1. **LED Blink**

**from** machine **import** Pin

**from** time **import** sleep\_ms

LED **=** Pin**(**16**,** Pin**.**OUT**)** #GPIO 2 and GPIO 16 have inbuilt LED's

**while** **True:**

LED**.**value**(**0**)**

sleep\_ms**(**100**)**

LED**.**value**(**1**)**

sleep\_ms**(**100**)**

**#####################**

1. **Switch LED Interfacing**

**from** machine **import** Pin

**from** time **import** sleep\_ms

LED **=** Pin**(**16**,** Pin**.**OUT**)** #GPIO 2 and GPIO 16 have inbuilt LED's

SW **=** Pin**(**5**,** Pin**.**IN**,** Pin**.**PULL\_UP**)** # Input Pin, Pull Up resistor enabled

**while** **True:**

**while(**SW**.**value**()==**0**):**

sleep\_ms**(**100**)**

LED**.**value**(**0**)**#LED ON

sleep\_ms**(**100**)**

LED**.**value**(**1**)**

**#####################**

1. **Switch LED Interfacing – LED Blink**

**from** machine **import** Pin

**from** time **import** sleep\_ms

LED **=** Pin**(**16**,** Pin**.**OUT**)** #GPIO 2 and GPIO 16 have inbuilt LED's

SW **=** Pin**(**5**,** Pin**.**IN**,** Pin**.**PULL\_UP**)** # Input Pin, Pull Up resistor enabled

**while** **True:**

**while(**SW**.**value**()==**0**):**

sleep\_ms**(**100**)**

LED**.**value**(**0**)**#LED ON

sleep\_ms**(**100**)**

LED**.**value**(**1**)**#LED OFF

**#####################**

1. **IR Counter**

**from** machine **import** Pin

**from** time **import** sleep\_ms

LED **=** Pin**(**16**,** Pin**.**OUT**)** #GPIO 2 and GPIO 16 have inbuilt LED's

IR **=** Pin**(**14**,** Pin**.**IN**)** # Input Pin, Produces 1 when Object detected else 0

count **=** 0

**while** **True:**

**while(**IR**.**value**()==**0**):**

sleep\_ms**(**50**)**

**pass**

**while(**IR**.**value**()==**1**):**

sleep\_ms**(**50**)**

**pass**

count **=** count **+** 1

**print(**"Counter Value is: "**,** count**)**

**#####################**

1. **LED Brightness Control**

**from** machine **import** Pin**,** PWM

**from** time **import** sleep\_ms

LED\_PWM **=** PWM**(**Pin**(**2**))**

LED\_PWM**.**freq**(**500**)** #500Hz PWM Freq

LED\_PWM**.**duty**(**1023**)** #100% duty cycle

**while** **True:**

**for** x **in** **range** **(**1023**,** 0**,** **-**10**):**

LED\_PWM**.**duty**(**x**)**

sleep\_ms**(**20**)**

**for** x **in** **range** **(**0**,** 1023**,** 10**):**

LED\_PWM**.**duty**(**x**)**

sleep\_ms**(**20**)**

**#####################**

1. **RGB PWM**

**from** machine **import** Pin**,** PWM

**from** time **import** sleep\_ms

r **=** PWM**(**Pin**(**0**))**

g **=** PWM**(**Pin**(**4**))**

b **=** PWM**(**Pin**(**5**))**

r**.**freq**(**500**)**

**while** **True:**

r\_val **=** **int(input(**"Enter Duty Cycle for Red between 0 to 1023: "**))**

g\_val **=** **int(input(**"Enter Duty Cycle for Green between 0 to 1023: "**))**

b\_val **=** **int(input(**"Enter Duty Cycle for Blue between 0 to 1023: "**))**

r**.**duty**(**r\_val**)**

g**.**duty**(**g\_val**)**

b**.**duty**(**b\_val**)**

sleep\_ms**(**1000**)**

**#####################**

1. **ADC Read**

**from** machine **import** Pin**,** ADC

**from** time **import** sleep\_ms

adc **=** ADC**(**0**)**

**while** **True:**

adc\_val **=** adc**.**read**()**

**print(**adc\_val**)**

sleep\_ms**(**1000**)**

**#####################**

1. **ADC Read – Voltage**

**from** machine **import** Pin**,** ADC

**from** time **import** sleep\_ms

adc **=** ADC**(**0**)**

step\_size **=** 3.1**/**1024

**while** **True:**

adc\_val **=** adc**.**read**()**

**print(**"ADC Value: "**,** adc\_val**)**

volts **=** adc\_val **\*** step\_size

**print(**"Voltage: "**,** volts**)**

sleep\_ms**(**1000**)**

**#####################**

1. **ADC – Temperature in Celsius**

**from** machine **import** Pin**,** ADC

**from** time **import** sleep\_ms

adc **=** ADC**(**0**)**

step\_size **=** 3.1**/**1024

**while** **True:**

adc\_val **=** adc**.**read**()**

**print(**"ADC Value: "**,** adc\_val**)**

volts **=** adc\_val **\*** step\_size

**print(**"Voltage: "**,** volts**)**

tempC **=** **(**volts**\***1000**/**10**)**

**print(**"Temperature in Celsius: "**,** tempC**)**

sleep\_ms**(**1000**)**

**#####################**

1. **ADC - Temperature in Fahrenheit**

**from** machine **import** Pin**,** ADC

**from** time **import** sleep\_ms

adc **=** ADC**(**0**)**

step\_size **=** 3.1**/**1024

**while** **True:**

adc\_val **=** adc**.**read**()**

**print(**"ADC Value: "**,** adc\_val**)**

volts **=** adc\_val **\*** step\_size

**print(**"Voltage: "**,** volts**)**

tempC **=** **(**volts**\***1000**/**10**)**

**print(**"Temperature in Celsius: "**,** tempC**)**

tempF **=** **(**tempC **\*** 9**/**5**)** **+** 32

**print(**"Temperature in Fahrenheit: "**,** tempF**)**

sleep\_ms**(**1000**)**

# (0°C × 9/5) + 32 = 32°F

**#####################**

1. **Connect to WiFi Access Point**

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

do\_connect**()**

**#####################**

**12. Data to ThingSpeak using HTTP GET Method**

api\_key **=** "VCEU995I3FJV8K3T" #write API Key

field\_noA **=** "1"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETSend **(**value1**):**

# url = "https://api.thingspeak.com/update?api\_key=V73YPTI4XFBKRT3C&field1=12&field2=56"

**import** urequests

url **=** "https://api.thingspeak.com/update?api\_key="

url **+=** api\_key

url **+=** "&field"

url **+=** field\_noA

url **+=** "="

value1 **=** **str(**value1**)**

url **+=** value1

**print(**url**)**

response **=** urequests**.**get**(**url**)**

**print(**response**.**text**)**

do\_connect**()**

**from** time **import** sleep

**while** **True:**

**for** x **in** **range** **(**0**,** 10**):**

GETSend**(**x**)**

sleep**(**16**)** #16seconds

**#####################**

**13. Upload LM35 DZ data to ThingSpeak Cloud**

api\_key **=** "VCEU995I3FJV8K3T" #write API Key

field\_noA **=** "1"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETSend **(**value1**):**

# url = "https://api.thingspeak.com/update?api\_key=V73YPTI4XFBKRT3C&field1=12&field2=56"

**import** urequests

url **=** "https://api.thingspeak.com/update?api\_key="

url **+=** api\_key

url **+=** "&field"

url **+=** field\_noA

url **+=** "="

value1 **=** **str(**value1**)**

url **+=** value1

**print(**url**)**

response **=** urequests**.**get**(**url**)**

**print(**response**.**text**)**

**def** lm35Read**():**

**from** machine **import** Pin**,** ADC

**from** time **import** sleep\_ms

adc **=** ADC**(**0**)**

step\_size **=** 3.1**/**1024

adc\_val **=** adc**.**read**()**

#print("ADC Value: ", adc\_val)

volts **=** adc\_val **\*** step\_size

#print("Voltage: ", volts)

tempC **=** **(**volts**\***1000**/**10**)**

**print(**"Temperature in Celsius: "**,** tempC**)**

**return** tempC

do\_connect**()**

**from** time **import** sleep

**while** **True:**

temp **=** lm35Read**()**

GETSend**(**temp**)**

sleep**(**16**)** #16seconds

**#####################**

**13. Read Channel Data**

read\_api\_key **=** "D235FTM7BCMZQO4B"

channel\_id **=** "2267871"

field\_no **=** "1"

results\_qty **=** "1"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'DESKTOP-HOF2DSK 4271'**,** '3y0N7!67'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETRead **():**

# url = "https://api.thingspeak.com/channels/2267871/fields/1.json?api\_key=D235FTM7BCMZQO4B&results=1"

**import** urequests

url **=** "https://api.thingspeak.com/channels/"

url **+=** channel\_id

url **+=** "/fields/"

url **+=** field\_no

url **+=** ".json?api\_key="

url **+=** read\_api\_key

url **+=** "&results="

url **+=** results\_qty

response **=** urequests**.**get**(**url**)**

**print(**response**.**text**)**

do\_connect**()**

**from** time **import** sleep

**while** **True:**

GETRead**()**

sleep**(**16**)** #16seconds

**14. Read Talk Command String**

talkback\_api\_key **=** "91FDU5E368SRJW1S" #talkback API Key

talkback\_id **=** "39014"

command\_id **=** "25401056"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETCommand **():**

# url = https://api.thingspeak.com/talkbacks/39014/commands/COMMAND\_ID.json?api\_key=91FDU5E368SRJW1S

**import** urequests

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json?api\_key="

url **+=** talkback\_api\_key

response **=** urequests**.**get**(**url**)**

**print(**response**.**text**)**

do\_connect**()**

**from** time **import** sleep

**while** **True:**

GETCommand**()**

sleep**(**1**)** #16seconds

**#####################**

**15. Read Talk Back String & Extract String**

talkback\_api\_key **=** "91FDU5E368SRJW1S" #talkback API Key

talkback\_id **=** "39014"

command\_id **=** "25401056"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETCommand **():**

# url = https://api.thingspeak.com/talkbacks/39014/commands/COMMAND\_ID.json?api\_key=91FDU5E368SRJW1S

**import** urequests

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json?api\_key="

url **+=** talkback\_api\_key

response **=** urequests**.**get**(**url**)**

response\_str **=** response**.**text

**print(**response**.**text**)**

index\_b **=** response\_str**.**find**(**"command\_string"**)**

index\_b **=** index\_b**+**17

index\_s **=** response\_str**.**find**(**"position"**)**

index\_s **=** index\_s **-** 3

**return(**response\_str**[**index\_b**:**index\_s**])**

do\_connect**()**

**from** time **import** sleep

**while** **True:**

command **=** GETCommand**()**

**print(**command**)**

sleep**(**16**)** #16seconds

**#####################**

**16. Read Command String and Control GPIO**

talkback\_api\_key **=** "91FDU5E368SRJW1S" #talkback API Key

talkback\_id **=** "39014"

command\_id **=** "25401056"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETCommand **():**

# url = https://api.thingspeak.com/talkbacks/39014/commands/COMMAND\_ID.json?api\_key=91FDU5E368SRJW1S

**import** urequests

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json?api\_key="

url **+=** talkback\_api\_key

response **=** urequests**.**get**(**url**)**

response\_str **=** response**.**text

**print(**response**.**text**)**

index\_b **=** response\_str**.**find**(**"command\_string"**)**

index\_b **=** index\_b**+**17

index\_s **=** response\_str**.**find**(**"position"**)**

index\_s **=** index\_s **-** 3

**return(**response\_str**[**index\_b**:**index\_s**])**

do\_connect**()**

**from** time **import** sleep

**from** machine **import** Pin

LED **=** Pin**(**2**,** Pin**.** OUT**)**

**while** **True:**

command **=** GETCommand**()**

**print(**command**)**

**if** **(**command**==**"LEDON"**):**

LED**.**value**(**0**)**

**elif** **(**command**==**"LEDOFF"**):**

LED**.**value**(**1**)**

sleep**(**1**)** #1seconds

**#####################**

**17. Update Talkback Command Queue**

talkback\_api\_key **=** "AUEK41OB9W3F6MI0" #talkback API Key

talkback\_id **=** "28064"

command\_id **=** "25405077"

commands **=** **[**"hello"**,** "LEDON"**,** "LEDOFF"**,** "Python"**,** "Random"**]**

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** PUTCommand **(**command**,** command\_ID**):**

# url = https://api.thingspeak.com/talkbacks/<talkback\_id>/commands/<command\_id>.<format>

**import** urequests

**from** time **import** sleep\_ms

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json"

#body = "api\_key=LK7OXGEIVFTPDIJT&command\_string=Command\_t0\_be\_added

body **=** "api\_key="

body **+=** talkback\_api\_key

body **+=** "&command\_string="

body **+=** command

response **=** urequests**.**put**(**url**,** headers **=** **{**'content-type'**:** 'application/x-www-form-urlencoded'**},** data **=** body**)**

**print(**response**.**text**)**

do\_connect**()**

**from** time **import** sleep

**while** **True:**

**for** x **in** **range** **(**0**,** 5**):**

command **=** commands**[**x**]**

response\_put **=** PUTCommand**(**command**,**command\_id**)**

**print(**response\_put**)**

sleep**(**5**)** #16seconds

**#####################**

**18. Update Command from Switches**

talkback\_api\_key **=** "AUEK41OB9W3F6MI0" #talkback API Key

talkback\_id **=** "28064"

command\_id **=** "25405077"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** PUTCommand **(**command**,** command\_ID**):**

# url = https://api.thingspeak.com/talkbacks/<talkback\_id>/commands/<command\_id>.<format>

**import** urequests

**from** time **import** sleep\_ms

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json"

#body = "api\_key=LK7OXGEIVFTPDIJT&command\_string=Command\_t0\_be\_added

body **=** "api\_key="

body **+=** talkback\_api\_key

body **+=** "&command\_string="

body **+=** command

response **=** urequests**.**put**(**url**,** headers **=** **{**'content-type'**:** 'application/x-www-form-urlencoded'**},** data **=** body**)**

**print(**response**.**text**)**

do\_connect**()**

**from** time **import** sleep

**from** machine **import** Pin

sw1 **=** Pin**(**5**,** Pin**.**IN**,** Pin**.**PULL\_UP**)**

sw2 **=** Pin**(**0**,** Pin**.**IN**,** Pin**.**PULL\_UP**)**

command **=** "LEDOFF"

**while** **True:**

**if** **(**sw1**.**value**()==**0**):**

command **=** "LEDON"

**print(**"sw1 closed"**)**

**elif** **(**sw2**.**value**()==**0**):**

command **=** "LEDOFF"

**print(**"sw2 closed"**)**

response\_put **=** PUTCommand**(**command**,**command\_id**)**

**print(**response\_put**)**

sleep**(**1**)** #16seconds

**#####################**

**19. Google Assistant IFTTT ThingSpeak – Control GPIO**

talkback\_api\_key **=** "AUEK41OB9W3F6MI0" #talkback API Key

talkback\_id **=** "28064"

command\_id **=** "25405077"

**def** do\_connect**():**

**import** network

sta\_if **=** network**.**WLAN**(**network**.**STA\_IF**)**

**if** **not** sta\_if**.**isconnected**():**

**print(**'connecting to network...'**)**

sta\_if**.**active**(True)**

sta\_if**.**connect**(**'sistec'**,** '1234567890'**)**

**while** **not** sta\_if**.**isconnected**():**

**pass**

**print(**'network config:'**,** sta\_if**.**ifconfig**())**

**def** GETCommand **():**

# url = https://api.thingspeak.com/talkbacks/39014/commands/COMMAND\_ID.json?api\_key=91FDU5E368SRJW1S

**import** urequests

url **=** "https://api.thingspeak.com/talkbacks/"

url **+=** talkback\_id

url **+=** "/commands/"

url **+=** command\_id

url **+=** ".json?api\_key="

url **+=** talkback\_api\_key

response **=** urequests**.**get**(**url**)**

response\_str **=** response**.**text

**print(**response**.**text**)**

index\_b **=** response\_str**.**find**(**"command\_string"**)**

index\_b **=** index\_b**+**17

index\_s **=** response\_str**.**find**(**"position"**)**

index\_s **=** index\_s **-** 3

**return(**response\_str**[**index\_b**:**index\_s**])**

do\_connect**()**

**from** time **import** sleep

**from** machine **import** Pin**,** PWM

light **=** Pin**(**2**,** Pin**.**OUT**)**

fan **=** Pin**(**16**,** Pin**.**OUT**)**

light**.**value**(**1**)**

fan**.**value**(**1**)**

**while** **True:**

command **=** GETCommand**()**

command **=** command**.**lower**()**

**print(**command**)**

**if** **(**"turn on the lights" **in** command**):**

light**.**value**(**0**)**

**elif** **(**"turn off the lights" **in** command**):**

light**.**value**(**1**)**

**elif** **(**"turn on the fan" **in** command**):**

fan**.**value**(**0**)**

**elif** **(**"turn off the fan" **in** command**):**

fan**.**value**(**1**)**

**else:**

**print(**"Invalid command received :( Try again!! "**)**

sleep**(**1**)** #1seconds

**#####################**