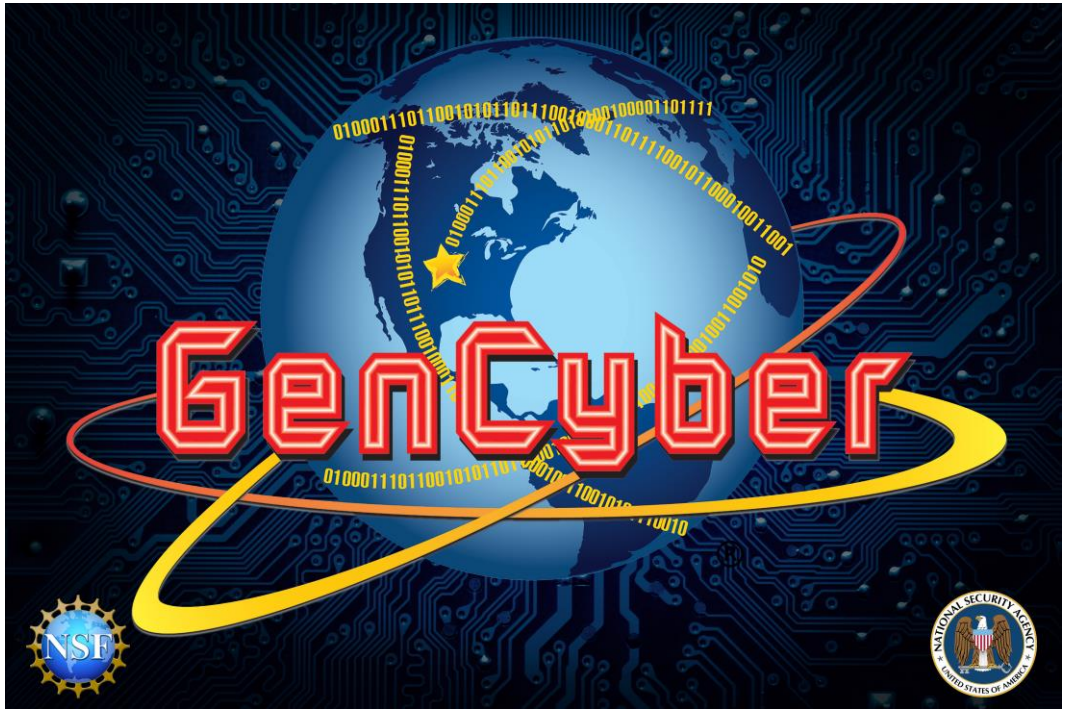

Workshop Overview

January 2022 – Extension Activity

8 Jan 2022

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Agenda

- Welcome (5 min)
- Introductions (15 min)
  - Name
  - State
  - School Name
  - Grades Taught
  - Cyber-Related Classes / Topics Taught
- Workshop Overview (8 minutes)
- Raspberry Pi Introduction (8 minutes)
- Hardware Boot and Troubleshooting (25 minutes)

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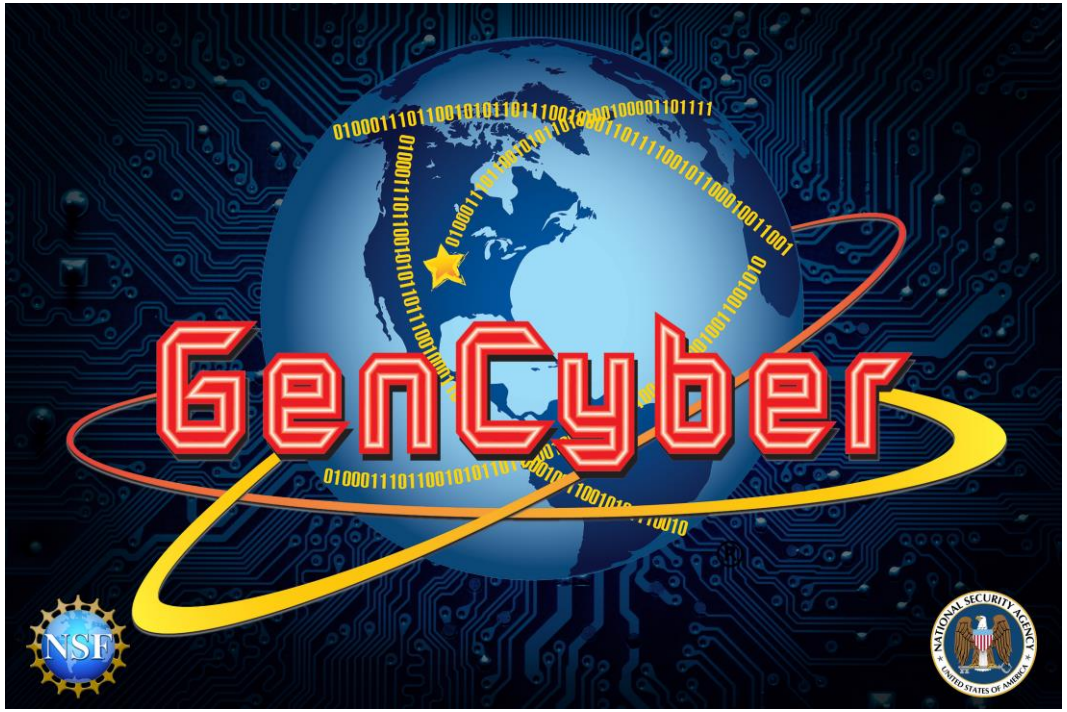
Workshop Overview

Introduce and have participants use and run several cybersecurity-related software programs in Kali, running on the Raspberry Pi (RPi).

- Introduce the affordable hardware environment of the RPi
- Practice using Kali Linux and Linux commands at a command line interface (CLI)
- Explore a few of the many pre-installed cybersecurity-related programs on Kali Linux

Organization of the Workshop

- Introduction / Practice with Kali
- Network forensics with Wireshark
- Password auditing using John the Ripper



Raspberry Pi

An Affordable, Flexible Hardware Platform

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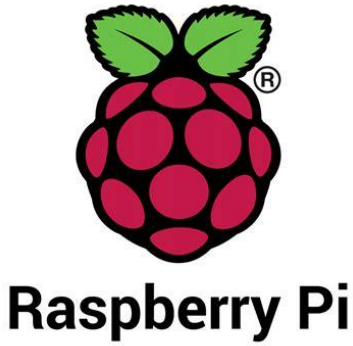
What is a Raspberry Pi?



- Low cost
- Small credit-card sized computer
- Plugs into a computer monitor or TV
- Uses a standard keyboard and mouse
- Capable functionality of a desktop computer
  - Browsing the internet
  - Playing high-definition video
  - Making spreadsheets and word-processing
  - Playing games

https://www.raspberrypi.org/help/what-%20is-a-raspberry-pi/

ARM Processors

- ARM is a family of reduced instruction set computer (RISC) architectures for computer processors
  - Family of processors includes
  - Raspberry Pi (At its core is an ARMv6 CPU)
  - Apple M1 is an ARM-based system on a chip (SoC) – Released Nov. 2020
    - Similar to chips used in iPhone and iPad
    - Lower power
  - Many others!
- Non-ARM processors in majority of computers: Intel / AMD that uses the x86 complex instruction set (CISC) architecture

https://www.arm.com/

What can RPi do for you?

- Small format and affordability – used for many digital maker projects
- Examples:
  - Music machines
  - Parent detectors
  - Weather stations
  - Tweeting birdhouses with infra-red cameras
  - Simpsons TV
  - Darth Vader Cryptocurrency Tracker
  - And sooooo much more!

https://all3dp.com/1/best-raspberry-pi-projects/

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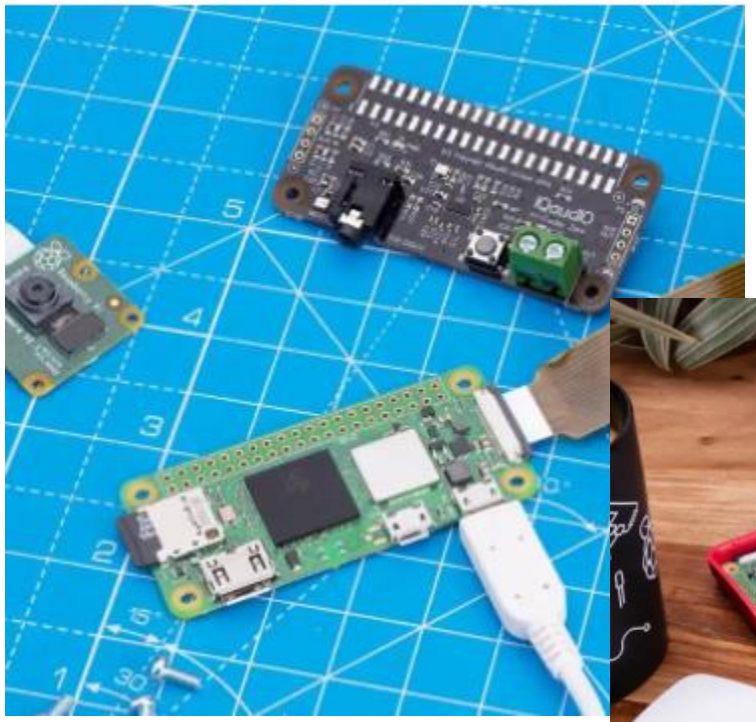
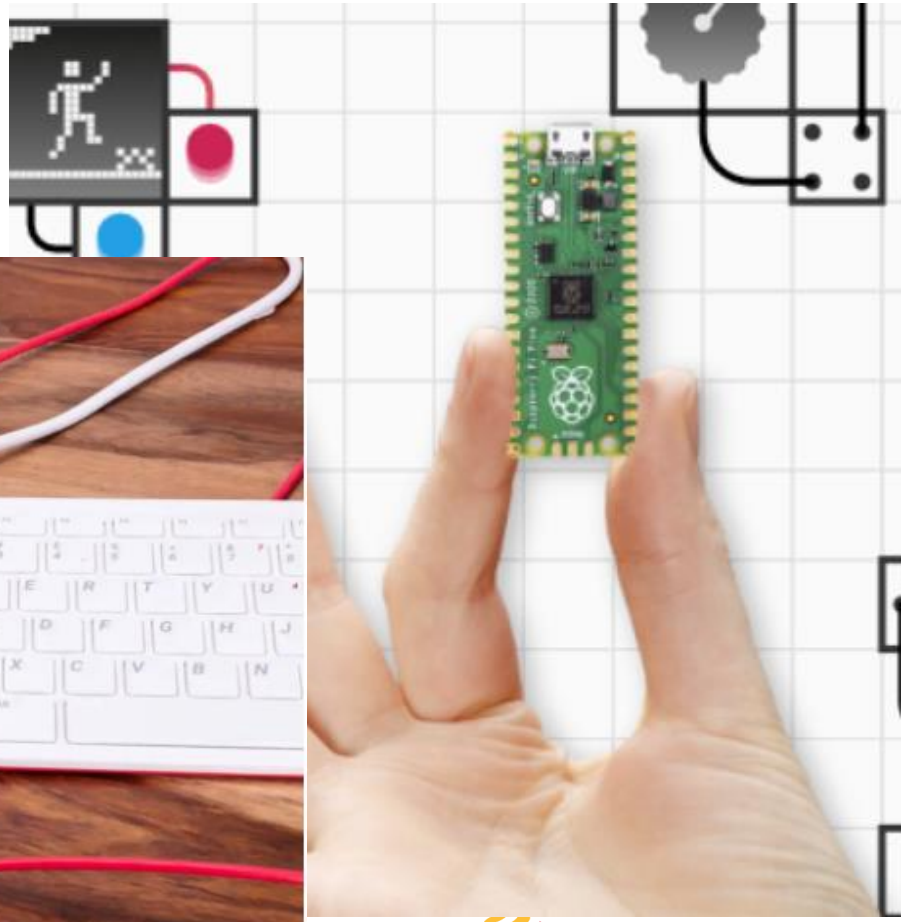
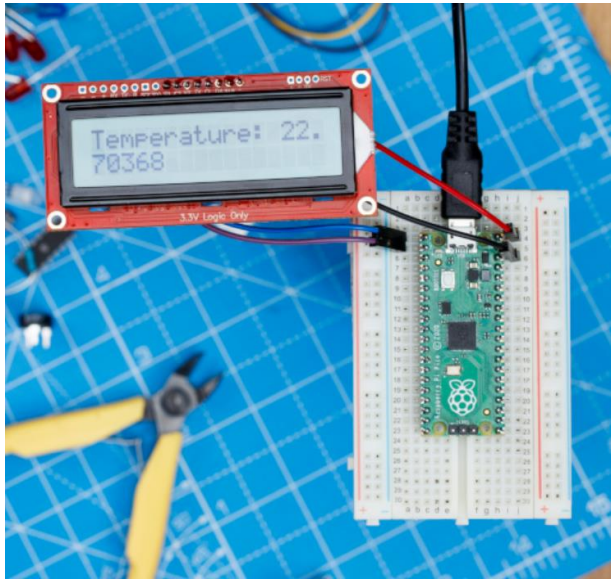
Raspberry Pi Hardware

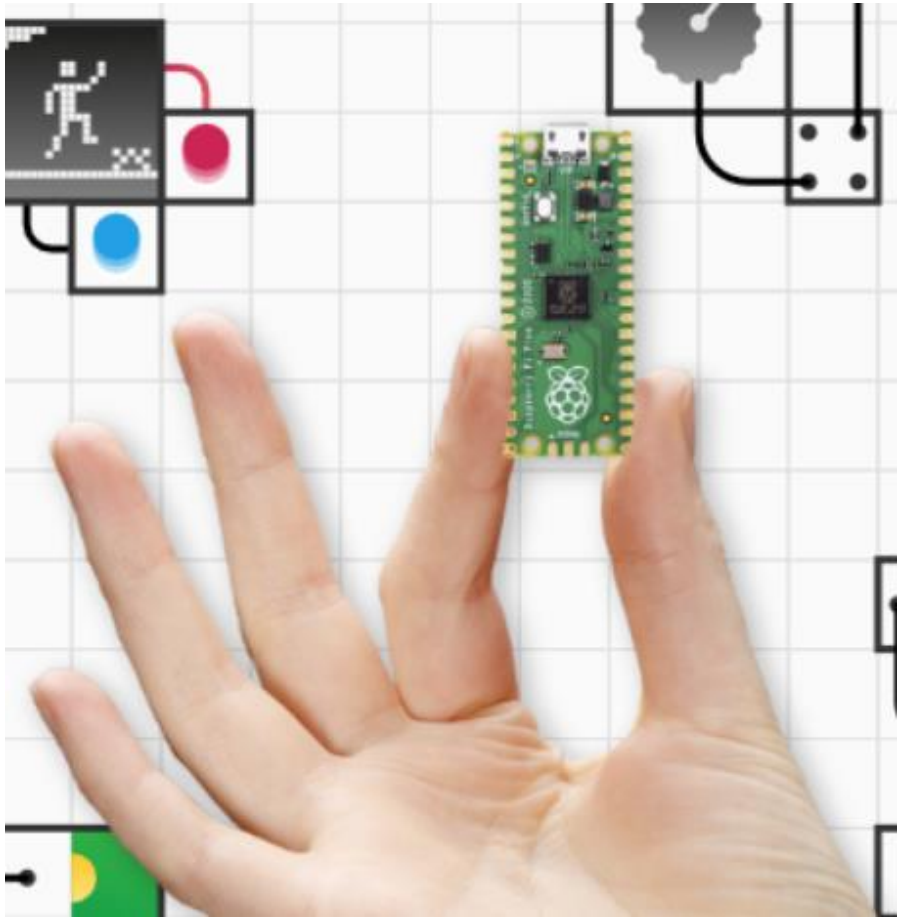




Raspberry Pi Pico (RP2040)

- Tiny microcontroller board
- $4

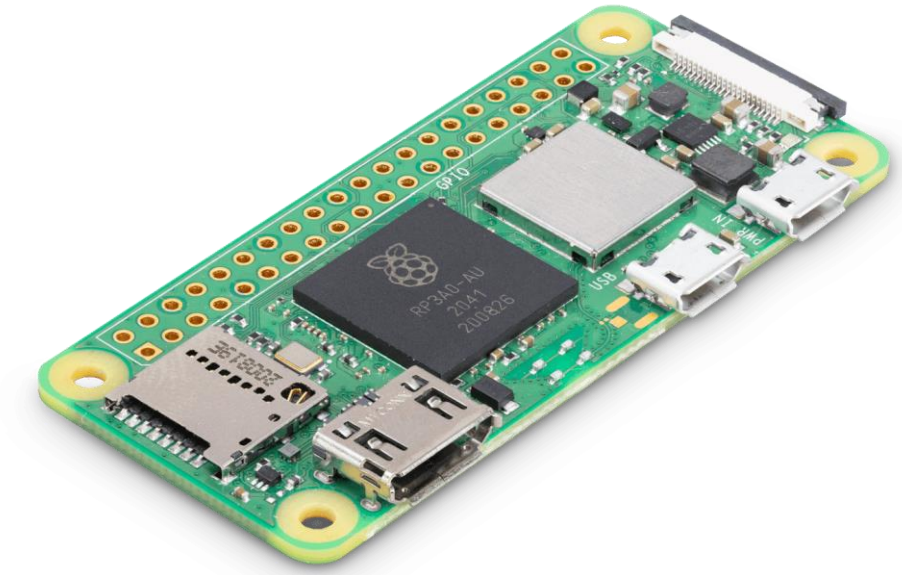




https://www.raspberrypi.com/products/raspberry-pi-pico/

Raspberry Pi Zero 2 W (RP3A0)

- Tiny computer
- $15
- “W” – indicates wireless LAN built in
- Quad-core 64-bit ARM Cortex-A53 processor clocked at 1GHz and 512MB of SDRAM
- 65mm × 30mm form factor



https://www.raspberrypi.com/products/raspberry-pi-zero-2-w/

Hardware Formats of the Raspberry Pi

Current version:

- Raspberry Pi Model 4 B

- Tiny, dual-display, desktop computer
- Starting at $35
- *A more complete description of the all current hardware at https://www.raspberrypi.com/documentation/computers/raspberry-pi.html*

https://www.raspberrypi.com/products/raspberry-pi-4-model-b/

Raspberry Pi 400

- Complete personal computer, built into a compact keyboard
- Purpose-built board based on Raspberry Pi 4
  - Quad-core 64-bit processor
  - 4GB of RAM
  - Wireless networking
  - Dual-display output and 4K video playback
  - 40-pin GPIO header

- This is what you were sent!

https://www.raspberrypi.com/products/raspberry-pi-400/

Overall Setup of Raspberry Pi 400

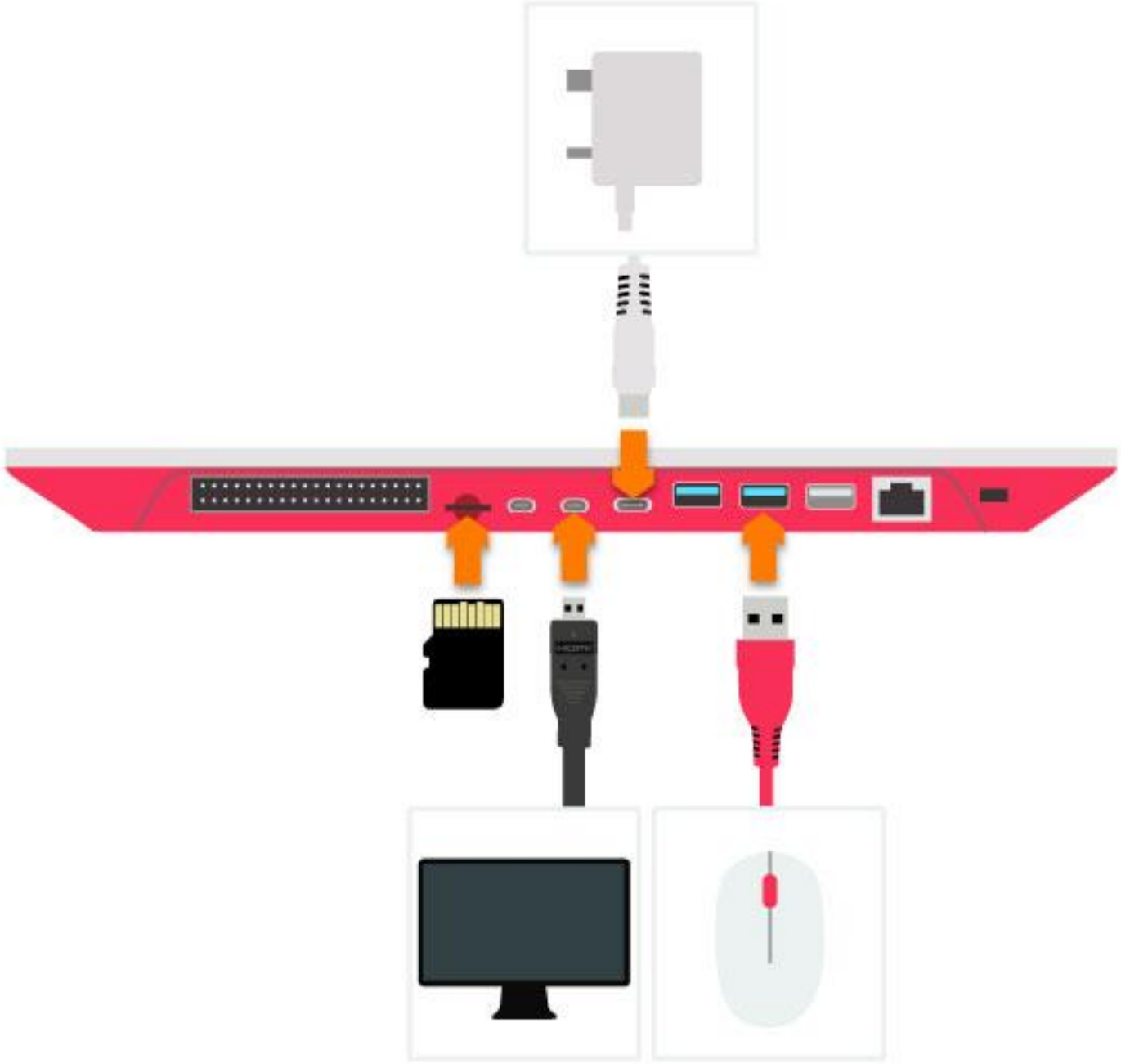
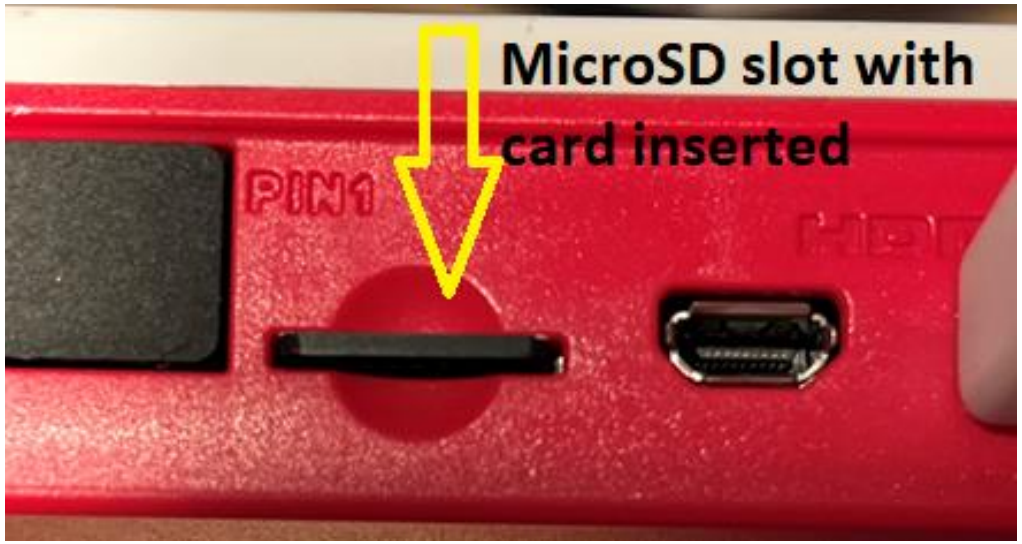


Image from:
https://www.okdo.com/getting-started/get-started-with-raspberry-pi-400/

Rear of Raspberry Pi 400

- All necessary connections made
- Mouse (USB)
- Monitor (microHDMI)
- Power (USB C)

Before Powering Up - Swap the MicroSD Card

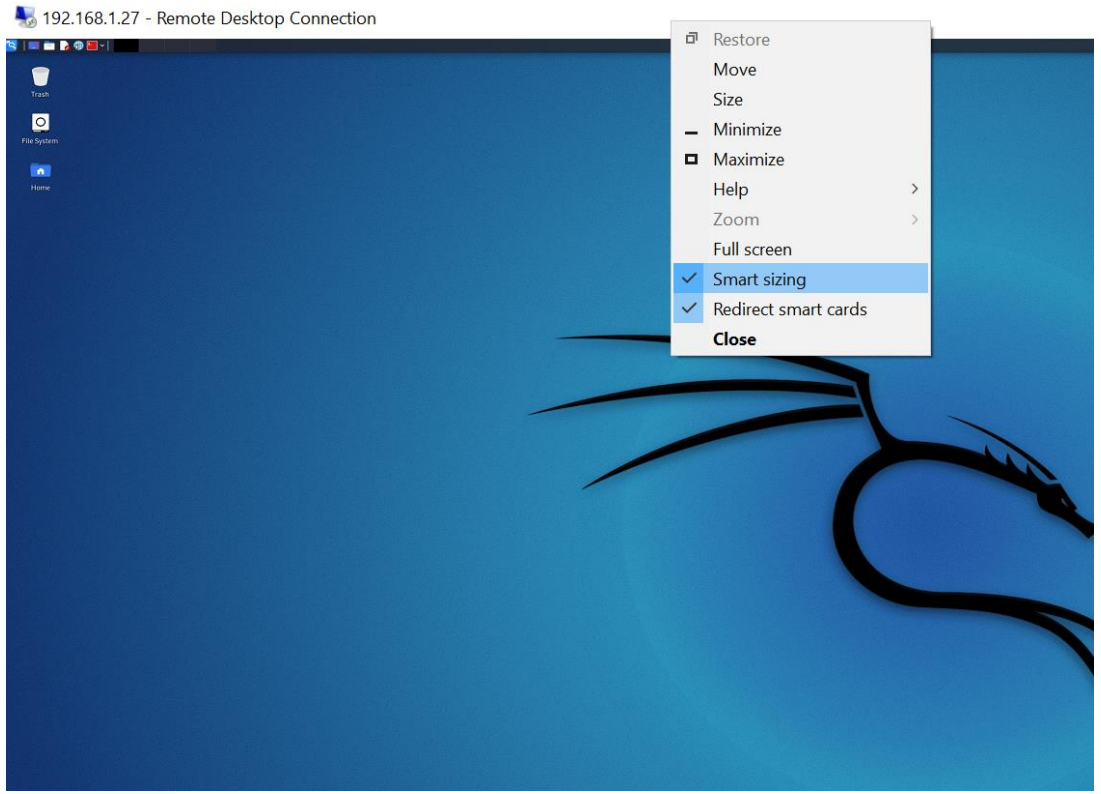


- If you already have a microSD card inserted, replace it with the 32-bit Kali OS for RPi that was shipped to you.
- Push in and when the card pops out, remove it and replace it.
- Be sure the pins are facing toward the bottom of the keyboard *and* that you completely push and lock the microSD card into the slot

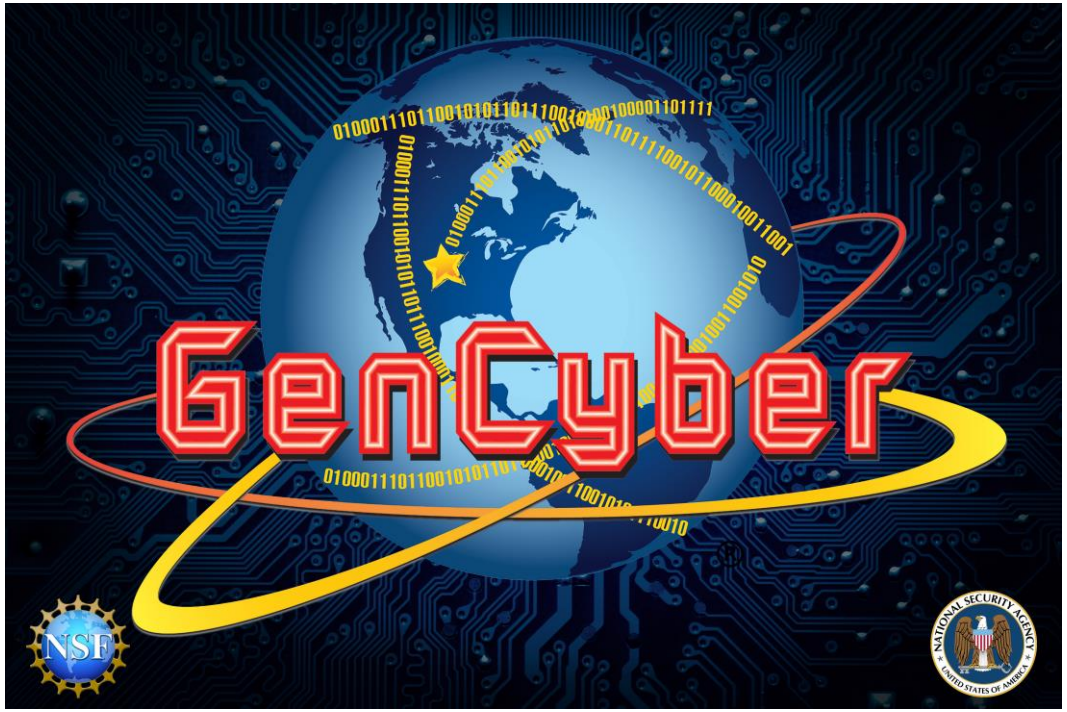
Booting the System

- Turn on your monitor
- Connect the power
- Wait for system to boot
  - Text will roll by – expected!
- Login to system
  - Username: kali
  - Password: kali

- Open a program
  - Such as Internet browser
- Open a command line terminal
  - Run command such as “ls” to list directory contents



Debrief



Wrap-Up

Homework and Reminders

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