

Call for Code P-TECH Challenge Raw Materials

Welcome curious programmers! This resource will help guide your learning by outlining some suggestions. Use this resource to get started but stay curious and make sure to explore additional resources as needed. Reminder, spend time understanding your topic (COVID-19 or Climate Change), how the problem affects your user (Design Thinking), the type of technology you will use (Chatbots, web development, dashboards, mobile apps), type of coding language you will need to learn, and don't forget to learn about professional skills along the way that will help you write and record your submission.

| Topic Resources | |
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| COVID-19 | |
| | <ul style="list-style-type: none"> (WEBSITE): Open Pandemics |
| CLIMATE CHANGE | |
| | <ul style="list-style-type: none"> (6:53 mins) VIDEO: Understanding Climate Change |

| Professional Skill Resources | |
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| Professional Skills + Badge | Link: https://ptech.yourlearning.ibm.com/channel/CNL_LCB_1565754160933 |
| <p>These courses will help you get a handle on the key skills you need to transition successfully from school to work. Take the courses that will help you the most or take all five courses and the quizzes and you can earn a badge.</p> <p>Suggestions include:</p> <ul style="list-style-type: none"> (155 mins) LEARNING PLAN: Present with Purpose (70 mins) LEARNING PLAN: Collaborate Effectively (90 mins) LEARNING PLAN: Interpersonal Skills (75 mins) LEARNING PLAN: Deliver Quality Work with Agility (100 mins) LEARNING PLAN: Solving Problems with Critical and Creative Thinking (15 mins) LEARNING PLAN: Learn How to Claim Your Digital Badges | |
| Design Thinking + Badge | Link: https://ptech.yourlearning.ibm.com/channel/CNL_LCB_1565755450471 |
| <p>Design thinking is important to everyone, regardless of the kind of job you might seek. It's the framework that businesses, companies, and start-ups use to do all kinds of things: collaborate, align teams, solve real problems, improve users' experience, and respond quickly. In this channel, learn about design thinking principles and practices, and even earn a badge if you'd like.</p> <p>Foundational Suggestions includes:</p> <ul style="list-style-type: none"> (40 mins) LEARNING PLAN: What is Design Thinking? (1.5 hours) LEARNING PLAN: How is Design Thinking Used? (20 mins) LEARNING PLAN: IBM and Design Thinking (2 hrs) E-LEARNING: Enterprise Design Thinking Practioner (15 min) E-LEARNING: Learn How to Claim Your Digital Badges <p>Get Curious- Additional Learning:</p> <ul style="list-style-type: none"> (3 hrs) E-LEARNING: Enterprise Design Thinking Co-Creator (20 min) WEBPAGE: Career Connection (20 min) BOOK/ARTICLE: Design Thinking at Work | |

Coding and Programming Resources

Coding and Programming Foundations

Coding and Programming:
Beginner

Link: https://ptech.yourlearning.ibm.com/channel/CNL_LCB_1594924977217

This channel includes articles, courses, and resources to get started with coding and programming.

Foundational Suggestions Include:

- (8 min) VIDEO: Why you should learn to code
- (2 min) VIDEO: What is Programming
- (33 min) VIDEO: Introduction to Programming
- (4 hrs) E-LEARNING: Think like a computer
- (5 mins) WEBPAGE: Which Programming Language Should I learn First?

Get Curious- Additional Learning:

- (1 hr) EXPERIENTIAL: Code Your Own Dance Party
- (1 hr) EXPERIENTIAL: Code Your Own Flappy Bird Game
- (10 hrs) E-LEARNING: Build Your First Web Pages With HTML and CSS
- (15 hrs) E-LEARNING: Learn Programming with JavaScript
- (4 hrs) E-LEARNING: Learn with Command Line in Terminal
- (8 hrs) E-LEARNING: Learn HTML Tutorial
- (9 hrs) E-LEARNING: Learn CSS Tutorial
- (11 hrs) E-LEARNING: Learn JavaScript Tutorial
- (30 min) WEBPAGE: HTML Element Reference
- (30 min) WEBPAGE: CSS Reference
- (30 min) WEBPAGE: CSS Reference
- (30 min) WEBPAGE: JavaScript and HTML DOM Reference
- (3 hrs): E-LEARNING: First Day on GITHUB

Coding and Programming:
Intermediate

Link: https://ptech.yourlearning.ibm.com/channel/CNL_LCB_1595003677664

Get Curious- Additional Learning

- (2.5 hrs) E-LEARNING: A Beginner's Guide to Using WordPress
- (10 hrs) E-LEARNING: Create Web Page Layouts Using CSS
- (10 hrs) E-LEARNING: Write JavaScript for the Web
- (4 hrs) E-LEARNING: Introduction to jQuery
- (10 hrs) E-LEARNING: Build Web Apps with ReactJS
- (12 hrs) E-LEARNING: Learn the PHP Web Programming Language
- (10 hrs) E-LEARNING: Learn the Ruby Programming Language
- (3.5 hrs) E-LEARNING: Learn W3.JS Tutorial
- (2.5 hrs) E-LEARNING: Learn React Tutorial
- (5.5. hrs) E-LEARNING: Learn AngularJS Tutorial
- (9 hrs) E-LEARNING: Learn PHP Tutorial
- (6 hrs) E-LEARNING: Learn jQuery Tutorial

Coding and Programming
Advanced

Link: https://ptech.yourlearning.ibm.com/channel/CNL_LCB_1595012253103

Get Curious – Additional Learning

- (20 min) E-LEARNING: Write Object-oriented Ruby

- (10 hrs) E-LEARNING: Swift 4 Fundamentals
- (3 hrs) E-LEARNING: Introduction to AJAX
- (2 hrs) E-LEARNING: Learn Node.js Tutorial
- (3 hrs) E-LEARNING: Learning JSON Tutorial
- (12 hrs) E-LEARNING: Learn Python Basics for Data Analysis
- (12 hrs) E-LEARNING: Learn the Python programming Language
- (9 hrs) E-LEARNING: Learn Python Tutorial
- (15 hrs) E-LEARNING: learn Programming with Java
- (3 hrs) E-LEARNING: Object-Oriented Java Programming
- (9 hrs) E-LEARNING: Learn Java Tutorial
- (9 hrs) E-LEARNING: C++ Programming Language
- (8 hrs) E-LEARNING: Learn C++ Tutorial
- (6 hrs) E-LEARNING: Machine Learning
- (3 hrs) E-LEARNING: Learn Machine learning with Python Tutorial
- (5 hrs) E-LEARNING: Introduction to Game AI and Reinforcement Learning

Learning About the Different Technology Resources

Artificial Intelligence

Build Your Own Chatbot

Link: <https://ptech.yourlearning.ibm.com/activity/SN-COURSE-V1:IBMDEVELOPERSKILLSNETWORK+CB0103EN+V2>

Learn how to create chatbots that can carry a conversation with your customers to increase sales, assist your website visitors with questions they may have, provide technical support or do whatever else your imagination inspires you to do. By the time you finish this course, you will be able to rightfully call yourself a chatbot builder.

Prerequisite: Sign-up for an IBM Cloud Account (See directions, about this course, general information).

Learning Plan Course Includes (Total Time: 6 hrs)

- Introduction to Chatbots
- Working with Intents
- Working with Entities
- Defining the Dialog
- Deploying your chatbot
- Advanced Concepts P1
- Advanced Concepts P2
- Certificate and Badge

Developer Tutorials: Chatbots

Link: <https://developer.ibm.com/callforcode/get-started/covid-19/crisis-communication/>

In times of crisis, communications systems are often overwhelmed with people trying to find basic information about testing, symptoms, community response, and other resources. When communication lines get clogged, people who need real help can't get through. Chatbots help respond to tens, even hundreds of thousands of messages a day.

Suggestions include:

- (40 mins): Create a COVID crisis chatbot and connect it to data sources
- (30 mins): Use Watson Assistant APIs to connect your chatbot to a website
- (20 mins): Integrate your COVID crisis communication chatbot with slack
- (30 mins): Create a voice-enabled COVID crisis chatbot connected to Node-RED

What is AI: Module 1

Link: <https://ptech.yourlearning.ibm.com/activity/MDLPT-30>

AI is one of the world's most important emerging technologies. Already impacting the way we live and work, Artificial Intelligence is going to impact virtually every career within the next 5 years. This module introduces you to the

fundamentals of Artificial Intelligence (what is AI), the history of AI, and the distinctions between Artificial Intelligence and Human Intelligence.

Learning Plan Course Includes (Total Time: 2.15 hrs)

- **Lesson 1: This is AI**
 - What do you know about AI?
 - What is AI?
 - What can AI do?
 - Myth or reality?
 - Concerns about AI?
 - Which technology uses AI?
 - Everyday AI
 - Describing AI

- **Lesson 2: History of AI**
 - Evolution of AI
 - 1900s-2020s
 - AI milestones
 - Top three AI Advancements
 - Imagining the Future of AI

- **Lesson 3: AI and HI**
 - What is intelligence?
 - Not smarter, just different
 - Strengths and limitations
 - Better together
 - Creative collaboration
 - Engage: Augment your intelligence

AI And You: Module 2

Link: <https://ptech.yourlearning.ibm.com/activity/MDLPT-31>

In this module, you will explore ethical considerations around AI. You will also learn about the design thinking process and dive into the first step of design thinking (Empathizing) to prepare for your AI Design Challenge.

Learning Plan Course Includes: (Total time: 3 hrs)

- **Lesson 1: AI and Humanity**
 - From one to many
 - What if...
 - AI for good
 - Benefits to humanity
 - Human-centered design
 - Engage: Got a problem? AI can help

- **Lesson 2: Risks of AI**
 - Unintended consequences
 - Negative impacts of AI
 - What is bias?
 - Types of bias
 - Bias in machines
 - Engage: Bias in AI decision-making

- **Lesson 3: Ethics in AI**
 - Ethical or unethical
 - Ethics questions
 - Everyday ethics for AI
 - Ethics principles for AI

- Engage: Evaluate an AI system

- **Lesson 4: The Design Thinking Method**

** If you completed the Design Thinking Badge, this content is repetitive but could be used as review.

- The components of Design Thinking
- Design Thinking in action
- Design Thinking and you
- Stages of Design Thinking
- A focus of empathy
- Engage: Create an empathy map

**Machine Learning and AI:
Module 3**

Link: <https://ptech.yourlearning.ibm.com/activity/MDLPT-32>

This module introduces you to the key concept of machine learning and how it intersects with AI, data, algorithms, and neural networks.

Learning Plan Course Includes Following Topics (Total Time: 3 hrs)

- **Lesson 1: Machine Learning and AI Challenge**

- What is Machine Learning?
- Components of Machine Learning
- How does machine Learning work?
- The Machine Learning process
- The power of Machine Learning
- The Machine Learning process revisited
- Engage: Get inspired

- **Lesson 2: Machine Learning with Data**

- Types of Machine Learning
- Supervised and unsupervised learning
- Classification, clustering, regression
- Reinforcement learning
- Deep learning
- What is data?
- How do you collect data?
- How do you ensure quality data?
- A close-up on bias in data
- Engage: Train a machine – Part 1

- **Lesson 3: AI Design Challenge**

- AI design challenge

- **Lesson 4: Machine Learning with Algorithms**

- Algorithms
- Parts of a Decision Tree
- Decision Trees
- How algorithms work
- Create a Decision Tree
- Algorithmic bias
- Engage: Train a Machine – Part 2

- **Lesson 5: Machine Learning with Neural Networks**

- A Machine Learning Experience
- Types of Machine Learning
- What are neural networks?
- A closer look at neural networks

- Machine Learning and Deep Learning
- Engage: AI Design Challenge – Empathy Map

AI Applications: Module 4

Link: <https://ptech.yourlearning.ibm.com/activity/MDLPT-34>

In this module, you will explore applications of AI tools including natural interaction, computer vision, recommender systems, and autonomous systems. You will also define your user’s problem for the AI Design Challenge.

Course Includes the Following Topics (Total Time: 3 hrs)

- **Lesson 1: Natural Interaction**
 - What is Natural Interaction?
 - Machine Learning and Natural Interaction
 - Processing Natural Interactions
 - Speech
 - Natural Language processing
 - Natural Interaction through language
 - Gestures
 - Affect
 - Natural Interaction and human impact
 - Engage: Natural Interaction activity
- *Lesson 2: Computer Vision (SKIP)*
- **Lesson 3: Recommender Systems**
 - What are recommender systems?
 - How recommender systems work
 - Hybrid recommendation systems
 - Limitations of recommender systems
 - Engage: Recommender system scavenger hunt
- **Lesson 4: Autonomous Systems**
 - Machine Perception
 - What are Autonomous Systems?
 - Autonomous Transportation
 - Engage: Ethical decisions and self-driving car activity

Mobile Applications Developer Toolkit Tutorial

Link: <https://developer.ibm.com/callforcode/get-started/covid-19/community-cooperation/>

Use this starter kit to understand how you can create a mobile application that enables community-based cooperation in times of crisis.

- (25 mins): Create a mobile app to facilitate community collaboration

Build Web Apps with ReactJS

<https://ptech.yourlearning.ibm.com/activity/URL-D3F5599BA88B>

In this course, you'll learn how to use the React JavaScript library for building user interfaces. It is among the most popular JavaScript frameworks in the world, and it powers sites like Facebook, the New York Times, eBay, and Pinterest. React will allow you to create UIs that fluidly handle complex interactions without creating tangled and hard-to-read JavaScript.

In this course, you'll learn how to build a React interface from the ground up, beginning with a set of specifications and ending with a working application that follows the best practices advocated by the React team.

Suggestions include (Total time 10 hrs):

- **Part 1: Set up a React development environment**
 - Understanding React and JavaScript frameworks
 - Use Create-react-app to build React app
 - Look at what's been installed and generated
 - Mounting React inside the webpage
 - Check out the App component
 - Start serving and developing your React app
 - Quiz: Understanding React
- **Part 2: Build components**
 - Components and props
 - Build a ticking clock component
 - Handle events
 - Understand one-way data bindings
 - Quiz: Working with components
- **Part 3: Build an app**
 - Break requirements down into components
 - Build a static app
 - Identify state
 - Handle user input
 - Practice: Add a validation message
 - Practice: Extend the form functionality to edit existing products

**Build Swift Mobile Apps with
Watson AI Services**

<https://ptech.yourlearning.ibm.com/activity/SN-COURSE-V1:IBMDEVELOPERSKILLSNETWORK+SW0101EN+V1>

Build three AI iOS apps in the cloud by using Watson services so that you can analyze the emotion and sentiment in text, recognize what's in a photo, and convert text to speech.

Suggestions include (Total time 2.5 hrs):

- **Watson AI Services**
 - Watson AI Services Overview
- **Lab 1: Analyze Sentiment**
 - Watson Natural Language understanding service
 - Create an application in Swift
 - Install Carthage and add the Watson SDK to your project
 - Create the Watson service and analyze sentiment
 - Lab solution P1
 - Lab solution P2
 - Lab solution P3
 - Quiz
- **Lab 2: Visual Recognition**
 - Watson Visual Recognition service
 - Create an iOS application in Swift
 - Install Carthage and add the Watson SDK to your project
 - Add the Watson service to the mobile app
 - Detect default classifications of an image
 - *SKIP: Detect faces in an image with classification "person"*
 - Run the Watson application
 - Lab 2, solution P1
 - Lab 2, solution P2
 - Quiz

- **Lab 3: Convert Text to Speech**

- Watson Text to Speech service
- Create an application in Swift
- Install Carthage and add the Watson SDK to your project
- Add the Watson service to the mobile app
- Convert text to speech
- Lab 3, solution P1
- Lab 3, solution P2
- Quiz
- Final exam

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| Dashboard Developer Toolkit Tutorial | Link: https://developer.ibm.com/callforcode/get-started/climate-change/water-sustainability/ |
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This tutorial demonstrates how to display hyper-local weather information from a residential or farming weather station, using a personal weather station, Node-RED, Weather Underground, and The Weather Company APIs and the noe-red-contrib-twc-weather nodes.

- (30 mins): Build a weather dashboard

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| Techniques to Manage, Share, and Put Data to Work | Link: https://ptech.yourlearning.ibm.com/activity/ILB-RKXEEWWKENWV2R4E |
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Dive into applications of data science and machine learning. You'll see how programming languages like R and Python and visualization tools like Tableau and ggplot2 can help uncover data's deepest secrets.

Suggestions include:

- (2 mins) LEARNING PLAN: Introduction
- (10 mins) LEARNING PLAN: Sort data to analyze it
- (10 mins) LEARNING PLAN: Visualize data to communicate it
- (3 mins) LEARNING PLAN: Use data to drive machine learning

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| Build Your First Web Pages with HTML and CSS | Link: https://ptech.yourlearning.ibm.com/activity/URL-91584CC5002C?channelId=CNL_LCB_1594924977217 |
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In this course, you will learn how to use HTML5 and CSS3, the two types of code upon which all websites are based.

HTML and CSS are great entry points to the world of code and are necessary languages for any developer or web designer to know. Create your page's content with HTML, and make it look great with CSS. You'll learn all about these two languages and how they work together to render all your favorite websites.

Suggestions include (Total time 10hrs):

- **Part 1: Introduction to HTML and CSS**
 - Write your first lines of HTML and CSS
 - Create content using HTML
 - Decorate your content with CSS
 - Quiz: Understand basic HTML, CSS, and their relationship
- **Part 2: Create HTML text elements**
 - Create headings for strong page structure
 - Add text in paragraphs
 - Strengthen and emphasize text
 - Add links and understand attributes
 - Organize elements in a list
 - Add images to your web page

- Use the best images possible
- Quiz: Test your knowledge of HTML text elements

- **Part 3: Structure an entire page**

- Create general page structure
- Understand block-level and inline elements
- Group content with divs and spans
- Add classes and ids to elements
- Add breaks and lines to your content
- Add a head to your HTML for information about your website
- Quiz: Understand page structure in HTML

- **Part 4: Spice up your content with CSS**

- Apply CSS to elements
- Decide where to write CSS
- Set your first colors
- Understand color theory
- Set fonts
- Control font sizes, line spacing, and word spacing
- Trick out your text
- Get some practice building your first page with HTML and CSS
- Quiz: Change a page's appearance with CSS

Beginner's Guide to Using WordPress

Link: <https://ptech.yourlearning.ibm.com/activity/URL-C47FB0B22EF6>

WordPress is one of the most powerful content management systems (CMS) available. It's versatile, constantly updated, and totally free. You can use it to create simple blogs, large complex websites, and anything in between.

Learn how to use WordPress from start to finish in this course. It's the only WordPress beginner's guide you'll ever need.

Suggestions include (Total time 2.5 hrs):

- **Introduction**

- (1:39 mins) VIDEO: Welcome to the course

- **The Basics**

- (7:40 mins) VIDEO: What is WordPress
- (10:32 mins) VIDEO: Installing WordPress locally
- (9:54 mins) VIDEO: Installing WordPress on a Line Server
- (4:37 mins) VIDEO: Getting familiar with the WordPress dashboard

- **Content Management**

- (15:07 mins) VIDEO: WordPress pages vs. posts
- (10:14 mins) VIDEO: A Quick WordPress Gutenberg tutorial
- (9:30 mins) VIDEO: Uploading and organizing media
- (9:12 mins) VIDEO: Managing WordPress comments
- (6:13 mins) VIDEO: Working with WordPress sidebars and widgets
- (5:41 mins) VIDEO: Building and maintaining menus

- **Customization, Plugins, and Settings**

- (9:01 mins) VIDEO: using the WordPress customizer
- (13:23 mins) VIDEO: Working with themes
- (5:14 mins) VIDEO: Working with plugins
- (6:00 mins) VIDEO: Adding and Managing Users

- (7:06 mins) VIDEO: How to Move a WordPress site
- (8:47 mins) VIDEO: Customizing WordPress via settings