



SciPy.in 2012

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“Technology feeds on itself. Technology makes more technology possible “
—Alvin Toffler

RASPBERRY PI AND SCIENTIFIC COMPUTING

29/12/2012

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About Me

2

- B.Tech Electronics Engineer – 2012
- Area of Interests
 - Hardware tinkering
 - Human Computer Interaction , Kinect
 - Open Source Computer Vision (OpenCV)
- Speaker
 - Design Engineer Conference , Delhi
 - Electronics Rocks'12 Conference , Bangalore
- Writer
 - Electronics For You
 - Open Source For You (Earlier “Linux For You”)
- Thinker
 - <https://shahsamarth.wordpress.com>
- Learner
 - Everything that amazes me



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What will you learn ?

3

- Raspberry Pi Overview
- Getting Started Raspberry Pi and Python Development
- Demonstration
- Some cool hacks

Motivation

4

- Tiny Board(85*56*21 mm , 45 grams)
- Portability
- Low Cost(25 \$ (Model A) , 35 \$(Model B))
- Open Source

What exactly is Raspberry Pi?



5

- In Simple Terms
 - ▣ Small credit card size mini Computer
- In Technical Terms
 - ▣ ARM11 700 MHz Processor based single-board computer



Features

6

- ❑ Broadcom BCM 2835 SOC
- ❑ 256 /512 MB RAM
- ❑ 1 /2 USB 2.0 Port/s
- ❑ 0/1 Ethernet Port
- ❑ Composite RCA and HDMI Video Output
- ❑ 3.5 mm jack for Audio
- ❑ 8 GPIO , UART , I2C bus , SPI bus with two chip selects

Which OS does it support?

7

- Android
- Debian Squeeze
- Firefox
- Fedora
- RISC OS
- FreeBSD
- Plan 9 from Bell Labs



Getting Started

8

- Components Required
 - SD Card (At least 2 GB)
 - USB Keyboard
 - USB Mouse
 - LCD with RCA cable/HDMI cable
 - Power Supply (5 V / 700 mA)
 - Ethernet cable(Optional)
- Mount OS to SD card

PLAYING WITH RASPBERRY PI AND PYTHON

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A Demonstration

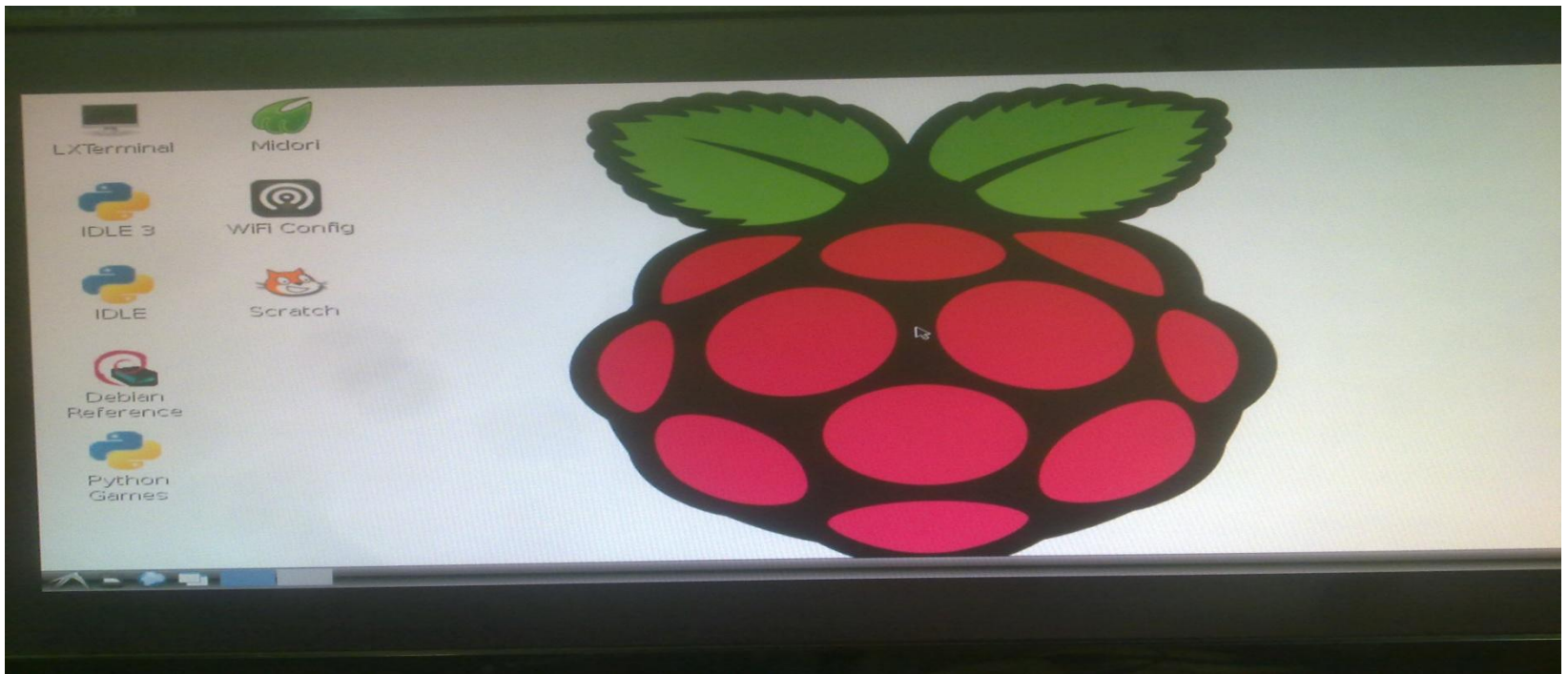
Raspi-config

info	Information about this tool
expand_rootfs	Expand root partition to fill SD card
overscan	Change overscan
configure_keyboard	Set keyboard layout
change_pass	Change password for 'pi' user
change_locale	Set locale
change_timezone	Set timezone
memory_split	Change memory split
overclock	Configure overclocking
ssh	Enable or disable ssh server
boot_behaviour	Start desktop on boot?
update	Try to upgrade raspi-config

<Select>

<Finish>

- Username : pi
- Password : raspberry



- Places
- pi
- Desktop
- Rubbish
- Applications



Limitations

14

- ❑ Performance
- ❑ Python Module Support
- ❑ LCD Support
- ❑ KeyBoard , Mouse

Few Applications

15

- To encourage students to learn programming
- To teach village students programming
- Development Board like Arduino
- Home Automation

What Else?

16

- Game Development(Pygame)
- 3D Development/programming
- Image Processing
- Web development



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Wait... Imagine What's Possible

17

- Tiny , Portable, Open Source Computer
- With Python Support
- numpy , scipy
- matplotlib , iPython
- Game Development
- 3D Processing
- Image Processing
- Web Development
- expEYES for Physics
- More...
- Personal Example



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Basic Idea

18

- Extend usage of Raspberry Pi
- Physical Research Laboratory , Ahmedabad
- Do “something” to support Indian Research Scientist



Demonstration

19

Data Entered by
User

Entered Data
processed by
Python in
Raspberry Pi

Based on results
external
connected device
can be controlled

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Going Beyond

20

- ❑ Raspberry Pi based Supercomputer
- ❑ Parallel Computing and more
- ❑ RPi Store
- ❑ Custom OS
- ❑ Imagination



Contact

21

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