



Programming

Scouts BSA · STEM

Name

Started

Completed

Programming is telling computers what to do, and it powers almost everything around you. You'll learn some history, explore different languages, and write programs of your own. Even if you've never coded before, you can start today.

Requirements

Every official requirement, in plain language. Check the official wording when you sign off (scouting.org/merit-badges/programming/). Tips and examples are ideas, not extra requirements.

1 Safety

Tips for this section: Watch the Digital Safety video and talk about ways to avoid eye strain and sore wrists when you're at a screen.

- ☐ **1a** With a parent's or guardian's permission, watch the Personal Safety Awareness "Digital Safety" video

- ☐ **1b** Discuss how to prevent and give first aid for injuries that can happen while programming, including repetitive stress injuries and eyestrain

- ☐ **2** Talk with your counselor about how programming and programming languages developed over time, covering at least three milestones

Tip: Look up a few milestones in computing history and how programming languages have changed.

Example: Pick five milestones and explain each in a sentence: Ada Lovelace's notes on the Analytical Engine, Grace Hopper's early compiler, FORTRAN, the rise of personal computers with BASIC, and languages like Python and JavaScript today.

3 General knowledge

Tips for this section: Make a list of devices around your house that run code, from phones to microwaves.

Example for this section: Your list might include Python, JavaScript, Java, C, and Swift, with what each is often used for. Then name programmed devices you use daily: a phone, a game console, a car's dashboard, a smart speaker, a microwave.

- ☐ **3a** List five widely used programming languages and describe which industries mainly use each one and why

- ☐ **3b** Describe three programmed devices that you depend on every day

4 Intellectual property

Tips for this section: Talk about why it matters to respect software licenses and the work of other programmers.

Example for this section: Name the four kinds of intellectual property that can protect a program: copyright, patents, trademarks, and trade secrets. Then show what licenses mean in practice: you can reuse an open-source library if you follow its license, but copying a paid game's code and sharing it isn't allowed.

- ☐ **4a** Explain the four kinds of intellectual property that protect computer programs

- ☐ **4b** Describe how licensing software differs from owning it

- ☐ **4c** Describe how freeware, open-source, and commercial software differ, and why you should respect each one's terms of use

- ☐ **5** With your counselor's guidance, pick three different programming languages and development environments to use for 5a, 5b, and 5c

Tip: Try a block-based language first, then a text language. Start small, like a simple game or calculator.

Example: Three programs in three languages: a Scratch game where a sprite collects stars, a Python program that quizzes you on Scout Law points, and a JavaScript web page that converts miles to kilometers. Explain how each one works.

- ☐ **5a** Using language and environment #1, write a new program or change an existing one so it takes input, makes decisions and computations, and gives output; debug it, demo it for your counselor, and explain how it works

- ☐ **5b** Using language and environment #2, write or change a program with input, decisions, computations, and output; then debug it, demo it, and explain it to your counselor

- ☐ **5c** Using language and environment #3, write or change a program with input, decisions, computations, and output; then debug it, demo it, and explain it to your counselor

6 Careers and hobbies: Choose 1 of 2

Tips for this section: Ask a programmer about their job, or join a coding club at school or the library.

- ☐ **6a** Research one programming career (training, education, costs, job outlook, pay, duties, advancement), with a parent's OK for online searches, interviews, or visits; discuss what you found and its appeal with your counselor

- ☐ **6b** Research how programming skills could support a hobby or healthy lifestyle, including training, costs, and supporting organizations, then discuss your short- and long-term goals with your counselor