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# 12 months of CODING!

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# 12 months of CODING!

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## A Special Thanks

YSS would like to thank everyone who took time out of their busy schedules to share their coding programs. "12 Months of Coding!" is a resource for library staff serving youth by library staff serving youth. YSS is able to provide resources like this because of your willingness to share your ideas and experiences. The YSS community is incredible, and together we are able to do amazing things.



# 12 months of CODING!

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## Coding with Checkers by YSS Member Emily Zorea

School Librarian and Media Specialist

Contact Emily at: [emily.zorea@ithaca.k12.wi.us](mailto:emily.zorea@ithaca.k12.wi.us) | (608)585-2311

**No Tech**

Low Tech

High Tech

Time/Day of Program	Age of Participants	Estimated Budget
Friday at 9:00am as part of a school outreach program, Monday at 4:00pm as an afterschool program	8 Years Old	FREE!

### Materials/Equipment Needed :

Multiple checkerboards and random supplies from any library craft closet.

### Description of Program:

I followed the "Tabletop Coding" lesson plan from WisCodeLiterati. The purpose of the program is to allow youth to experiment with computational logic and the idea that lines of code are simply sets of instructions. I showed the students a checkerboard and gave myself two checker pieces (one red and one black). I randomly placed my red and black checker piece on the board and told the students the object of their program was to write instructions to make the red checker piece land on top of the black piece, moving the red checker piece only.

I had made a deck of "x" and "y" cards with instructions such as "x+2" which would allow my red checker piece to move horizontally to the right by two squares, or "y-1" which would allow my red checker piece to move down one square. I showed the students the cards that I made, and how the "X" cards allowed their red checker piece to move horizontally, and the "Y" cards allowed their piece to move vertically. I played through my shuffled deck of cards, and showed the youth how without order, my red checker piece may never reach the black checker piece, or, it may do so in a very complicated route. I then had the kids tell me how I should order my deck so that I would use the least number of cards possible.

After playing through several of their deck suggestions, I then gave groups of 2-3 students their checkerboard, two checker pieces, their deck of "X" and "Y" direction cards, and told them to have fun! To make the game even harder, I then placed a basket filled with odds and ends from my craft room on the floor. I told them that they could place these objects on their board to close off certain squares. They would have to write their program to go around these objects. Students came up with very creative boards. I was able to record two students going through their program here: [https://www.youtube.com/watch?time\\_continue=2&v=ArKOuANWJrg](https://www.youtube.com/watch?time_continue=2&v=ArKOuANWJrg)

### Things you might change or practical tips:

Plan on 30-40 minutes for this program.



# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Coding with Checkers by YSS Member Emily Zorea

School Librarian and Media Specialist

Contact Emily at: [emily.zorea@ithaca.k12.wi.us](mailto:emily.zorea@ithaca.k12.wi.us) | (608)585-2311

**No Tech**

Low Tech

High Tech

### Time/Day of Program

Friday at 9:00am as part of a school outreach program, Monday at 4:00pm as an afterschool program

### Age of Participants

8 Years Old

### Estimated Budget

FREE!

### Things you liked most about the program:

"Computational thinking is all about logic, and logic is something anyone can experiment and learn, even without a computer. I liked having this no-tech coding activity, and it was a great coding introduction for my future Code.org and Scratch coding programs with these same students."





# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Coding IRL (In Real Life) by Valerie Morris

Whitefish Bay Public Library | [www.wfblibrary.org](http://www.wfblibrary.org) | Milwaukee County Federated Library System

Contact Valerie at: [v.morris@wfblibrary.org](mailto:v.morris@wfblibrary.org) | 414-755-6555

No Tech

Low Tech

High Tech

### Time/Day of Program

Wednesday, 4-5pm

### Age of Participants

9 Year Olds (3rd-5th grade)

### Estimated Budget

\$16.50 approximately

### Materials/Equipment Needed :

Plastic lacing cord, pony beads (3 different colors), paper for printables, 3 different colored markers

### Description of Program:

The coding concepts I teach in Coding IRL are binary numbers, if/then conditional statements, sequencing a set of instructions, problem solving and logic. I start the program by showing the kids (10 kids) some short YouTube videos called DK Coding for Kids 1, 2, and 3 that explain what computer programming is.

The first activity (about 5 minutes) is to play a "live action" code game (similar to simon says) where I give conditional instructions to the kids. For example, I use statements like "if I jump, then you jump", "if I raise my right hand, then you jump", "if I spin around, then you raise your right hand, else you stomp your feet", or "if I roll my hands, then you take 2 steps forward, else you stomp your feet". The kids find this fun as a warm up.

For the second activity, I use the Coding a Lego Maze activity at [researchparent.com/coding-a-lego-maze/](http://researchparent.com/coding-a-lego-maze/) (I do not use Legos to build the maze just a paper maze, but I use a Lego figure to move through the maze itself). This site has easy to follow lesson plans, photos, and printables for you to use like the 4 different mazes and instruction pieces ("if, then" statements, "move forward", etc), as well as different learning levels of complication that you can use with the kids. I only use the first 2-3 levels depending on their understanding and time. Essentially, the kids, working in pairs, are putting instruction pieces in the order they need (coding) to move the figure through their maze.

The third activity I do is learning about binary numbers. In order to understand binary numbers myself, I used the information on Computer Science in a Box: Unplug Your Curriculum provided by the National Center for Women and Information Technology, [www.ncwit.org/sites/default/files/resources/computerscience-in-a-box.pdf](http://www.ncwit.org/sites/default/files/resources/computerscience-in-a-box.pdf) (starting on page 7 of the PDF document). I also referenced this website [www.kidscodex.com/a-binary-numbers-tutorial-with-1-and-0/](http://www.kidscodex.com/a-binary-numbers-tutorial-with-1-and-0/) for more understanding with a kids point of view. For this activity, I created eight 8.5" x 11" flashcards with dots (1 dot, 2 dots, 4 dots, 8 dots, 16 dots, 32 dots, 64 dots, and 128 dots) to demonstrate how to make the binary numbers. I also give each child mini versions of the flashcards (available to print from the PDF mentioned above) to work with for the binary bracelet or keychain activity.



# 12 months of CODING!

Month 2 cont.

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Coding IRL (In Real Life) by Valerie Morris

Whitefish Bay Public Library | [www.wfblibrary.org](http://www.wfblibrary.org) | Milwaukee County Federated Library System

Contact Valerie at: [v.morris@wfblibrary.org](mailto:v.morris@wfblibrary.org) | 414-755-6555

**No Tech**

Low Tech

High Tech

### Time/Day of Program

Wednesday, 4-5pm

### Age of Participants

9 Year Olds (3rd-5th grade)

### Estimated Budget

\$16.50 approximately

The binary bracelet is the next activity. The kids use a worksheet that I created and five of the mini flashcards to determine the binary numbers for their birthday. On the worksheet the kids color in the boxes blue for 0, red for 1, and black for a spacer between numbers. They are then able to thread the red, blue, and black beads on the plastic lacing cord to represent their birthday in binary numbers.

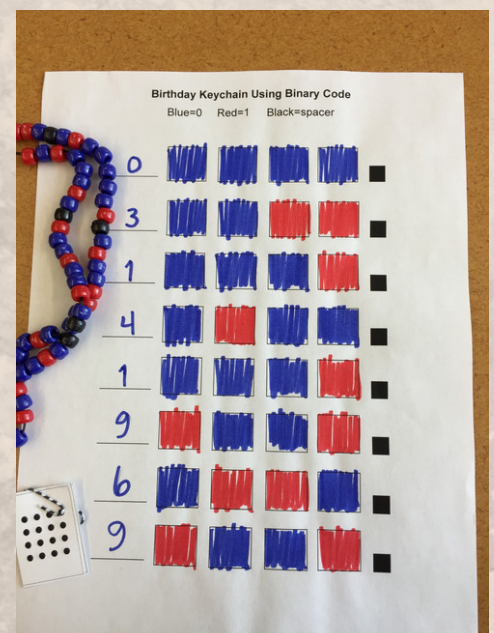
Lastly, if time permits, I give the kids a message in binary to solve. I provide them with the ASCII Alphabet to decode the message. The end

### Things you might change or practical tips:

Even though this is a no tech program, you still need to have a good grasp of the concepts like how computers work and process information, logic, and the binary numbers. The resources I used were very helpful so find out as much as you can about the computers to be prepared for those inevitable questions from the kids. However, if you don't know, it's ok to say you don't.

### Things you liked most about the program:

"I like the no tech aspect of this program. I enjoyed seeing the "lightbulb" above the kids heads when they understood the binary numbers."





# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Code a LEGO Maze by YSS Member Caitlin Schaffer

Oconomowoc Public Library | [www.oconomowoclibrary.org](http://www.oconomowoclibrary.org) | Bridges Library System

Contact Caitlin at: [cschaffer@cooney.lib.wi.us](mailto:cschaffer@cooney.lib.wi.us) | (262) 569-2193

### Time/Day of Program

Wednesdays, 4-5 pm

### Age of Participants

5-12

### Estimated Budget

\$0 (if your library already owns LEGOs)

**No Tech**

Low Tech

High Tech

### Materials/Equipment Needed :

LEGO bricks, minifigures, and base plates; cardstock cut into squares; paper cutter; writing materials

### Description of Program:

Low to no cost coding and LEGO fun! What's not to like?

1. Briefly explain the concept of coding languages to participants. At it's most basic, programming a computer is telling it what to do by giving it specific sets of instructions. Relate this back to finding your way through a maze. In order to get from the start to the end, you need to take one exact route that is mapped out for you.
2. Explain the instructions:
  - Using LEGO bricks, build a maze that covers one standard-sized base plate
  - After building, create your instructional cards to find the exact path for a minifigure to make it through the maze. \*Remind them that the minifigure can only do what you instruct them to do with the cards, one step at a time.
  - When everyone has built and coded the path through their mazes, challenge them to switch with friends and other participants to try to code their way through their mazes.
3. Want to level up or provide some options for more advanced coders? Use the free printables and/or instructions from this website to provide some more challenging code: <https://researchparent.com/coding-a-lego-maze/>

### Things you might change or practical tips:

The make-your-own-instruction-cards was the most popular choice, especially with the younger kids. Some of them use A LOT of instructions for their elaborate mazes! Make sure you have plenty of cardstock pre-cut out, and make sure you have some on hand in case you need more.

If you know you will have a big turn out, reach out to local high school or middle school students involved in robotics clubs or groups. They are a big help!

### Things you liked most about the program:

Every participant, no matter how advanced or new they are to coding, is 100% engaged at this program.



# 12 months of CODING!

Month 3 Cont

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Code a LEGO Maze by YSS Member Caitlin Schaffer

Oconomowoc Public Library | [www.oconomowoclibrary.org](http://www.oconomowoclibrary.org) | Bridges Library System

Contact Caitlin at: [cschaffer@cooney.lib.wi.us](mailto:cschaffer@cooney.lib.wi.us) | (262) 569-2193

### Time/Day of Program

Wednesdays, 4-5 pm

### Age of Participants

5-12

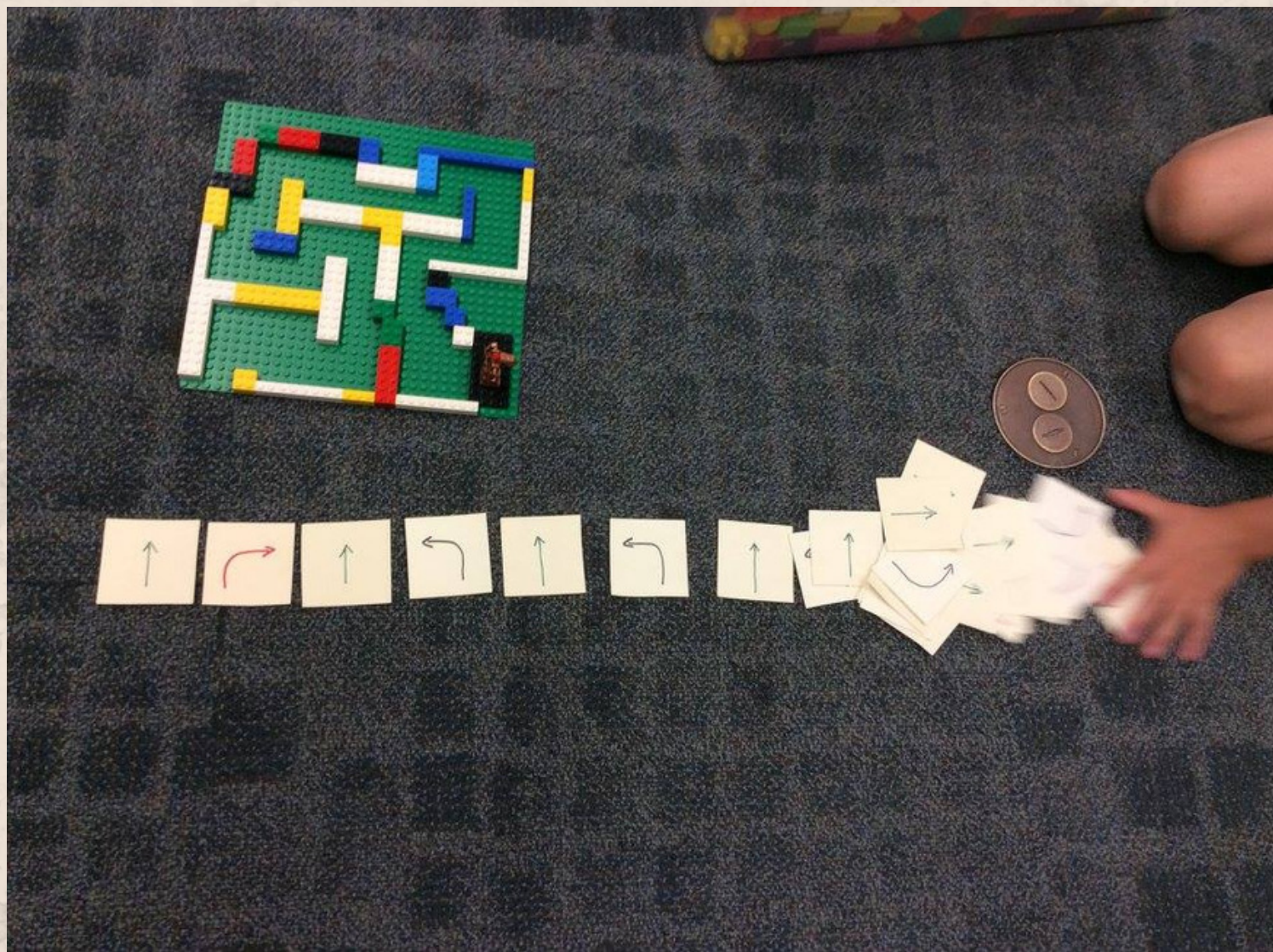
### Estimated Budget

\$0 (if your library already owns LEGOs)

No Tech

Low Tech

High Tech





# 12 months of CODING!

Month 4

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Robot Training by YSS Member Susie Menk

Manitowoc Public Library | [www.manitowoclibrary.org](http://www.manitowoclibrary.org) | Manitowoc-Calumet Library System

Contact Susie at: [smenk@manitowoc.org](mailto:smenk@manitowoc.org) | 920-686-3030

Time/Day of Program	Age of Participants	Estimated Budget
Afterschool on a Monday, can also be done during the summer or on an early release day!	8 Years Olds	FREE
<div>No Tech</div>	Low Tech	High Tech

### Materials/Equipment Needed :

Masking tape or colored tape of your choice, open room with lots of space, stuffed animal and piece of fruit, paper with directional arrows on them (need multiple copies of each direction (Up, Down, Left and Right))

### Description of Program:

Take the masking tape and create a large grid. Place the stuffed animal in one square of the grid and the piece of fruit in another square. Have the children use arrows to determine how to get the animal to the piece of fruit. Remind students that the animal is like a robot and only goes where they tell it to. They will need to have specific step-by- step instructions. If time allows, have a child stand in a square as the robot and put the animal or fruit in another square. Have the other children give verbal directions to get the robot child to the animal/fruit. This can be done multiple times and changed every time to make sure the students master the concept of programming. Meets Computer Science Standard for Algorithms and Programming.

### Things you might change or practical tips:

It's simple and easy to put together and is a visual reminder of what computer programming is doing, teaching step by step instructions.

### Things you liked most about the program:

Be sure to allow enough room for items or students to move about on the grid. If space allows, this can be easily expanded to multiple grids and have students work in small groups.



# 12 months of CODING!

## Create Video Games in Scratch! by YSS Member Emily Zorea

School Librarian and Media Specialist

Contact Emily at: [emily.zorea@ithaca.k12.wi.us](mailto:emily.zorea@ithaca.k12.wi.us) | (608)585-2311

### Time/Day of Program

Wednesdays at 3:45pm

### Age of Participants

8 Years Old

### Estimated Budget

FREE!

No Tech

**Low Tech**

High Tech

### Materials/Equipment Needed :

6 laptops with internet access

### Description of Program:

This program lasted four weeks and was held after school every Wednesday at 3:45pm. I had six laptops available from our system and made sure the laptops were booted up, connected to the internet, and on the Scratch.mit.edu webpage before the students came in. Each week we used a different Level 1 lesson plans from the book, "20 Games to Create with Scratch" (Hungry Cat, Treasure Island, Amazing Maze, and Drive Me Craze). We began each program together by sitting in a circle. The kids would be from diverse age groups, some as young as 6 and others as old as 10. We would talk about our favorite video games, or computer games, and why we liked each game. I would ask the kids if there were things about their favorite game that they wished they could change, and then told them that they would be creating their own video game today, and they could make decisions about how they wanted their game to work.

Beginning with the end in mind, I would already have built the game on my personal laptop. I would show my game to the students and how to play it, and then we would also look over the lines of code I used to make my game run. I would tell the students that this is the game we would be working on for that week.

I then passed out laptops, asking kids to pair up with a partner and share a laptop. This allowed me to stretch 6 laptops out to 12 kids. I copied out the lesson plan from the book and gave that out to each child. I asked the kids to read the first instruction together as a group, and then to get started. After beginning, kids had questions, but I would first ask them to read the instructions before I gave help. Kids liked solving the problems on their own. When they did need help, parents very naturally sat down at the tables and helped their kids read through the instructions, making for some very positive work time.

Our programs lasted about 45 minutes. Every child was able to create their game, and students played each other's games since they all were a little bit different. Even though the lessons were challenging, finally creating the games was so rewarding that the kids did not want to leave once the program time ended. Even though our program only lasted 45 minutes, every week I had kids staying later to keep tinkering with their code to see what would happen. Parents also took a great interest in coding, and I would talk with them every week about the Scratch.mit.edu website, and how to set up accounts for their child at home so that their projects could be saved. The kids also asked if they could keep the lesson plans so they could create their game again at home.



# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Create Video Games in Scratch! by YSS Member Emily Zorea

School Librarian and Media Specialist

Contact Emily at: [emily.zorea@ithaca.k12.wi.us](mailto:emily.zorea@ithaca.k12.wi.us) | (608)585-2311

No Tech

**Low Tech**

High Tech

### Time/Day of Program

Wednesdays at 3:45pm

### Age of Participants

8 Years Old

### Estimated Budget

FREE!

### Things you might change or practical tips:

Invite kids to work in pairs of two. This allows kids to collaborate together, share ideas, and troubleshoot together, so the leader of the program is not so stretched to go and help everyone.

### Things you liked most about the program:

Each lesson was independent, so students could miss a program and join in the next week without having missed any information that would make the following lesson difficult. Parents naturally joined in and helped their children, creating a great working time together. The students who came to these programs had no coding experience. The lessons were challenging, but every student was able to create their game within 30-45 minutes. And, the look of genuine excitement on each child's face when they ran their game and saw it working was contagious. Every week parents asked for more information on Scratch, and kids asked to take their lesson plans home with them to build again.





# 12 months of CODING!

Month 6

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Fisher Price Think and Learn Code-a-Pillar by YSS Member Terry Ehle

Brewer Public Library | [www.lesterlibrary.org](http://www.lesterlibrary.org) | Manitowoc-Calumet Library System

Contact Terry at: [tehle@lesterlibrary.org](mailto:tehle@lesterlibrary.org) | 920-793-7118

No Tech

**Low Tech**

High Tech

### Time/Day of Program

Anytime

### Age of Participants

5-12 Year Olds

### Estimated Budget

\$50-\$100!

### Materials/Equipment Needed :

Fisher Price Think and Learn Code-a-Pillar

### Description of Program:

Participants connect code segments to make Code-a-Pillar move—go forward, turn left, turn right, etc. The segments are easy to connect; kids as young as 5 are able to operate Code-a-Pillar but even middle schoolers have enjoyed playing with it. The basic kit comes with 9 segments; expansion packs of 3 silly sounds, or 3 movement segments: 45° turn, 180° turn, and repeat previous segment are also available for an additional cost. Does not move great on thick carpet and a table is not

**Basic:** Place the green "GO" disc on the floor and the red "STAR" disc at a distance. Place the Code-a-Pillar on "GO" and connect segments that make Code-a-Pillar drive to the "STAR".

### Challenges:

- **Random vs. Planned:** Print out segment cards on cardstock and cut apart.
- **Random:** Place segment cards face down. Have participants take turns picking a card and adding the corresponding segment. After each segment is added to the Code-a-Pillar press the button and watch it go. Will the Code-a-Pillar make it to the red "STAR"? Why or why not?
- **Planned:** Place the segment cards on the table face up. Allow participants to choose which segment card to use. After each segment is added to the Code-a-Pillar press the button and watch it go. Will the Code-a-Pillar make it to the red "STAR"? Why or why not?
- **Obstacle Course:** Create an obstacle course for the Code-a-Pillar using cones, stones, blocks or masking tape lines. Connect segments to navigate the Code-a-Pillar through the course. Challenge participants to use the least amount of segments possible.

### Things you might change or practical tips:

If you can, buy the expansion packs as you can add more complicated coding like repeats and turning by degrees. This would add another \$50 to the budget.



# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Fisher Price Think and Learn Code-a-Pillar by YSS Member Terry Ehle

Brewer Public Library | [www.lesterlibrary.org](http://www.lesterlibrary.org) | Manitowoc-Calumet Library System

Contact Terry at: [tehle@lesterlibrary.org](mailto:tehle@lesterlibrary.org) | 920-793-7118

No Tech

**Low Tech**

High Tech

**Time/Day of Program**

Anytime

**Age of Participants**

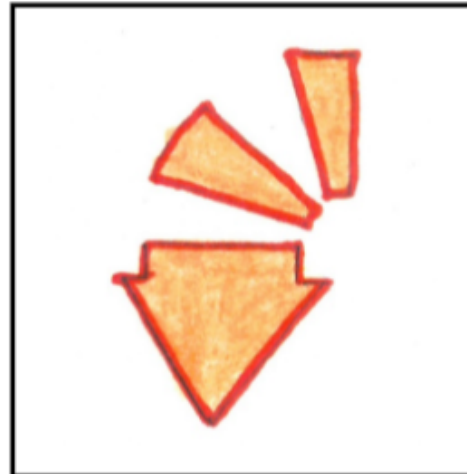
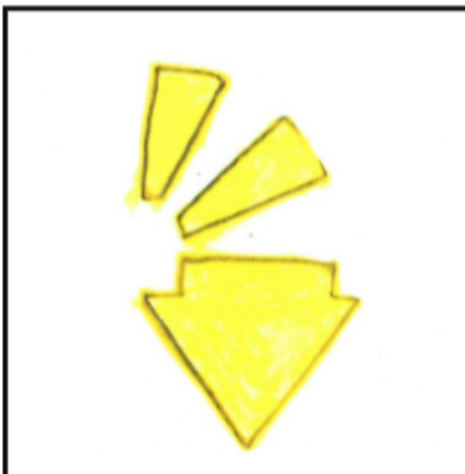
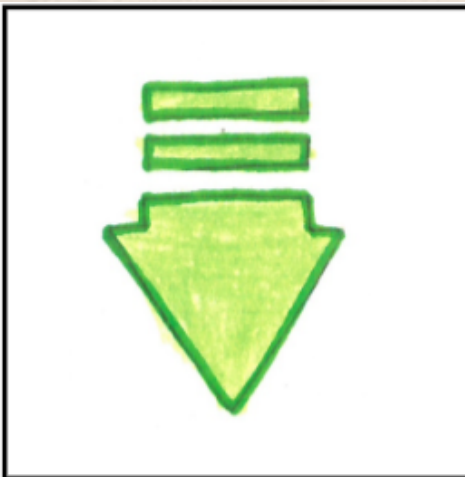
5-12 Year Olds

**Estimated Budget**

\$50-\$100!

### Things you liked most about the program:

The reason I like this program is because it can be adapted easily. You can use the code-a-pillar right out of the box with young children but you can create challenges for older students as well. Even teens enjoy the code-a-pillar as an added activity to hour of code programs.





# 12 months of CODING!

Month 7

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Dance Your Way To Coding by YSS Member Susie Menk

Manitowoc Public Library | [www.manitowoclibrary.org](http://www.manitowoclibrary.org) | Manitowoc-Calumet Library System

Contact Susie at: [smenk@manitowoc.org](mailto:smenk@manitowoc.org) | 920-686-3030

No Tech

Low Tech

High Tech

### Time/Day of Program

Monday @ 4:00 pm

### Age of Participants

8 Years Olds

### Estimated Budget

FREE

### Materials/Equipment Needed :

Easel with paper, markers, open space, iPads, words for song "A Ram Sam Sam", copies of the Unplugged program sheet called "The Iteration Dance"

### Description of Program:

Vocabulary word of the day: Loops

Discuss how we use loops in everyday life.

Have the children walk in a square and discuss which actions are repeated.

Show them the words to the song "A Ram Sam Sam". Ask them which words or groups of words repeat.

Using colored markers, mark up the text of the song by crossing out repeated words or groups of words and using "3x" or "2x" or some way to note the number of repetitions. This song works really well because the children focus on the repetitions instead of the words since the words are nonsense words.

Put up a copy of "The Iteration Dance" and talk the kids through it, have them actually do the dance.

Discuss how sometimes only one action is repeated and sometimes more than one action is repeated so they need to be specific about what actions are repeating or looping. Then hand out copies of "The Iteration Dance" and have children mark the repeats or loops. End by having them stand up and try their marked copies to see if they are all the same or different. I usually end a coding workshop by allowing the children time on Code.org.

### Things you might change or practical tips:

This is a totally active program. Make sure you have room for the kids to stand up and move around. You could also have them make up their own dance with looped or repeated actions.

### Things you liked most about the program:

I have worked often with loops and it seemed like the kids weren't really getting it. This activity was the best one I found for getting the concept of loops across.



# 12 months of CODING!

Month 8

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Coding Unplugged: If/Then Conditionals by YSS Member Lisa Pike

Manitowoc Public Library | [www.manitowoclibrary.org](http://www.manitowoclibrary.org) | Manitowoc-Calumet Library System

Contact Susie at: [lpik@manitowoc.org](mailto:lpik@manitowoc.org) | 920-686-3030

No Tech

**Low Tech**

High Tech

### Time/Day of Program

4:15-5:15pm/Wednesday

### Age of Participants

8-11 Year Olds

### Estimated Budget

\$5-\$10

### Materials/Equipment Needed :

iPad/laptop for videos, paper or index cards, laminate( if desired)

### Description of Program:

I started out the program with an explanation of If/Then Conditionals using a simple example such as "If it's raining outside, then you'll wear your raincoat." "If it's sunny, then you'll leave it at home." Using an example like this allows for them to start making connections and to realize that they really do make these types of decisions in their everyday lives.

Once, the general definition of the concept was understood, I shared a video from Code.org, starring Bill Gates, which shared similar information but in a different and more detailed way. Once that short two minute video was finished, I asked the kids if they had any questions regarding the information. Once any questions were resolved, I showed another short one minute video from Code.org in which the same function is discussed but using the Minecraft World which totally held their attention!

After some brief discussion of the videos, I had the kids line up in the room for a game similar to red light, green light, except using the if/then conditional coding function. Instead of just saying red light or green light, the teacher has a deck of cards which have different conditionals on them such as, "If your name has five letters in it, then move two steps forward." These cards can also be used as part of a sit and pass game like Hot Potato where depending on the condition a computer mouse gets passed around the circle. The cards have been attached to this document and look blank but do have text once downloaded.

I found that the kids had a lot of fun playing this game and that they definitely understood the concept afterwards, if not before the game. And it was great just to get them up and moving and detached from the computers! By the time this game was done the kids had about 15-20 minutes to work on their Code.org tutorials if they wished.

### Things you might change or practical tips:

One practical tip in playing the red light, green light conditional game, make sure you have a big open space with no obstacles that can be tripped over.

### Things you liked most about the program:

I have worked often with loops and it seemed like the kids weren't really getting it. This activity was the best one I found for getting. The thing I liked best about this program was that it got the kids to think spatially, as well as, in "if" and "then" statements, which is important once they get into directional commands that often mirror their own movements. the concept of loops across.



# 12 months of CODING!

Month 9

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Bots for Tots by YSS Member Abby Bussen

Muskego Public Library | <https://www.cityofmuskego.org/166/Library> | Bridges Library System

Contact Abby at: [abussen@cityofmuskego.org](mailto:abussen@cityofmuskego.org) | 262-971-2106

No Tech

**Low Tech**

High Tech

### Time/Day of Program

First Friday of the month at 10

### Age of Participants

3-5 Year Olds

### Estimated Budget

250.00-1500.000

### Materials/Equipment Needed :

Coding books, wooden pattern blocks and toys, Code-a-pillar, Cubetto, Code & Go Robot Mouse, tablets, Botley Coding Robot, Bee-Bot, Dot & Dash

### Description of Program:

A 20-minute storytime that uses books to explore coding concepts like algorithms, sequences, and circuits. The mix of low-tech and no-tech play allows the young participants to have hands on coding experience and prepares them for analytical thinking. We also introduce a new app at each meeting that caregivers are encouraged to download onto their own device. When possible, we try to suggest apps that are entirely or partially free.

### Things you might change or practical tips:

If you do this on more than a monthly basis, it can be hard to keep finding new apps, so it's easier to focus on working with a small set of apps for longer periods of time. Also, it's a program that, if you plan to keep it going for a while, you can add to over time, so of course you'll want to start with a couple Code-a-pillars and a few patterning toys, but you can add new tech slowly over time. Also, don't reinvent the wheel -- if you're interested in starting this program but are worried about where to start, email me! I can send you my planning documents, sample schedule, and book list.

### Things you liked most about the program:

What I loved about this program is that it allowed us to show the caregivers that coding and robotics encourage the kind of analytical thinking and problem solving that allows kids to find their own solutions, work their way through difficulties, and collaborate to achieve their desired results. We tell caregivers all the time that we didn't go to school for computer science, but we have built our skills through practice and perseverance. Our goal for the program was to make coding exciting for kids and un-intimidating for adults. I think we achieved our goal with many of the families who attended.



# 12 months of CODING!

Month 9 cont.

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Contact Abby at: [abussen@cityofmuskego.org](mailto:abussen@cityofmuskego.org) | 262-971-2106

No Tech

**Low Tech**

High Tech

### Time/Day of Program

First Friday of the month at 10

### Age of Participants

3-5 Year Olds

### Estimated Budget

250.00-1500.000



**Bots for Tots**  
Fridays  
February 1, March 1,  
& April 5  
from 10:00-10:30

Discover new apps & no-/low-tech coding play that boosts brain power & gets even tiny tots ready for analytical thinking!

The library has 15 tablets available for your use during this program. If you have your own tablet, you are welcome to bring it along & download the free apps that will be highlighted at each meeting.

No registration is required for this FREE program.  
Tablets will be available on a first-come, first-served basis.

MUSKEGO PUBLIC LIBRARY  
S73W16663 Janesville Rd.  
Muskego WI 53150  
[www.cityofmuskego.org/library](http://www.cityofmuskego.org/library)

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# 12 months of CODING!

Month 10

Sponsored by the Youth Services Section of the Wisconsin Library Association

## LEGO Robotics by YSS Member Cat Mullen

Milwaukee Public Library Central | <http://www.mpl.org/> | Milwaukee Public Library System

Contact Cat at: [cimulle@milwaukee.gov](mailto:cimulle@milwaukee.gov) | 9526938569

No Tech

Low Tech

High Tech

### Time/Day of Program

Anytime

### Age of Participants

10-18 Year Olds

### Estimated Budget

\$350 per set.

### Materials/Equipment Needed :

LEGO Mindstorms EV3 set/s (https://shop.lego.com/en-US/LEGO-MINDSTORMS-EV3-31313?p=31313&track=checkprice);

laptops with ability to download free LEGO Mindstorms software.

### Description of Program:

Participants who attended the program were able to build a robot (called EV3) out of LEGO Mindstorm bricks and use the LEGO Mindstorms coding software to program their own robots to do tasks that ranged from the easy--move backwards and forwards, make noises--to more difficult tasks--lift their robotic arms up and down, have the light on the robot change color.

### Things you might change or practical tips:

**Practical tip 1:** If you don't have much time, build the most basic robot model ahead of time, especially if you are expecting a younger crowd or you yourself are not a LEGO expert.

**Practical tip 2:** This software allows users to either program/code their robot on the robot itself or by using a laptop. My suggestion: use the laptop! It is much easier to code on the laptop than it is to try to set up a series of commands on the robot itself.

**Changes 1:** If I could do this program again, I would make it longer and allow the participants time to build their own robots, or let them follow the schematics and have them follow the directions and build the robots on their own.

**Changes 2:** I also would suggest gearing this program towards tweens or teens - the Mindstorms program does require more complex coding and tech skills.

### Things you liked most about the program:

1. really enjoyed the quality of the robots once they were built - they looked very impressive, and had many parts so that participants could customize their own robot.

2. The LEGO Mindstorms software itself is free (downloadable from their website) and works on even the older laptops that my library has.



# 12 months of CODING!

Month 10 cont.

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## LEGO Robotics by YSS Member Cat Mullen

Milwaukee Public Library Central | <http://www.mpl.org/> | Milwaukee Public Library System

Contact Cat at: [cimulle@milwaukee.gov](mailto:cimulle@milwaukee.gov) | 9526938569

No Tech

Low Tech

High Tech

### Time/Day of Program

Anytime

### Age of Participants

10-18 Year Olds

### Estimated Budget

\$350 per set.

3. The Mindstorms software can be accessible to a variety of ages and skill levels (as long as at least one person running the program knows what they're doing). I had two participants who were young and had never coded before in their life, but, with assistance, were able to understand the basics of coding and could program their own robots to do simple tasks.

4: The Mindstorms software is very useful in teaching participants trial and error - the coding is fairly straightforward, but also has some subtle quirks that could make a block of code unsuccessful, allowing participants the chance to really examine their code and see what went wrong.



# 12 months of CODING!

Month II

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Code Quest by YSS Member Mary Ostrander

Verona Public Library | veronapubliclibrary.org | South Central Library System

Contact Mary at: mostrander@ci.verona.wi.us | 608-845-7180

No Tech

Low Tech

High Tech

### Time/Day of Program

Mondays, 3:45-5 (8 sessions)

### Age of Participants

10 Year Olds

### Estimated Budget

FREE

### Materials/Equipment Needed :

Computers (laptops or desktops)laptops with ability to download free LEGO Mindstorms software.

### Description of Program:

Tell a story using Scratch and CS First. This group meets once a week for 8 weeks. When you sign up for the first session, you will be registered for all eight weeks. For kids in 4th and 5th grade. No experience necessary. All equipment provided.

"Scratch is a free programming language and online community where you can create your own interactive stories, games, and animations." CS First is a Google computer coding course for kids.

### Things you might change or practical tips:

It is intended for the students to go at their own pace and watch the videos on their own. I found that after a long day at school, the kids focus was everywhere. We watch the videos together, for the most part, and the kids are having a much easier time staying on track.

### Things you liked most about the program:

CS First is really easy to use. I take about an hour each week to prepare for each session and set up only takes about a half hour. Kids get to tell all kinds of stories and CS First encourages kids to share their stories



# 12 months of CODING!

Sponsored by the Youth Services Section of the Wisconsin Library Association

## Hour of Code - Star Wars by YSS Member Valerie Morris

Whitefish Bay Public Library | [www.wfblibrary.org](http://www.wfblibrary.org) | Milwaukee County Federated Library System

Contact Valerie at: [v.morris@wfblibrary.org](mailto:v.morris@wfblibrary.org) | 414-755-6555

No Tech

Low Tech

**High Tech**

### Time/Day of Program

Tuesday, 4pm-5pm

### Age of Participants

9 Year Olds

### Estimated Budget

FREE

### Materials/Equipment Needed :

laptops, Ipads, chrome books, paper, pencils, power strips, tables, chairs

### Description of Program:

At the beginning of the program I do a "no tech" coding activity to get the kids warmed up. For example, using paper and pencil, I give the kids very basic instructions to draw a character (draw a circle for a body, add two eyes, add wings, add four legs). When the kids are finished drawing, they see that all of their drawings are different. From this they learn that when they code they have to give the computer very specific instructions.

For my Hour of Code - Stars Wars program I selected the resources on the website [code.org](http://code.org). By creating an account on the site, I have access to the online courses for kids ranging from multi-day or hour long lesson plans. The kids (10 kids) use the self-guided tutorials to learn various coding concepts. Using BB-8, the kids learn about algorithms, events, and debugging to create their own game at the end of the lesson. Within the hour course, there are short videos to watch that highlight people working in the tech industry and also give instructions for the next steps in the course. Through the [code.org](http://code.org) website, the class facilitator is able to create easy logins for each student that then directs them to the selected course. Certificates of accomplishment are available for printing for each child (print out before program so they are ready at the end).

### Things you might change or practical tips:

I might add another 15 minutes to the hour of code to do an extra no tech activity. Also, do the course before you do the program so that you know what you are doing and can answer questions. I did the course a couple of times and printed out the lesson plan tips and troubleshooting just in case. If the kids are quick at finishing the course, they can select another hour of code lesson to use up the time.

### Things you liked most about the program:

I liked using the [code.org](http://code.org) resources. I am not that technically savvy so by using [code.org](http://code.org) I was able to learn how to do the coding and finish the same course the kids do. The website also has helpful tips and lesson plans. I also like adding the no tech activities to teach coding concepts.