more.

Sandbox Computers also mentors students for competitions such as First LEGO League and National STEM Video Game Challenge. Sandbox has also partnered with public libraries (Simi Valley, Westlake Village, Thousand Oaks and Newbury Park) to create STEM awareness in the community. We also have camps in Summer, Fall, and Winter.

Applications and Tools

1 **Lego Wedo**:

Lego Wedo is an educational tool provided by Lego Education. It is a fusion of hardware and software programming. It can be used to create real-world projects. 3-D working models can be created to use and understand the working of real-world gigantic models like dams, mines, etc.

It can be used in the fields of science, engineering, technology, architecture, and coding. It uses Lego bricks for creating models and uses drag-and-drop programming software like Scratch. This helps in creating interactive models like toys for kids to play. The models can imitate sound and movement of real life objects and things.

It is specially designed for ages 7-11 to inculcate programming and creativity in kids. It makes use of highly sophisticated motors and sensors which aid in flawless and robust creations. The lego blocks have vibrant colors to attract kids and the tutorials and steps to create robotic models are self-explanatory. This is the first step towards active robotics for kids.

2 **Scratch**:

Scratch is a free visual programming language which was developed by MIT students to help kids code. It is an interactive language which is used by various educational institutes and individuals to create animations, games, and programs. Many parents recommend the use of Scratch for math and science projects. Educators prefer the use of Scratch for demonstrating simulations and science experiments. Presentations get a whole new life with the use of sprites in Scratch.

Sprites are active objects which can be controlled using event-driven programming. The sprites can be drawn or imported using a webcam. Sprites can have multiple costumes which can be combined with different backdrops and sounds.

Short movies and storytelling can become simpler with the use of scratch. It can teach kids how to design and interact with animated characters. It uses simple drag-and-drop programming with categories divided based on the color scheme so it becomes easy to identify. It supports the use of loops, conditional statements, and variables. It is a stepping stone to high-level programming.

3 **Kodu Game Lab**:

Kodu game lab is used to create games on PC and Xbox. It is a visual programming language which is used to develop skills like creativity, problem-solving, storytelling and programming. It can be used by young children as well as adults to create games with no design or programming skills.

Kodu is a 3-D gaming tool which helps to create various characters, terrains, and objects. The attributes of these entities can be easily modified to suit the look and appearance of the user. Multiplayer games can be designed easily by programming each module (character) easily. Bots can also be created to compete with opponents in the game. Game designed can be played with controllers as well as mouse and keyboards.

It has the ability to develop multi-level games where a player can go to the next level after completing the current level. It has multiple editing modes where camera angles, depth, height can be controlled to suit the situation. It is a guide to the advanced level of gaming for kids.

Lessons Learned

From a technical point of view, I was introduced to a series of new tools and applications like Scratch, Kodu, and Lego. It was new for me but I loved the experience. It was learning the same thing with different views and angles. Basics of programming were refreshed and the concepts grew stronger. My understanding and thinking pattern got an update.

This experience is different as I was also a student and a teacher. I had to teach myself and then I had to teach kids. I believe if I can teach myself with conviction only then I can teach others. I am very thankful to my mentors who helped me in absorbing more than I could ever imagine.

The entire Sandbox team was very helpful. They treated me like family and made sure I felt comfortable. Despite being from different parts of the world and speaking different languages communication was never a problem.

The one thing I admire about working in the US industry is that the people here are very punctual and disciplined. They management was transparent and well organized. We also used an app on our mobile devices known as "When I Work". This app kept a record of our schedule and also shared our location. It also calculated the number of hours an employee would work. One could update his/her availability and also see who is scheduled with them for a shift. It had integration with maps so an employee could only clock in and out on given time and location of his/her shift.Everyone carried out their duties. The tasks were well distributed and at the end, each part fell perfectly in the puzzle.

Weekly Logs

Week 1

Week 1 was an introductory session for me. I was introduced to the basics of Lego Wedo. I was trained in Lego by my supervisor Sandeep Bijili, who demonstrated a few tutorials from Lego Education. I was introduced to use Lego bricks and in no time got a hang it. I created an airplane project which was my first project. It gave me confidence and I moved on to the programming part of the project. I programmed the motor of the airplane so it would move and make a sound. I used the tilt sensor so that when the airplane was kept in an upright position the wings would rotate in a clockwise motion and when held in a downward position the wings would rotate in an anticlockwise motion.
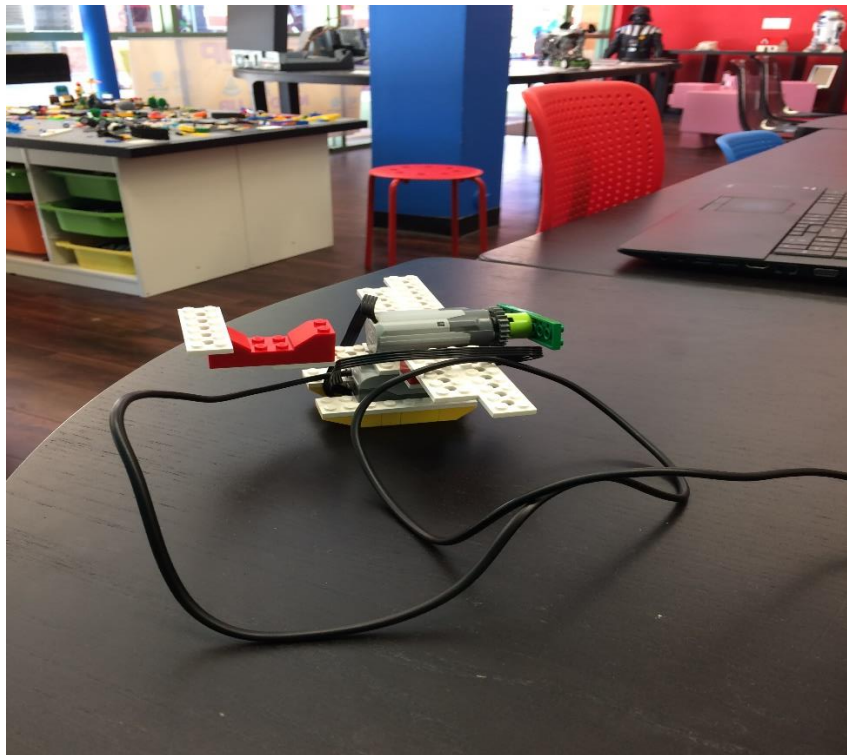

Figure 1 Lego Plane

Week 2

To test my skills I was invited to a demo at Ladera Elementary School. We had to teach kids from grades 1 to 5 in half an hour session each. As I was the operations manager I got the equipment ready before class such as the projector, Lego Blocks, Laptops, Chargers, and Cables. I was assisting the director, Tulasi Agina and System Lead, Sandeep Bijili in the class. I was assisting the kids in helping them find the right parts for the project. I helped kids in using the right parts so that the model functioned properly. We had to see that the kids understood and finished their projects in a timely manner. As an instructor, it was very important to know how to handle the kids and answer their questions. It was important to do our homework before the session to help students solve their problems.

Week 3

Week 3 had a lot of work as I was appointed as an Assistant Professor to teach the class. I studied the Lego tool so that I could be more comfortable with using it. I experimented and implemented some projects so that I could answer the questions of the students. It was also my duty to run the sessions smoothly in the limited time. I had to practice the projects over and over so I could finish them in time.

The same week I had to take a class in the Sandbox studio and I had to teach the kids to build a boat using Lego bricks and program it to sail back and forth. I had to sit with my supervisor to discuss the scenario and design a simple and efficient model so that the kids could understand it and construct it easily. It was my first solo session with the kids and I was nervous. I was afraid that kids would take time and would have difficulty in understanding such a complex model, but in the end, they were able to construct it as well as program it.
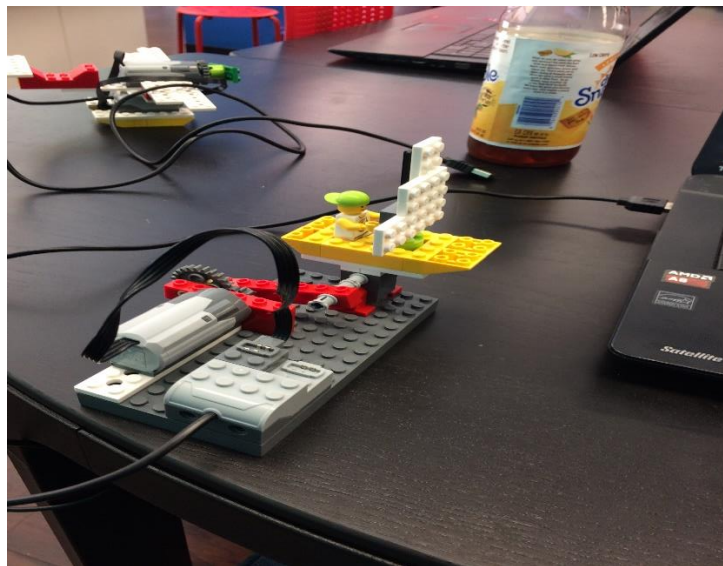

Figure 2 Lego Boat

Week 4

In the fourth week, I was introduced to Scratch Programming. It was different as compared to the Lego Wedo. It too had drag-and-drop programming but it did not use any lego blocks. It was an editor where we had to place blocks of code in correct order to get the output right.

My training started and I got acquainted with it. The same week I assisted Sandeep at a session on Scratch at Sycamore Canyon School which boosted my confidence.
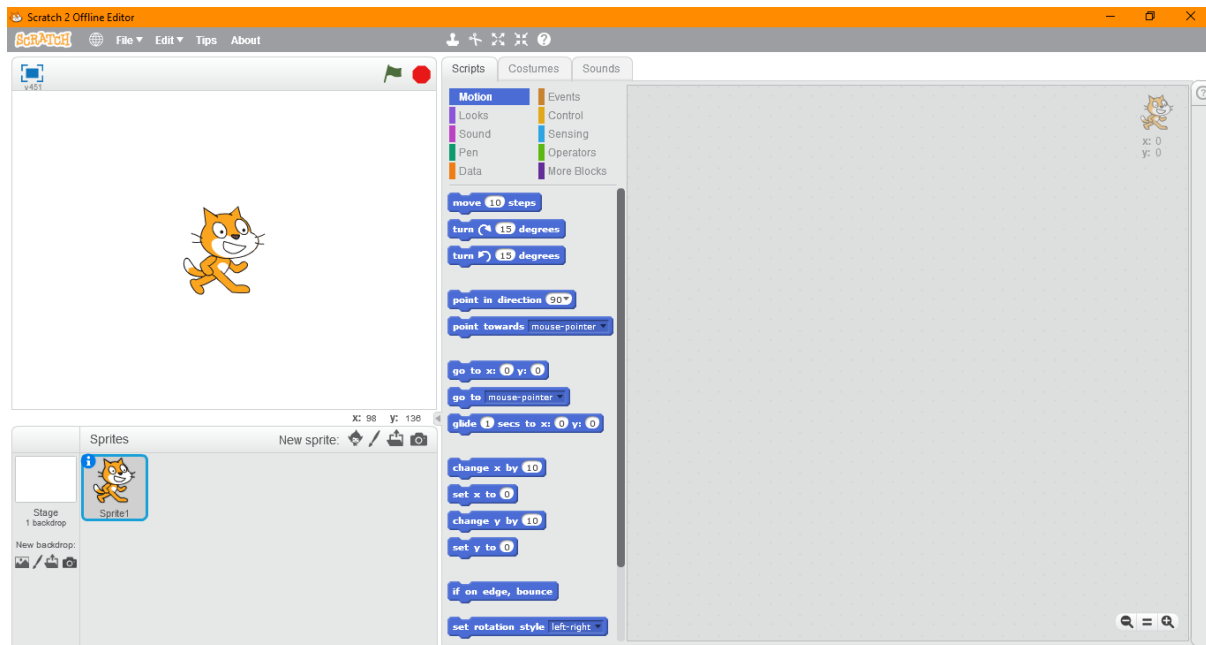

Figure 3 Scratch 2 Offline Editor

Week 5

As the main instructor could not lead the class in Week 5 I was asked to lead the class. It was the first time I was going to lead a class of 25 students. It was a great learning experience, I had to teach them to make a ping pong game. It was fun as the kids were very excited. I explained the rules of the game to the kids by drawing the model on the board. Then with the help of assistant instructors I was able to teach them the game. Kids took time as it was an advanced session. Many new errors came across that session but we were able to rectify them and things ended smoothly.
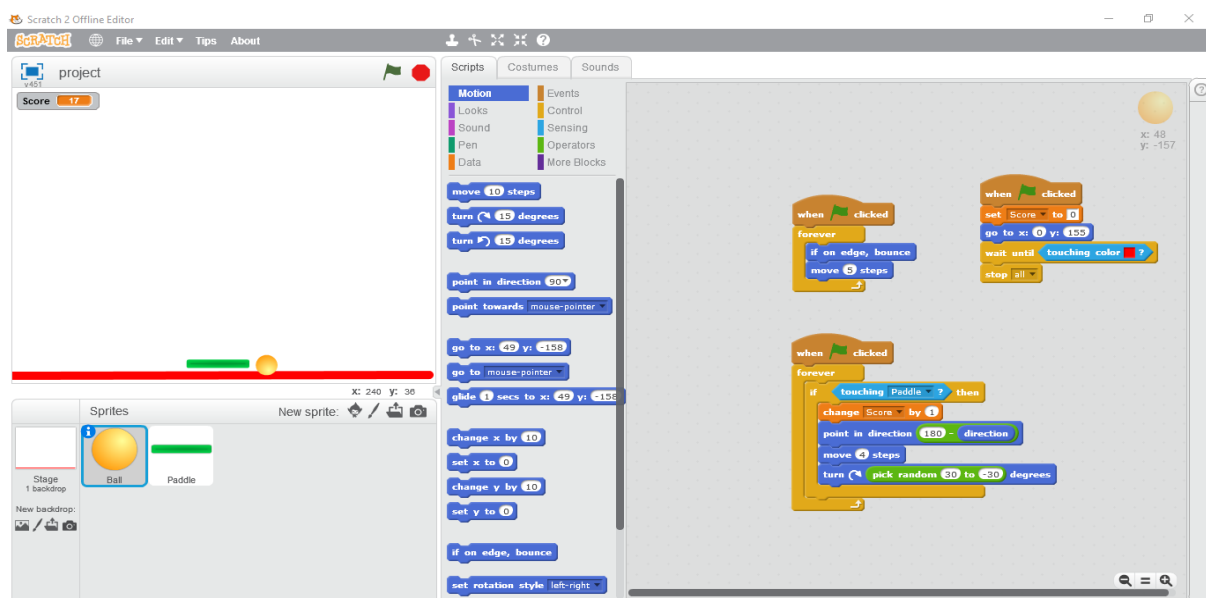

Figure 4 The Ping Pong Game

Week 6

In week 6, we had an all day event where we had to prepare a Lego world and present it. It was fun, my colleagues and I had sat together the previous evening to prepare the model. It was huge and needed a lot of time and effort. It was a promotional event for the "Fall Nerd Camp". Many parents came to the event and asked us about the courses we had to offer and the curriculum of the courses. I also took a class that week for scratch where I taught the kids a fruit ninja game. It was a very interactive game which used gestures. The webcam was used to play the game and it was a big challenge to make it work. After a lot of brainstorming and trials, we got it right. The final output was a masterpiece.
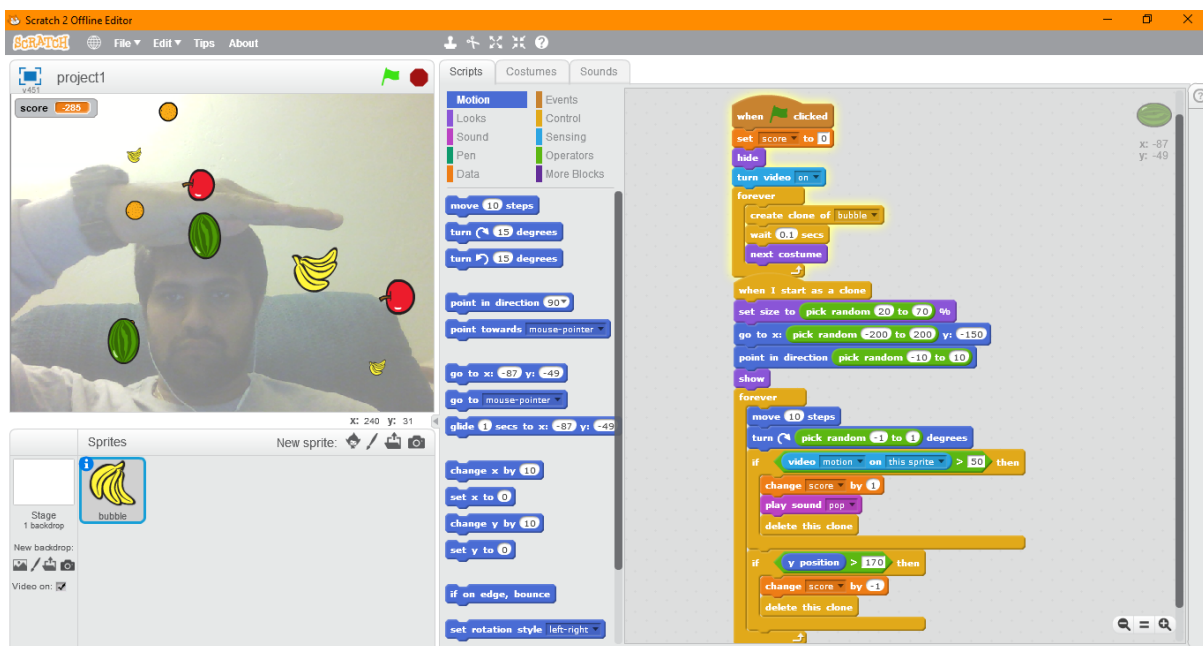

Figure 5 The Fruit Ninja Game

Week 7

Looking at my performance and the pace at which I was going I was introduced to Kodu Game Lab. It was a 3-D gaming software which worked on PC as well as Xbox platforms. It needed special training as I had to run my code on both the platforms. The programming was different but easy to grasp. It was amazing to test the programs as they were all games. We used to spend a lot of time paying them. It was a never ending process as every time we played it we would introduce something new. There was a lot to explore but keeping the kids in mind we had to limit the complexities of the program.

Figure 6 Kodu Game Lab

Week 8

I taught kids to make a Racing game where they had to create two characters and race. A Kodu and a Rover were the two characters. One was controlled by using W, A, S, D characters and other was controlled by arrow keys. It was the first class for them so it was very simple and it was just an introduction to the course.
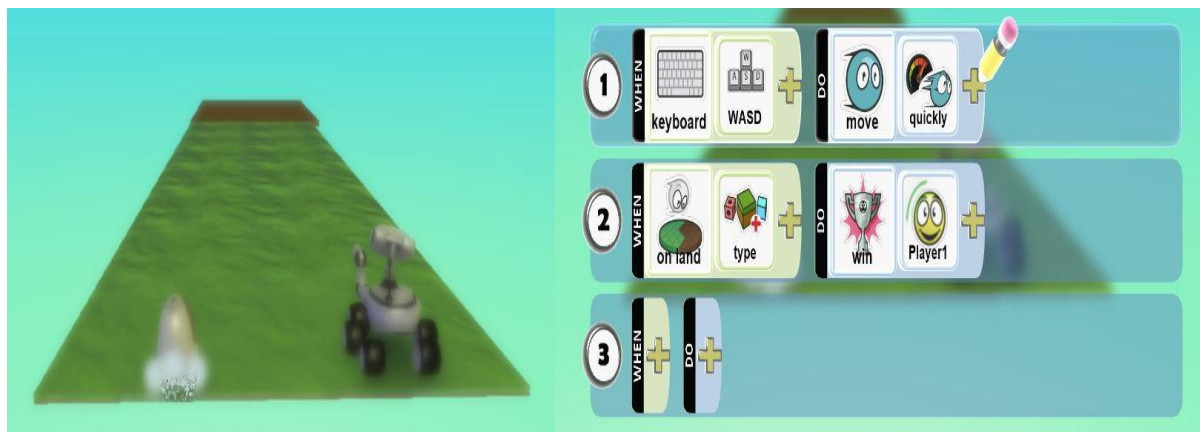
Week 9

In this week I taught them how to play the Knock Knock game. In this game, they had to create two characters out of which one was a Kodu and other was an Octopus. The characters had to enact a Knock Knock Joke. It was a different project as the characters had to interact with each other in a timely fashion. It was very important to get the timing right. At the end, the octopus had to look angry and shoot the Kodu. The kids had a gala time creating this game.
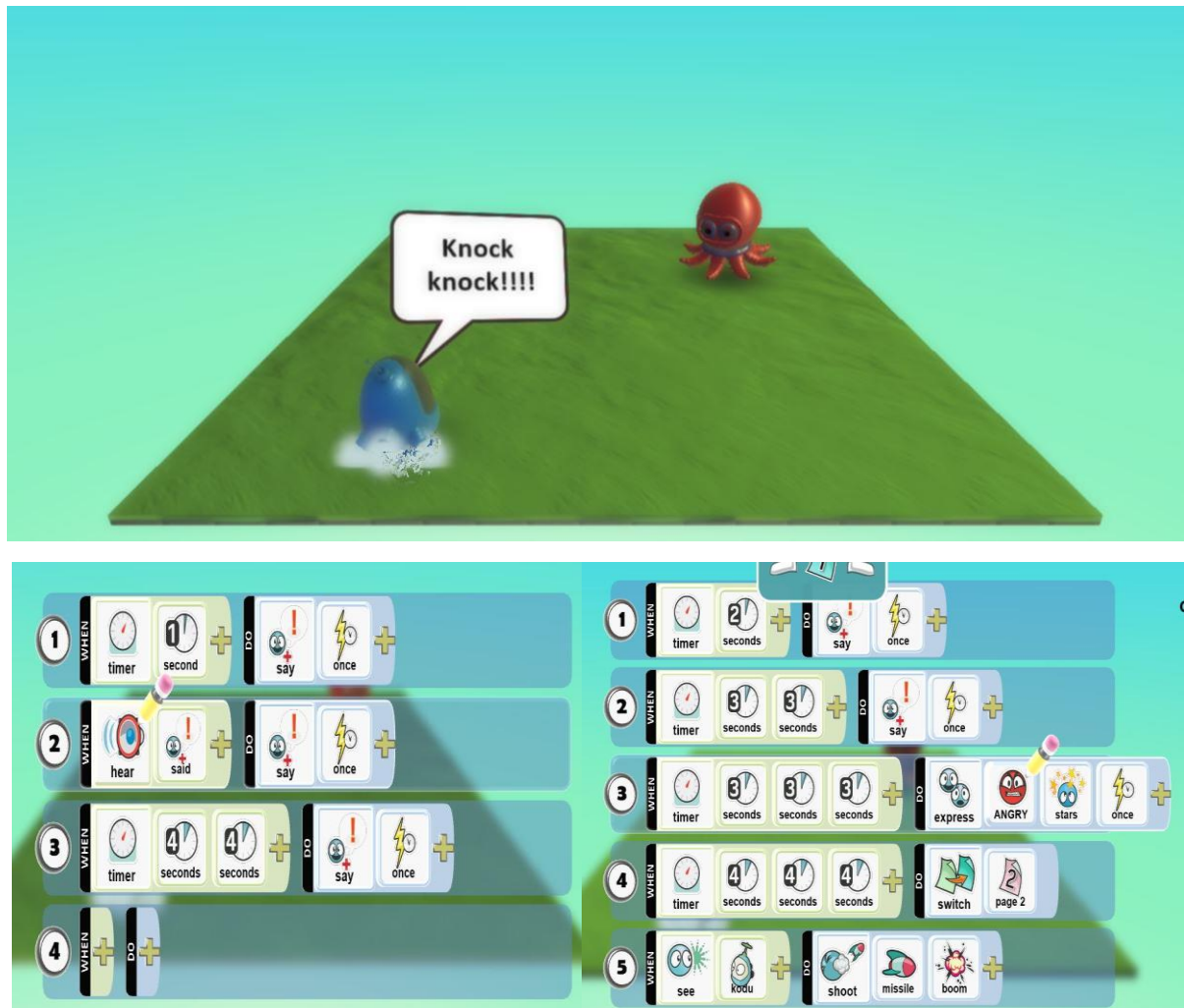
Week 10

This was the final week of the course the kids were given a final project. They had to create their own game. They were given 45 mins to create the game and 15 mins to display the game. It was nice to see them use their creativity to create and design the characters. It was amazing to see that with a little guidance they could actually portray what they were visualizing. One of the kids had created a PAC-man game. It was a very proud moment to see that they had learned the basics of Kodu Game Lab.

Conclusion

I would like to take this moment and appreciate California Lutheran University and my advisor Dr. Virginia Ilie for providing me this opportunity to explore the industry and gain this experience which will help me in years to come. I would like to thank the entire team of Sandbox, especially my mentor, Mr. Tulasi Agina who welcomed me and introduced me to a whole new learning experience.

Along with technical skills, I got to enhance my soft skills which will help me grow in the market. This was a small step towards the real world and I think now I am ready to face a different challenge. I have learned the art to manage time, handle pressure and complete the

given work on a deadline. My experience with kids has made me calmer and patient. Despite differences in opinions I have learned to accept the views and opinions of others. Being a teacher I understand how it feels to receive the immense love and respect from your students.