

60

READY-TO-USE

CODING PROJECTS

EDITED BY
Ellyssa Kroski

ALA
Editions
CHICAGO | 2020

alastore.ala.org

ELLYSSA KROSKI is the director of information technology at the New York Law Institute as well as an award-winning editor and author of 37 books. She is a librarian, an adjunct faculty member at Drexel University and San Jose State University, and an international conference speaker. She received the 2017 Library Hi Tech Award from the ALA/LITA for her long-term contributions in the area of library and information science technology and its application. She can be found at: <http://amazon.com/author/ellyssa/>.

© 2020 by the American Library Association

Extensive effort has gone into ensuring the reliability of the information in this book; however, the publisher makes no warranty, express or implied, with respect to the material contained herein.

ISBN: 978-0-8389-1872-2 (paper)

Library of Congress Cataloging-in-Publication Data

Names: Kroski, Ellyssa, editor.

Title: 60 ready-to-use coding projects / edited by Ellyssa Kroski.

Other titles: Sixty ready-to-use coding projects

Description: Chicago : ALA Editions, 2020. | Includes bibliographical references and index. | Summary: "This book provides 60 ready-to-use coding projects that can be implemented in libraries"—Provided by publisher.

Identifiers: LCCN 2019029389 | ISBN 9780838918722 (paperback)

Subjects: LCSH: Libraries—Activity programs—United States. | Computer programming—Study and teaching. | Computer literacy—Study and teaching.

Classification: LCC Z716.33 .A145 2020 | DDC 025.5—dc23

LC record available at <https://lccn.loc.gov/2019029389>

Cover design by Kimberly Thornton. Cover illustration © Nizwa Design/Adobe Stock.

Text design and composition by Dianne M. Rooney using Archer and Univers typefaces.

© This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Printed in the United States of America

24 23 22 21 20 5 4 3 2 1

Contents

Acknowledgments *xi*

Preface *xiii*

Introduction *xv*

*From Coding to Computational Thinking Literacy:
A Library Call to Action*

LINDA BRAUN and MARIJKE VISSER

Part I Programs for Kids (Ages 3-7)

- | | | |
|----------|--|----|
| 1 | Make Your Own Cartoon with PBS Kids ScratchJr
JOANNA SCHOFIELD | 3 |
| 2 | Before You Plug In, Analog Games to Play with Young Children: Story Mapping
STACY HURT | 7 |
| 3 | Before You Plug In, Analog Games to Play with Young Children: The Human Robot
STACY HURT | 11 |
| 4 | Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar
BIANCA RIVERA | 14 |
| 5 | Coding Storytime for Families
KRISTINE TECHAVANICH | 23 |
| 6 | Using Spheros to Retell a Story
SHARON McCUBBINS | 32 |

7	Demonstrating Characterization with ScratchJr	<i>37</i>
	SHARON McCUBBINS	
8	Computational Thinking in Storytime: Robots	<i>43</i>
	CLAUDIA HAINES	
9	Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families	<i>53</i>
	PAULA LANGSAM	
10	Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities	<i>56</i>
	PAULA LANGSAM and AMY STEINBAUER	
11	Program the Human Robot: Decomposition Activities for Preschoolers and Families	<i>62</i>
	PAULA LANGSAM	
12	IF You Can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics	<i>66</i>
	ALESSANDRA AFFINITO	
13	Tell Me a Story with ScratchJr	<i>74</i>
	LISA O'SHAUGHNESSY	
14	Storytime Coding	<i>79</i>
	MARISSA GUIDARA	
15	TechTacular	<i>83</i>
	MARISSA GUIDARA	
16	Bee-Bot Bowling	<i>88</i>
	MARISSA GUIDARA	
17	Preschool Coding: How to Teach Coding to Children	<i>92</i>
	KATIE CLAUSEN	
18	Screen-Free Coding for Preschoolers	<i>97</i>
	KATIE CLAUSEN	
19	Great Books for Teaching Coding to Preschoolers	<i>103</i>
	KATIE CLAUSEN	
20	Coding Stations in a K–3 School Library	<i>110</i>
	DANIELLE ARNOLD	

- 21 Integrate Picture Books to Teach Computational Thinking Skills** 116
DANIELLE ARNOLD

Part II Programs for Tweens [Ages 8–12]

- 22 Scratch Coding for Tweens: Creating Cartoons** 123
KARLENE TURA CLARK
- 23 Bring Your LEGOs to Life with LEGO Education WeDo** 131
JOANNA SCHOFIELD
- 24 Program a Mad Libs Game with Python** 136
CONNOR McNAMARA
- 25 Program a Number Guessing Game with Python** 145
CONNOR McNAMARA
- 26 Program a SUPER Number Guessing Game with Python** 153
CONNOR McNAMARA
- 27 Coding Music with Exceptional Learners: Mission Possible** 163
MELANIE TORAN
- 28 Build an Automated Puppet with Arduino** 167
JAMIE BAIR
- 29 Coding Camp for Tweens** 172
ANNAMARIE CARLSON
- 30 Beginner Video Game Coding and Design** 189
ANNAMARIE CARLSON
- 31 Outreach Programming with Robots and Coding** 195
ANNAMARIE CARLSON
- 32 Scratch Art: Create and Animate Characters Using Scratch** 204
MARY CARRIER
- 33 Program A-mazing Finch Robots with Scratch** 210
MARY CARRIER
- 34 A Crash Course in Robotics** 216
LOREN McCLAIN

35	Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play	221
	JULIA CLARK	
36	Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling	226
	KAITLIN FRICK and GRACE ZELL	
37	LEGO Sumobots: Programming Robots with LEGO MINDSTORMS	238
	CHAD CLARK	
38	Digital Dress-Up: Creating Drag-and-Drop Games in Scratch	243
	OLIVIA HORVATH	
39	Remix a Meme Using Scratch	249
	OLIVIA HORVATH	
40	Using Bloxels to Teach Storytelling and Video Game Design	254
	DANIELLE ARNOLD	
41	How to Give Successful Coding Workshops for Ages 8–12	258
	KARIMA KAFIF	

Part III Programs for Young Adults [Ages 13-18]

42	Form a Hacker Club and Hacker Club Jr.	267
	JESSICA FRANCO and EMILY SHEEHAN	
43	Host a Teen and Tween App Development Camp in Your Library	273
	JESSICA FRANCO and EMILY SHEEHAN	
44	Host an Escape Room with a Robotic Twist	279
	JOANNA SCHOFIELD	
45	Advancing Beyond Scratch to Text-Based Coding with Pencil Code	284
	JAMIE BAIR	

- 46 Program a Scratch Guessing Machine** 289
DAVID VANCE
- 47 Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000** 294
DAVID VANCE
- 48 Player Ready: Making Your First Video Game** 302
LOREN McCLAIN
- 49 Partners in Technology: How to Create a Successful Technology Mentorship Program** 308
JULIA CLARK
- 50 Walk Through My World: Create a Virtual Reality Digital World** 313
LISA O'SHAUGHNESSY
- 51 Living in Fairyland: Explore Fairy Tales with VR Technology** 318
LISA O'SHAUGHNESSY
- 52 Create and Choreograph Original Music Videos** 323
JESSICA FRANCO and EMILY SHEEHAN
- 53 After Scratch: Connecting Teen Patrons with Next Steps** 329
OLIVIA HORVATH
- 54 Programming Stories: How to Animate with Code** 335
AUSTIN OLNEY

Part IV Programs for Adults

- 55 Scratch Coding for Adults: Creating a Collectible Game** 343
KARLENE TURA CLARK
- 56 Learn with Lynda.com: An Introduction to JavaScript** 354
JOANNA SCHOFIELD
- 57 Meetup.com and Libraries: Programming Partnerships to Teach Adults** 362
ESTHER JACKSON and RASHAD BELL

58 MakeCode with Circuit Playground Express: Physical Computing for Adults 370

CHAD CLARK

Part V Creating Circulating Collections

59 Rotating Kits for Easy STEM Programming 377

KELSEY HUGHES

60 Creating a Tech-Related Circulating Collection 383

MICHAEL P. SAUERS

Resources 389

Index 391

Preface

Coding or computer programming is an integral part of digital literacy and has become of paramount importance for libraries committed to providing computational thinking skills to their patrons. These types of programs offered by libraries can provide patrons of all ages with valuable STEM skills as well as problem-solving, critical thinking, and computational thinking abilities and practical career-building proficiencies. For these reasons, the interest in providing such technical programs in libraries continues to grow. ALA’s Libraries Ready to Code initiative, funded by Google, provided “more than \$500,000 in grants for 28 libraries in 21 states . . . to design and implement coding programs for young people.” This was the first time ALA dedicated funds for computer science-related programming in libraries. The introduction shares findings from the Libraries Ready to Code program and shows how your coding projects can contribute to the larger goal of developing computational thinking.

While the benefits of coding programs in libraries is clear, these types of events and workshops can be quite intimidating for librarians who don’t have a computer science background. And that’s where this book comes in. Each chapter in this book is a complete start-to-finish recipe for how to plan and run an effective coding program in your library, including learning outcomes and recommendations for future programs, even for librarians without any technical background or previous experience.

The programs and workshops in this book have been organized by age group and cover a variety of challenging and engaging topics that run the gamut from choreographing music videos with Ozobots to programming Mad Libs games with Python to animation with Scratch. All age ranges and skill levels are represented—from the youngest kids who can take part in storytime coding activities to tweens who can learn to program robots and develop video games to hacker clubs for young adults and physical computing for adults.

60 Ready-to-Use Coding Projects is an all-in-one guide book for creating innovative coding and computer-related programming that is chock-full of practical project ideas for libraries. It provides real-world programming ideas for public, school, and academic libraries. The programming projects herein have been contributed by librarians and library professionals, and each chapter is specifically geared toward how to implement these projects in libraries.

Introduction

From Coding to Computational Thinking Literacy: A Library Call to Action

LINDA BRAUN and MARIJKE VISSER

Taylor, a teen girl from a rural community, took part in her library's Ready to Code-sponsored activities. She got involved because the school librarian talked with her about her interests and learned that Taylor is very interested in fashion. The librarian then introduced Taylor to Ready to Code programming by working with her on learning how to code and produce e-textiles. Taylor may not pursue a career in fashion or become a coder, but through the exposure to coding through the library, she is more aware of how coding can enhance her interests and even open up opportunities for her.

We often hear that children entering school now will work in jobs or pursue careers not yet imagined. Statistics tell us in the United States today, more than 500,000 computing jobs are not being filled and yet are the fastest growing type of science, technology, engineering, and mathematics (STEM) job available. Along with that, the majority of these jobs are outside the tech sector. Moreover, technology infuses all aspects of learning and human interaction. This will continue to change the nature of how we communicate, how we work, and how we live. There is tremendous opportunity for innovative approaches to solving complex social and economic problems that challenge local communities and around the globe.

Today's workforce requires technical and digital skills. As technologies continue to advance and as emerging technologies are embedded across work sectors and in daily life, the demand for specific sets of cognitive skills will increase in order to integrate these technologies into a variety of areas related to work and life. In response, recent reports from McKinsey & Company and Harvard Business Review have called for more attention to developing social and emotional (SE) skills such as taking initiative and collaboration as well as creativity and problem-solving skills. Coding and computer science (CS) activities help youth develop SE skills, which are at the heart of the concepts in computational thinking (CT).

Libraries Ready to Code CT Definition

“Computational thinking (CT) refers to thought processes used to formulate problems and their solutions.” These include breaking down problems into smaller parts, looking for patterns, identifying principles that generate these patterns, and developing instructions that computers—machines and people—can understand. It is an approach to critical thinking that can be used to solve problems across all disciplines.[†] Along with leaders in education and industry, the Libraries Ready to Code initiative considers CT to be a critical literacy for all ages of learners.”

^{*}Wing, Jeannette. “Computational Thinking.” *Communications of the ACM*. March 2006. <https://www.cs.cmu.edu/~15110-s13/Wing06-ct.pdf>.

[†]“Google for Education: Exploring Computational Thinking.” Google Expeditions. Accessed October 2, 2018. <https://edu.google.com/resources/programs/exploring-computational-thinking/>.

When libraries prepare youth for college and career or design programs for adult learners, they expose learners and connect their interests to the opportunities made available through technology. This is the first step in making sure youth and adults are equipped with essential work and life skills. More importantly, libraries that provide coding programs help their patrons develop a mindset to seek new or alternative strategies for using technology to find information, think critically, as well as create and share knowledge and ideas. As librarians and library staff embrace the emerging role of facilitators of coding and CS programs based in CT, they propel youth and adults to think differently. Library staff help build a community of thinkers and doers who create and share new ideas or use digital tools to imagine and put into place innovative solutions to community challenges.

Research also tells us that the educational and career opportunities technology brings are not equally available to young people. There are structural and social barriers that create disparities for some groups underrepresented in technology, including Hispanics, African American youth, and girls generally. Even when formal CS education is available, not all students are equally encouraged or individually inclined to pursue the options. Students in rural communities are also less likely to have access to CS courses or be exposed to computers at home. Nor do all uses of technology lead to the skills and fluency necessary to know how to most effectively use it.¹

The library community—information professionals dedicated to ensuring equitable access to information—must take an active role in ensuring such opportunities are available to everyone regardless of zip code, cultural or

ethnic background, gender identity, or age and ability. They can actively serve children and teens who are less likely to have access to or be exposed to technology, CS curriculum in school, or extended learning opportunities. To support all youth as they journey through the technology-rich educational and career landscape, libraries need to consider how effectively their coding and CS programs connect to youth interests and broaden participation. Coding and CT through the library are catalysts for youth to pursue their interests and discover new ones and ensure they have a portfolio of skills and literacies to meet life challenges and opportunities head-on.

ALA and Google Inc. are collaborating on the Libraries Ready to Code (RtC) initiative to build capacity, provide resources, and create a space for peer-to-peer learning so any library can design and implement coding and CS activities that promote CT literacies among children and youth. The initial RtC report, “Ready to Code: Connecting Youth to CS Opportunity through Libraries,” found that librarians and library staff in school and public libraries are essential community resources ensuring youth have access to technology and are equipped with the skills and competencies required for full participation in today’s and tomorrow’s global economy and society.

IS IT CODING, COMPUTER SCIENCE, OR COMPUTATIONAL THINKING?

While the RtC initiative began with a scan of coding and computer science programs in libraries, it did not take the project team long to realize libraries are at varying levels of understanding why they should be part of the CS educator community and how best to do so. Evaluation data collected from a small cohort of faculty from library and information science schools and the RtC cohort libraries reveals a shift over the course of the projects from focusing on coding for coding’s sake to a more nuanced approach that places computational thinking literacies at the center for library engagement. Whether cohort libraries view CT as necessary for workforce or early learning, or equitable access to opportunity, the cohort was in general agreement that CT is a fundamental literacy for children and youth.

WHY LIBRARIES AND CODING?

From early-learning activities with families, caregivers, and young children, to in and out of school time learning for youth, to college or career activities for young adults and activities for professionals already in the workforce, library

programs are designed to address community needs. Libraries are key places for inclusive informal and lifelong learning experiences. Over the course of the RtC initiative (2015–2018), through focus groups, interviews, site visits, work with faculty at library and information science schools and iSchools, and the collaborative work of the 30 libraries (members of a cohort) selected to participate in the RtC project, evaluation and assessment data (both qualitative and quantitative) highlights how the library value of meeting community needs fits into CT programming for children and teens. Further, the RtC initiative identifies the contributions libraries that offer CT make for the youth they serve, their communities, and CS education stakeholders more broadly.

The RtC cohort libraries developed coding and CS programs while exploring and refining the skills and mindsets library staff need to ensure such programs foster CT literacies. Through a vibrant community of practice that developed among the cohort, participants gained confidence in developing CT programs while shifting from viewing coding-specific skills as the endgame of their programs. The cohort also contributed to the initiative’s understanding of just what the library’s role could be in addressing the gaps in access to CT programs among children and youth. Libraries are essential partners and, given a full array of support and resources, excel at designing CT programs that range from one-time events to multi-week sessions.

“Ultimately, when youth practice CT, they find new ways to communicate their ideas, express themselves, and practice problem solving. Library staff can embed CT in addition to traditional literacy in their work with children and teens, empowering them with the literacies they need to be lifelong learners and to succeed in college and career.”

—Claudia Haines, RtC cohort member and youth services librarian, Homer (Alaska) Public Library; see chapter 8 for more from Claudia

FACILITATING CT LITERACIES THROUGH THE READY TO CODE THEMES

RtC research uncovered 5 themes that are integral to successful acquisition of CT literacies through libraries. These themes take into account the needs of youth, families, adults, communities, and libraries. They are organized in the RtC Facilitation Pathway, designed to help libraries find a good fit with CT activities offered in the Ready to Code website’s collection of resources. See the facilitation pathway at www.ala.org/tools/readytocode/pathway/. See the Libraries Ready to Code website for more examples illustrating the themes along with tools and resources: <https://www.librariesreadytocode.org>.

Broadening Participation

The Leaky Tech Pipeline highlights 3 reasons why addressing underrepresentation in technology careers is important:

- The growing diversity of the U.S. population and need for a robust future workforce,
- The benefits associated with having a diverse workforce, and
- The detrimental impact of underrepresentation on exacerbating economic inequality for diverse communities.²

Through expanding their reach, working with community organizations and members, and developing recruitment and retention efforts that specifically focus on diverse youth and diverse learning environments, libraries play a role in addressing technology underrepresentation.

Connecting Youth Interests and Emphasizing Youth Voice

The connected learning framework emphasizes creative and social learning experiences that are driven by learners' personal interests. The framework's core principles include learning contexts that are peer supported, interest powered, and academically oriented along with experiences that are production centered, openly networked, and bring together learners and adults around a shared purpose.³

Engaging with Communities

In an RtC strategy brief, Susan Baier, library director for the McCracken County (Kentucky) Public Library, notes how she began learning about the community: "When I started out as a library director, I spent my first few months in meetings with community stakeholders. A common thread soon became evident—preparing a workforce for the future was a key concern for local employers with technology jobs they couldn't fill. Companies were approaching schools asking how they could attract youth to their industries. I saw an opportunity for us to better position the library as a partner in education and workforce development by offering CS/CT programs for youth."⁴

Engaging with Families

Families that take part in library CT literacy activities have the chance to become familiar with these skills and gain an understanding of the role these skills play in young people's lives.

Demonstrating Outcomes Through Impact

It should be expected that not all CT literacy activities that a library provides will be successful. However, there is extreme value in recognizing at the planning stage of a CT library activity what success will look like and how the library will measure that success.

THERE IS AN ENTRY POINT AT YOUR LIBRARY

For many library staff, the idea of including coding and CT activities in the services provided to youth and families may seem daunting and even a little bit scary. There are ways to start small and build as skills and knowledge are gained.

These tips and resources from the Libraries Ready to Code Collection can help you take first steps into this work:

- If you need to gain support from others within the library, such as colleagues or administrators, take a look at the slide deck—http://bit.ly/rtc_waseca_deck/—created by the Waseca (Minnesota) Public Library. It provides an overview of why libraries play a vital role in bringing coding and CT literacies to youth and families.
- Unplugged activities that don't require any technology to help youth gain CT skills are a great way to get started in this work. To learn more about designing and implementing these types of activities, take a look at the unplugged lesson plan from the Homer (Alaska) Public Library—http://bit.ly/homer_rtc_unplugged. (You can see more about Claudia Haines's work in this area in chapter 8.)
- Looking for ways to get started with bringing community partners into coding and CT library activities? Take a look at the community partner invitation—http://bit.ly/rtc_kent_recruitment/—developed by the Kent County (Maryland) Public Schools.

No matter the entry point and resources you use to get started with this work, don't forget that every community is different. When using materials from other libraries, think about what should stay the same and what needs to change based on your community makeup. Ask yourself about the audience you serve, the partners you may work with, and the materials and resources available for the activity.

NOTES

1. Google Inc. & Gallup Inc. “Diversity Gaps in Computer Science: Exploring the Underrepresentation of Girls, Blacks and Hispanics.” Gallup Inc., 2016, “Diversity Gaps in Computer Science: Exploring the Underrepresentation of Girls, Blacks and Hispanics,” services.google.com/fh/files/misc/diversity-gaps-in-computer-science-report.pdf; Google Inc., and Gallup Inc. “Computer Science Learning: Closing the Gap Rural and Small-Town School Districts.” Gallup Inc., 2017, “Computer Science Learning: Closing the Gap Rural and Small-Town School Districts,” services.google.com/fh/files/misc/computer-science-learning-closing-the-gap-rural-small-town-brief.pdf.
2. Scott, Allison, et al. The Leaky Tech Pipeline. Kapor Center for Social Impact, 2018, The Leaky Tech Pipeline, www.leakytechpipeline.com/wp-content/themes/kapor/pdf/KC18001_report_v6.pdf.
3. Hoffman, Kelly M., et al. Connected Libraries: Surveying the Current Landscape and Charting a Path to the Future. The Connected Lib Project, 2016, Connected Libraries: Surveying the Current Landscape and Charting a Path to the Future, connectedlib.ischool.uw.edu/wp-content/uploads/2016/02/ConnectedLibraries-SurveyingtheCurrentLandscape-and-ChartingthePathtotheFuture.pdf.
4. Baier, Susan. “Strategy Brief: Making the Case to Your Community That Libraries Are Ready to Code.” Libraries Ready to Code. 2018. Accessed October 2, 2018. https://drive.google.com/file/d/14ANpQaU4ptgJpeWsB9ElAKA_KNN157N2/view/.

PART I



PROGRAMS FOR KIDS

[AGES 3-7]

alastore.ala.org

1

Make Your Own Cartoon with PBS Kids ScratchJr

JOANNA SCHOFIELD

Branch Services Librarian-Generalist | Cuyahoga County (Ohio) Public Library

PROJECT DESCRIPTION

What if I could make a cartoon story where my rocket can fly? What if I could make my pigs dance? What if my characters could sing “Happy Birthday”? These are just some of the things young children may want to do if they knew how to code. So how can we introduce coding to the youngest of children? One great resource for engaging and motivating young coders is PBS Kids ScratchJr. PBS has developed an entire curriculum for introducing the app and making fundamentals in their Family Creative Learning Project. This project is designed to teach young children the meaning of coding and making and how to use PBS Kids ScratchJr to create their own stories and images.

Age Range

- Kids (Ages 3-7)
- Adults

Type of Library Best Suited For

- Public Libraries
- School Libraries

Cost Estimate

- \$0
PBS ScratchJr is a free app for iPads and Android devices.

OVERVIEW

The PBS Family Creative Learning Project is a free guide and slideshow for libraries looking to teach coding to families with young children. It is designed to be a 4-week program with families meeting once a week for 2 hours. Each

week covers a slightly different topic. Adults and children are split into 2 different rooms for instruction, and the program concludes with participants working together on the app and sharing their experiences. The PBS Family Creative Learning Project walks you step by step through the process and provides information for facilitators. You can access the documents at <https://ideastream.pbslearningmedia.org/resource/fcl-scratchjr-rtl-2015-2020/family-community-learning-with-scratchjr-rtl-2015-2020/>.

The program requires 2 staff facilitators. The program should be limited to no more than 10 families.

Software/Hardware Needed

Each family requires:

- A tablet with the PBS Kids ScratchJr application installed

Materials List

- Printed activity cards from facilitator website
- Peanut Butter
- Jelly
- Plastic knife
- Plates
- Food for dinner
- Napkins
- Cups for Water
- Water source (water fountain, water cooler, water tower)

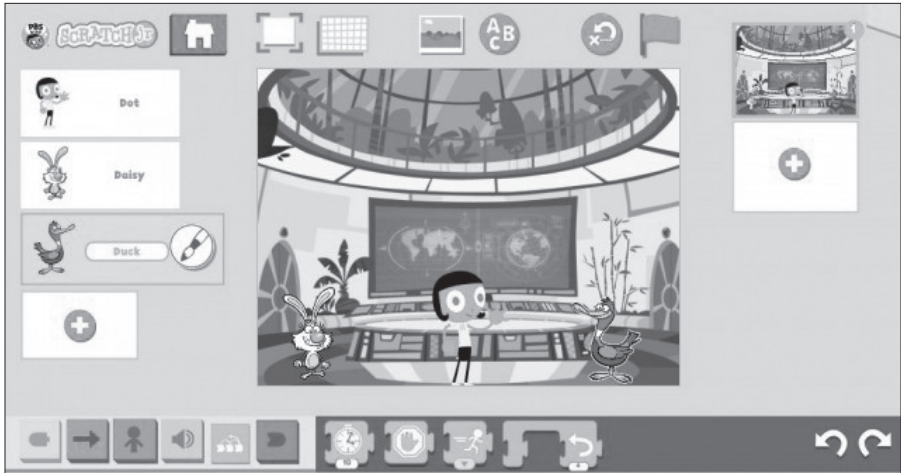
STEP-BY-STEP INSTRUCTIONS

Eat

A major component of this series is community building. To encourage participants to get to know each other better, the session always begins with a communal dinner. For our program, we ordered pizza. You can order anything you like for the meal or even reach out to local restaurants to see if they would be willing to donate food. This portion usually takes up the first 20 minutes or so of the program.

Explore

- This is the time when adults and children are encouraged to split into different groups. The “Explore” time is for creative discussions and experiences.
- During the first week, the facilitator opens with a discussion of why adults are separated from children at this point (adults are having facilitated conversations about the maker movement while children are conducting maker activities). During the first week, adults discuss the use of technology in their children’s lives and the pros and cons of technology usage.

**FIGURE 1.1**

The PBS ScratchJr interface

- Adults are also introduced to the PBS Kids ScratchJr app (figure 1.1) and given a few minutes to explore its contents. Children are discussing “what is a maker?” and creating maker hats.
- The second week, adults and children are separately introduced to coding and play a game called Robot Chef. The purpose of Robot Chef is to program a person to make a peanut butter and jelly sandwich. This teaches the complexity of a simple task and how important it is to give specific instructions. After playing Robot Chef, the groups are able to play Robot Dancer, which utilizes dance cards to program an individual dancer.
- The third week, everyone explores the engineering design process. Adults begin with a brief discussion of the engineering design process and engineering as a profession. Next, they break up into groups of 2–4 individuals and are challenged to create a paper airplane that will fly the farthest. In the other room, the children talk about designing and engineering. Next, they participate in a paper airplane challenge similar to what their parents did.
- The fourth week, adults engage in a short discussion about how to extend these engineering and making facets into their home life with their children. The children read the book *Rosie Revere Engineer* by Andrea Beaty.

Make

Each week the families are reunited for creative play on the PBS Kids ScratchJr app. There are note cards available on the facilitator’s page that can be printed

to show participants how to do basic functions, such as creating a sprite, moving the sprite around the screen, or having the sprite make noise. This time is really meant to engage children with their parents and work through creating images and stories on the PBS Kids ScratchJr app. The facilitator is there to help troubleshoot, but the emphasis should be on the family’s exploration of the app.

Share

Each day students are encouraged to share their progress with the whole group. On the last day, groups are encouraged to share their final projects and explain how they developed their ideas.

LEARNING OUTCOMES

Participants will:

- Gain an understanding of engineering and the maker movement.
- Become familiar with PBS Kids ScratchJr.
- Work together with their parents to create something in PBS Kids ScratchJr.
- Gain an understanding of basic coding.

RECOMMENDED NEXT PROJECTS

- There are numerous iterations of Scratch that participants can master. After PBS Kids ScratchJr, participants can work in ScratchJr. After ScratchJr, participants can move into Scratch (<https://scratch.mit.edu>).
- There are other coding activities that participants can use, such as Codecademy, Code.org, and Khan Academy.

Index

A

- abstraction, 43-44
- academic libraries
 - Build an Automated Puppet with Arduino, 167-171
 - Coding Music with Exceptional Learners: Mission Possible, 163-166
 - Creating a Tech-Related Circulating Collection, 383-388
 - MakeCode with Circuit Playground Express: Physical Computing for Adults, 370-374
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
 - Scratch Coding for Tweens: Creating Cartoons, 123-130
- action songs, 26-29
- active listening skills, 11-13
- activities featuring coding toys, 81-82
- adults
 - Build an Automated Puppet with Arduino, 167-171
 - Creating a Tech-Related Circulating Collection, 383-388
 - Learn with Lynda.com: An Introduction to JavaScript, 354-361
 - LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
 - Make Your Own Cartoon with PBS Kids ScratchJr, 4
 - MakeCode with Circuit Playground Express: Physical Computing for Adults, 370-374
 - Meetup.com and Libraries:
 - Programming Partnerships to Teach Adults, 362-369
 - Program a Mad Libs Game with Python, 136-144
 - Program a Number Guessing Game with Python, 145-152
 - Program a SUPER Number Guessing Game with Python, 153-162
 - Scratch Art: Create and Animate Characters Using Scratch, 204-209
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
- Advancing Beyond Scratch to Text-Based Coding with Pencil Code, 284-288
- Affinito, Alessandra, 66
- After Scratch: Connecting Teen Patrons with Next Steps, 329-334
- After the Fall* (Santat), 31
- Alex Toys Future Coders, 113
- algorithm design
 - Bee-Bot Bowling, 88-91
 - Coding Storytime for Families, 23-31
 - Integrate Picture Books to Teach Computational Thinking Skills, 116-119
 - Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
 - Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22

algorithm design (cont.)

- Player Ready: Making Your First Video Game, 302-307
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10
- Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
- Alice 2 programming language, 335-340
- Alice 3 programming language, 340
- Amazing Grace* (Hoffman), 40
- American Library Association (ALA), xvii
- American Library Association's Libraries Ready to Code program, xiii, xv, xvi, xvii, xviii
- analog activities, xx, 269
 - Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
 - Outreach Programming with Robots and Coding, 195-203
 - Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53-55
 - Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10
 - Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13

animation

- How to Give Successful Coding Workshops for Ages 8-12, 258-264
- Make Your Own Cartoon with PBS Kids ScratchJr, 3-6
- Programming Stories: How to Animate with Code, 335-340
- Scratch Art: Create and Animate Characters Using Scratch, 204-209
- Scratch Coding for Adults: Creating a Collectible Game, 343-353
- Scratch Coding for Tweens: Creating Cartoons, 123-130
- app development, 273-278
- Arduino projects, 167-171
- Arnold, Danielle, 110, 116, 254
- artificial intelligence
 - Coding Storytime for Families, 23-31

- Host a Teen and Tween App Development Camp in Your Library, 273-278
- Association for Library Service to Children, 52

B

- Baby Code!* [series] (Horning), 105
- Baby Loves Coding* (Spiro), 30, 106
- background creation and modification
 - Scratch Art: Create and Animate Characters Using Scratch, 204-209
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
 - Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294-301
- Baier, Susan, xix
- Bair, Jamie, 167, 284
- basic coding, gaining an understanding of
 - Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226-237
 - Coding Stations in a K-3 School Library, 110-115
 - Great Books for Teaching Coding to Preschoolers, 103-109
 - How to Give Successful Coding Workshops for Ages 8-12, 258-264
 - Make Your Own Cartoon with PBS Kids ScratchJr, 3-6
 - Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
 - Preschool Coding: How to Teach Coding to Children, 92-96
 - Screen-Free Coding for Preschoolers, 97-102
 - Using Spheros to Retell a Story, 32-36
 - Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10
 - Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
- Bau, Anthony, 284
- Bau, David, 284
- BBC BiteSize, 52

- Beachwood (OH) Branch of the Cuyahoga County (OH) Public Library, 280
- Beautiful Oops* (Saltzberg), 31
- The Beauty and Joy of Computing (curriculum), 365
- Becoming a Media Mentor: A Guide for Working with Children and Families* (Haines, Campbell, and Association for Library Service to Children), 52
- Bee-Bot Bowling, 88–91
- Bee-Bots, 88–91, 92–96
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7–10
- Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11–13
- Beginner Video Game Coding and Design, 189–194
- Bell, Rashad, 362
- Belmar (NJ) Elementary School, 110, 116, 254
- Bernstrom, Daniel, 30
- Bers, Marina Umaschi, 52, 103, 108
- binary coding
 - Coding Stations in a K-3 School Library, 110–115
 - Screen-Free Coding for Preschoolers, 97–102
- Blender (software), 340
- block-based coding. *See also specific programming languages*
- Coding Camp for Tweens, 172–188
- A Crash Course in Robotics, 216–220
- Form a Hacker Club and Hacker Club Jr., 267–272
- Host a Teen and Tween App Development Camp in Your Library, 273–278
- Living in Fairyland: Explore Fairy Tales with VR Technology, 318–322
- MakeCode with Circuit Playground Express: Physical Computing for Adults, 370–374
- Outreach Programming with Robots and Coding, 195–203
- Tell Me a Story with ScratchJr, 74–78
- Walk Through My World: Create a Virtual Reality Digital World, 313–317
- Bloxels
 - Beginner Video Game Coding and Design, 189–194
 - Using Bloxels to Teach Storytelling and Video Game Design, 254–257
- board books, 105–106
- The Book of Mistakes* (Luyken), 30
- Braun, Linda, xv
- break statement, 158
- Bring Your LEGOs to Life with LEGO Education WeDo, 131–135
- Brown Bear, Brown Bear, What Do You See?* (Martin), 30
- Bucknell, Alice, 250
- Build an Automated Puppet with Arduino, 167–171
- ## C
- Campana, Kathleen, 52
- Campbell, Cen, 52
- Carle, Eric, 24, 26, 117
- Carlson, Annamarie, 172, 189, 195
- Carnegie Mellon University, 336
- The Carpentries (curriculum), 365
- Carrier, Mary, 204, 210
- Carter, David, 45, 49
- cartoons. *See* animation
- characters and strings, worksheet on, 360
- Chatham Square Branch of the New York Public Library, 66
- Chester Fritz Library, University of North Dakota, Grand Forks, 123, 343
- Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226–237
- choreography for music videos, 323–328
- Circuit Playground Express, 370–374
- circulating collections
 - Creating a Tech-Related Circulating Collection, 383–388
 - Rotating Kits for Easy STEM Programming, 377–382
- Clanton, Ben, 81
- Clark, Chad, 238, 370
- Clark, Julia, 221, 308
- Clark, Karlene Tura, 123, 343

- Clarkston (MI) Independence District
Library, 136, 145, 153
- Clausen, Katie, 92, 97, 103
- Clifton Park-Halfmoon Public Library,
Clifton Park, NY, 204, 210
- closing songs, 29
- Code-a-pillar, 24
Computational Thinking in Storytime:
Robots, 43-52
Mommy and Me Coding: Learning
Coding Concepts Together with
Code-a-Pillar, 14-22
Outreach Programming with Robots
and Coding, 195-203
Preschool Coding: How to Teach
Coding to Children, 92-96
- Code Hopper, 24
- Coding as a Playground: Programming
and Computational Thinking in the
Early Childhood Classroom* (Bers),
52, 103, 108
- Coding Camp for Tweens, 172-188
- coding clubs, 329-334
- Coding in Scratch: Games Workbook*
(Woodcock and Setford), 193
- Coding Music with Exceptional Learners:
Mission Possible, 163-166
- Coding Stations in a K-3 School Library,
110-115
- Coding Storytime for Families, 23-31
- collaboration skills
LEGO Sumobots: Programming
Robots with LEGO MINDSTORMS,
238-242
Program a Scratch Guessing Machine,
289-293
Unstructured Learning: Using Drop-
In Technology Programs to
Engage More Patrons and Support
Learning Through Play, 221-225
- Colleen, Marcie, 40
- communication skills
Choose Your Own Adventure: Bring
Coding to Life with Interactive
Storytelling, 226-237
LEGO Sumobots: Programming
Robots with LEGO MINDSTORMS,
238-242
TechTacular, 83-87
Unstructured Learning: Using
Drop-In Technology Programs
to Engage More Patrons and
Support Learning Through Play,
221-225
Before You Plug In, Analog Games
to Play with Young Children: The
Human Robot, 11-13
community engagement as theme for
facilitating CT literacies, xix
computational thinking. *See* CT
(computational thinking)
“Computational Thinking” (BBC
BiteSize), 52
Computational Thinking in Storytime:
Robots, 43-52
computational thinking skills. *See* CT
(computational thinking) skills
Computational Thinking (Wing), 52
computer science (CS), xv-xvii
computers and how they work, 177
conditional statements
Coding Camp for Tweens, 172-188
Coding Storytime for Families,
23-31
Digital Dress-Up: Creating Drag-and-
Drop Games in Scratch, 243-248
IF You can Imagine It, THEN You Can
Code It: Mini-Stories with Dash
Robotics, 66-73
LEGO Sumobots: Programming
Robots with LEGO MINDSTORMS,
238-242
Mommy and Me Coding: Learning
Coding Concepts Together with
Code-a-Pillar, 14-22
Program a Number Guessing Game
with Python, 145-152
Program a Scratch Guessing Machine,
289-293
Scratch Coding for Adults: Creating a
Collectible Game, 343-353
Screen-Free Coding for Preschoolers,
97-102
Before You Plug In, Analog Games
to Play with Young Children: The
Human Robot, 11-13

CoSpaces program
 Living in Fairyland: Explore Fairy Tales with VR Technology, 318–322
 Walk Through My World: Create a Virtual Reality Digital World, 313–317

A Crash Course in Robotics, 216–220

Create and Choreograph Original Music Videos, 323–328

Creating a Tech-Related Circulating Collection, 383–388

critical thinking skills
 How to Give Successful Coding Workshops for Ages 8–12, 258–264
 Preschool Coding: How to Teach Coding to Children, 92–96
 Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221–225

CS50's Introduction to Computer Science (curriculum), 365

CSS programming
 After Scratch: Connecting Teen Patrons with Next Steps, 332
 Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294–301

CT (computational thinking), xv–xx, 43–44, 53–54

CT (computational thinking) skills
 Bee-Bot Bowling, 88–91
 Computational Thinking in Storytime: Robots, 43–52
 Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14–22

Cube Stackers, 113

Cubelets Tech Activity Kits, 383–388

Cubetto, 86

Cumberland Trace Elementary School Library, Bowling Green, KY, 32, 37

Cuyahoga County (OH) Public Library, 3, 131, 279, 354

Cuyahoga County (OH) Public Library, Beachwood (OH) Branch, 280

D

Dash robots
 Coding Camp for Tweens, 172–188
 IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66–73
 Outreach Programming with Robots and Coding, 195–203

data types
 Program a Number Guessing Game with Python, 145–152
 worksheet on, 359–360

DC Public Library, Washington, D.C., 53, 56, 62

Dean, James, 45

debugging
 Coding Stations in a K-3 School Library, 110–115
 Integrate Picture Books to Teach Computational Thinking Skills, 116–119
 Learn with Lynda.com: An Introduction to JavaScript, 354–361

Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56–61

Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14–22

Screen-Free Coding for Preschoolers, 99

Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294–301

decomposition
 defined, 43
 Program the Human Robot: Decomposition Activities for Preschoolers and Families, 62–65

Demonstrating Characterization with ScratchJr, 37–42

design thinking, 79–82

digital art. *See also* animation
 Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243–248
 Remix a Meme Using Scratch, 249–253

Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243–248

digital game-based learning (DGBL),
302-303

Dinosaurs at the Movies project,
123-130

direction following skills, 7-10

directional skills, 88-91

Do Space, Omaha, NE, 383

doll makers, 243-248

Dollz, 244

The Dot (Reynolds), 31

drag-and-drop games, 243-248

Dreger, Amy, 280

dress-up games, 243-248

drop-in technology programs, 221-225

DrTechniko, 12

E

East Orange (NJ) Public Library, 74, 313,
318

The Elevator Song (action song), 27

engineering, gaining an understanding
of, 3-6

Escape from Mr. Lemoncello's Library
(Grabenstein), 279-283

escape rooms, 279-283

"Evaluating Apps and New Media for
Young Children: A Rubric" (blog
post), 52

Evansville Vanderburgh (IN) Public
Library, 7, 11, 221, 308

F

fairy tales and VR technology, 318-322

families, engaging with, xix

family projects

Coding Storytime for Families, 23-31

Make Your Own Cartoon with PBS
Kids ScratchJr, 3-6

Mazes and Games: How to Integrate
Algorithm Design with Analog
Preschool and Family Activities,
56-61

Mommy and Me Coding: Learning
Coding Concepts Together with
Code-a-Pillar, 14-22

Pattern Play: Analog Activities to
Explore Patterns with Preschoolers
and Families, 53-55

Program the Human Robot:

Decomposition Activities for
Preschoolers and Families, 62-65

53rd Street Branch of the New York Public
Library, 226

Finch robots, 210-215

Fisher-Price, 16, 20

Five Helpful Robots (action song), 29

\$500-\$1,500 projects

Coding Camp for Tweens, 172-188

Host an Escape Room with a Robotic
Twist, 279-283

LEGO Sumobots: Programming
Robots with LEGO MINDSTORMS,
238-242

Outreach Programming with Robots
and Coding, 195-203

Program A-mazing Finch Robots with
Scratch, 210-215

Fliess, Sue, 81

Follow the Trail [series] (Sirett), 105

Form a Hacker Club and Hacker Club Jr.,
267-272

Fort Vancouver Regional Libraries,
Vancouver, WA, 167, 284

Franco, Jessica, 267, 273, 323

free projects

Advancing Beyond Scratch to Text-
Based Coding with Pencil Code,
284-288

After Scratch: Connecting Teen
Patrons with Next Steps, 329-334

Choose Your Own Adventure: Bring
Coding to Life with Interactive
Storytelling, 226-237

Coding Storytime for Families, 23-31

Demonstrating Characterization with
ScratchJr, 37-42

Digital Dress-Up: Creating Drag-and-
Drop Games in Scratch, 243-248

Host a Teen and Tween App
Development Camp in Your
Library, 273-278

How to Give Successful Coding
Workshops for Ages 8-12, 258-264

Integrate Picture Books to Teach
Computational Thinking Skills,
116-119

Learn with Lynda.com: An
Introduction to JavaScript, 354–361

Make Your Own Cartoon with PBS
Kids ScratchJr, 3–6

Mazes and Games: How to Integrate
Algorithm Design with Analog
Preschool and Family Activities,
56–61

Meetup.com and Libraries:
Programming Partnerships to
Teach Adults, 362–369

Partners in Technology: How to
Create a Successful Technology
Mentorship Program, 308–312

Pattern Play: Analog Activities to
Explore Patterns with Preschoolers
and Families, 53–55

Player Ready: Making Your First Video
Game, 302–307

Program a Mad Libs Game with
Python, 136–144

Program a Number Guessing Game
with Python, 145–152

Program a Scratch Guessing Machine,
289–293

Program a SUPER Number Guessing
Game with Python, 153–162

Program the Human Robot:
Decomposition Activities for
Preschoolers and Families, 62–65

Programming Stories: How to
Animate with Code, 335–340

Remix a Meme Using Scratch, 249–253

Scratch Art: Create and Animate
Characters Using Scratch, 204–209

Scratch Coding for Adults: Creating a
Collectible Game, 343–353

Scratch Coding for Tweens: Creating
Cartoons, 123–130

Storytime Coding, 79–82

TechTacular, 83–87

Tell Me a Story with ScratchJr, 74–78

Use HTML, JavaScript, and CSS to
Create an Interactive Online Greet-
Bot 3000, 294–301

Before You Plug In, Analog Games to
Play with Young Children: Story
Mapping, 7–10

Before You Plug In, Analog Games
to Play with Young Children: The
Human Robot, 11–13

Frick, Kaitlin, 226

Funk, Josh, 106

Fuzz Family Frenzy, 12

G

Gail Borden Public Library, Elgin, IL, 92,
97, 103

Ghoting, Saroj Nadkarni, 52

Girl Develop It, 364

The Girl Who Never Made Mistakes
(Pett), 30

Glasgow (KY) Middle School, 289, 294

Google Inc., xvii

Grabenstein, Chris, 280, 281

Grace Hopper: Queen of Computer Code
(Wallmark), 107

grants, applying for, 87

Great Books for Teaching Coding to
Preschoolers, 103–109

Greenwood, Melicia, 244

GROOVECODERS.COM, 164–166

Groton (CT) Public Library, 267, 273, 323

guessing games
Program a Number Guessing Game
with Python, 145–152

Program a Scratch Guessing Machine,
289–293

Program a SUPER Number Guessing
Game with Python, 153–162

Guidara, Marissa, 79, 83, 88

H

Haines, Claudia, 43, 52

Hamilton, Margaret, 106

hardware resources, 389

Harvard University, 365

Head, Shoulders, Knees, and Toes (action
song), 26

Hello Ruby: Adventures in Coding
(Liukas), 81

Hello Ruby [series] (Liukas), 107

Here We Go Up, Up, Up (action song), 26

Heritage High School, Newport News
(VA) Public Schools, 163

Highland Park (IL) Public Library, 238, 370

Hoffman, Mary, 40
 Homer (AL) Public Library, xx, 43
 Hopper, Grace, 107
 Horning, Sandra, 105
 Horvath, Olivia, 243, 249, 329
 Host a Teen and Tween App
 Development Camp in Your
 Library, 273-278
 Host an Escape Room with a Robotic
 Twist, 279-283
 Hour of Code, 12, 364
 Houston (TX) Public Library, 233
How to Code a Sandcastle (Funk), 106
 How to Give Successful Coding
 Workshops for Ages 8-12, 258-264
 HTML programming
 After Scratch: Connecting Teen
 Patrons with Next Steps, 332
 Use HTML, JavaScript, and CSS to
 Create an Interactive Online Greet-
 Bot 3000, 294-301
 Hughes, Kelsey, 377
 The Human Robot, 11-13
 Hurt, Stacy, 7, 11

I

if/then statements. *See* conditional
 statements

IF You can Imagine It, THEN You Can
 Code It: Mini-Stories with Dash
 Robotics, 66-73

If You Give a Mouse a Cookie (Numeroff),
 24, 28

If You're a Robot and You Know It (Carter),
 45, 49

If You're Happy and You Know It (action
 song), 28

iMovie software, 323-328

impact, facilitating CT literacies by
 theme of demonstrating outcomes
 through, xx

infinite loops, 157

inquiry-based learning, 83-87

integers, 151

Integrate Picture Books to Teach
 Computational Thinking Skills,
 116-119

IntelliJ Idea (software), 340

introduction to computer programming,
 sample worksheets for, 358-361
The Itsy Bitsy Spider (Trapani), 30

J

Jackson, Esther, 362

JavaScript programming
 After Scratch: Connecting Teen
 Patrons with Next Steps, 332
 Form a Hacker Club and Hacker Club
 Jr., 267-272
 Learn with Lynda.com: An
 Introduction to JavaScript,
 354-361
 Use HTML, JavaScript, and CSS to
 Create an Interactive Online Greet-
 Bot 3000, 294-301

K

Kafif, Karima, 258
 Kent County (MD) Public Schools, xx
 KIBO robots, 195-203
 kids (ages 3-7)
 Bee-Bot Bowling, 88-91
 Choose Your Own Adventure: Bring
 Coding to Life with Interactive
 Storytelling, 226-237
 Coding Stations in a K-3 School
 Library, 110-115
 Coding Storytime for Families, 23-31
 Computational Thinking in Storytime:
 Robots, 43-52
 Creating a Tech-Related Circulating
 Collection, 383-388
 Demonstrating Characterization with
 ScratchJr, 37-42
 Form a Hacker Club and Hacker Club
 Jr., 267-272
 Great Books for Teaching Coding to
 Preschoolers, 103-109
 IF You can Imagine It, THEN You Can
 Code It: Mini-Stories with Dash
 Robotics, 66-73
 Integrate Picture Books to Teach
 Computational Thinking Skills,
 116-119
 Make Your Own Cartoon with PBS
 Kids ScratchJr, 3-6

- Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
- Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
- nonfiction books for, list of, 107-108
- Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53-55
- picture books for, list of, 30-31, 106-107
- Preschool Coding: How to Teach Coding to Children, 92-96
- Program the Human Robot: Decomposition Activities for Preschoolers and Families, 62-65
- Screen-Free Coding for Preschoolers, 97-102
- Storytime Coding, 79-82
- TechTacular, 83-87
- Tell Me a Story with ScratchJr, 74-78
- Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221-225
- Using Spheros to Retell a Story, 32-36
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10
- Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
- Kids Get Coding* [series] (Lyons), 107 kits
- Creating a Tech-Related Circulating Collection, 383-388
 - Rotating Kits for Easy STEM Programming, 377-382
- Kodable, 12
- L**
- Langsam, Paula, 53, 56, 62
- Leaky Tech Pipeline, xix
- Learn with Lynda.com: An Introduction to JavaScript, 354-361
- learning resources, 390
- LEGO BOOST, 216-220
- LEGO MINDSTORMS
- Host an Escape Room with a Robotic Twist, 279-283
 - LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
- Let's Go Code! game, 82
- Libraries Ready to Code Collection, xx
- Libraries Ready to Code initiative (ALA), xiii, xv, xvi, xvii, xviii
- library programs and community needs, computational thinking and, xvii-xviii
- Litwin, Eric, 30
- Liukas, Linda, 81, 107
- Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322
- logic, introduction to, 7-10
- Long Beach (NY) Public Library, 14
- loops
- Coding Camp for Tweens, 172-188
 - Coding Storytime for Families, 23-31
 - Computational Thinking in Storytime: Robots, 43-52
 - Create and Choreograph Original Music Videos, 323-328
 - Form a Hacker Club and Hacker Club Jr., 267-272
 - IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 - LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
 - Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
 - Program a SUPER Number Guessing Game with Python, 153-162
 - Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
- Luyken, Corinna, 30
- Lynda.com, 354-361
- Lyons, Heather, 107

M

Mad Libs game, 136-144

Make Your Own Cartoon with PBS Kids ScratchJr, 3-6, 4

MakeCode with Circuit Playground Express: Physical Computing for Adults, 370-374

maker movement, gaining an understanding of, 3-6

Mandel Public Library of West Palm Beach, FL, 23

Margaret and the Moon: How Margaret Hamilton Saved the First Lunar Landing (Robbins), 106

Martin, Bill, Jr., 30

Massachusetts Institute of Technology Media Lab, 123, 343

Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61

McClain, Loren, 216, 302

McCracken County (KY) Public Library, xix

McCubbins, Sharon, 32, 37

McNamara, Connor, 136, 145, 153

McNamara, Margaret, 81

McWilliams, Kristin, 233

Meetup.com and Libraries: Programming Partnerships to Teach Adults, 362-369

memes
 overview, 249-250
 Remix a Meme Using Scratch, 249-253

mentorships, 308-312

Michalakis, Nikolaos, 12

microcontrollers, 167-171

Mills, J. Elizabeth, 52

MindWare, 24

MIT App Inventor, 273-278

Mitchell, Susan K., 30

modular programming, 14-22

Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22

The Most Magnificent Thing (Spire), 31

Muncie (IN) Public Library, 216, 302

Munsch, Robert, 40

music projects

Coding Music with Exceptional Learners: Mission Possible, 163-166

Create and Choreograph Original Music Videos, 323-328

My First Coding Book: Packed with Flaps and Lots More to Help You Code without a Computer! (Prottsman), 108

My Robotic Friends, 12

N

The Napping House (Wood), 30

narrative skills

Coding Storytime for Families, 23-31

Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10

national groups for partnerships, list of potential, 364-365

New York Botanical Garden, the Bronx, 362

New York Public Library
 Chatham Square Branch, 66
 53rd Street Branch, 226

Next Generation Science Standards, 382

nonfiction books for kids (ages 4-7), list of, 107-108

Not a Box (Portis), 30

Numeroff, Laura, 24, 28

O

object-oriented programming (OOP), 335-340

Olney, Austin, 335

One Day in the Eucalyptus, Eucalyptus Tree (Bernstrom), 30

1xGDD, 333

opening songs, 25

operators

Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243-248

Scratch Coding for Adults: Creating a Collectible Game, 343-353

worksheet on, 361

opportunities, unequal availability of educational and career, xvi-xvii

O'Shaughnessy, Lisa, 74, 313, 318

Ottawa (ON) Public Library, Greenboro Branch, 258
 Outreach Programming with Robots and Coding, 195-203
 Ozobots, 114
 Create and Choreograph Original Music Videos, 323-328
 Form a Hacker Club and Hacker Club Jr., 267-272

P

parents, projects with. *See* family projects
 participation broadening as theme for facilitating CT literacies, xix
 Partners in Technology: How to Create a Successful Technology Mentorship Program, 308-312
 Partners in Technology program, 308-312
 partnerships
 Meetup.com and Libraries:
 Programming Partnerships to Teach Adults, 362-369
 national groups to use as potential partners, 364-365
 Partners in Technology: How to Create a Successful Technology Mentorship Program, 308-312
 Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53-55
 pattern recognition
 defined, 43
 Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53-55
 Preschool Coding: How to Teach Coding to Children, 92-96
 Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
 PBS Family Creative Learning Project, 3-4
 PBS Kids ScratchJr, 3-6
 Pencil Code, 284-288
Penguinaut! (Colleen), 40
Pete the Cat: I Love My White Shoes (Litwin), 30
Pete the Cat, Robo-Pete (Dean), 45
 Pett, Mark, 30

picture books for ages 3-7, list of, 30-31, 106-107
 Pixelatto, 333
 Player Ready: Making Your First Video Game, 302-307
 Portis, Antoinette, 30
 Preschool Coding: How to Teach Coding to Children, 92-96
 Prince George's County (MD) Memorial Library System, 243, 249, 329, 377
 problem solving skills
 Bee-Bot Bowling, 88-91
 Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226-237
 How to Give Successful Coding Workshops for Ages 8-12, 258-264
 IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 Outreach Programming with Robots and Coding, 195-203
 Preschool Coding: How to Teach Coding to Children, 92-96
 Storytime Coding, 79-82
 TechTacular, 83-87
 Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221-225
 Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
 Program a Mad Libs Game with Python, 136-144
 Program A-mazing Finch Robots with Scratch, 210-215
 Program a Number Guessing Game with Python, 145-152
 Program a Scratch Guessing Machine, 289-293
 Program a SUPER Number Guessing Game with Python, 153-162
 Program the Human Robot:
 Decomposition Activities for Preschoolers and Families, 62-65
 Programming Stories: How to Animate with Code, 335-340

- Prottzman, Kiki, 108
 public libraries
 Advancing Beyond Scratch to Text-Based Coding with Pencil Code, 284-288
 After Scratch: Connecting Teen Patrons with Next Steps, 329-334
 Bee-Bot Bowling, 88-91
 Beginner Video Game Coding and Design, 189-194
 Bring Your LEGOs to Life with LEGO Education WeDo, 131-135
 Build an Automated Puppet with Arduino, 167-171
 Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226-237
 Coding Camp for Tweens, 172-188
 Coding Music with Exceptional Learners: Mission Possible, 163-166
 Coding Stations in a K-3 School Library, 110-115
 Coding Storytime for Families, 23-31
 Computational Thinking in Storytime: Robots, 43-52
 A Crash Course in Robotics, 216-220
 Create and Choreograph Original Music Videos, 323-328
 Creating a Tech-Related Circulating Collection, 383-388
 Demonstrating Characterization with ScratchJr, 37-42
 Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243-248
 Form a Hacker Club and Hacker Club Jr., 267-272
 Great Books for Teaching Coding to Preschoolers, 103-109
 Host a Teen and Tween App Development Camp in Your Library, 273-278
 Host an Escape Room with a Robotic Twist, 279-283
 How to Give Successful Coding Workshops for Ages 8-12, 258-264
 IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 Integrate Picture Books to Teach Computational Thinking Skills, 116-119
 Learn with Lynda.com: An Introduction to JavaScript, 354-361
 LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
 Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322
 Make Your Own Cartoon with PBS Kids ScratchJr, 3-6
 MakeCode with Circuit Playground Express: Physical Computing for Adults, 370-374
 Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
 Meetup.com and Libraries: Programming Partnerships to Teach Adults, 362-369
 Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
 Outreach Programming with Robots and Coding, 195-203
 Partners in Technology: How to Create a Successful Technology Mentorship Program, 308-312
 Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53-55
 Player Ready: Making Your First Video Game, 302-307
 Preschool Coding: How to Teach Coding to Children, 92-96
 Program a Mad Libs Game with Python, 136-144
 Program A-mazing Finch Robots with Scratch, 210-215
 Program a Number Guessing Game with Python, 145-152
 Program a Scratch Guessing Machine, 289-293
 Program a SUPER Number Guessing Game with Python, 153-162

- Program the Human Robot:
 - Decomposition Activities for Preschoolers and Families, 62–65
 - Programming Stories: How to Animate with Code, 335–340
 - Remix a Meme Using Scratch, 249–253
 - Rotating Kits for Easy STEM
 - Programming, 377–382
 - Scratch Art: Create and Animate
 - Characters Using Scratch, 204–209
 - Scratch Coding for Adults: Creating a Collectible Game, 343–353
 - Scratch Coding for Tweens: Creating Cartoons, 123–130
 - Screen-Free Coding for Preschoolers, 97–102
 - Storytime Coding, 79–82
 - TechTacular, 83–87
 - Tell Me a Story with ScratchJr, 74–78
 - Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221–225
 - Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294–301
 - Using Bloxels to Teach Storytelling and Video Game Design, 254–257
 - Using Spheros to Retell a Story, 32–36
 - Walk Through My World: Create a Virtual Reality Digital World, 313–317
 - Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7–10
 - Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11–13
 - puppets, 167–171
 - puzzles, 279–283
 - Pygame programming, 333
 - PyLadies, 364
 - Python programming
 - After Scratch: Connecting Teen Patrons with Next Steps, 332–333
 - Program a Mad Libs Game with Python, 136–144
 - Program a Number Guessing Game with Python, 145–152
 - Program a SUPER Number Guessing Game with Python, 153–162
- R**
- RailsBridge, 364
 - The Rainforest Grew All Around* (Mitchell), 30
 - random number generation, 145–152
 - Reading (PA) Public Library, 79, 83, 88
 - “Ready to Code: Connecting Youth to CS Opportunity through Libraries” report, xvii
 - Red Light, Green Light game, 70
 - Remix a Meme Using Scratch, 249–253
 - resources
 - hardware, 389
 - learning, 390
 - nonfiction books for kids (ages 4–7), list of, 107–108
 - picture books for ages 3–7, list of, 30–31, 106–107
 - software, 389–390
 - for starting to include coding and CT activities in your library, xx
 - Rex Wrecks It* (Clanton), 81
 - Reynolds, Peter H., 31
 - Rivera, Bianca, 14
 - Robbins, Dean, 106
 - Robo-Sauce* (Rubin), 80
 - robot crafts, 82
 - Robot Mouse, 92–96
 - Robot Races, 113
 - Robot Turtles, 112–113
 - Robot Zot* (Scieszka), 45, 49
 - robotics
 - Bring Your LEGOs to Life with LEGO Education WeDo, 131–135
 - Coding Camp for Tweens, 172–188
 - Coding Stations in a K-3 School Library, 110–115
 - Computational Thinking in Storytime: Robots, 43–52
 - A Crash Course in Robotics, 216–220
 - Create and Choreograph Original Music Videos, 323–328

robotics (cont.)

- Host an Escape Room with a Robotic Twist, 279-283
- LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
- Outreach Programming with Robots and Coding, 195-203
- Program A-mazing Finch Robots with Scratch, 210-215
- Program the Human Robot:
 - Decomposition Activities for Preschoolers and Families, 62-65
 - Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294-301
- Robots, Robots, Everywhere* (Flies), 81
- Rosen, Michael, 30
- Rotating Kits for Easy STEM Programming, 377-382
- RtC Facilitation Pathway, xviii
- Rubin, Adam, 80

S

- Saltzberg, Barney, 31
- sample worksheets for introduction to computer programming, 358-361
- Santat, Dan, 31
- Sauers, Michael P., 383
- Schachner, Judy, 40
- Schofield, Joanna, 3, 131, 279, 354
- school libraries
 - Advancing Beyond Scratch to Text-Based Coding with Pencil Code, 284-288
 - After Scratch: Connecting Teen Patrons with Next Steps, 329-334
 - Bee-Bot Bowling, 88-91
 - Beginner Video Game Coding and Design, 189-194
 - Bring Your LEGOs to Life with LEGO Education WeDo, 131-135
 - Build an Automated Puppet with Arduino, 167-171
 - Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226-237
 - Coding Camp for Tweens, 172-188
 - Coding Music with Exceptional Learners: Mission Possible, 163-166
 - Coding Stations in a K-3 School Library, 110-115
 - Computational Thinking in Storytime: Robots, 43-52
 - A Crash Course in Robotics, 216-220
 - Create and Choreograph Original Music Videos, 323-328
 - Creating a Tech-Related Circulating Collection, 383-388
 - Demonstrating Characterization with ScratchJr, 37-42
 - Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243-248
 - Form a Hacker Club and Hacker Club Jr., 267-272
 - Great Books for Teaching Coding to Preschoolers, 103-109
 - Host a Teen and Tween App Development Camp in Your Library, 273-278
 - Host an Escape Room with a Robotic Twist, 279-283
 - How to Give Successful Coding Workshops for Ages 8-12, 258-264
 - IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 - Integrate Picture Books to Teach Computational Thinking Skills, 116-119
 - Learn with Lynda.com: An Introduction to JavaScript, 354-361
 - LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238-242
 - Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322
 - Make Your Own Cartoon with PBS Kids ScratchJr, 3-6
 - Mazes and Games: How to Integrate Algorithm Design with Analog Preschool and Family Activities, 56-61
 - Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22

- Outreach Programming with Robots and Coding, 195–203
- Partners in Technology: How to Create a Successful Technology Mentorship Program, 308–312
- Pattern Play: Analog Activities to Explore Patterns with Preschoolers and Families, 53–55
- Player Ready: Making Your First Video Game, 302–307
- Preschool Coding: How to Teach Coding to Children, 92–96
- Program a Mad Libs Game with Python, 136–144
- Program A-mazing Finch Robots with Scratch, 210–215
- Program a Number Guessing Game with Python, 145–152
- Program a Scratch Guessing Machine, 289–293
- Program a SUPER Number Guessing Game with Python, 153–162
- Program the Human Robot: Decomposition Activities for Preschoolers and Families, 62–65
- Programming Stories: How to Animate with Code, 335–340
- Remix a Meme Using Scratch, 249–253
- Rotating Kits for Easy STEM Programming, 377–382
- Scratch Art: Create and Animate Characters Using Scratch, 204–209
- Scratch Coding for Adults: Creating a Collectible Game, 343–353
- Screen-Free Coding for Preschoolers, 97–102
- TechTacular, 83–87
- Tell Me a Story with ScratchJr, 74–78
- Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221–225
- Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294–301
- Using Bloxels to Teach Storytelling and Video Game Design, 254–257
- Using Spheros to Retell a Story, 32–36
- Walk Through My World: Create a Virtual Reality Digital World, 313–317
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7–10
- Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11–13
- school visits, use of TechTacular for, 87
- Scieszka, Jon, 45, 49
- Scratch Art: Create and Animate Characters Using Scratch, 204–209
- Scratch Coding for Adults: Creating a Collectible Game, 343–353
- Scratch Coding for Tweens: Creating Cartoons, 123–130
- Scratch programming
 - Beginner Video Game Coding and Design, 189–194
 - Coding Camp for Tweens, 172–188
 - Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243–248
 - How to Give Successful Coding Workshops for Ages 8–12, 258–264
 - Program A-mazing Finch Robots with Scratch, 210–215
 - Program a Scratch Guessing Machine, 289–293
 - Remix a Meme Using Scratch, 249–253
 - Scratch Art: Create and Animate Characters Using Scratch, 204–209
 - Scratch Coding for Adults: Creating a Collectible Game, 343–353
- ScratchED, 365
- ScratchJr programming, 113–114
 - Demonstrating Characterization with ScratchJr, 37–42
 - Make Your Own Cartoon with PBS Kids ScratchJr, 3–6
 - Tell Me a Story with ScratchJr, 74–78
- Screen-Free Coding for Preschoolers, 97–102
- sequencing
 - Coding Stations in a K-3 School Library, 110–115

sequencing (cont.)

- Integrate Picture Books to Teach Computational Thinking Skills, 116-119
- Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
- Preschool Coding: How to Teach Coding to Children, 92-96
- Scratch Art: Create and Animate Characters Using Scratch, 204-209
- Tell Me a Story with ScratchJr, 74-78
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10

servo motors, 167-171

Setford, Steve, 193

Sheehan, Emily, 267, 273, 323

simple circuits, 167-171

Sirrett, Dawn, 105

Skippjon Jones (Schachner), 40

social and emotional (SE) skills, xv

software resources, 389-390

Sonic Pi, 332

spatial reasoning skills

- Coding Storytime for Families, 23-31
- Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10

special libraries, partnerships and, 362-369

Sphero technology, 32-36

Spires, Ashley, 31

Spiro, Ruth, 30, 106

sprite creation and modification

- Digital Dress-Up: Creating Drag-and-Drop Games in Scratch, 243-248
- Remix a Meme Using Scratch, 249-253
- Scratch Art: Create and Animate Characters Using Scratch, 204-209
- Scratch Coding for Adults: Creating a Collectible Game, 343-353

Steinbauer, Amy, 56

STEM (science, technology, engineering, and mathematics)

- jobs, xv
- program, 377-382

Stencyl

- After Scratch: Connecting Teen Patrons with Next Steps, 333
- Player Ready: Making Your First Video Game, 302-307

Stephanie's Ponytail (Munsch), 40

Story Mapping, 7-10

storytelling skills

- Choose Your Own Adventure: Bring Coding to Life with Interactive Storytelling, 226-237
- Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322

- Programming Stories: How to Animate with Code, 335-340
- Using Bloxels to Teach Storytelling and Video Game Design, 254-257

Walk Through My World: Create a Virtual Reality Digital World, 313-317

Before You Plug In, Analog Games to Play with Young Children: Story Mapping, 7-10

Storytime Coding, 79-82

strings, 151, 360

Supercharged Storytimes: An Early Literacy Planning and Assessment Guide (Mills, Campana, and Ghoting), 52

syntax, worksheet on, 359

T

Taback, Simms, 30

Tech Activity Kits, 383-388

Techavanich, Kristine, 23

TechTacular, 83-87

Tell Me a Story with ScratchJr, 74-78

text-based coding

- Advancing Beyond Scratch to Text-Based Coding with Pencil Code, 284-288

After Scratch: Connecting Teen Patrons with Next Steps, 329-334

There Was an Old Lady Who Swallowed a Fly (Taback), 30

Thimble programming, 332

Think Fun, 112

- Think & Learn Code-a-pillar. *See*
Code-a-pillar
- Thinkersmith, 12
- Thonny
Program a Mad Libs Game with
Python, 136-144
Program a Number Guessing Game
with Python, 145-152
Program a SUPER Number Guessing
Game with Python, 153-162
- Three Little Aliens and the Big Bad Bot*
(McNamara), 81
- Thunkable, 273-278
- tips and resources for starting to include
coding and CT activities in your
library, xx
- Toran, Melanie, 163
- “Toying with Tech: Early Coding and
Computational Thinking in a
Museum Setting” (blog post), 52
- toys, activities featuring coding, 81-82
- Trapani, Iza, 30
- Trinket, 332-333
- Trivisonno, Maria, 134
- troubleshooting
Advancing Beyond Scratch to Text-
Based Coding with Pencil Code,
284-288
Build an Automated Puppet with
Arduino, 167-171
Host a Teen and Tween App
Development Camp in Your
Library, 273-278
Program A-mazing Finch Robots with
Scratch, 210-215
- tweens (ages 8-12)
Advancing Beyond Scratch to Text-
Based Coding with Pencil Code,
284-288
After Scratch: Connecting Teen
Patrons with Next Steps, 329-334
Bee-Bot Bowling, 88-91
Beginner Video Game Coding and
Design, 189-194
Bring Your LEGOs to Life with LEGO
Education WeDo, 131-135
Build an Automated Puppet with
Arduino, 167-171
Choose Your Own Adventure: Bring
Coding to Life with Interactive
Storytelling, 226-237
Coding Camp for Tweens, 172-188
Coding Music with Exceptional
Learners: Mission Possible, 163-166
A Crash Course in Robotics, 216-220
Create and Choreograph Original
Music Videos, 323-328
Creating a Tech-Related Circulating
Collection, 383-388
Demonstrating Characterization with
ScratchJr, 37-42
Digital Dress-Up: Creating Drag-and-
Drop Games in Scratch, 243-248
Form a Hacker Club and Hacker Club
Jr., 267-272
Host a Teen and Tween App
Development Camp in Your
Library, 273-278
Host an Escape Room with a Robotic
Twist, 279-283
How to Give Successful Coding
Workshops for Ages 8-12, 258-264
Integrate Picture Books to Teach
Computational Thinking Skills,
116-119
LEGO Sumobots: Programming
Robots with LEGO MINDSTORMS,
238-242
Living in Fairyland: Explore Fairy
Tales with VR Technology, 318-322
Mazes and Games: How to Integrate
Algorithm Design with Analog
Preschool and Family Activities,
56-61
Outreach Programming with Robots
and Coding, 195-203
Partners in Technology: How to
Create a Successful Technology
Mentorship Program, 308-312
Pattern Play: Analog Activities to
Explore Patterns with Preschoolers
and Families, 53-55
Player Ready: Making Your First Video
Game, 302-307
Program a Mad Libs Game with
Python, 136-144

tweens (ages 8-12) (cont.)

- Program A-mazing Finch Robots with Scratch, 210-215
 - Program a Number Guessing Game with Python, 145-152
 - Program a Scratch Guessing Machine, 289-293
 - Program a SUPER Number Guessing Game with Python, 153-162
 - Program the Human Robot: Decomposition Activities for Preschoolers and Families, 62-65
 - Programming Stories: How to Animate with Code, 335-340
 - Remix a Meme Using Scratch, 249-253
 - Rotating Kits for Easy STEM Programming, 377-382
 - Scratch Art: Create and Animate Characters Using Scratch, 204-209
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
 - Scratch Coding for Tweens: Creating Cartoons, 123-130
 - TechTacular, 83-87
 - Tell Me a Story with ScratchJr, 74-78
 - Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221-225
 - Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294-301
 - Using Bloxels to Teach Storytelling and Video Game Design, 254-257
 - Using Spheros to Retell a Story, 32-36
 - Walk Through My World: Create a Virtual Reality Digital World, 313-317
 - Before You Plug In, Analog Games to Play with Young Children: The Human Robot, 11-13
- Twine, 331-332
- \$200-\$500 projects
- Bring Your LEGOs to Life with LEGO Education WeDo, 131-135
 - Computational Thinking in Storytime: Robots, 43-52
 - A Crash Course in Robotics, 216-220

- IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 - Using Spheros to Retell a Story, 32-36
- \$200 and under projects
- Bee-Bot Bowling, 88-91
 - Beginner Video Game Coding and Design, 189-194
 - Build an Automated Puppet with Arduino, 167-171
 - Coding Music with Exceptional Learners: Mission Possible, 163-166
 - Coding Stations in a K-3 School Library, 110-115
 - Create and Choreograph Original Music Videos, 323-328
 - Creating a Tech-Related Circulating Collection, 383-388
 - Form a Hacker Club and Hacker Club Jr., 267-272
 - Great Books for Teaching Coding to Preschoolers, 103-109
 - IF You can Imagine It, THEN You Can Code It: Mini-Stories with Dash Robotics, 66-73
 - Integrate Picture Books to Teach Computational Thinking Skills, 116-119
 - Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322
 - MakeCode with Circuit Playground Express: Physical Computing for Adults, 370-374
 - Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
 - Preschool Coding: How to Teach Coding to Children, 92-96
 - Rotating Kits for Easy STEM Programming, 377-382
 - Screen-Free Coding for Preschoolers, 97-102
 - Using Bloxels to Teach Storytelling and Video Game Design, 254-257
 - Walk Through My World: Create a Virtual Reality Digital World, 313-317

U

- underrepresentation in technology, addressing, xix
- Unity (software), 340
- unplugged activities. *See* analog activities
- Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221-225
- Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294-301
- Using Bloxels to Teach Storytelling and Video Game Design, 254-257
- Using Spheros to Retell a Story, 32-36

V

- Vance, David, 289, 294
- variables
 - Mommy and Me Coding: Learning Coding Concepts Together with Code-a-Pillar, 14-22
 - Program a Mad Libs Game with Python, 136-144
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
 - worksheet on, 359-360
- The Very Hungry Caterpillar* (Carle), 24, 26, 117, 118
- video games
 - Beginner Video Game Coding and Design, 189-194
 - Player Ready: Making Your First Video Game, 302-307
 - Scratch Coding for Adults: Creating a Collectible Game, 343-353
 - Using Bloxels to Teach Storytelling and Video Game Design, 254-257
- viral images and memes, 249-253
- virtual reality (VR)
 - Living in Fairyland: Explore Fairy Tales with VR Technology, 318-322
 - Walk Through My World: Create a Virtual Reality Digital World, 313-317
- Visser, Marijke, xv

W

- Walk Through My World: Create a Virtual Reality Digital World, 313-317
- Wallmark, Laurie, 107
- Waseca (MN) Public Library, xx
- We're Going on a Bear Hunt* (Rosen), 30
- Westerville (OH) Public Library, 172, 189, 195
- What Do You Do with an Idea?* (Yamada), 31
- White Plains (NY) Public Library, 335
- Wing, Jeannette, 52
- Wood, Audrey, 30
- Woodcock, Jon, 193
- worksheets for introduction to computer programming, sample, 358-361
- workshops
 - How to Give Successful Coding Workshops for Ages 8-12, 258-264
 - Meetup.com and Libraries: Programming Partnerships to Teach Adults, 362-369
- WYSIWYG game, 82

Y

- Yamada, Kobi, 31
- young adults (ages 13-18)
 - Advancing Beyond Scratch to Text-Based Coding with Pencil Code, 284-288
 - After Scratch: Connecting Teen Patrons with Next Steps, 329-334
 - Bring Your LEGOs to Life with LEGO Education WeDo, 131-135
 - Build an Automated Puppet with Arduino, 167-171
 - Create and Choreograph Original Music Videos, 323-328
 - Creating a Tech-Related Circulating Collection, 383-388
 - Form a Hacker Club and Hacker Club Jr., 267-272
 - Host a Teen and Tween App Development Camp in Your Library, 273-278
 - Host an Escape Room with a Robotic Twist, 279-283
 - Learn with Lynda.com: An Introduction to JavaScript, 354-361

young adults (ages 13–18) (cont.)

- LEGO Sumobots: Programming Robots with LEGO MINDSTORMS, 238–242
- Living in Fairyland: Explore Fairy Tales with VR Technology, 318–322
- Partners in Technology: How to Create a Successful Technology Mentorship Program, 308–312
- Player Ready: Making Your First Video Game, 302–307
- Program a Mad Libs Game with Python, 136–144
- Program a Number Guessing Game with Python, 145–152
- Program a Scratch Guessing Machine, 289–293
- Program a SUPER Number Guessing Game with Python, 153–162
- Programming Stories: How to Animate with Code, 335–340
- Rotating Kits for Easy STEM Programming, 377–382

Scratch Art: Create and Animate Characters Using Scratch, 204–209

Scratch Coding for Adults: Creating a Collectible Game, 343–353

Scratch Coding for Tweens: Creating Cartoons, 123–130

Unstructured Learning: Using Drop-In Technology Programs to Engage More Patrons and Support Learning Through Play, 221–225

Use HTML, JavaScript, and CSS to Create an Interactive Online Greet-Bot 3000, 294–301

Walk Through My World: Create a Virtual Reality Digital World, 313–317

youth interests and voice emphasizing as theme for facilitating CT literacies, xix

Z

Zell, Grace, 226