

# Shorewood Scratch

## Club Portfolio

February 3rd, 2012 - May 10th, 2012

Thursdays 3:30-4:30pm

### **UW Leaders**

Cynthia Qian, Elise Gale, and Josh Serbus

### **Volunteers**

Victor Bittorf, Chris Dragga

## **Background of Scratch use at Shorewood**

The Scratch club at Shorewood is the longest running of the UW CS After School clubs with this semester's club being the 5th iteration. What started as a handful of students and one instructor (Andrea herself) has grown to 5 instructors, and over 25 students all of varying Scratch ability. The Parent Teacher Organization (PTO) is in charge of running the club. Each week, a parent volunteer attends. The parent usually helps take attendance. There are students for which this was their 4th club, and students for which this was their first, and many in between. We split our group into 2 subgroups, returners and beginners, to best plan our weekly lessons and activities.

### **Weekly Lesson Schedule:**

- Week 1: Welcome/Welcome Back
- Week 2: Essentials of Programming and Shorewood Trivia
- Week 3: Information Hiding and Turtle's Sand Castle
- Week 4: Image Encoding and Going Loopy
- Week 5: Battleship and Leprechaun Game
  - a. Assessment Technique - Fist to Five Evaluation
- Week 6: Crypt Quest
- Week 7: Challenge Day
- Week 8: Fish Game
- Week 9: Work Day #1
  - a. Assessment Technique - Questions on a scale of 1-10
- Week 10: Work Day #2
- Week 11: Show and Tell Day

## **Attendance**

Attendance at our club was pretty consistent throughout the semester. We started with 28 students, lost 1 girl after the first week, and gained another boy when there was about 4 weeks left. Weekly we usually had everyone there, save for one or two absences on random weeks.

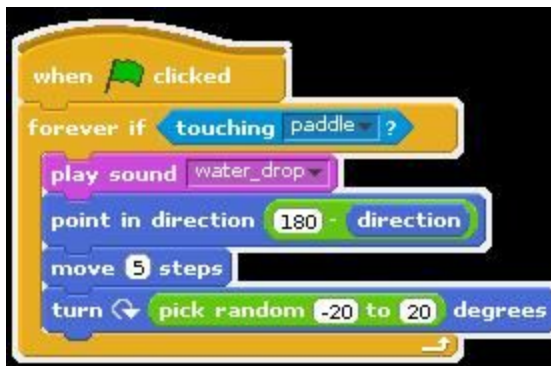
## **Week 1: Welcome/Welcome Back**

**Objectives:** Get to know the students we will be working with and either teach them basic operations or review their previous scratch knowledge.

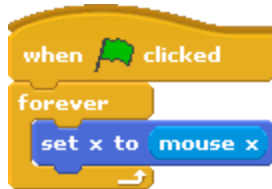
- **Ice Breaker Exercise (10 minutes):**
  - Rock, Paper Scissors Tournament

- When you lose a match, you must cheer for the winner
  - continues until one winner
- Four Square
  - Topics like: Favorite Class, Favorite Drink, Favorite Music, etc
- **Rules (5 minutes):**
  - Lay some ground rules
    - Be respectful
    - Listen to instructors
    - Make sure programs are respectful
    - Only school-appropriate game content
- **New Student Activity (30 minutes):**
  - Introduce how to add sprites
  - Introduce how to move, costumes, hat blocks
  - Leaders need to be attentive at answers all questions and make sure that students are on task while still letting them explore Scratch
- **Returning student activity (30 minutes):**
  - Students are given a simple game (Pong) that is one of the sample games that comes defaulted with Scratch
  - Then they are asked to make the game better/more interesting
    - make a “Game Over” screen, keep score, change backgrounds, etc
  - Leaders will check in from time to time and ask students what they are doing and also determine if students need to be put in a different group based on level of work
  - Leaders also need to make sure that students are on task so they can show their skill level
- **Clean-up and stickers (5 minutes)**

### Pong Ball Script:



### **Pong Paddle Script:**



**Josh** - The first week went a lot better than I expected, actually. Going in, I had this vision of every kid being able to out-scratch me, but the group I dealt with was actually very attentive to my lesson. We started out with the rules, although it was hard to get all the kids focused at first. We played a rock-paper-scissors tournament as a warm-up/energy drainer which only turned out to get the kids more riled up. After that, Elise and Cynthia took a group of returners, and I took the kids brand new to scratch. Once I finished my lesson, my kids moved into the lab and basically had time to try some of the things I showed them and play around a little. One thing I wish I would have done differently is assigned them some sort of goal. Most of the kids worked on getting familiar with scratch, while a few decided using the paint function would be more exciting. Afterwards, Victor mentioned our first club went way better than their first attempt, which was reassuring. I have a good feeling next week will go better now that I have some idea what's coming.

### **Cynthia-**

I was really nervous about the first week because of obvious reasons. When we got there I remembered just how hectic little children are and got completely swept away by their energy. After Elise introduced the club and explained rules, I was in charge of ice-breakers. I thought that a rock-paper-scissors tournament would be an excellent idea to get everyone happy and hopefully release a lot of energy--apparently they have much more energy so it only served to make them more excited and jumpy. I forgot how difficult it is to try and regain control of kids once you leave them to their own devices so it was pretty hard to get them paying attention again--luckily, after I went through what I had planned they actually really wanted to work on Scratch so it was a perfect segue back to the actual club. After we split up into newbies and returners, it turned out that most (if not all) of the rowdier and more rambunctious and confident kids were returners. On the most part, it went well and the kids tried to do different things with the program. Some kids wanted to do other things (play other games, only paint, and/or goof off) but after a quick chat they were hard at work. The kids that had trouble didn't seem to remember variables and broadcasting very well but there were also some children who obviously knew what they were doing and were helping others. It was a lot more peaceful after everyone was

working and I got to ask a lot of kids about what they were doing--very creative stuff. Overall it was quite a successful week--I believe I know what they need to be taught next, now it's just a matter of making sure they listen and are attentive.

**Elise** - 28 kids is a lot! Today we focused on introducing the kids to us, each other, and the goals of the club. While getting them to quiet down was a challenge, the kids listened attentively to the rules and club goals. Next, we did ice breakers. I think the kids enjoyed them, but it was pretty hectic with all 28 kids doing the same activity at once. We will probably change that for next week, because I don't think they learned a lot of names in all the yelling.

Next, we broke up the kids into returners and new kids. The new kids got a lesson from Josh and the returning kids got an assignment from Cynthia and I. We had them use the "Pong" example from the Scratch demos and improve upon it. We thought this would be a good assignment because the functionality is very basic and there is a lot of room for improvement. Some kids made very cool modifications, like scoring, changing the paddle size, and changing the sprite appearance. Other students didn't seem to know what to do and got bored quickly. We overestimated the time needed for the activity and ended up giving them free time at the end.

There are a couple things I think we did well, and some we could improve upon. I think the activities flowed very well and we avoided boredom as much as possible. However, trying to direct a group of 28 students at once was challenging, so we will try smaller groups next week. Also, we overestimated the time needed to complete the Scratch activity, so some of the students got bored. Overall, I am very excited for the weeks to come and I think the students are also.

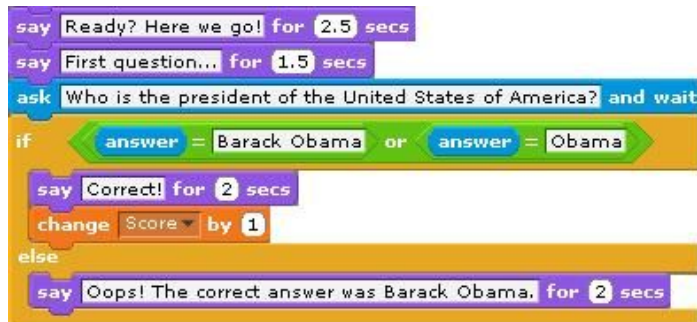
## **Week 2: Essentials of Programming and Shorewood Trivia**

**Objectives:** Demonstrate programming through a simple game. Teach them variable and broadcasting skills using a trivia game.

- **Drawing-Directions Activity (15 minutes)**
  - **Materials:**
    - Crayons
    - 3 Sheets of paper per student
  - **Directions:**
    - Each child draws their own picture
    - Passes drawing to the left
    - Each child writes directions to draw the picture they were passed
    - Pass the directions to the left
    - Each child follows the directions

- Compare the final pictures to the completed ones
  - Discuss relationship to programming succinctly
- **Shorewood Trivia (New/Returning) (40 minutes):**
  - Create a trivia game with a sprite host and user input
  - New students focused on using ask, answer, and conditions
  - Returning students used these elements plus broadcasting to change backgrounds and variables to store names and scores
- **Clean up and Stickers (5 minutes)**

**Ask a question script:**



**Show user their score script:**



**Cynthia -**

This week seemed even better because we split them into 4 groups (we had 4 leaders so it went quite well) which was about 7-8 kids per college student. A couple of the kids were much quieter because they weren't surrounded by friends so that's good to keep track of. Though some kids got really loud because they had a bunch of friends in the group so I might want to switch around the groups so they aren't always giggling and being disruptive. They were really excited to get into the lab so I had to coerce them to do the activity we had planned. There were moments that they went off on tangents but overall, I felt like I had a good control over them and that they listened pretty well. We then moved the returners to the lab and introduced the quiz game that we wanted them to do. Even though they are loud, if you ask them to move to different areas of the room to separate them from their friends, they did it without problems so it wasn't too difficult. I think the mental idea of just being separated from the beginners is enough for the returners to be happy because even though the lesson was very similar (the theme of quiz game)

they didn't even seem to notice it.

**Josh** - This week felt a lot more under control now that I knew what to expect. We started out with a drawing activity to show the importance of telling the computer exactly what you want it to do when programming. We split the kids into groups of 6-7, and I was actually surprised that some kids in my group actually understood the point of the activity before I even told them. Next we showed the demo for our quiz game to two separate groups. The demo I led went really well actually, most kids participated in giving suggestions/answering questions, and seemed genuinely interested in learning how to make their own. I think the division of kids based on skill level was pretty accurate, and will work well for the rest of the semester.

**Elise** - This week was much less stressful. The drawing activity went okay. The students seemed to understand the point very well, but it was difficult because some student chose to draw inappropriate things. The activity also took longer than expected because we didn't know exactly when to start.

The scratch activity went well. The returning students got a little impatient with the demo because it didn't use any new blocks. Next time, I think I will ask more questions instead of showing them how to do it and let them get started more quickly. Almost all the students completed the activity satisfactorily, although some students still got hung up on painting sprites. Even though we gave the same lesson to the beginners and the returners, the returning students seemed to enjoy it and did not get bored. Lastly, I think I want to go over broadcasting in the near future because that is what most of the students struggled with.

### **Week 3: Information Hiding and Turtle's Sand Castle**

**Objectives:** We wanted to teach kids about how secrets are kept on the internet, and introduce them to the logical concepts needed for a maze game.

#### **Time Breakdown:**

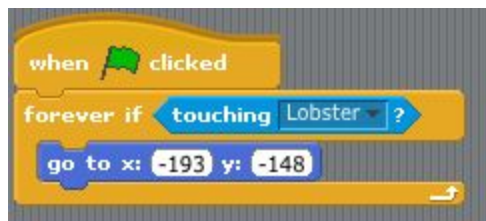
- **Information Hiding Activity (10 minutes)**
  - **Reference:**
    - <http://csunplugged.com/information-hiding>
  - **Materials:**
    - Post-it notes
    - Pencils
  - **Directions:**
    - Explained goal of finding average age of group without anyone saying their age
    - First child picks secret number
    - They add their age, and pass a note with the sum on it

- Next child adds their age, and passes a new note with the total sum
- When this is completed, the secret number can be subtracted and the average computed
- Then discussed secrets you must keep on the internet
- **Turtle's Sand Castle Demo (10 minutes + 40 minutes of work time)**
  - Goal was to create a maze game with:
    - Start and end screens
    - Walls they could not pass through
    - Enemies that could send them back to the beginning (Returners)
    - Coins or points to collect to get a score (Returners)

#### Script for walls to be impassable for sprites



#### Script for main character sprite to move back to beginning if touching an enemy



**Elise** - This was our third week and I feel that the students and the volunteers are all getting into the swing of things. We did a very short CS Unplugged activity with mixed results. It required some math that the students weren't 100% comfortable with.

Cynthia led the demo for the advanced group. The students were more attentive this week, although some of them needed clarification on some of the stuff we covered. They enjoyed making a maze and overall had strong success with the basics of staying inside the lines. However, many of them desired to work on their quiz games from last week or didn't get to finish their mazes. Next week, we will probably do a shorter lesson and give them free time, but only to work on their previous projects from this semester.

**Cynthia** - I tested a new idea out this week with trying to get the kids to listen. Instead of being loud and yelling to get their attention I just waited for them to settle down. And then continued to



wait (this only worked because they were really excited to get into lab) so for the unplugged activity I told them the faster they pay attention, the faster they can get into lab. It was a little unruly at first but once they understood that I could wait forever, peer pressure got the other kids to be quiet. I led the demo and the kids were quieter because I showed them Pac-Man (Scratch version) and showed it was possible to make in Scratch. Then I showed them the maze demo and did a brief cover of all the topics (how to make walls, how to make enemies work, how to make coins work, etc) and instead of showing them how to do it, I got different kids to answer every question and after that I sent them on their way. A lot of them made very similar games to the demo but there was a lot of creativity for how the actual program ran. Kids were mixed on what they wanted to work on and a lot of the kids went back to quiz game but they definitely got things working really quickly for the maze game so we allowed it.

**Josh** - This week felt even more at ease than last week. The activity we planned was to try to explain cryptography and secret numbers, so we thought we would use the kids' ages as the secret number, then try to find their average age. It sounded good in theory, but when the kids already know each others ages they were less interested. Chris led the maze demo, which went surprisingly well. I stood to the side and answered questions as the kids had them. Once they were actually working on their own projects they were pretty well occupied.

## **Week 4: Image Encoding and Going Loopy**

**Objectives:** Introduce them to how computers encode images and increase their comfort using repeat blocks in different ways

### **Time Breakdown:**

- **Image Encoding Activity (10-15 minutes)**
  - **Reference:**
    - <http://csunplugged.com/image-representation>
  - **Materials:**
    - CS Unplugged Worksheets
    - Pencils
    - Graph Paper
  - **Directions:**
    - Explained that computers need to store images as numbers, so they make a “code” to show how the image looks
    - Let them Decode the CSUnplugged Worksheets
    - With the extra time, let them use graph paper to encode their own images
- **Going Loopy Activity (20 - 30 minutes)**
  - **Reference:**
    - <http://voyager.egglescliffe.org.uk/mwc/mukoku/mod/resource/view.php?id=803>

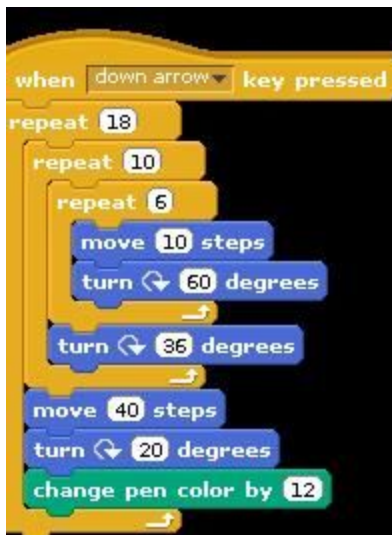
- **Directions:**

- Let them navigate the online lesson
- Had them demonstrate a cool new shape using a minimum of two nested loops
- Let them have free time on prior projects once they demonstrated this

**Script to clear screen:**



**Script for one possible end result using nested loops:**



**Elise** - This week was a little wacky for two reasons. First, we had accidentally selected a CS Unplugged Activity that some of the students had done in the fall. I was able to spice it up for my group by going over RGB encoding, but it was a little harder to keep them interested. The second issue was that neither of the projectors were working properly so we were not able to demo a lesson. This was not catastrophic because we were planning on using an online activity anyway, but the main problem was that the students didn't realize the cool shapes they could make and were slightly impatient. A short demo would have maybe helped them focus more early on. Once they got to the fun part though everything seemed to go well. Once students

made their shapes, they were allowed to improve a previous project. About 50% of the students chose to continue playing with their loops instead. This proved to me that the students don't need an elaborate lesson or end result to stay engaged for a long period of time.

**Cynthia** - The CS Unplugged activity was a tad difficult for the returners because they had done it before but some of them didn't remember how so I had the other kids teach it to them so it worked out well. Also, I had them code their own pictures instead of drawing the ones of the worksheet so it ended up pretty well. I used the same technique of waiting for them to simmer down and it worked really well again so I'm going to continue with that. We let them work on their own through the Loops tutorial so that was interesting. Some of the kids got right to it and finished quickly. Others didn't want to do it and thought it was boring -- but then they saw other kids making fancy shapes and etc (and getting praised) so they got serious because their friends were working hard and they weren't getting attention. All in all, the activity worked really well and a lot of kids really enjoyed it. We set each of them free once they showed us their loops and a lot of kids actually continued playing with loops instead of working on their mazes or quiz games. The loops show creativity and style and it was really exciting to see what some of the kids came up with!

**Josh** - This week presented some new challenges. We couldn't get the projectors working, so we decided to have the kids log onto a website and check out a power-point type demo on loops. The CS unplugged activity was actually one the kids had done before, though we didn't find this out until last minute. With my group, I basically explained to the new kids how pixels worked and the relation to our activity, and I told the advanced kids they didn't have to redo it if they really didn't want to.

The online activity was another difficult task. Some of the kids didn't understand that they were supposed to try the code from the website in Scratch, to see what it would output. Once I kinda pointed them in the right direction, it seemed that they had a lot of fun trying to make different shapes and patterns with loops. For next week, we'll make sure to show the kids something new with the unplugged activity, and hopefully we'll have projectors to use.

## **Week 5: Battleship and The Leprechaun Game**

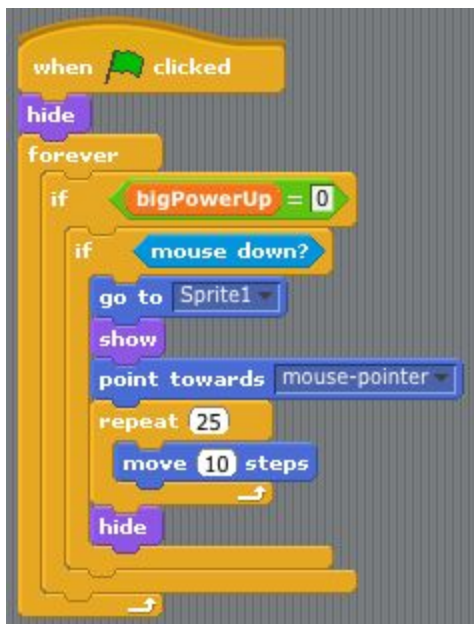
**Objectives:** Discuss binary search and introduce kids to "shooting" style games

### **Time Breakdown:**

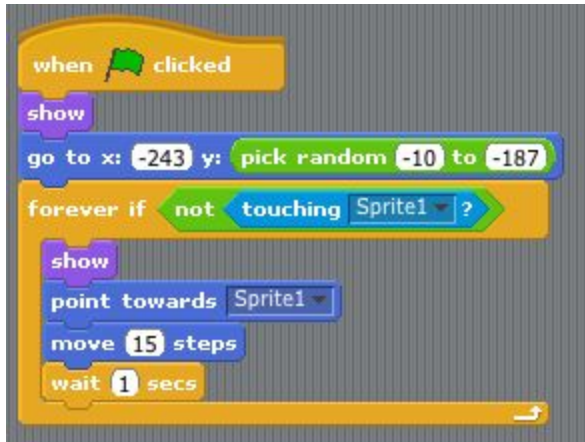
- **Battleship Activity (10-15 minutes)**
  - **Reference:**
    - <http://csunplugged.com/searching-algorithms>
  - **Materials:**
    - CS Unplugged Worksheets

- Pencils
- **Directions:**
  - Explain to students why sorting might be important
  - Let them play battleship
    - Guess a letter
    - Get feedback: higher or lower
    - Use feedback to make a new guess until ship is found
- **Leprechaun Game (45 minutes)**
  - **Goal:** Create a 'throwing' game with:
    - Enemies that approach main character and disappear when hit
    - Sprites that are thrown in response to mouse click
    - Power-up options to improve throwing or object thrown (optional)
    - Scoring or other improvements (optional)

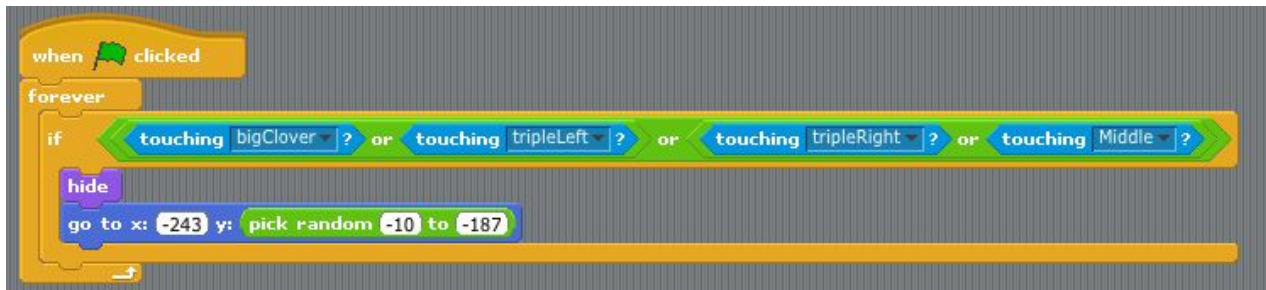
### Script for throwing shamrocks



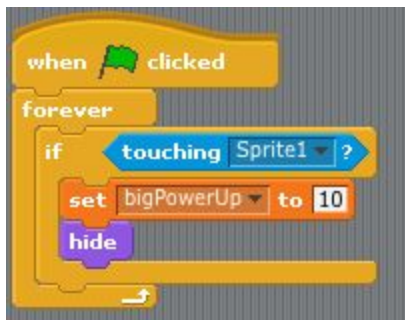
### Script for enemy coming towards main sprite



### Script for enemies getting hit by shamrock



### Script for powerups



**Elise** - We decided that this week would be the last one where we use CS Unplugged Activities. We have run out of intuitive ones, and so the ones that are left are less suitable. Additionally, the student's projects are getting much more advanced, which means they are benefiting from more time in the computer lab. I'm glad we did them at the beginning as a way to get to know the students and teach more concepts, but moving on seems like a good idea.

The demo this week was awesome! Cynthia made a leprechaun-based throwing game (NOT a shooting game) that the kids immediately latched on to. The returners still don't take direction that well in the demo - they get too chatty and excited about making the game. However, most

of them are able to figure out the logic on their own. This week I focused on helping just 2-3 students instead of floating around. This worked out a lot better I think because there aren't that many kids that need guidance, but those who do need a lot of it.

Josh performed the assessment activity at the end of class. The kids didn't enjoy the CS Unplugged activity this week (I don't know that we did either), but they voted that they like the demos and they like the games and challenges we give them to do in Scratch. The feedback was very helpful for determining how the club will go in the future.

**Cynthia** - This week, we did a pretty quick activity on Binary Search (using some strange sort of battleship). The kids flew through the exercise partially because of the fact that it was battleship and they were semi-interested in winning quicker but they weren't big fans. I wasn't really interested in it myself so I wasn't surprised that the kids didn't take particularly well either. My kids are slowly starting to listen to me better although they still dissolve into chaos once I finish giving them directions (there is definitely improvement though) so I've come to the conclusion that waiting in an excellent strategy as long as everyone wants to go to the computer lab. Some of the kids seemed pretty interested in what Binary Search can be used for (winning games faster and finding objects quickly and etc).

We went into lab and it was my St. Patrick's Day Demo. It was a lot of fun to make but the kids weren't as excited about this game as the maze game (probably because I made sure to say that the main character was THROWING shamrocks and not shooting the leprechauns). It was harder to keep their attention but as usual, we showed what the game could do and asked how to code specific parts. Every single question I asked had a volunteer (which is normal) so I was confident that it would be pretty easy for them to get. It was pretty calm at first but after about 10 minutes the amount of kids with questions just skyrocketed and I was running around the rest of the time trying to get things working. A lot of kids had trouble with throwing the item correctly but the concepts like "enemy disappearing on impact" were easier for them to understand since we had done a similar concept in the past. It seemed that certain kids had way more trouble than others (some had issues because they didn't listen to the demo but after a quick talk they were on their way) so we were thinking about grouping the ones that needed more help together so one person could dedicate all their time to them. My favorite part of dealing with the onslaught of questions was asking kids sitting near the child with the question to teach him/her how to program that specific piece. For the most part, it worked really well so that's definitely a technique to use later.

At the end of lab, Josh did a hand-five survey that showed they didn't like the Unplugged Activity (which I could have guessed) because it was boring but also that it gave them less time in lab. It was pretty unanimous that everyone liked the demos and the challenges and games that we set up for them. It was good to see that our hard work was actually going to interested students!

**Josh-** Since last week the students had already done the unplugged activity, we decided to make sure we did a new one this week and chose the battleship example. It was meant to teach about binary sort, but it didn't really fit into the lesson we used that week. I think the students didn't really understand the purpose of the activity and they were more interested in practicing Scratch. I ended up explaining the directions 5-6 times which was kind of a hassle. Once everyone finished their game I explained how binary search worked and then moved into the demo.

I did the demo of Cynthia's shamrock throwing game and surprisingly the kids were very helpful and correct. It was nice to see more kids getting involved in giving ideas for how to code certain parts of the game. When we moved the kids into the lab most of them figured out the main idea of shooting pretty quickly, and then started to help kids sitting next to them with something I had explained. That was also kind of cool to see.

At the end of the day I did the fist-to-five assessment activity with the entire group. Most kids turned out not to like the unplugged activities we had been doing, which seemed to be the case the past week or two. Starting next week, we decided to move away from the opening unplugged activities and try to get them into the lab earlier to maximize work time. Additionally, most responded that they liked our demos before their lab time, which is good feedback. I think it will be fun to see what they come up with when they have more lab time each week.

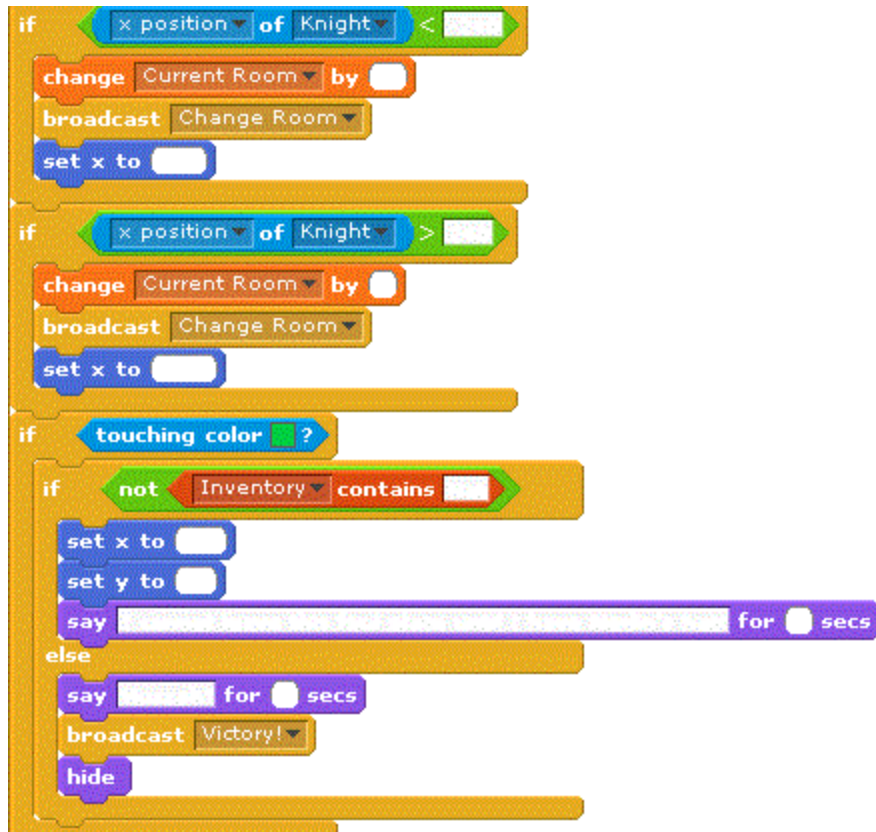
## **Week 6: Crypt Quest**

**Objectives:** Introduce students to lists and games with multiple rooms

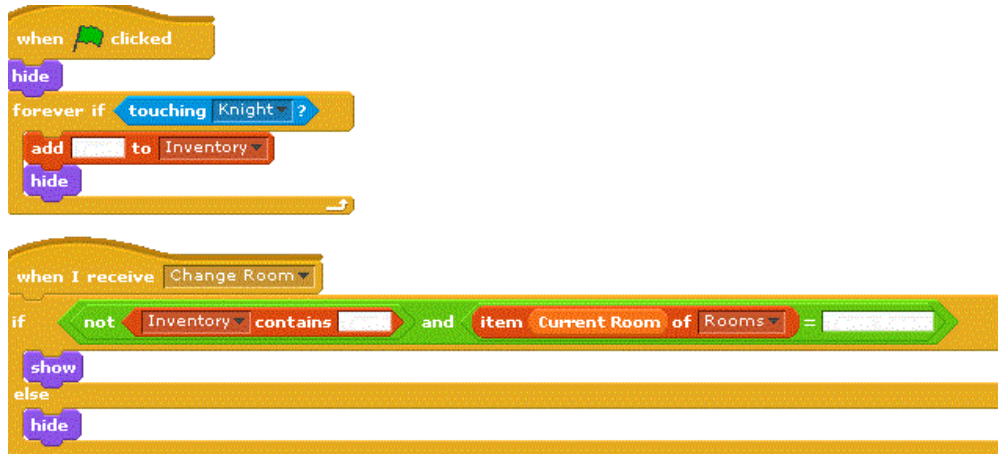
**Time Breakdown:**

- **Crypt Quest Game (60 minutes)**
  - Demonstrate how lists could be used to:
    - Store an inventory
    - Change rooms
  - Let the students work on their own projects using at least one list

**Knight using list changing for rooms:**



**Example of object the knight can pick up:**



\*Text should read: "Torch," "Torch," and "Torch Room"

**Elise** - Today was an interesting day for a couple reasons. Firstly, it was the first day we did not do an unplugged activity before the main Scratch activity. I think this worked well because the students were much more attentive during the demo. The second interesting thing was that it was the last lesson before spring break, and the kids had been given ice cream earlier in the day. This reduced their focus as the hour went on.



I think the students have started to have pretty strong opinions about what types of projects they like or don't like. It was difficult to get them to use lists because they weren't big fans of the context provided. They did use them in the end though, which is the most important part.

**Josh** - This week we decided to try something new. We steered away from the CS unplugged activity and tried to get the kids more time in the lab, which I think they enjoyed. Chris did the demo of his crypt quest game. The kids seemed to follow, but some seemed a little unsteady with the idea of lists. Once they got into the lab, most the the kids got the general setup of the game, but I ended up having to explain the lists several times. Overall, it was a solid week, without too many troubles. The club is starting to feel like it's wrapping up a little bit, although it could simply be that it's the week before spring break and all the kids were a little antsy.

**Cynthia** -

This week was more challenging so we decided to give them more time and forgo the Unplugged Activity. It was actually a little bit more difficult to keep the kids' attention this time around (but that was also because they had ice cream and were extremely energetic BUT ALSO because it was a longer demo). Elise lost their attention once and it took about 5 minutes to regain control of the entire room. That was the first time we lost them that badly, but also the first time we regained control that well--so overall I consider it a very big success. Most children do not like using lists so it was tougher to get them interested (but they did end up using it in their games and with a little guidance they were on their way!). We also got some comments about how knights were "uncool." But as usual, they were very tempted to try the game and so that was fine.

## **Week 7: Challenge Day**

**Objectives:** Review skills that students have learned through short challenges

**Time Breakdown:**

- **Challenges (60 minutes)**

1. Choose a musical instrument sprite to import, and make it play for a beat when clicked.
2. When a sprite is clicked, make it do a short dance. This should include at least one costume change for credit.
3. When the 'b' key is pressed, make the sprite bigger. When the 's' key is pressed, make the sprite smaller.
4. For the sprite of your choosing, when the 'h' key is pressed, draw an hexagon (6 sides) using the pen tool. When the 'j' key is pressed, erase it.
5. For any sprite, when the 'n' key is pressed, that sprite should ask the user for their name, then use it in a sentence.
6. For any sprite, change the background when the sprite is clicked. (Hint: use broadcasting!)

7. Create a sprite that bounces around randomly but cannot escape a square.
8. Create a sprite that follows the mouse pointer around the screen when the 'f' key is pressed.
9. Create a cat sprite and a dog sprite. Whenever the cat sprite approaches the dog sprite, the cat turns and runs away from the dog.
10. Create a sprite that picks up a ball and throws it into a goal. (Hint: you will need three sprites to do this.)

\*Students were awarded upon completion of 4, 6, and 10 challenges

**Elise** - This week was hectic, but very successful. It was a great opportunity for us as leaders to see which concepts had stuck and which ones had not over the course of the class. We had set it up so that kids who completed 4 challenges got a piece of candy, and those that got to 6 could switch to free time. Getting all 10 right meant a prize and free time. It was very encouraging to see how many students wanted to go for all ten. Additionally, it was great to see Victor's kids get involved in the challenges as well because they are usually doing more advanced activities.

If I could do this again, I would have a candy/prize station outside the lab for people to visit when they reached a milestone. That way, the hustle of trying to get candy would be less distracting to working students. Other than that, I would highly recommend this activity for later in the class when the students have been introduced to a variety of concepts.

**Josh** -

This was probably my favorite week so far for a couple of reasons. 1. There was no demo to prepare, which is always a little less stressful. 2. The kids turned our challenge day into sort of a race to finish the most, and it's nice to see them getting excited about scratch. 3. Throughout the club, kids who had finished more objectives actually ended up helping the ones sitting around them to finish as well.

The lab got a little hectic with kids running back and forth to collect prizes all the time, so that could use a little more organization. Other than that, I think the Challenge Day idea went over pretty well with the kids, and they enjoyed the candy anyway.

**Cynthia** -

Challenge day was excellent! All the kids were excited by the idea of competition and prizes so it was easy to get them started. Everyone wanted candy and a lot of them were whizzing through the activities. With each of the different activities, it became really obvious who understood the material on a more conceptual level. It got a little hectic when the children started to actually finish their 4 (beginner level) or 6 (advanced level) tasks to get candy. After

they finished that they could move to free time, but the extra prize at the end was to finish all 10 challenges and get a little more candy. I was super excited learn that a lot of kids aimed for all 10 instead of just moving to free time. It was fun to see Victor's kids heavily involved in the competition as well (I saw them peering into the lab a lot to see where the other kids were).

The only thing that got a little intense was that Elise got swarmed with kids trying to get candy and other prizes. The rest of us were just helping out people who got stuck with specific questions. A funny little side note is that it is necessary to check actual code and not just watch their demos for completion because they're quite sneaky with their cheating (e.g. instead of having a cat move away from the dog if close by (within a range), they made a small sprite in from of the dog and had the cat move away if it sense that sprite).

## **Week 8: Fishy**

**Objectives:** Introduce advanced students to gravity, all students should review collision detection and motion.

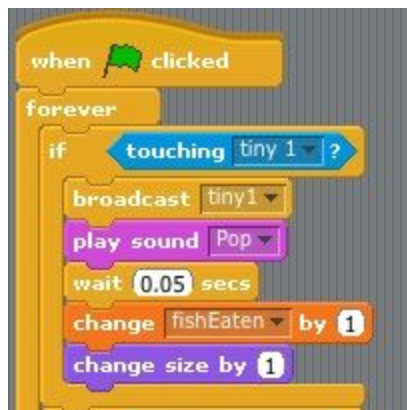
### **Time Breakdown:**

- **Fishy Game (60 minutes)**
  - Discuss how to make fish movement more natural
    - show them how to use acceleration
  - Review use of “enemies” and random block
  - Encourage students to try acceleration and/or more sophisticated enemies

### **Example of Deceleration:**



### Example of Eating a Smaller Fish:



**Elise-** This was our last lesson week. Wow! We tried a very advanced lesson with acceleration

to mixed results. Some of the students were discouraged and got off topic. Most students did get a solid review of “enemy” behaviors though. Hopefully that will help as they move toward final projects.

Others didn’t find the theme compelling enough. I’m not sure what we could have done to make the demo more interesting. I think the lack of interest was mostly due to “spring fever” and having done the class for eight weeks now.

As for instructing, we have a pretty well-run system going. Most students are able to accomplish basic projects with the help they are given, which is the most we can hope for in such a big class! I hope the energy of the students is a little more focused next week though.

**Josh** - This was our last week of giving demos. It seems like yesterday that the kids were just getting introduced to scratch. For our demo this week, we used Kelly Salmon’s Fishy demo, except I sort of gutted the code and reworked it for my beginner kids. It ended up being a fish game, only without the acceleration. I also decided to do the demo a little differently this week. I showed the kids the final version of the game (my code), then used a whiteboard to make a list of all the things the game would need. I had the kids come up with a list of all the sprites we needed, and what type of code blocks we would need as well. This actually ended up working out pretty well, and the code they assembled was more or less correct. After they finished making the list, I offered to show the kids my code so they could compare, which a couple kids hung around for.

In the lab, most kids got their games working. Although, I did have to re-explain the enemy spawning to a couple kids. One boy named Ray was actually sneaking between the demo computer and his computer copying code so he could play the game. This was a little disheartening to see, so I tried to keep an eye on him so he would have to do his own work.

**Cynthia** - Last week of demos and I presented! We used Kelly’s Fishy game that incorporated acceleration and deceleration. The concept of gravity was a lot more difficult to grasp because it was more math and abstract than a lot of the concepts they learned so far. Because the concept wasn’t as interesting it was much more difficult to keep their attention up. Also, even the kids that seemed to be paying attention needed a lot of help with acceleration and deceleration. Only a couple kids actually had the concept make sense. During lab I had to re-explain a lot of the ideas behind it and Ray Tan just bypassed that entire step and copied code straight from the demo--which is too bad because I thought he was one of the kids who understood what they were doing.

## **Week 9: First Work Day**

**Objectives:** Get them started on final projects, Project planning worksheets

**Time Breakdown:**

- **Work time (50 minutes)**
  - Help students decide a topic or theme if necessary
  - Help them refine their ideas so they work well with Scratch
  - Help them with any technical issues
- **Survey (10 minutes)**
  - Students tell us what their project is called and what Scratch tools they are using for it
  - Report on a scale of 1-10 how well they think the class went using a few metrics

**Elise** - Was not present, but helped create the survey in advance.

**Josh** - I was pretty excited going into club today, partially because the end is finally nearing, but also because the kids got to come up with their own final project ideas. When they arrived, I handed out or “project planning” sheets. I explained that they would have this week and next week to work on their projects, but they had to finish the planning sheet by the end of the day. Most of them were itching to get into the lab and get started, while a few needed some help getting a concrete idea of what they wanted to do. I did my best not to explicitly give them projects, but to try to find out their favorite game/suggest elements they might incorporate.

Once they were in the lab, our job was basically to help as needed. At first it was easy, but once they progressed further, more time was required to acclimate to the student’s project in terms of which variables/sprites they used and what exactly they wanted to do. I’m excited for next week to see how the games turn out.

In addition to using the handouts to plan their final projects, we also put another assessment at the bottom. The questions asked were on a scale of 1-10, and went as follows: I am a Scratch expert, I learned new things about Scratch in this club, I would recommend this club to my friends who haven’t tried it. Most of the kids said they learned new things (avg answer - 9.15, ) and that they would recommend this club to their friends (avg answer - 9.34). The majority of my students, save for the Felix and Else who work with Victor, would not consider themselves Scratch experts but are at least comfortable using Scratch (avg answer - 6.14). Keeping in mind that they were brand new to Scratch, I feel that a 6/10 is good progress for their first semester.

**Cynthia** - Class was very exciting today! They created their own projects while we helped them think of ideas and keep their projects school appropriate (a lot of kids were headed towards shooting games and blood and guts). Although I told the kids that had the class period to finish their sheet, most finished the entire sheet to quickly enter lab and start their projects. A couple kids got stuck so I stayed outside and asked them what they wanted to do and how they would implement it. A couple kids (Daniel & Matt, Ula & Rosa, etc) teamed up which was good and I

was pretty sure it would help make some excellent projects!

Then, I spent the rest of the day answering questions which was nice and easy because a lot of kids knew at least a little of what they were doing. I helped Yohan with basic concepts again for a while (but it wasn't hectic so it was fine to spend a lot of time). In terms of assessment, a lot of my students are goofs and overconfident so they overestimated their skills extremely. I got only a few good responses (Steven in particular) that did an accurate statement about their level in Scratch. Also, pretty much all my students said that they liked the club and would recommend it to their friends.

## **Week 10: Second Work Day**

**Objectives:** Finish final projects, make sure to email/save to a flash drive if not finished

### **Time Breakdown:**

- **Work time (60 minutes)**
  - Help students reach a mostly finished state on their projects

**Elise** - This was the first time seeing the final projects coming together and I was very impressed. It was great to see the variety of themes and different techniques that were used. I especially loved it when I could tell the students were using stuff we had taught them! Only a few students seemed to have overreached the two-day work time with projects that may not be complete in time. The biggest problem of the day was volume, which I suspect we will have to keep an eye on next week also.

I am looking forward to show-and-tell day next week. Hopefully, we will be able to keep order well enough that everyone will have their chance to show off if they desire.

**Josh** - Today was our last work day of Scratch club! I passed out the planning sheets and reminded the kids that they had only today left to finish, so they might have to take their game home to work on. In the lab, there were a few students who finished their games, and spent the rest of the time modifying and tweaking their projects. Others who finished early, however, decided their time was best spent wandering around watching others work. We did our best to "police" them into staying at their own seats, but it was not a huge issue. We collected the planning sheets at the end and had to help a few kids email their projects or save them to flash drives. I'm a little timid at how the show-and-tell will work next week with 25+ students, but I'm excited to see all of the finished games.

**Cynthia** - I made sure to extremely emphasize the fact that today was the last work day in class. This was good because a few of them were shocked and definitely need to take their stuff home

to work on it. Today had more questions in lab because they were starting to tackle more of the difficult issues. I was actually very surprised to see that a lot of kids had changed their ideas from their program in just one week. Some kids had taken it home the first week and were just finishing up in class so when those children were done, they were distracting other kids to come see their game. By the end of class, it was extremely loud and chaotic. Hopefully it won't be like that on demo day!

## **Week 11: Show and Tell / Sendoff**

**Objectives:** Presentation of final projects, hand out Scratch certificates

### **Time Breakdown:**

- **Finishing Touches(10 minutes)**
  - Let the students into the lab to load their final projects
  - They make apply finishing touches as needed
  - Numbers students 1-4 to present
- **Presentations (40 minutes)**
  - Students in group 1 present first, others roam and watch
  - Switch to group 2 after 10 minutes, then 3, then 4
  - Logoff and shutdown when your group is done presenting
- **Award Ceremony (10 minutes)**
  - Move all students into the library
  - Call up individually and present with Scratch Club Certificate of Completion

**Josh** - Whoa, all done with Scratch club. It seems like yesterday that we were in over our heads with 30 yelling children. Our show and tell day went a lot better than expected. What I had anticipated to be organized chaos at best was actually a manageable day. It was easy to tell that everyone was excited to play each other's games, while a few students who didn't want to present decided to keep working on their projects. Most of the games turned out really well, and it also appeared that the students put a lot of effort into making them, so it was cool to see that.

**Elise** - Our show and tell day went really well. The students were clearly proud of their work and were very positive when trying out the work of others. One particular thing that went well was that we had all the students who were done presenting or not going to present turn off their computers. It drew their focus to the kids who were presenting, and they definitely appreciated the attention. I was a little hard to keep the noise level down but it was not as bad as the week before. It was very sad to see the kids head out after the last class, but I think it was a good ending to a good semester.

**Cynthia** - Last day of club! The kids didn't seem too sad to be done but they definitely enjoyed the show and tell. Giving them those last 10 minutes to clean up their code was very useful and I



got a bunch of last minute questions to work on. We then split them into 4 groups of presenters (only the people that wanted to present of course) and let them show off. It was a lot of fun to watch and see their progress! A great thing that we did was turn off all the monitors of all computers that weren't presenting at the time which worked out really well and drew in attention to the programs on display. It wasn't as loud which was great and I had a lot of fun too. A couple kids (Ula in particular) actually LEFT the room because they didn't want to present and didn't want to look at other projects so that was a bit ridiculous. We got them herded in but then Ula somehow managed to draw them back out. Luckily that was at the end of class so we escorted them out to the library and handed out certificates. I got a hug from one kid as a thank you! It was definitely fun experience.

## **Individual Student Analyses**

Twice throughout the club, we were to analyze our group of students on a per-child basis. Since there was such a large number of kids, we did our analyses based on the students that were in our respective groups, as they were the ones we worked with the most.

### **Josh's Students (Beginners Group)**

#### **Week 6 - Crypt Quest Game**

**Scott L** - Scott is a very determined worker, and he gets very excited about finishing his games. He usually has to ask for help, but that doesn't seem to bother him.

**Eli S** - Eli is a little timid, but seems to really enjoy working with Scratch. He is also one of the students who usually asks for help. I'll try to encourage Scott and him to work together.

**Annie H** - Annie is a Korean girl who doesn't speak English very well. I usually try to explain things to her more slowly once the rest of the group moves into the lab. She works with her friend Dai-Rong and usually gets the gist of the lesson each week.

**Maya S** - Maya is a quiet girl who doesn't seem to have a huge interest in Scratch. She usually reads a book for the first part, then spends lab time creating and drawing games. I've tried asking if she wants to try working on the game of the week, but she usually says no. I'll try to see if she want to work with another person to help her understand scratch a little better.

**Eve P** - Eve is usually the first one of my group to arrive, and she always has questions about Scratch when she gets there. She usually gets the game of the week working, and is usually pretty independent about working on them.

**Koki I** - Koki is an interesting kid to work with. His english isn't very strong either,.He usually works with Eli or Scott, and is able to communicate (although after some interpretation) what he is trying to do.

#### **Week 11 - Show and Tell Day**

**Scott L** - Scott made a maze game for his final project. I helped him with some of the trickier things like changing rooms, but he managed to get most of the rest working on his own. He was a hard worker all semester, and it was cool to see his skills grow throughout that time.

**Eli S** - Eli also made a maze game for his final project. Unfortunately he missed the second work day, so he never got to finish. I think he enjoyed making games in Scratch, and also seemed to have a genuine interest in learning about it.

**Annie H** - Annie's final game was actually pretty cool. She made a drawing game where you could pick colors, and the pencil followed your mouse as you drew. It took me by surprise how well it turned out because she usually spent the lab time using the paint part of Scratch to color.

**Eve P** - Eve sort of struggled on getting her final game together during the work days, but she was very proud when she came in today and announced that she had finished. She made an arrow shooting game that changed the bow and arrows as you shot more. Eve made a lot of progress in Scratch throughout the semester, and she always seemed interested in learning more.

**Maya S** - Maya was one of those students who just didn't have an interest in Scratch. She figured out how to do simple things like movement (which was covered only on the first day), but seemed more interested in coloring different outfits on the cat than actually making games, which is fine. I'm glad she gave it a shot and got to see how Scratch works a little, and seemed content most weeks which was reassuring for me.

**Koki I** - Koki's final game was a shooting game. I think the language barrier was tough for him, so I tried to help him out during the work day. I think he missed the first few weeks or he was switched to my group late because I ended up having to help him out throughout his entire project. At the end, he seemed more interested in just playing games than actually making them, but it was still cool to see that he gave the club a try.

### **Elise's Students (Intermediate)**

First evaluation was done in Week 4: Going Loopy, and Second was done in Week 11: Show and tell. Evaluations are grouped by student.

Griffin (5th Grade):

1. Griffin seems to enjoy most of the challenges we have offered so far. He is very good at independent problem solving. He could benefit from additional challenges to make projects more exciting.
2. Griffin's final project was very sophisticated. It was clear that he worked on it outside of class and had a little adult help. However, it was clearly based on the Leprechaun project, which was good to see. He seems very passionate about scratch and I hope he continues exploring!

Matt M. (4th Grade):

1. Matt is very creative and sometimes a little antsy. He is sometimes insecure about asking for help, and can get a little off task. Offering help is much more effective than nagging

him to get on track.

2. Matt left his final project at home, but it was clear that his problem solving skills have improved over time. He is much better at addressing some of the concurrency bugs that come up in Scratch and puts thought into how he develops his games. I hope he continues to try new things.

Steven W. (4th Grade):

1. Steven is very advanced. Despite having a strong understanding of the concepts we go over each week, he stays on topic and makes great games that use the material. He is very good at challenging himself, but could also do well with extra challenges from us.
2. Steven continued to take on advanced tasks. He even got scrolling to work in his game. Like Griffin, he build off the Leprechaun concept. I hope that if he continues, he will join Victor's group because I think his talents and energy would fit in well there.

Zach (4th Grade):

1. Zach has been very engaged in the projects so far. He requires some assistance with which blocks to use when; perhaps he didn't remember as much from last semester as others. Often, Steven W. helps him out. He would probably benefit from a challenge day to review a variety of concepts. It's also important to make sure Steven isn't doing Zach's work for him.
2. Zach did not have a strong final project. He pulled together some of the elements we discussed like asking questions, but it was not as sophisticated as the other students' work. I think he enjoyed the club, but I don't think programming is his main interest.

Yohan (4th Grade):

1. Yohan requires a great deal of personal attention. He is capable of understanding concepts at the level we are teaching, but only with personal assistance. One thing that could improve his experience is to check in early on to make sure he has grasped the main concept of the day so he can be more productive overall.
2. Yohan was able to put together a very basic final project with movement and an enemy. He required lots of prodding, but he was able to write most of the code himself. I hope he'll continue with the club because it is a good problem solving experience for him.

Erik (5th Grade):

1. Erik missed the last lesson so I haven't gotten to know him quite as well as the others. He seems to side-skirt concepts that are difficult and this can lead him to get off track. However, he is open to suggestions and has a very positive attitude. He may benefit from a review or challenge day, since he catches on quickly but doesn't always remember how to do everything.
2. Erik had a very strong final project. He build on the quiz game we did at the beginning of the semester. He added lots of personal touches and fun extras. I think Erik could handle more advanced concepts in the future, like gravity or side-scrolling. Hopefully he will stick with it and branch out a little more from the themes provided.

### **Cynthia's Students (Intermediate)**

First evaluation was done in Week 4: Going Loopy, and Second was done in Week 11: Show and tell. Evaluations are grouped by student.

Ula Zarnowska (4th Grade)

1 She often expects special attention because she is the only girl in the group and doesn't like to participate with the boys. Her coding skills are rather weak and I found her grabbing code from pre-made examples instead of working it out herself. She seems more in the club to hang out with her friend Rosa than actually participate. She's pretty quiet. She likes attention though so if you need her to do something, you just need to sit with her.

2 Ula was very disruptive on the last day of classes. She started a project but didn't want to present nor did she want to see anyone else's project. Also, she was distracting a lot of other kids as well. Her coding skills did seem to improve a little which is great but in all reality, I haven't seen a lot out of her. I don't think she actually likes programming all that much except to show off to Rosa.

Steven Guo (5th Grade)

1 Steven Guo is one of the main leaders of the group. He often is extremely disruptive during demos and is always giggling with friends. He definitely should NOT sit by them during actual lab otherwise not very much gets done. His coding seems okay from what I can see. He gets a lot of help from Ian. He is extremely easy to get off track and dissuaded from working on tough concepts.

2 He has quieted down a lot more recently. This isn't a particularly good thing because he's not as smiley. Other than that, his programming skills are really starting to improve. He's not very good yet and focused on costume making but he's getting there (his final project wasn't fantastic but it's the most complex I've seen him do so that's great). In particular he gets frustrated easily but it seems like he's getting focused about programming. I want him to continue with Scratch because I'm pretty sure he'll get better really quickly if he puts his mind to it. He works well with attention so getting someone to sit with he would be best.

Ray Tan (4th Grade)

1 He definitely knows his code pretty well. The only thing is that he often makes games exactly like the demo game. This isn't necessarily a bad thing but I would love to see more creativity from him. He has a little difficulty with English but not enough to stop him from asking questions. I'm not sure how well he understands the concepts because he often asks for help at the first sign of trouble.

2 I can't get too much of an accurate assessment from Ray because it turns out he is a code stealer (he stole code from the demo and didn't even try to understand it himself). I called him out on it and he looked a little ashamed. His final project was pretty interesting and included

a shop. It was pretty complex so I was happy with it even though it was a little buggy and confusing.

#### Ian Shi (5th Grade)

1 Ian is extremely easy to derail. One minute he'll be hard at work and then the next he'll be across the room laughing about cheese with Steven. But other than that he seems to have a bright mind and understands pretty much all the concepts given to him. He doesn't ask a lot of questions but when he does you can see him apply it very well. He catches on very quickly and goes straight to the code (only uses example sprites and doesn't waste time of backgrounds).

2 His final project was excellent! It incorporated acceleration/deceleration along with enemies. Essentially it was the Fishy demo but the sprites were different. He seemed to have put a lot of time into it and I'm very proud of his progress. He should definitely continue with Scratch. I see a lot of potential with this one.

#### Michael Mello (5th Grade)

1 Michael is grumpy unless he is in lab. He often whines during CS Unplugged activities (but then he gets really into it). The nice thing is that he usually pays attention during demos and works really hard. He seems to have a good understanding of Scratch and doesn't ask too many questions. The most difficult part with him is to get him to not make games that are focused on guns and violence. He definitely has a strong interest in programming though.

2 His final project is excellent. very nice and decently complex. It was a shooter game with aliens (there was blood... I give up haha) but it was very good overall. It shows a lot more creativity than some of the projects I had seen. Michael should definitely continue programming as he shows a lot of good skills and I'd love to see more of his work in the future.

#### Will Barford (4th Grade)

1 He is another one of the often distracted in my group but he seems to really enjoy programming and often asks intelligent questions. He seems to really love Scratch club along with programming with friends. I think his programming skills are pretty good and he answers questions during demos which shows understanding.

2 Will is extremely over confident in his skills as a Scratch programming but he isn't too bad. His final project was rather simple for his skill set (a shooting game). But he did use variables and etc that we taught this year so I'm really happy with his progress. He is a little shaky on a few concepts but overall, he's very good with Scratch. He should definitely continue with it. He often rises to the challenge so it would be good to give him more projects to work on. Will works well near others so putting him in a group setting would be great.

#### Daniel (Unknown)

2 He joined late in the semester so I didn't really get a chance to know him very well.

The final project was combined with Matt's and I know for a fact that Matt did most of the coding because Daniel has not done much Scratch. He seems to have a decent interest in Scratch so it would be great for him to continue.

## **End of Semester Analysis**

### **Elise:**

Wow, this semester flew by. I learned a lot from this experience about working with kids and organizing lessons. Most of the students I worked with were very bright, but they needed different types of help and encouragement. For example, Matt needed direct hints with scratch blocks, but Steven just needed feature suggestions to stay on track. I also learned that it pays to practice teaching the lesson out loud, even if it's not your first one and you are familiar with the code. The skills I learned here will help me if I continue to do outreach with children and will help in giving presentations also.

I also enjoyed working at Shorewood. The students had a lot of personality, but they were eager to learn and had good attitudes. I think each student's experience would have been improved if the class size was a little smaller. It was hard for us to keep control of the class during demos and almost impossible to give all of the students the individual help they needed. I don't think adding more volunteers would solve the problem, even though Victor and Chris were invaluable. A smaller class size would fit the facility better and would create a more low-key atmosphere. Overall, I think Shorewood is a great site to work with, and I hope that smaller class sizes will improve the experience for the students who join the club.

Lastly, Andrea, Chris, and Victor deserve a huge thank you for their assistance. Cynthia and Josh and I could not have done it without their insight and hands-on help when needed. I am very glad I participated in this Scratch club and got to work with such great people!

### **Josh:**

It's a really cool experience to teach kids something abstract like programming and have them do well. Even though I worked with students who were brand new to Scratch, their improvement and progress was exciting to watch throughout the semester. Working with elementary children was a new challenge for me; one that I wasn't absolutely sure how it would turn out. We learned pretty quick that we needed to take control of the group, seeing as 28 4th-5th graders can be a lot to handle. After the first couple of weeks, it felt like a balance had been established for what the leaders and students expected from each other. It was also challenging figuring out how to help them with their code without implicitly doing it for them. Throughout the semester I tried to modify how I explained things, trying to use less abstract visualizations. The students seemed to

understand things a little better that way.

In terms of the club itself, managing 28 children is always going to be a difficult task. It was invaluable having Victor and Chris there to take on groups of their own. Unfortunately, with a group that size, there isn't enough of us to help each child all the time. On multiple occasions I would have 2 or 3 kids asking me for help, which is especially difficult when I'm trying to simplify and explain something to the first child. The logical direction to move towards in the future is probably to decrease the amount of students allowed in the club. First, to give students more personalized help, and second, to give kids who have never tried Scratch a chance to get in the club rather than having repeat participants.

It was a lot of fun working with Elise, Cynthia, Chris, and Victor teaching club this semester. It's definitely a unique experience that takes time and effort on everyone's part. I'm glad we all meshed so well.

### **Cynthia:**

Working with kids this semester was super exciting. I have always loved teaching so this was a great experience not only in dealing with children and being able to hold their attention for periods of time but also working on creating demos, documenting what we do, and learning more about different types of computer programming.

Having 6 kids (that went up to 7 later in the semester) to teach was really exciting because they all have extremely different personalities and needs. It was great finding ways to keep them focused and pay attention to the demonstrations that we held. Also I really enjoyed learning to give simple presentations and learn a new language. Overall, the children quantity was too much. That amount of kids definitely needs to be split up in some sort of way. Whether it be to just limit the amount in the club or create 2 different levels of clubs it would solve the problem. Victor and Chris were amazing because they helped not only with demonstrations and leading group but also answering tough questions and just maintaining order in general. I would definitely suggest having less kids in a space and also more volunteers. If you have to choose one, lessen the kids. More attention for students is always a good thing.

It can get amazing hectic if there is a difficult concept. Even when we were all there, sometimes there would still be too many kids with questions. And when you're helping children you have to phrase your help in a sort of way that doesn't immediately point out the answer. I'm really looking forward to using what I've learned to teach more kids and others in the future!

It was great working with Elise, Josh, Chris, and Victor! I'm a freshman so it was exciting to see people in all different sections of the CS track. Also, the work was split a lot more evenly and it

was fun to experience it was many people. We worked really well together! Special thanks to Chris for leading some of the kids and Victor for having so much knowledge and fielding the more difficult questions.