

# Raspberry Pi

An Affordable, Flexible Hardware Platform

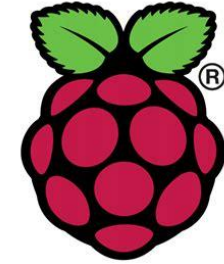
Dr. Shannon Beck – United States Air Force Academy



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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



**Raspberry Pi**



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



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# 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?

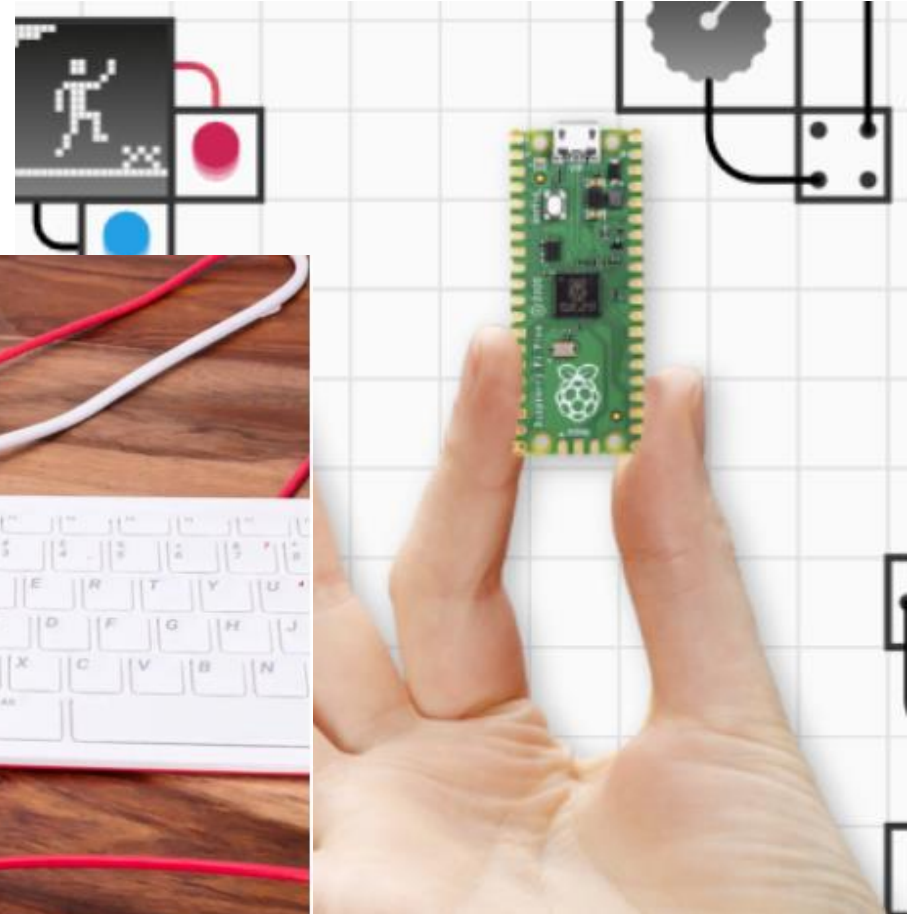
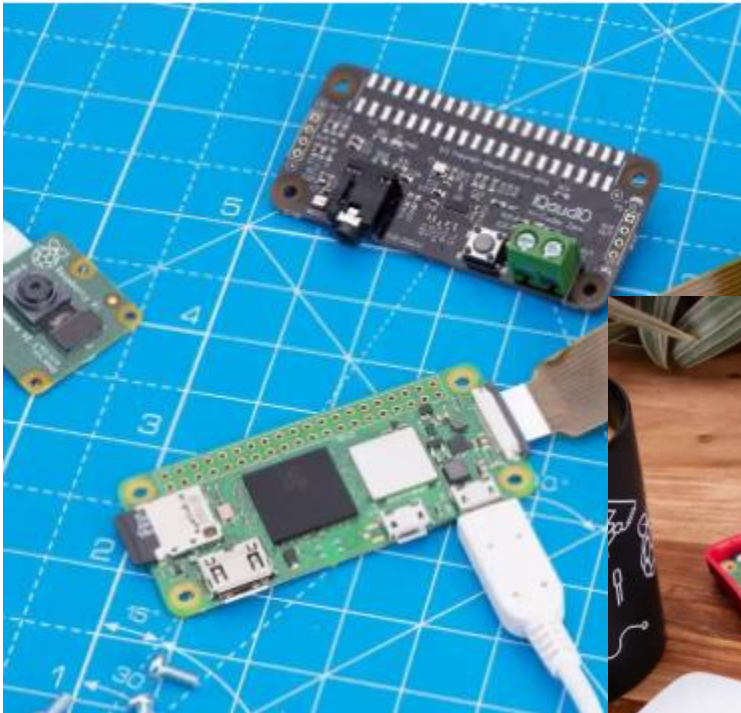
- Small format and affordability – used for many digital maker projects
- Examples:
  - Music machines
  - Parent detectors
  - Weather stations
  - Tweeting birdhouses with infra-red cameras
  - [Simpsons TV](#)
  - [Darth Vader Cryptocurrency Tracker](#)
  - And sooooo much more!



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

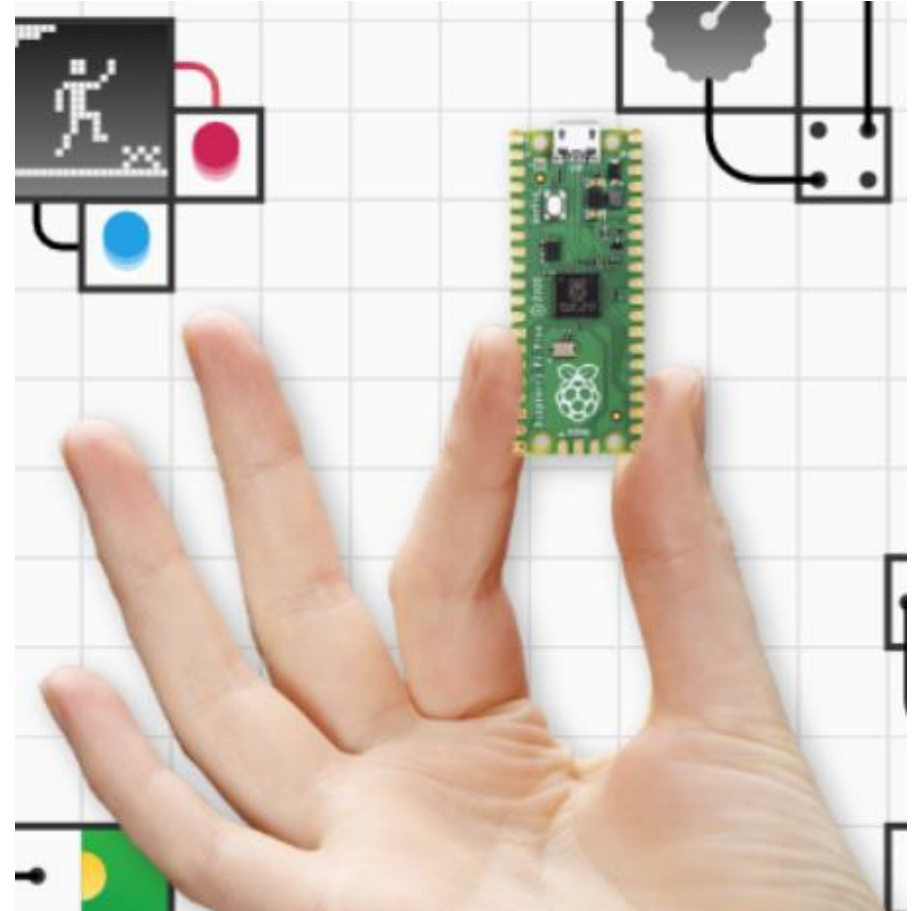
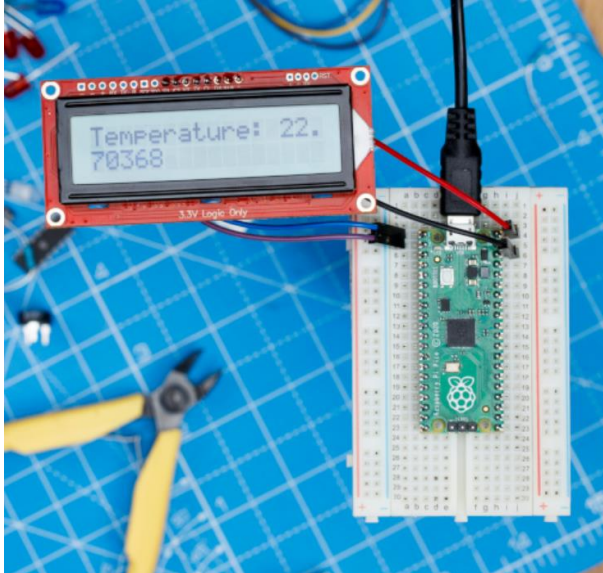


# Raspberry Pi Hardware



# Raspberry Pi Pico (RP2040)

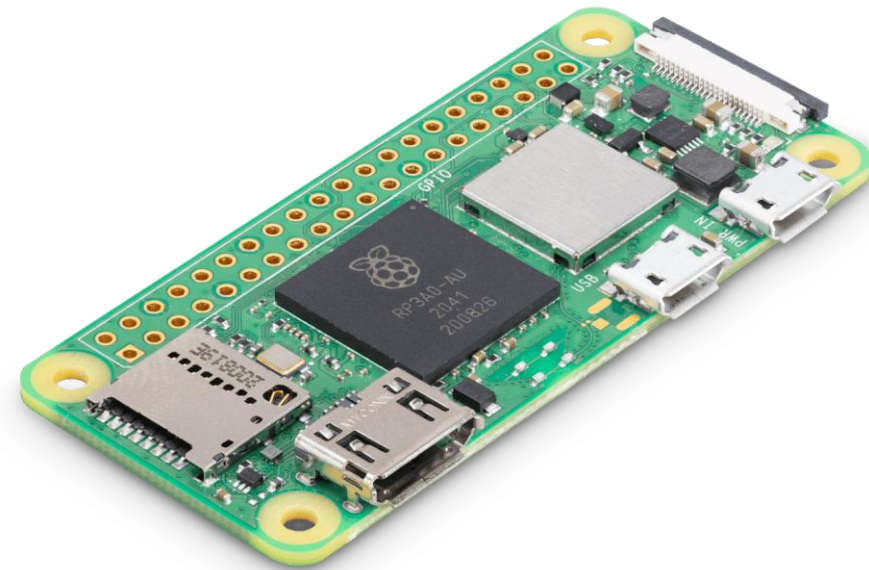
- Tiny microcontroller board
- \$4



<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





# 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!



# Overall Setup of Raspberry Pi 400

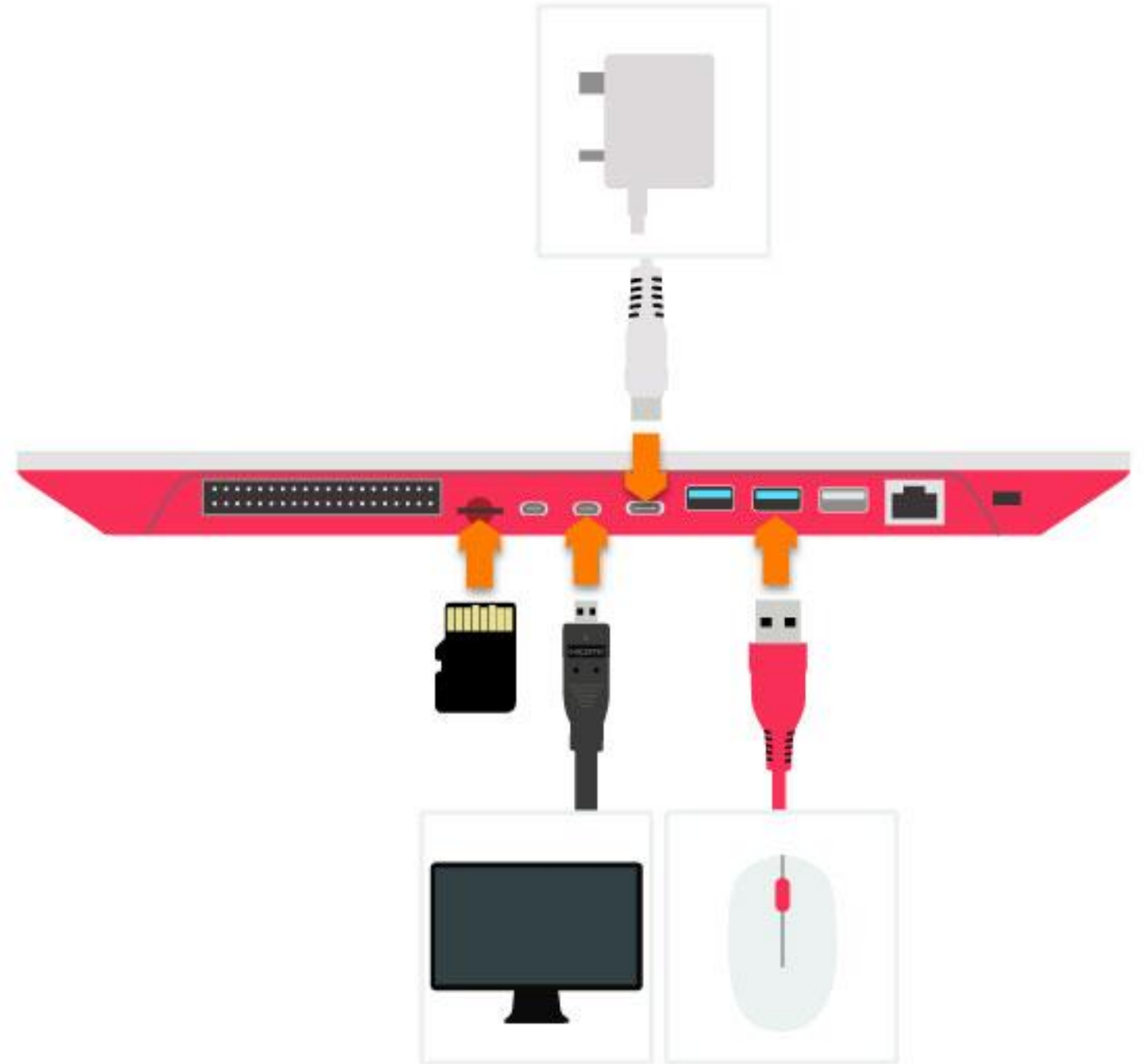


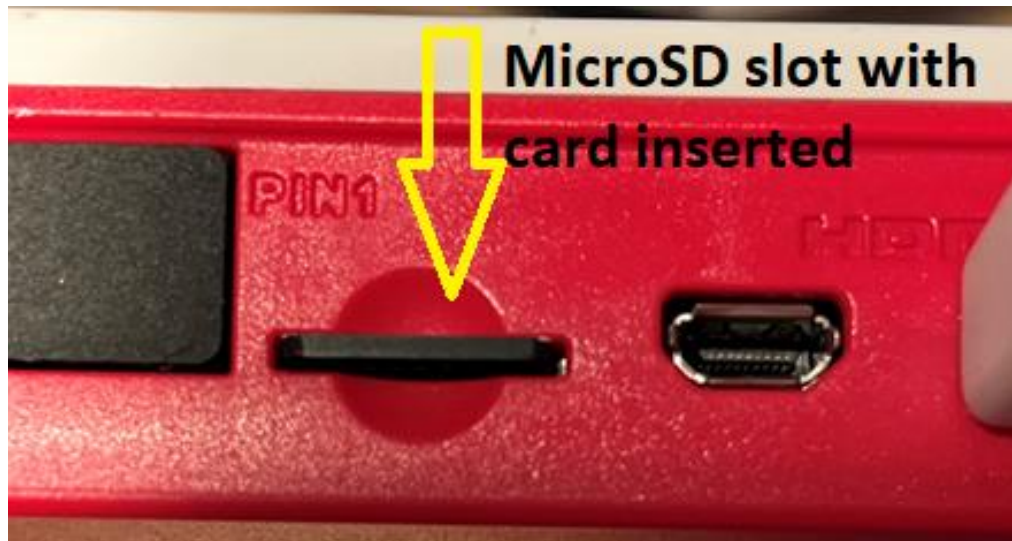
Image from:  
<https://www.okdo.com/getting-started/get-started-with-raspberry-pi-400/>

# 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

