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FAQ and instructions for the XPRT Women Code-a-Thon

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Benchmark **XPRT**



## What exactly will I be doing in the XPRT Women Code-a-Thon?

In the XPRT Women Code-a-Thon, you'll create a small app, or "workload," that mimics an action you do on a mobile device every day. The app can be Web-based or Android-based.

You'll be spending two days creating your workload, and you can code on your own or with a partner in a team of two. At the end of the weekend, a team of judges will examine all the workloads and choose the top three, which will receive cash prizes.

The XPRT development team will also consider all workloads for inclusion in future versions of the XPRTs. All Web-based workloads developed in Javascript and/or HTML5 have the potential to appear in [WebXPRT](#), while Android-based workloads may be a part of [MobileXPRT](#). To learn more about the XPRTs and what they do, check out [What exactly are the XPRTs?](#) below.

## What exactly am I building?

To find examples of possible workloads, look no further than the [What constitutes a successful workload?](#) FAQ question, which contains all of the current workloads in WebXPRT and MobileXPRT. Other examples might include workloads that measure how long it takes to do a 3D animation, load a simple game, or mix a song or podcast. There are no bad ideas for workloads – anything you do often on your device is a possible source of inspiration.

Because the timeframe for the code-a-thon is so short, your workload does not need to have a complete UI.

## What do I need to know to participate?

You should have some experience in Web development (Javascript and/or HTML5) or Android development. The workloads do not need to be complex – we welcome anyone interested in trying their hand at either type of development!

## What tools will I need to bring?

You'll need to bring your device – typically a laptop, but whatever you prefer to code on is great – and your coding skills.

You'll need to find test data for your workload, but you can bring this to the code-a-thon or find it during the contest, whatever is easier for you. This test data is basically a set of sample text, images, and/or videos. If your workload is mimicking the action of loading a page of text, for example, you'll need to have some text for that page; if the workload is applying a filter to a photo, you'll need a sample photo. (In the future, if we use your workload in an XPRT tool, we will provide new sample data for the workload.)

If you're planning on developing for Android, please also bring an Android device for testing and enable USB debugging on it. You should also download Google's Android Studio, which is available for free at <https://developer.android.com/sdk/index.html>. You'll be using this tool for development.

For either the Web-based or Android workloads, you may use any open source or freely available libraries. There's no point reinventing the wheel!

## What will PT bring to the table?

A few days before the code-a-thon, you'll receive access to the complete source code for WebXPRT and MobileXPRT. This source code will give you a jumping-off point for creating your workloads. You may wish to familiarize yourself with it, since it will give you an idea of how we've coded workloads in the past. Those developing in Javascript and/or HTML5 will find WebXPRT most helpful, while those developing for Android will find MobileXPRT more useful.

For those developing in Javascript and/or HTML5, we will also provide you with a URL that you can use to upload files and test your workload during the event.

You can find further documentation for WebXPRT and MobileXPRT [here](#).

## What constitutes a successful workload?

The criteria for a successful workload are:

- It must use the device's resources in realistic ways by modeling the behavior of real applications. The workload does not need to be full-featured, as we assume that the workload will model only a portion of the functionality of an application.
- It should model an activity where the delay is noticeable in the real world.
- It must run from a script, without any human interaction during the test.
- It must allow the device to run full speed. Activities that run for a fixed time, like playing a video, will not work. Neither will activities that throttle the device, like games that lock the frame rate.
- Performance must depend only on the device. The program should download content at the beginning of execution, and the timed portion of the code should not include the download time.

- It must run exactly the same way every time.
- It should present the elapsed time in milliseconds as the result.
- It should complete in 1 to 2 minutes on the test device.

And finally, the workload must not duplicate workloads that are already part of WebXPRT and MobileXPRT.

WebXPRT contains six workloads:

**Photo Effects.** Measures the time to apply three effects (Sharpen, Emboss, and Glow) to two photos each for a set of six photos total, each of which is 1024x768 pixels. This test exercises HTML5 Canvas, Canvas 2D, and JavaScript performance. It uses the Pixastic JavaScript Image Processing Library.

**Organize Album.** Measures the time it takes to check for human faces in a set of five photos. The dimensions of the photos are variously 720x480 pixels, 720x504 pixels, and 693x504 pixels. This test exercises HTML5 Canvas, Canvas 2D, and JavaScript performance. It uses the Core Computer Vision JavaScript library.

**Stock Option Pricing.** Calculates and displays graphic views of a stock portfolio comprising 500 stocks. This test exercises HTML5 Canvas, SVG, and JavaScript performance. It uses the dygraphs JavaScript charting library.

**Local Notes.** Measures the time it takes to encrypt, store, and display notes from local storage. This test exercises HTML5 Local Storage, JavaScript, AES encryption, and asm.js performance. It uses the localStorageDB.js database layer for localStorage and sessionStorage, the Emscripten LLVM-to-JavaScript Compiler, and 10 and aes.c for AES encryption.

**Sales Graphs.** Provides a web-based application displaying multiple views of sales data. This test exercises HTML5 Canvas and SVG performance. It uses the D3.js JavaScript library for manipulating documents based on data.

**DNA Sequence Analysis.** Measures the time it takes to process eight DNA sequences for open reading frames (ORFs) and amino acids. This test exercises HTML5 Web Worker and JavaScript (String, regexp and array) performance. It uses the functions findPotentialStartsAndStops and findORFsInSeq and the Sequence Manipulation Suite.

MobileXPRT contains five workloads:

**Apply Photo Effects.** Measures the time to apply four photo effects (Sepia, Vintage, Vignette, and Grayscale) to five 8-megapixel photos each.

**Create Photo Collages.** Measures the time to create five photo collages with four photos in each collage. It applies effects to each photo before including it in the collage.

**Create Slideshow.** Measures the time to create a slideshow video (H.264, 720p) from a photo album and an audio file (327 KB MP4). This test uses the same photos as the previous two tests.

**Encrypt Personal Content.** Measures the time to encrypt (AES 256-bit) and then decrypt two sets of six files. The first set of files comprises five photos and an MP3 audio file. The second set of files comprises five photos and an MP4 video. The 12 pre encryption files total 165 MB in size.

**Detect Faces to Organize Photos.** Measures time to check a set of seven photos for faces. Photos range in size from .3 megapixels to 2.8 megapixels.

## How do the judging and prizes work?

A panel of judges will study all the workloads and choose the top three. Though a successful workload will follow all of the guidelines in the previous question, the top criteria for judging the workloads are:

- It runs successfully to completion and presents the elapsed time in milliseconds.
- It runs without human interaction.
- For repeated runs on a given device, the results are within 5% of each other.
- It lets each device run at its full speed.

The judges' subjective impression of the workload will also be a factor in determining the winners.

You may work on your own or in a team of two. The contestants or teams who produced the top three workloads will receive cash prizes: \$2,500 for first place, \$1,500 for second place, and \$1,000 for third place. If you choose to work with a teammate and win a cash prize, you and your teammate will split the prize.

## What exactly are the XPRTs?

What's always too slow on your device? What's frustrating to do, even though it should be fast and easy? What if there was a tool out there that could tell you just how fast your device is – at these kinds of everyday tasks – compared to other devices out there?

The BenchmarkXPRT tools, or the XPRTs, do just that. They're a set of apps that empower you to test how well devices do everyday activities. These tools, sometimes called "benchmarks," are designed to test a wide range of devices on a level playing field and provide unbiased, fair product comparison information. WebXPRT tests the Web browsing capabilities of any device that can connect to the Internet, while MobileXPRT tests specifically how well Android devices handle everyday activities. You can run these tests on your own devices, get a score, and compare that score to scores from other devices to see how well your device stands up next to others of its type. Companies and individuals who manufacture and review devices use these tools to test new devices and see how they compare to the competition.

There are a lot of these tools, or benchmarks, available in the world. But while many benchmarks test only low-level hardware capabilities, the XPRTs simulate activities that regular people do in their daily lives. We in the BenchmarkXPRT Development Community believe this approach tests the entire device – hardware and software – in a more integrated and representative way. To that end, the purpose of the XPRT Women Code-a-Thon is to create workloads that we could potentially incorporate into future versions of the XPRTs.

That's where you come in. We want workloads that include your perspective on what a regular everyday activity is. The more perspectives WebXPRT and MobileXPRT include, the stronger they'll be – and your ideas could influence a tool that people around the world use.

To learn more, go to [www.benchmarkxpert.com](http://www.benchmarkxpert.com).

## Can you tell me more about WebXPRT?

WebXPRT is a free online tool that tests how well your device handles Web browsing. It can run on any Web-enabled device, from a smartphone to a desktop to a smart TV. After you run the test, you get a score that makes it easy to compare your device against others on the WebXPRT website. If you're developing in Javascript and/or HTML5, your workload is eligible for inclusion in WebXPRT. To learn more and run the test yourself, go to [www.webxpert.com](http://www.webxpert.com).

## Can you tell me more about MobileXPRT?

MobileXPRT is a free Android app that gives you reliable, objective information about how well your Android phone or tablet handles common, everyday tasks. After you download and run the app, it will give you a score that you can use to compare your device with others on MobileXPRT.com. If you're developing for Android, your workload is eligible for inclusion in MobileXPRT. To learn more and download the app, go to [www.mobilexpert.com](http://www.mobilexpert.com).

Contact Jennie Faries at [jfaries@principledtechnologies.com](mailto:jfaries@principledtechnologies.com) with any questions.

Although ChickTech and Principled Technologies will focus on anyone who identifies as a woman/girl for these events and our goal is to empower women/girls, we also welcome those who identify as men as participants. Any person may be asked to not participate and/ or leave if they are being disruptive or creating an unwelcome environment for others.

ChickTech and Principled Technologies do not discriminate on the basis of race, color, religion, sex, gender identity, age, national origin, disability, marital status, sexual orientation, or military status, including, but not limited to, hiring and firing of staff and selection of volunteers and vendors. We are committed to providing an inclusive and welcoming environment for all members of our staff, volunteers, and program participants.