



Introdução ao Raspberry Pi3

Aula 2

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Agenda

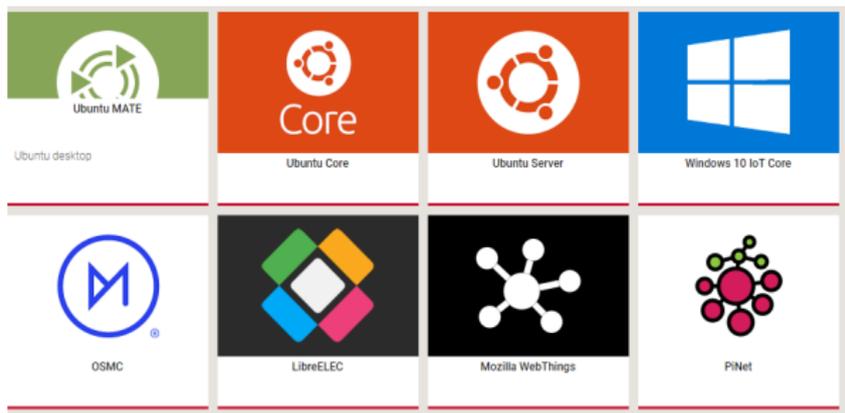
- Como começar a usar
- Instalação
- Exemplos de aplicações
- Links úteis
- Tarefa

Como começar a usar

- Instalar o sistema operacional (SO)
- Instala-se o SO no cartão de memória conectado a um computador
- Conectar os componentes ao Raspberry
- Colocar o cartão de memória no Raspberry
- Ligar a fonte de alimentação

Processo de Instalação do SO

- Escolha do sistema operacional
- Existem diversas opções
- Recomenda-se o Raspbian



- Raspbian

- Distribuição baseada no Debian
- SO oficial para todos os modelos do Raspberry Pi
- Download:
<https://www.raspberrypi.org/downloads/raspbian/>

Processo de Instalação do SO

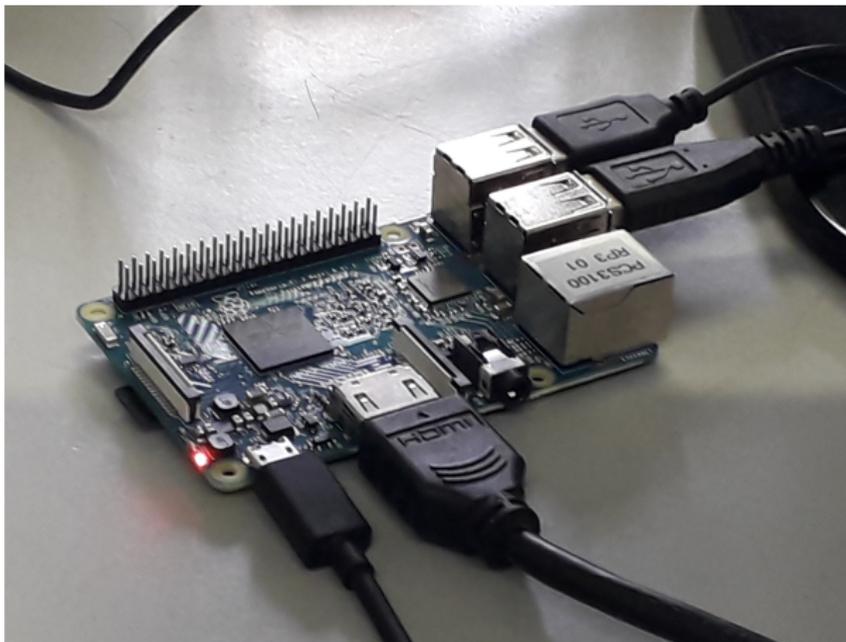
- Opção antiga: Noobs
- Escrita da imagem no cartão de memória
- Escolha do SO a ser instalado
- Download: <https://www.raspberrypi.org/downloads/noobs/>

Preparação da Instalação

- Itens usados:
 - Raspberry Pi3
 - Fonte de alimentação 5V / 2A
 - Cartão SD (Classe 10 e mínimo de 16gb)
 - Monitor com entrada HDMI
 - Cabo HDMI
 - Mouse e teclado USB
 - Cabo de rede ou wifi

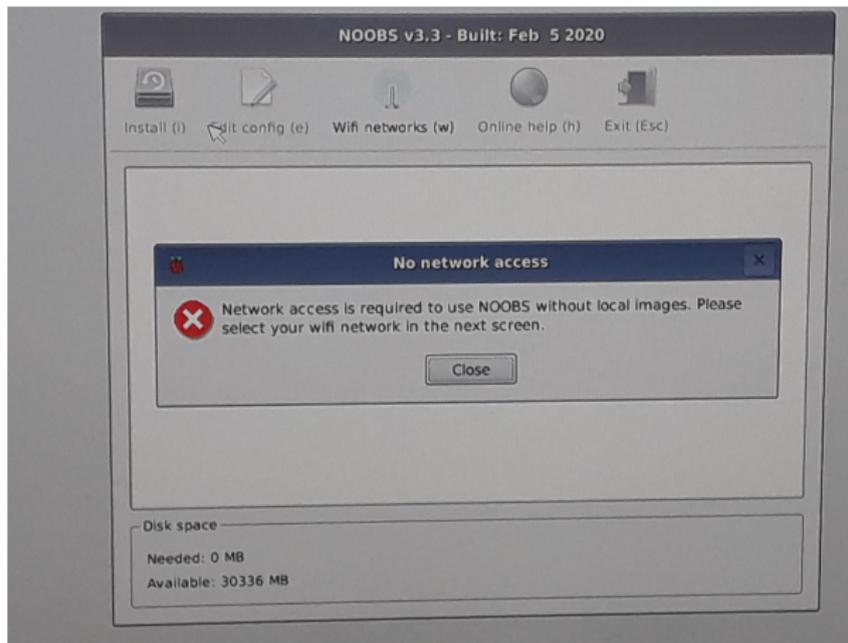
Preparação da Instalação

■ Montagem inicial



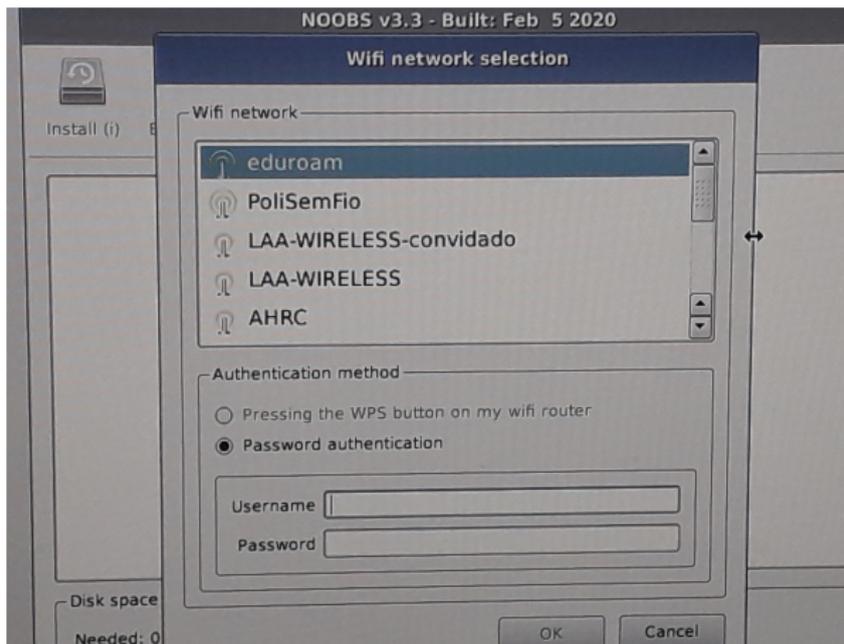
Instalação usando o Noobs

■ Necessidade da rede



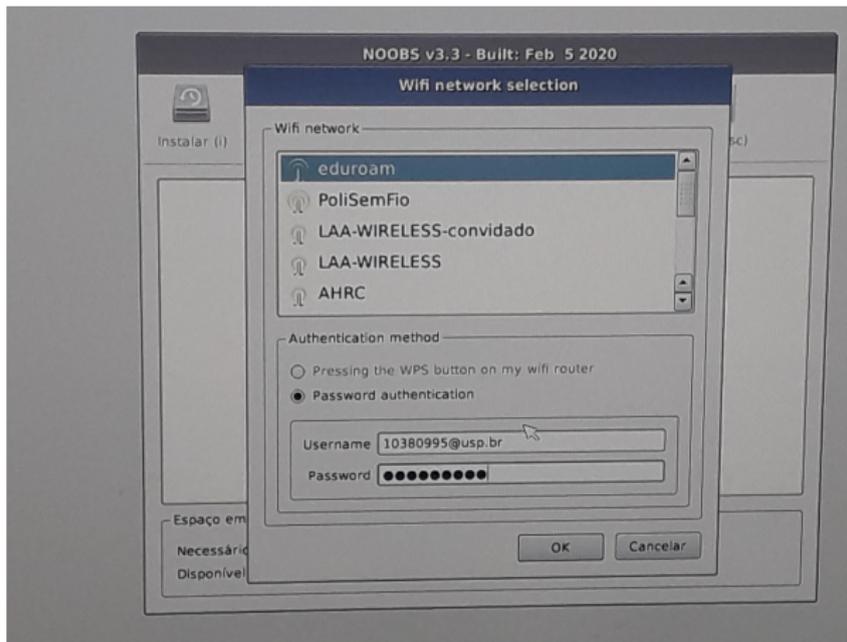
Instalação usando o Noobs

■ Escolha da rede



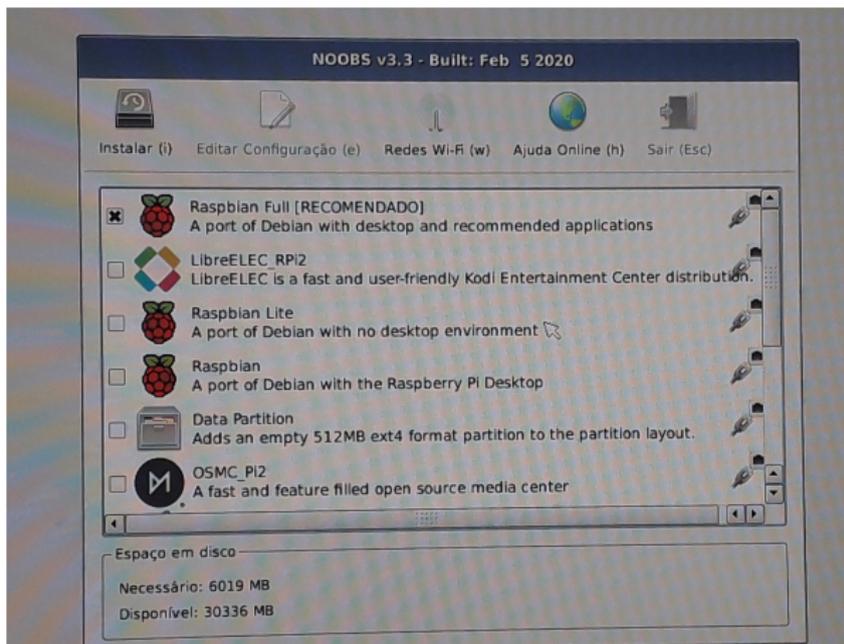
Instalação usando o Noobs

- Se for eduroam, use seu número USP + @usp.br



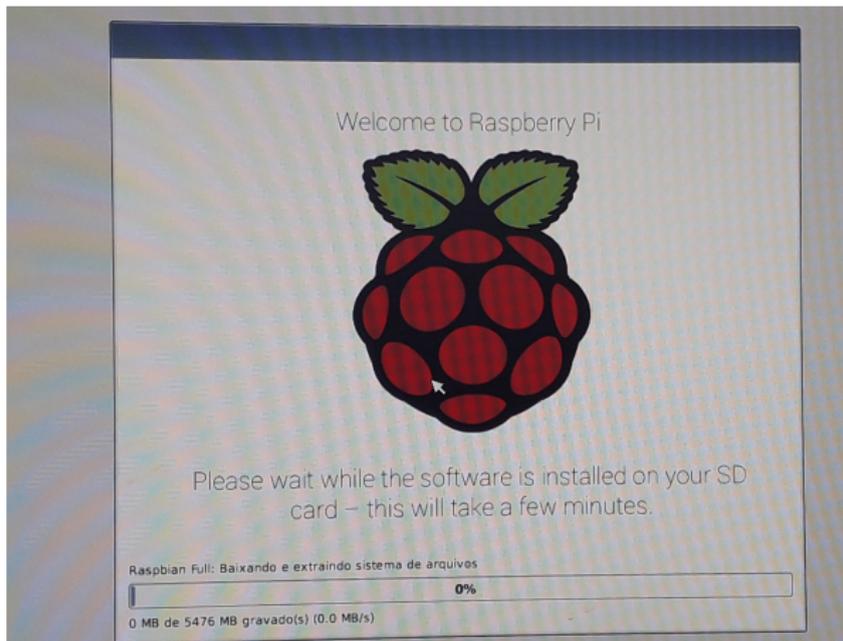
Instalação usando o Noobs

■ Escolha do SO



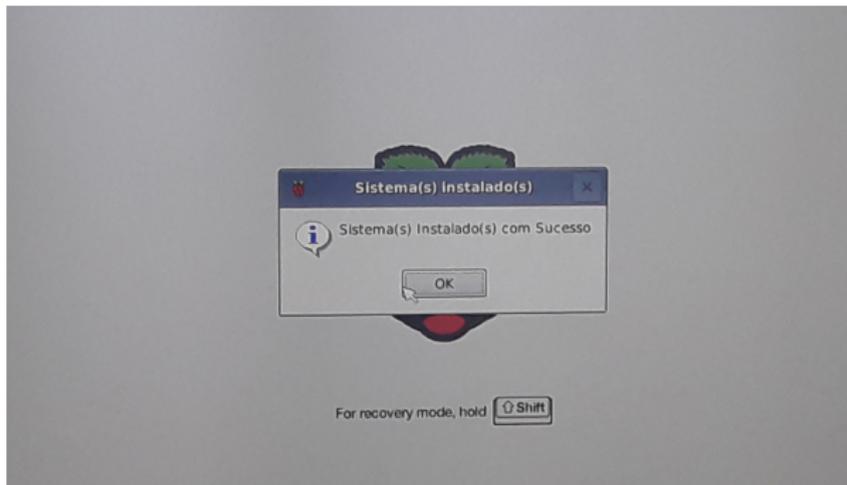
Instalação usando o Noobs

- Velocidade depende da sua rede



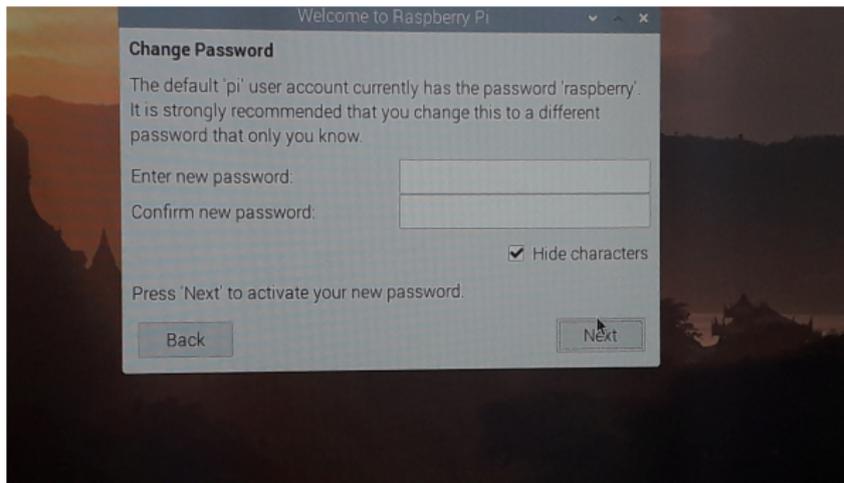
Instalação usando o Noobs

- Na minha rede levou cerca de 40 minutos



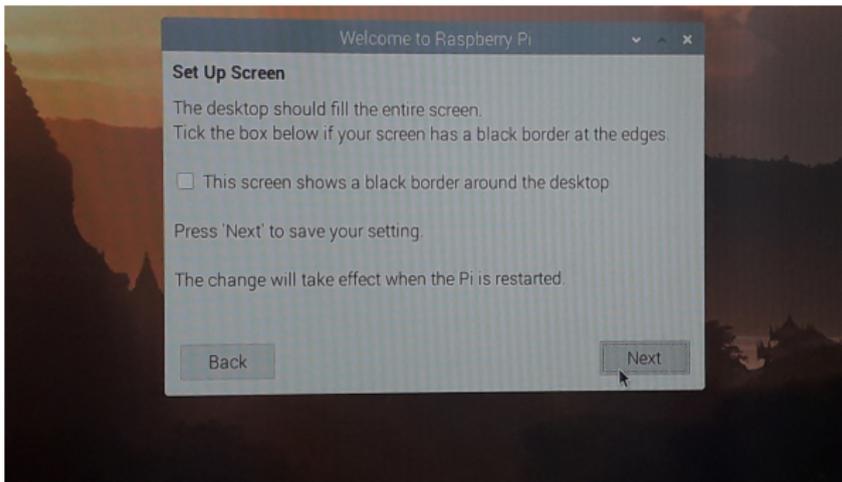
Finalização da Instalação

■ Senha inicial é raspberry



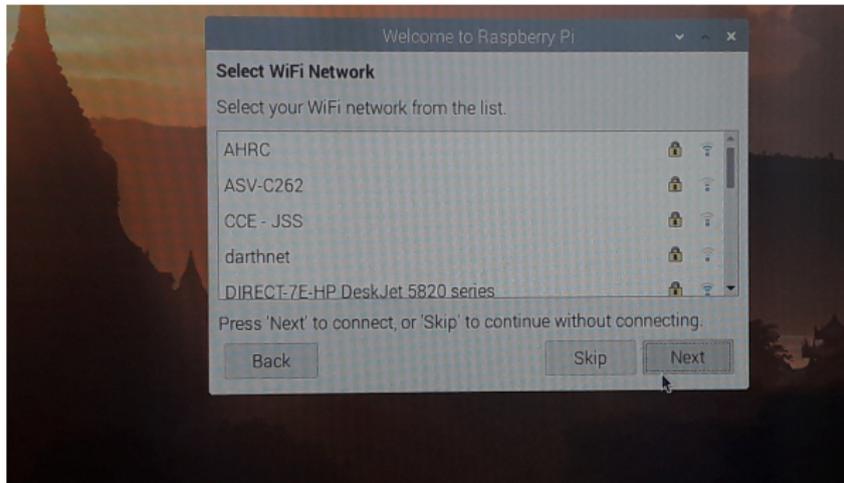
Finalização da Instalação

■ Configuração da tela



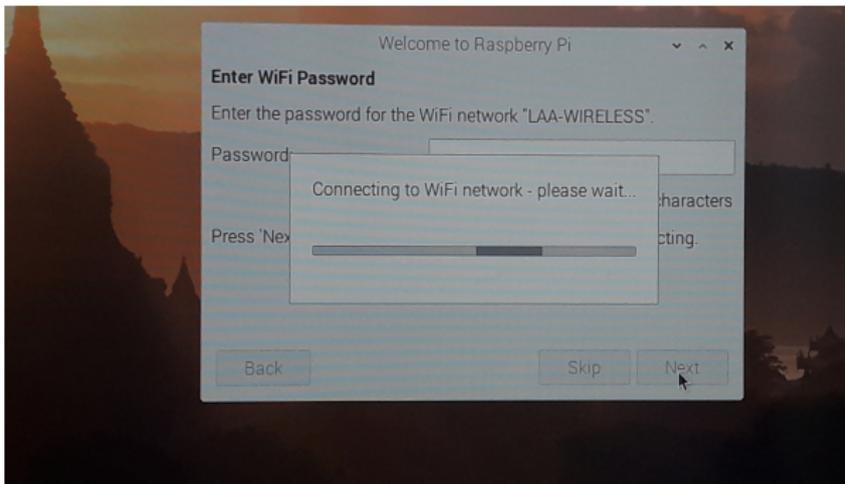
Finalização da Instalação

■ Escolha da rede

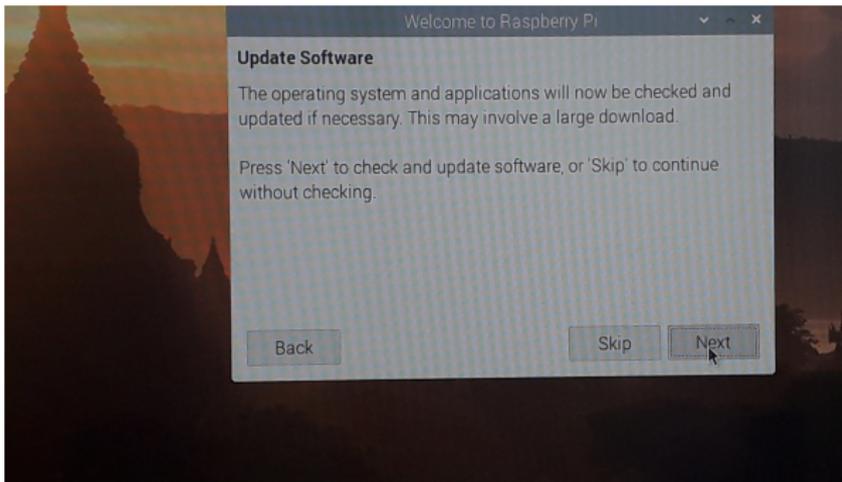


Finalização da Instalação

■ Escolha da rede

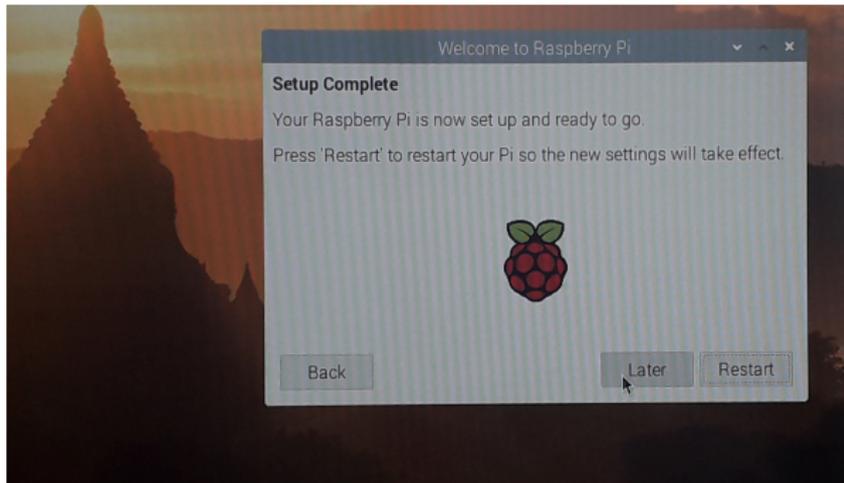


■ Atualização dos pacotes

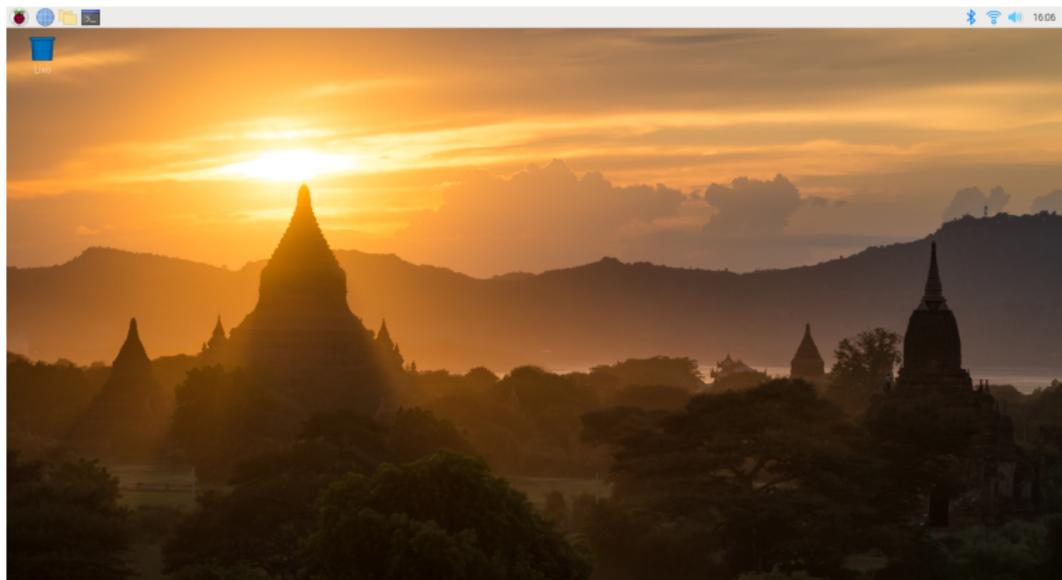


Finalização da Instalação

■ Finalizado!

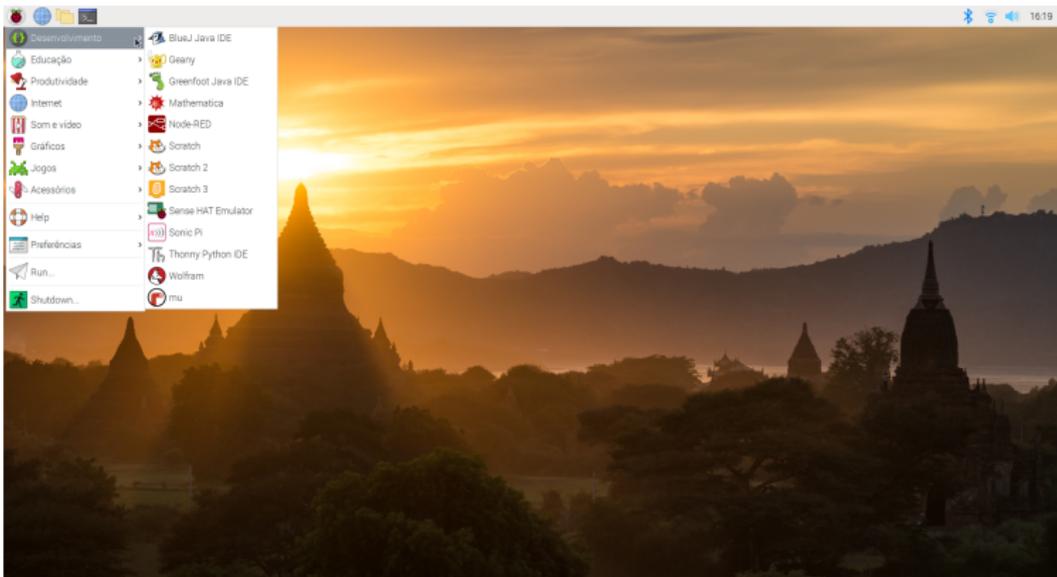


■ Tela inicial



Raspbian - Aplicativos instalados

■ Ferramentas de desenvolvimento



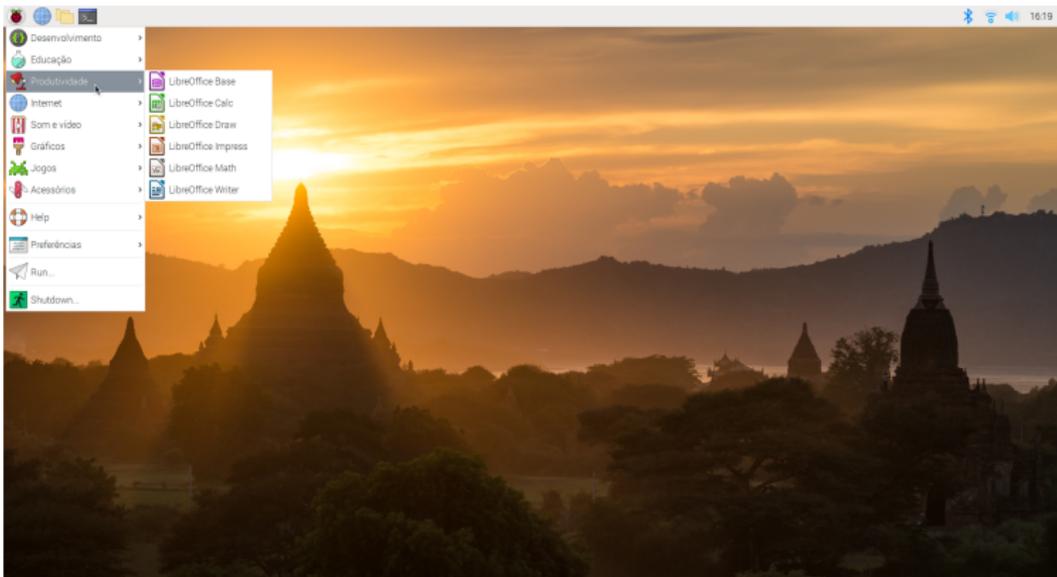
Raspbian - Aplicativos instalados

■ Educação



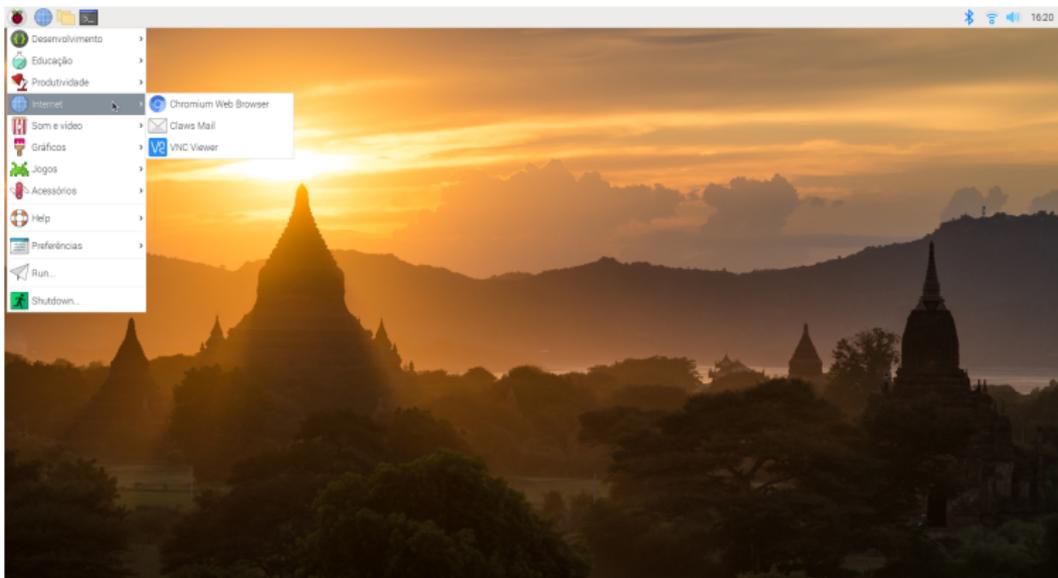
Raspbian - Aplicativos instalados

■ Pacote Office



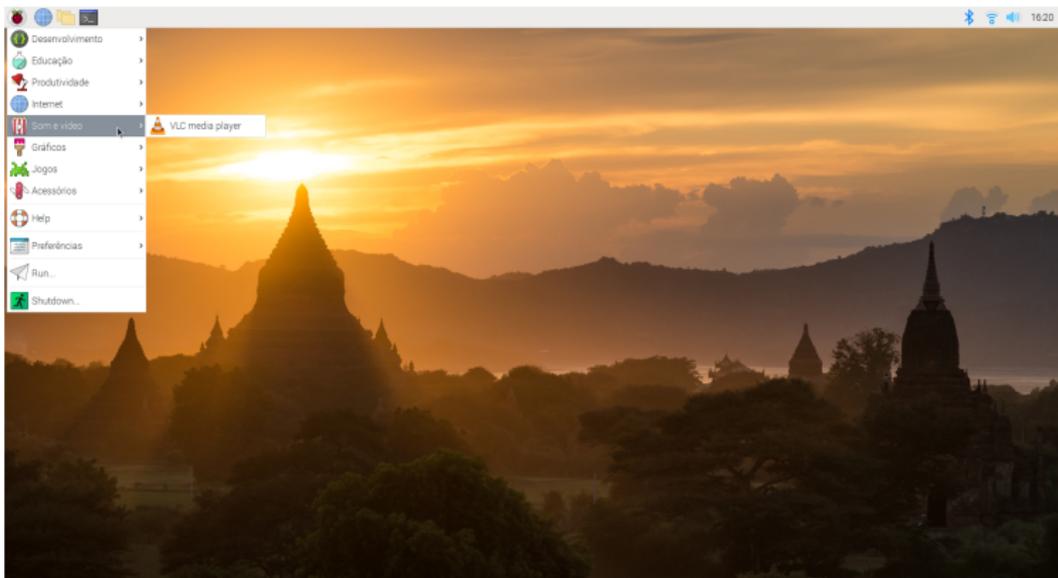
Raspbian - Aplicativos instalados

■ Internet



Raspbian - Aplicativos instalados

■ Vídeo



Raspbian - Aplicativos instalados

■ Imagens



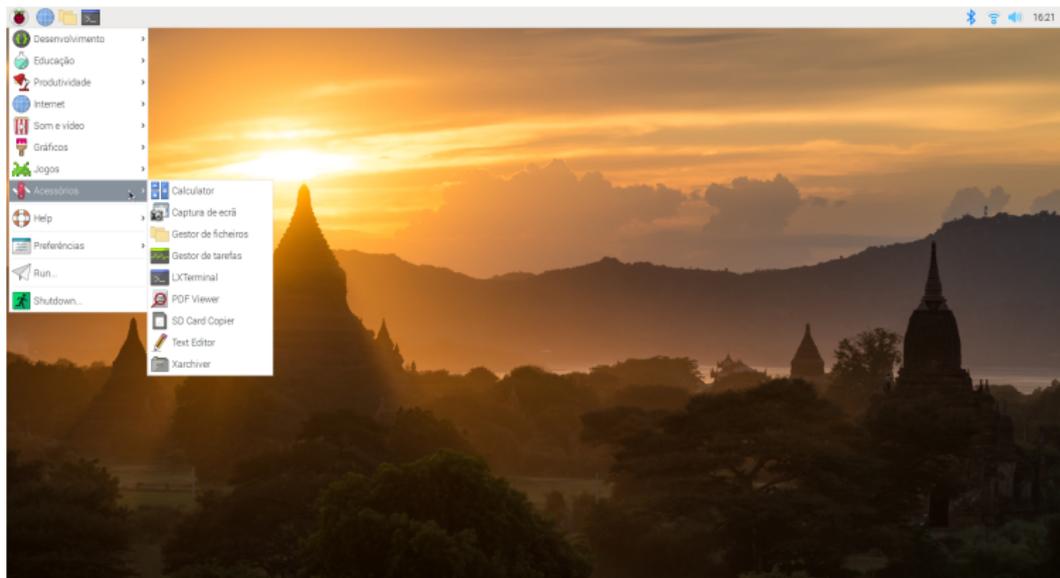
Raspbian - Aplicativos instalados

Jogos



Raspbian - Aplicativos instalados

■ Acessórios



Navegador

Chromium

The screenshot shows a Chromium browser window displaying the website of the Escola Politécnica (USP). The browser's address bar shows the URL `poli.usp.br`. The website header features the school's logo and name, along with social media icons for USP, Facebook, Messenger, Twitter, and YouTube. A navigation menu is visible on the left side of the header.

The main content area is divided into three columns:

- Destaques:** A large featured article titled "Professores da Poli recebem calouros e apresentam todas as possibilidades oferecidas pela Escola" with a sub-label "Destaque" and "Noticias". It is dated "1 hora ago".
- Nossa Opinião:** Two opinion pieces are shown. The first is "Jornal da USP: Inteligência artificial agiliza busca pela inovação em biblioteca" (dated "5 horas ago"). The second is "Professor Luis Sanchez comenta projeto de lei que deixa Estados definirem regras sobre licenciamento ambiental" (dated "1 dia ago").
- Notícias:** A list of news items, including "recebidos com palestra do cientista Paulo Artaxo" (dated "4"), "Professores da Poli recebem calouros e apresentam todas as possibilidades oferecidas pela Escola" (dated "3"), and "Jornal da USP: Inteligência artificial agiliza busca pela inovação em biblioteca" (dated "4").

■ IDE Python

```
Thonny - /home/pi/Documents/teste.py @ 2 - 13
```

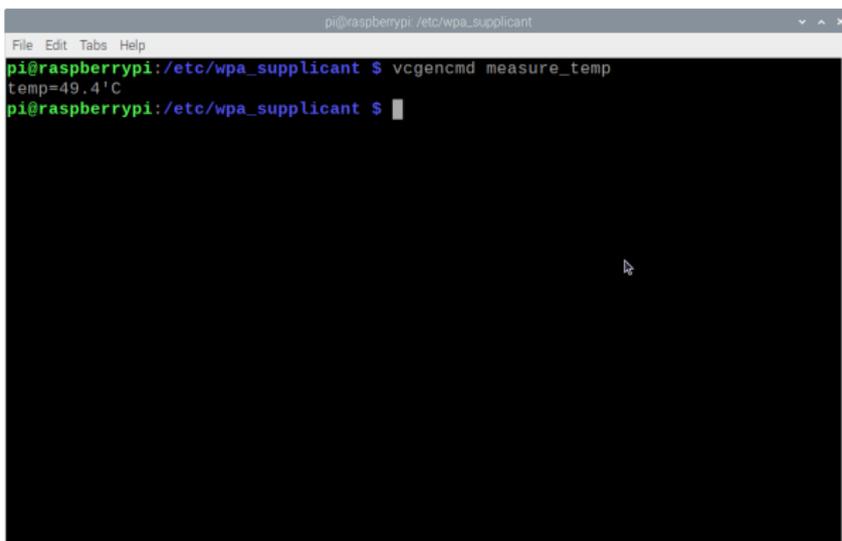
New Load Save Run Debug Over Info Out Stop Zoom Quit [Switch to regular mode](#)

```
teste.py X
1 for i in range(10):
2 print(i)
```

Shell

```
Python 3.7.3 (/usr/bin/python3)
>>> %cd /home/pi/Documents
>>> %Run teste.py
0
1
2
3
4
```

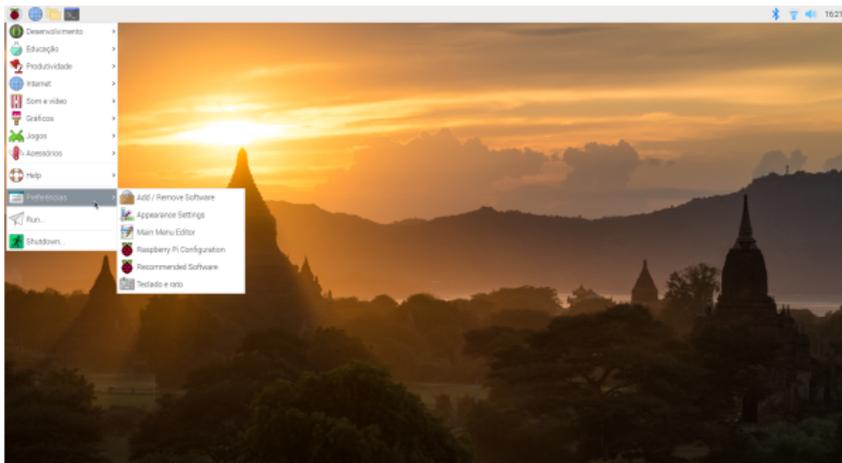
■ Comando simples



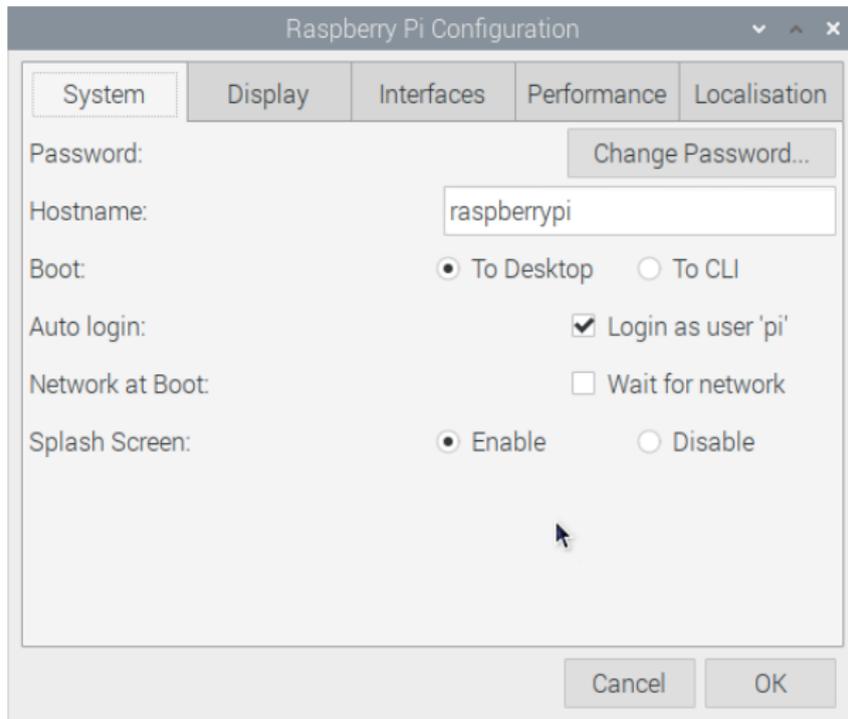
```
pi@raspberrypi: /etc/wpa_supplicant
File Edit Tabs Help
pi@raspberrypi: /etc/wpa_supplicant $ vcgencmd measure_temp
temp=49.4'C
pi@raspberrypi: /etc/wpa_supplicant $
```

- O monitor usado apenas na instalação
- Acesso pode ser remoto
- Tipos:
 - Secure Shell (SSH)
 - Virtual Network Computing (VNC)

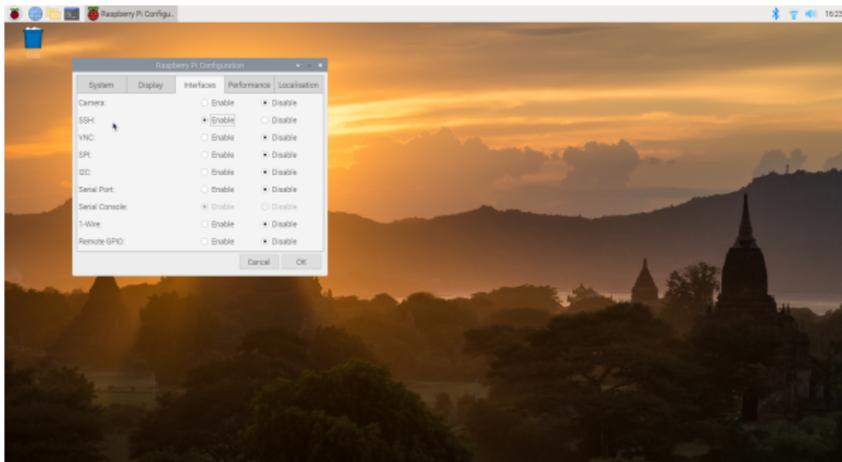
■ Clique em Raspberry Configuration



■ Clique em Interfaces

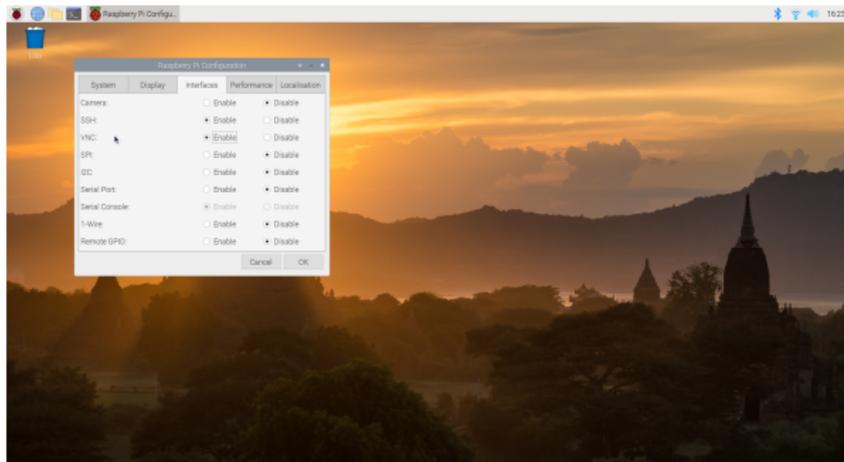


■ Habilitar SSH



Configuração acesso remoto

■ Habilitar VNC

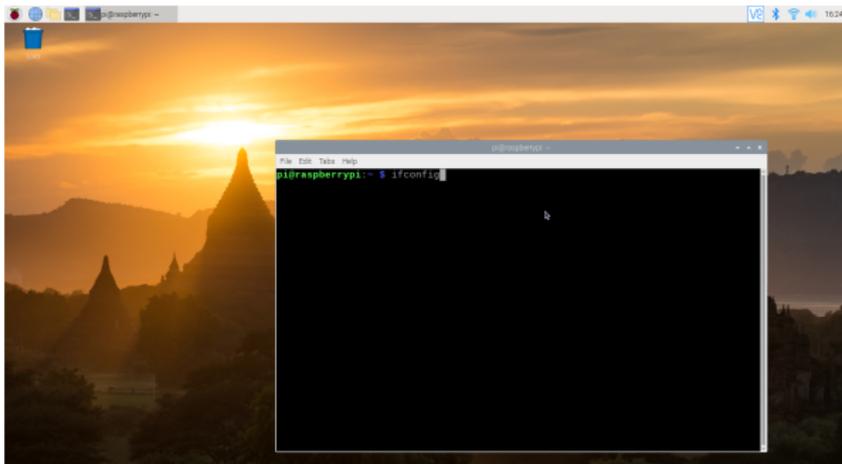


Acesso remoto - SSH

- Usuários do Windows: devem baixar um cliente SSH
- Usuários Linux: basta usar o terminal
- Necessário identificar o IP do Raspberry

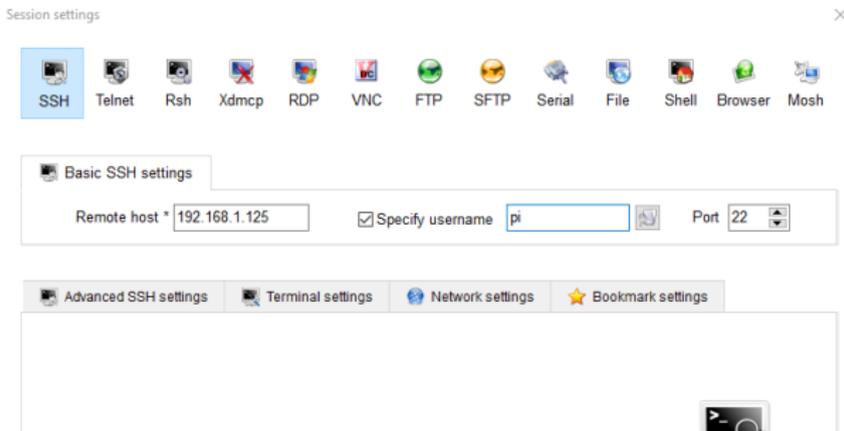
Identificando o IP

- Identifique o IP: comando *ifconfig*



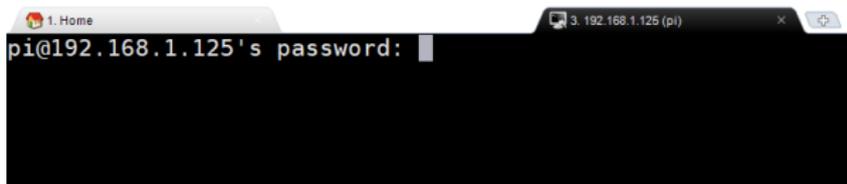
Acesso remoto - SSH

- Para usuários do Windows: acesso via MobaXTerm
- Download do MobaXTerm
<https://mobaxterm.mobatek.net/>



Acesso remoto - SSH

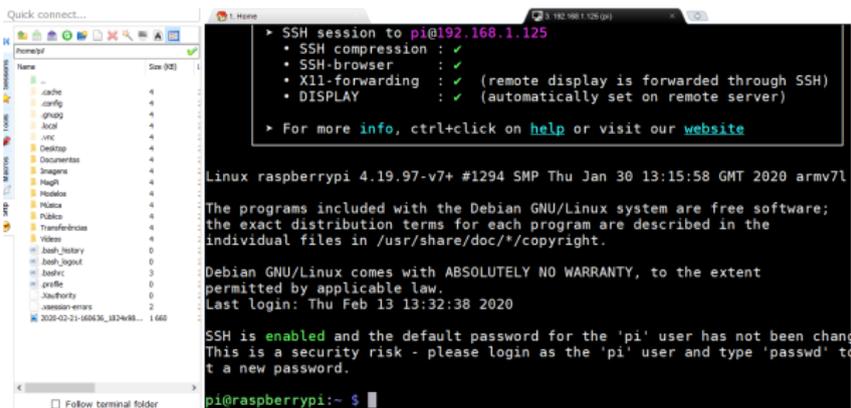
- A senha padrão é *raspberrypi*



The image shows a terminal window with a black background and white text. The prompt is `pi@192.168.1.125's password:` followed by a cursor. The window title bar shows two tabs: "1. Home" and "3. 192.168.1.125 (pi)".

Acesso remoto - SSH

■ Conexão OK!



```
Quick connect...
Name Size (KB)
...
SSH session to pi@192.168.1.125
  * SSH compression : ✓
  * SSH-browser      : ✓
  * X11-forwarding   : ✓ (remote display is forwarded through SSH)
  * DISPLAY          : ✓ (automatically set on remote server)
  * For more info, ctrl+click on help or visit our website

Linux raspberrypi 4.19.97-v7+ #1294 SMP Thu Jan 30 13:15:58 GMT 2020 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Feb 13 13:32:38 2020

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to
set a new password.

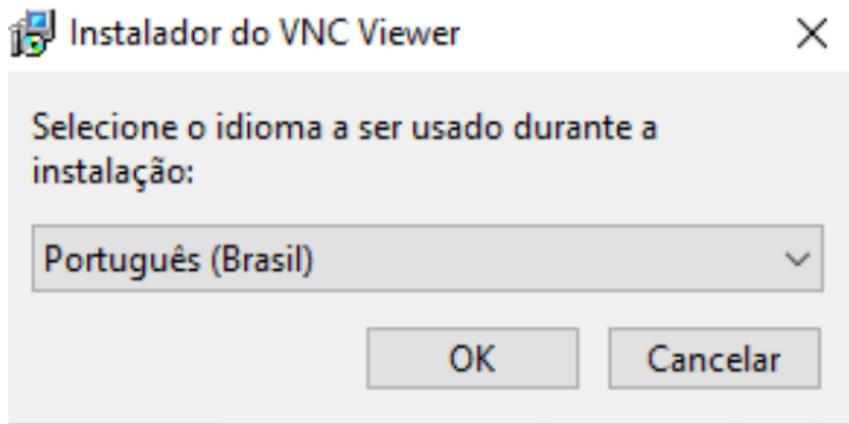
pi@raspberrypi:~$
```

Acesso remoto - VNC

- Acesso ao sistema com ambiente gráfico
- Download do VNC Viewer:
<https://www.realvnc.com/pt/connect/download/viewer/>

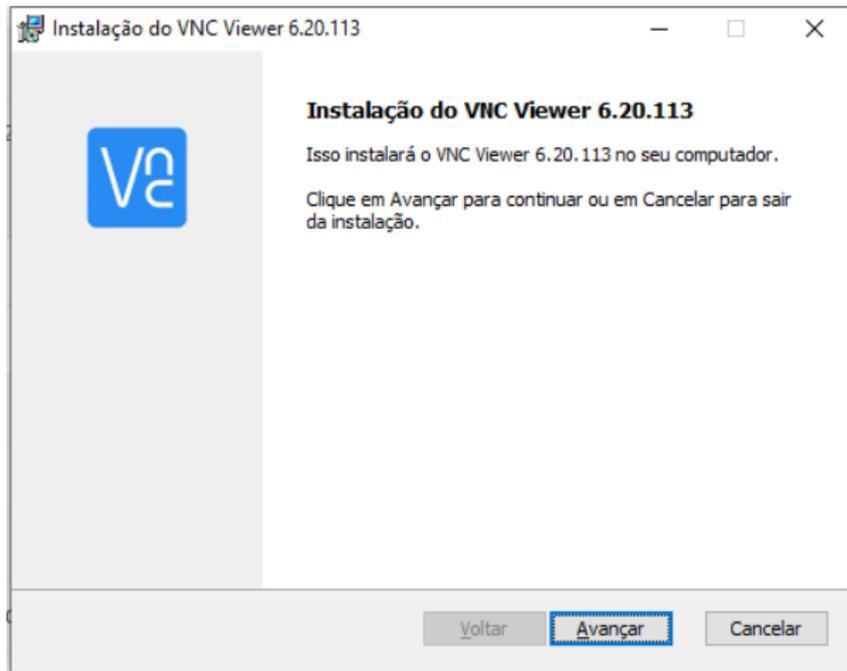
Instalando o VNC Viewer

■ Passo 1



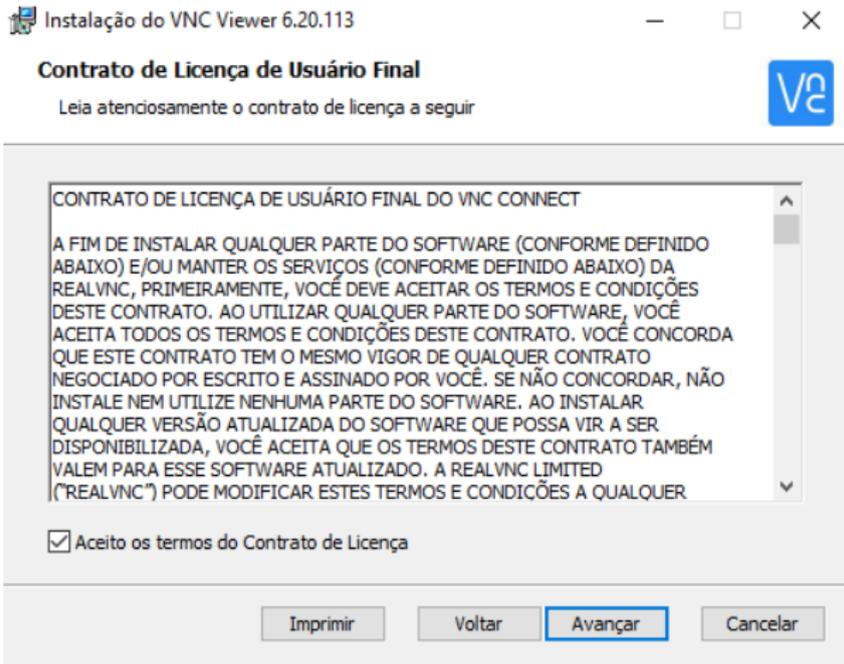
Instalando o VNC Viewer

■ Passo 2



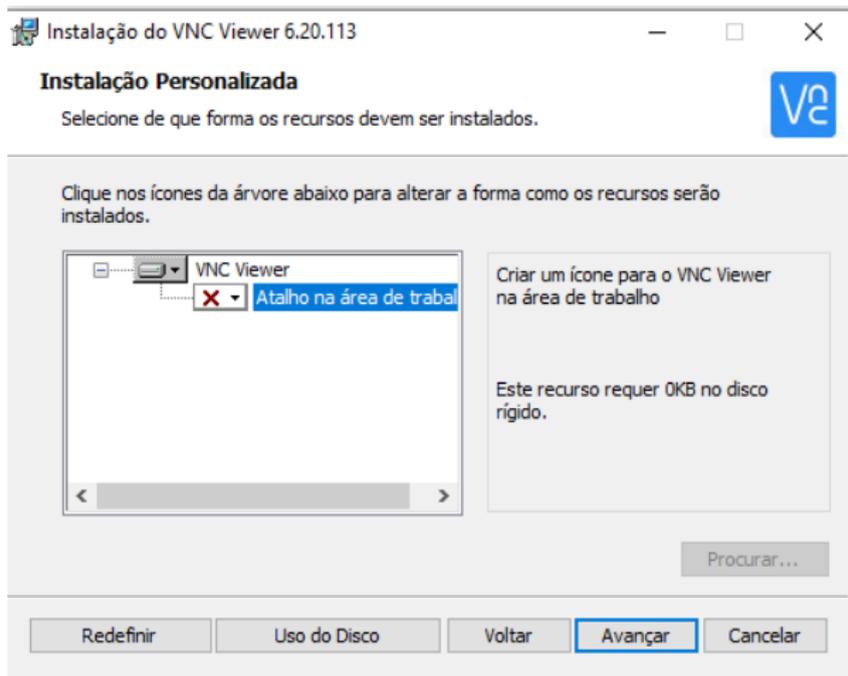
Instalando o VNC Viewer

■ Passo 3



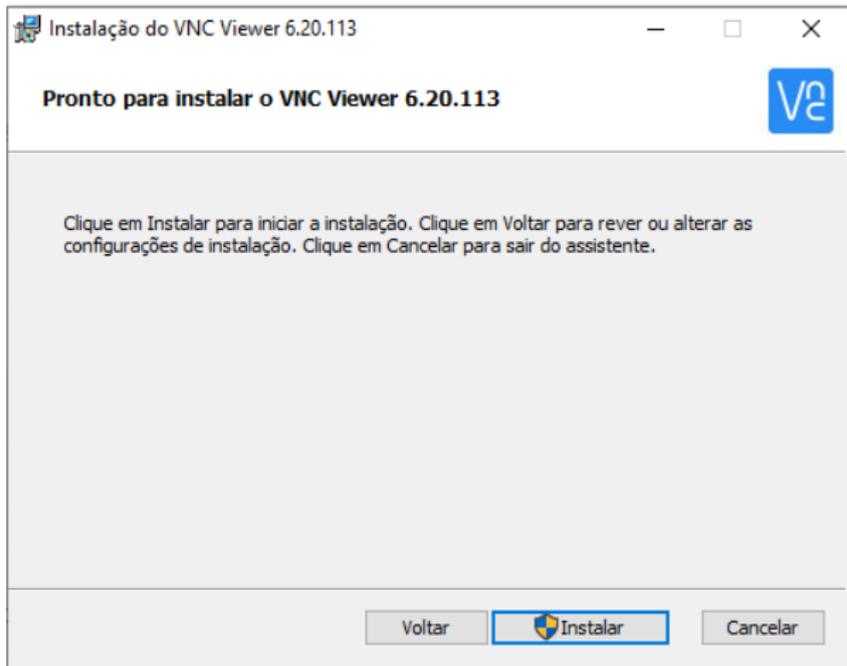
Instalando o VNC Viewer

■ Passo 4



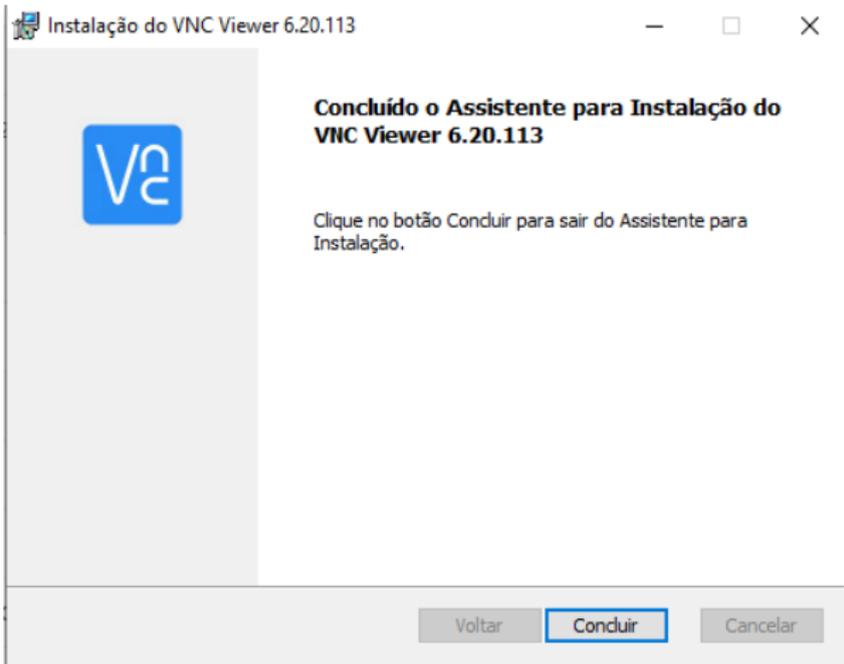
Instalando o VNC Viewer

■ Passo 5



Instalando o VNC Viewer

Passo 6



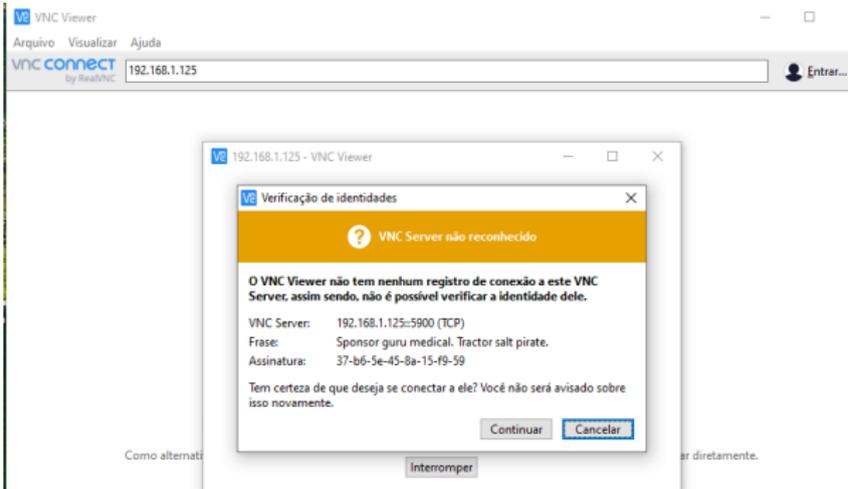
Acesso remoto via VNC

■ Passo 1



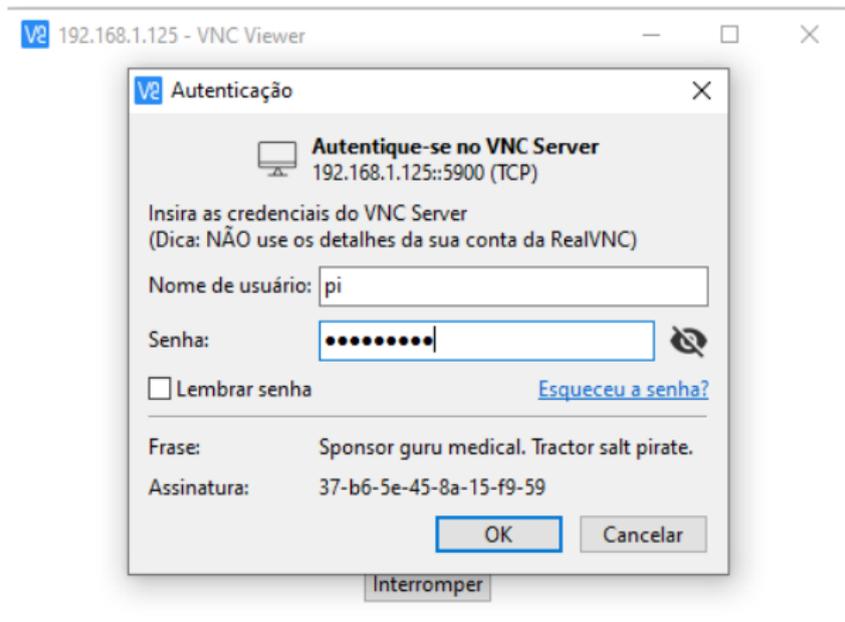
Acesso remoto via VNC

Passo 2



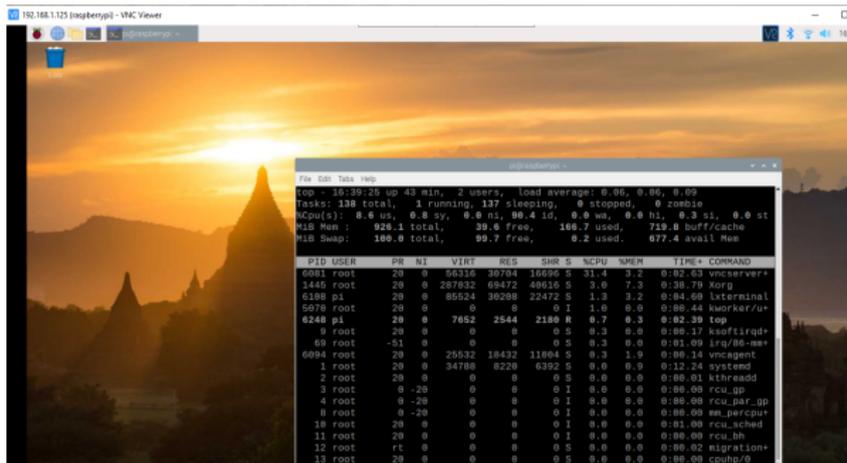
Acesso remoto via VNC

■ Passo 3



Acesso remoto via VNC

■ Máquina conectada!

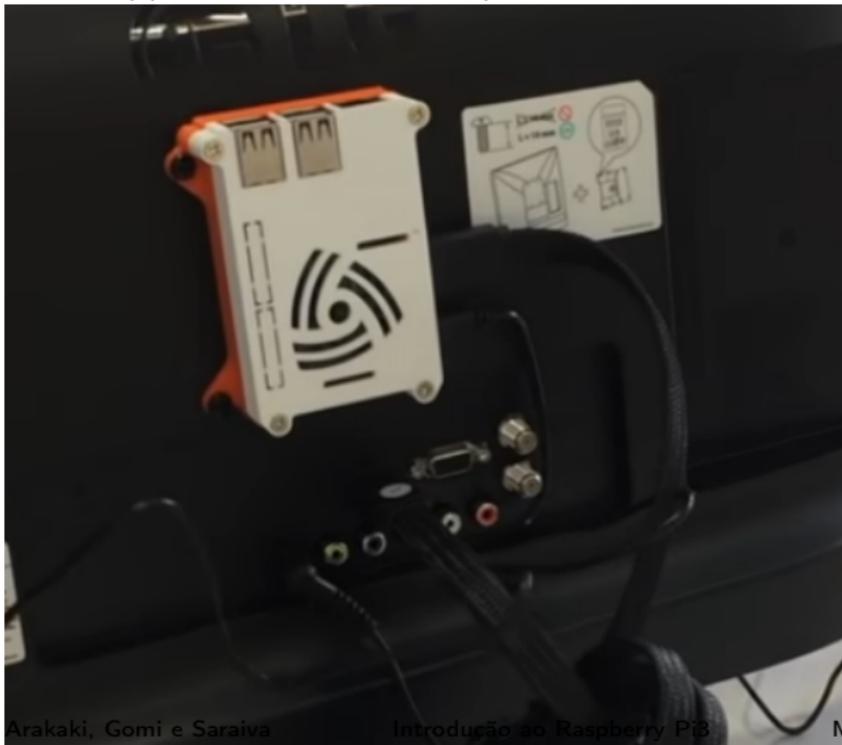


```
192.168.1.125 (raspberrypi) - VNC Viewer
File Edit View Help
top 16:39:25 up 43 min, 2 users, load average: 0.06, 0.06, 0.09
Tasks: 138 total, 1 running, 137 sleeping, 0 stopped, 0 zombie
Cpu(s):  8.6 us,  0.8 sy,  0.0 ni, 99.4 id,  0.0 wa,  0.0 hi,  0.3 si,  0.0 st
Mem Mem :  926.1 total,  39.6 free,  166.7 used,  719.8 buff/cache
Mem Swap: 100.0 total,  99.7 free,  0.2 used,  677.4 avail Mem

PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM     TIME+ COMMAND
6081 root        20   0 56316 30794 16696 S 31.4   3.2   0:02.63 vncserver
1440 root        20   0 287632 69472 48616 S  3.0   7.3   0:38.79 Xorg
6188 pi         20   0 85524 36208 22472 S  1.3   3.2   0:04.69 lxterminal
5078 root        20   0   0     0     0  I  1.0   0.0   0:00.44 kworker/u
6248 pi        20   0  7652  2544  2188 R  0.7   0.3   0:02.39 top
 0 root        20   0   0     0   0  S  0.3   0.0   0:00.17 ksoftirqd
 60 root       -51   0   0     0   0  S  0.3   0.0   0:01.09 irq/86-mes
6094 root        20   0 25532 18432 11864 S  0.3   1.9   0:00.16 vncagent
 1 root        20   0 34788  8220  6392 S  0.0   0.0   0:12.24 systemd
 2 root        20   0   0     0   0  S  0.0   0.0   0:00.01 kthreadd
 3 root        0 -20   0     0   0  I  0.0   0.0   0:00.00 rcu_gp
 4 root        0 -20   0     0   0  I  0.0   0.0   0:00.00 rcu_par_gp
 8 root        0 -20   0     0   0  I  0.0   0.0   0:00.00 mm_percpu
10 root        20   0   0     0   0  I  0.0   0.0   0:01.00 rcu_acked
11 root        20   0   0     0   0  I  0.0   0.0   0:00.00 rcu_bh
12 root        rt    0   0     0   0  S  0.0   0.0   0:00.02 migration+
13 root        20   0   0     0   0  S  0.0   0.0   0:00.00 cpuhp/0
```

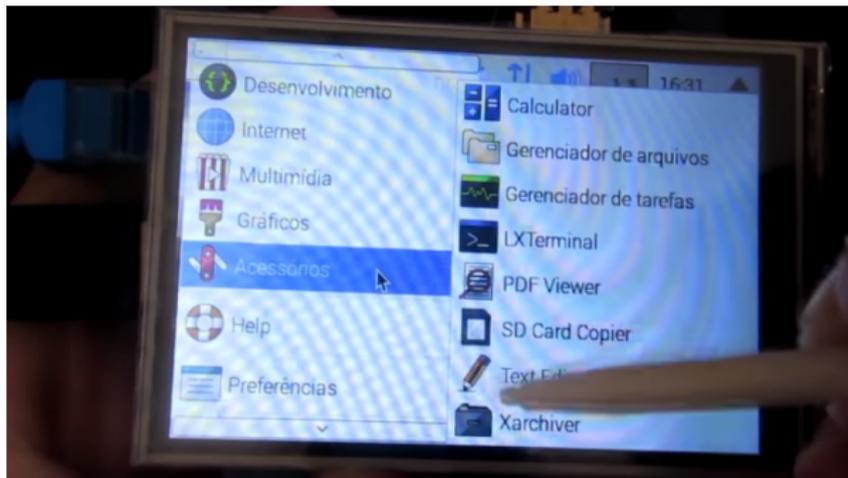
Exemplos de aplicações

- Transformando uma TV em PC com o Raspberry Pi 3:
<https://www.youtube.com/watch?v=PFwSfXgjm8I>



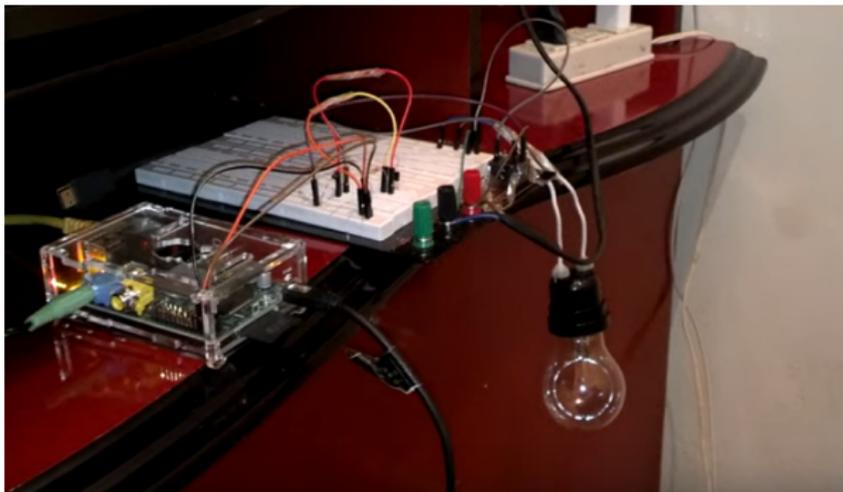
Exemplos de aplicações

- Como Transformar a Raspberry Pi em um Mini PC de Bolso: <https://www.youtube.com/watch?v=ZtLEFAvguOQ>



Exemplos de aplicações

- Controlando uma lâmpada usando GTalk:
<https://www.youtube.com/watch?v=si-pfnSspJk>



Exemplos de aplicações

- Raspberry Pi 4 Running Windows 10:
<https://www.youtube.com/watch?v=OKCHGCOcHis>

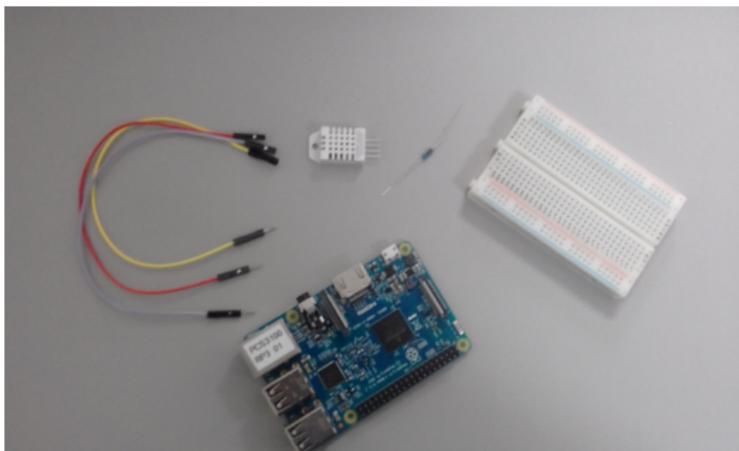
Exemplos de aplicações

- Videogame com Raspberry Pi 0:
<https://www.youtube.com/watch?v=oNUETIoY4hk>



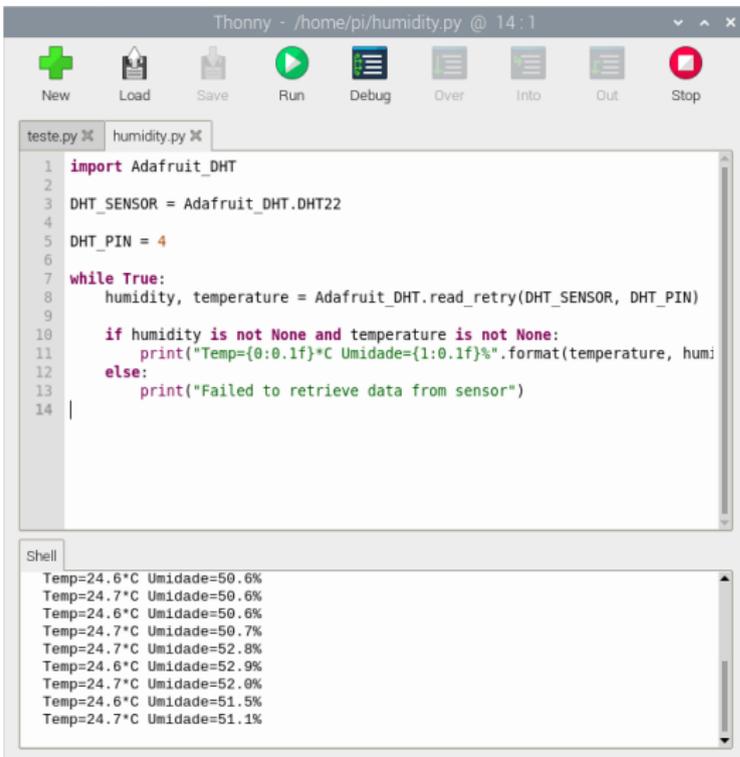
Sensor de temperatura

- Componentes
 - Raspberry Pi3
 - Sensor de temperatura DHT22
 - Protoboard
 - Resistor 10k ohm
 - Cabos para a protoboard



Sensor de temperatura

■ Script simples em Python para ler do sensor



```
Thonny - /home/pi/humidity.py @ 14:1
New Load Save Run Debug Over Into Out Stop

teste.py humidity.py
1 import Adafruit_DHT
2
3 DHT_SENSOR = Adafruit_DHT.DHT22
4
5 DHT_PIN = 4
6
7 while True:
8     humidity, temperature = Adafruit_DHT.read_retry(DHT_SENSOR, DHT_PIN)
9
10     if humidity is not None and temperature is not None:
11         print("Temp={0:0.1f}*C Umidade={1:0.1f}%".format(temperature, humi
12     else:
13         print("Failed to retrieve data from sensor")
14
```

```
Shell
Temp=24.6*C Umidade=50.6%
Temp=24.7*C Umidade=50.6%
Temp=24.6*C Umidade=50.6%
Temp=24.7*C Umidade=50.7%
Temp=24.7*C Umidade=52.8%
Temp=24.6*C Umidade=52.9%
Temp=24.7*C Umidade=52.0%
Temp=24.6*C Umidade=51.5%
Temp=24.7*C Umidade=51.1%
```

Links úteis

- Como usar a Eduroam: <https://eduroam.usp.br/como-usar/>
- Site oficial: <https://www.raspberrypi.org/>
- Instalação: <http://tiny.cc/ieirkz>
- Sensor de temperatura: <http://tiny.cc/rolrkz>

- Tarefa do MacGyver



Tarefa do MacGyver

- Objetivo: desenvolver uma ideia de produto
- Componentes usados:
 - Raspberry Pi3
 - Leitora RFID (distância máx de leitura: 10 cm)
 - Tags RFID

Tarefa do MacGyver

- Regras
 - Grupo se reúne por 10 minutos
 - Ao final, um membro de cada grupo apresenta a ideia
 - Formato pitch de apresentação: 1 minuto
 - Obs: usem o mesmo grupo do projeto da disciplina

Obrigado!

USP

Universidade de São Paulo



DEPARTAMENTO DE ENGENHARIA DE
COMPUTAÇÃO E SISTEMAS DIGITAIS

PCS