Embedded Linux (D)

Task (4)

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-Different versions of raspberry pi:

	Raspberry Pi 3 B+	Raspberry Pi Zero WH	Raspberry Pi Zero W	Raspberry Pi 3	Raspberry Pi Zero	Raspberry Pi 2	Raspberry Pi A+	Raspberry Pi B
Image								
Release date	2018 Mar 14	2018 Jan 12	2017 Feb 28	2016 Feb 29	2015 Nov 30	2015 Feb 1	2014 Nov 10	2012 Feb 15
Description		Same as Raspberry Pi Zero W with header already soldered						model B mostly w/some model A detail
Product details								
Price	US$35.00	US$15.00	US$10.00	US$35.00	US$5.00	US$35.00	US$20.00	
SOC								
SOC Type	Broadcom BCM2837B0	Broadcom BCM2835	Broadcom BCM2835	Broadcom BCM2837	Broadcom BCM2835	Broadcom BCM2836	Broadcom BCM2835	Broadcom BCM2835
Core Type	Cortex-A53 64-bit	ARM1176JZF-S	ARM1176JZF-S	Cortex-A53 64-bit	ARM1176JZF-S	Cortex-A7	ARM1176JZF-S	ARM1176JZF-S
No. Of Cores	4	1	1	4	1	4	1	1
GPU	VideoCore IV	VideoCore IV	VideoCore IV	VideoCore IV 1080p@30	VideoCore IV	VideoCore IV	VideoCore IV	VideoCore IV 1080p@30
CPU Clock	1.4 GHz	1 GHz	1 GHz	1.2 GHz	1 GHz	900 MHz	700 MHz	700 MHz
RAM	1 GB	512 MB	512 MB	1 GB DDR2	512 MB	1 GB	256 MB	512 MB

Wired Connectivity

USB Ports	✓ 4xUSB 2.0	✓ micro & micro OTG	✓ micro & micro OTG	✓ 4	✓ micro + micro OTG	✓ 4	✓ 1	⊖ 2
Ethernet	✓ Gigabit - Over USB 2.0	✗	✗	✓	✗	✓ 10/100M	✗	✓
SATA Ports	✗	✗	✗	✗	✗	✗	✗	✗
HDMI port	✓ 1	✓ mini	✓ mini	✓	✓ mini	✓	✓	✓ 1.3
Analog Video Out	✓ shared with audio jack	✓ via unpopulated pin	✓ via unpopulated pin	✓ shared with audio jack	✓ via unpopulated pin	✓ shared with audio jack	✓ shared with audio jack	✓ Composite
Analog Audio Out	✓ 3.5mm jack	⊖ HDMI audio	⊖ HDMI audio	✓	⊖ HDMI audio	✓	✓	✓
Analog Audio In	✗	✗	✗	✗	✗	✗	✗	✗ USB mic or sound-card could be added
SPI	✓	✓	✓	✓	✓	✓	✓	✓
I2C	✓	✓	✓	✓	✓	✓	✓	✓
GPIO	✓ 40-pin	✓	✓	✓ 40-pin	✓	✓	✓	⊖ 26-pins
LCD Panel	✓	✗	✗	✓	✗	✓	✓	✓ DSI
Camera	✓	✓	✓	✓	✓ latest version include a camera connector	✓	✓	✓ DSI
SD/MMC	✓ micro-SD	✓ microSD	✓ microSD	✓ microSD	✓ microSD	✓ microSD	✓ microSD	⊖ SD
Serial	✓ RX/TX UART	⊖	⊖	⊖	⊖	⊖	⊖	⊖ Through Expansion Connector, needs level shifting

Wireless Connectivity (On-Board)								
Wi-Fi	✓ 2.4GHz and 5GHz 802.11 b/g/n/ac	✓ 802.11n	✓ 802.11n	✓ 802.11n	✗	✗	✗	✗
Bluetooth®	✓ 4.2, BLE	✓ 4.1	✓ 4.1	✓ 4.1 LE	✗	✗	✗	✗
Dimensions								
Height	3.37 in (85.6 mm)	1.18 in (30 mm)	1.18 in (30 mm)	3.37 in (85.6 mm)	1.18 in (30 mm)	3.37 in (85.6 mm)	2.55 in (65 mm)	2.12 in (53.98 mm)
Width	2.22 in (56.5 mm)	2.55 in (65 mm)	2.55 in (65 mm)	2.22 in (56.5 mm)	2.55 in (65 mm)	2.22 in (56.5 mm)	2.22 in (56.5 mm)	3.37 in (85.6 mm)
Depth	0.66929 in (17 mm)	0.51181 in (13 mm)	0.19685 in (5 mm)	0.66929 in (17 mm)	0.19685 in (5 mm)	0.66929 in (17 mm)	0.39370 in (10 mm)	0.66929 in (17 mm)
Weight	1.58 oz (45 g)	0.42328 oz (12 g)	0.31746 oz (9 g)	1.58 oz (45 g)	0.31746 oz (9 g)	1.58 oz (45 g)	0.81130 oz (23 g)	1.58 oz (45 g)
Website	raspberrypi.org/...	raspberrypi.org/...	raspberrypi.org/...	raspberrypi.org/...	raspberrypi.org/...	raspberrypi.org	raspberrypi.org/...	raspberrypi.org
Power								
Power ratings	1.13 A @5V	180 mA	180 mA	1.34 A @5V	160 mA	800 mA	200 mA	700 mA @5V
Power sources	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO	microUSB or GPIO
Power Over Ethernet	⊖ with PoE Hat	✗	✗	✗	✗	✗	✗	✗

-Linux distro for raspberry pi

- Rasbian :

  -it’s an operating system designed for raspberry pi as a linux distribution that works light and fast.

  -We can run audios , videos , or even play games that runs on python using it.

- Kali :

  - It’s a fantastic Linux distro with an array of security testing tools, from password cracker John the Ripper, web app security scanner OWASP ZAP, and Aircrack-ng pen testing suite. Since this is a security-focused operating system, it’s one of the best Raspberry Pi Linux distros for programmers and developers with security testing needs.

- Pidora :

  -Pidora has ability to function well in a network without the display.

  -Also most Raspbian OS will come with one inbuilt programming language, pidora comes with a variety of them.

- Gentoo linux :

  -you need an operating system that you can optimize for almost any task. Gentoo Linux is the answer. With the ability to configure it to run almost any application. The operating system can run as a secure server, a development workstation or even as a gaming station. Its adaptability supports it to run also as an embedded solution as well as a professional desktop.Gentoo also has an established community of engineers and enthusiasts as well. This means users will benefit from the good documentation, referencing and a nice infrastructure for software porting. The Portage package management system, around which Gentoo Linux is built on is what makes it flexible on any device.

- Ultra sonic code :

İmport RPi.GPIO as GPIO
- import time
-
- #GPIO Mode (BOARD / BCM)
- GPIO.setmode(GPIO.BCM)
-
- #set GPIO Pins
- GPIO_TRIGGER = 18
- GPIO_ECHO = 24
-
- #set GPIO direction (IN / OUT)
- GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
- GPIO.setup(GPIO_ECHO, GPIO.IN)
-
- def distance():
- # set Trigger to HIGH
- GPIO.output(GPIO_TRIGGER, True)
-
- # set Trigger after 0.01ms to LOW
- time.sleep(0.00001)
- GPIO.output(GPIO_TRIGGER, False)
-
- StartTime = time.time()
- StopTime = time.time()
-
- # save StartTime
- while GPIO.input(GPIO_ECHO) == 0:
- StartTime = time.time()
-
- # save time of arrival
- while GPIO.input(GPIO_ECHO) == 1:
- StopTime = time.time()
-
- # time difference between start and arrival
- TimeElapsed = StopTime - StartTime
- # multiply with the sonic speed (34300 cm/s)
- # and divide by 2, because there and back
- distance = (TimeElapsed * 34300) / 2
-
- return distance
-
- if __name__ == '__main__':
- try:
- while True:
- dist = distance()
- print ("Measured Distance = %.1f cm" % dist)
- time.sleep(1)
-
- # Reset by pressing CTRL + C
- except KeyboardInterrupt:
- print("Measurement stopped by User")
- GPIO.cleanup()