Raspberry Pi CPS Lab – Command Cheat Sheet (Python3 Only)

This cheat sheet is meant for **lab survival**. All commands are **STRICTLY Python 3 only**. No `python` command is used anywhere.

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1. Basic System Check Commands

Check OS & Kernel

```
uname -a
```

Check current user

```
whoami
```

Check current date & time

```
date
```

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2. Fix Date & Time (VERY IMPORTANT)

Wrong date causes **pip, SSL, and package install failures**.

Date format (MANDATORY)

```
sudo date -s "YYYY-MM-DD HH:MM:SS"
```

Example

```
sudo date -s "2025-01-01 10:00:00"
```

Recheck:

```
date
```

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3. Package Update & Upgrade (Run First)

```
sudo apt update
sudo apt upgrade -y
```

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4. Python 3 Check & Installation (ONLY PYTHON3)

Check Python 3

```
python3 --version
```

Install Python 3 (if missing)

```
sudo apt install python3 -y
```

Install pip for Python 3

```
sudo apt install python3-pip -y
```

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5. Upgrade pip (Python 3 only)

```
python3 -m pip install --upgrade pip
```

If SSL error occurs → **recheck system date**.

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6. GPIO & Python 3 Libraries (CPS Mandatory)

```
sudo apt install -y python3-rpi.gpio python3-matplotlib python3-pandas
```

DHT Sensor Library (Python 3)

```
pip3 install Adafruit_DHT
```

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7. OpenCV (for Camera-Based Programs)

```
sudo apt install -y python3-opencv
```

If this fails due to storage or internet, **skip and explain logic in exam**.

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8. Running Python 3 Programs (LAB RULE)

Always run GPIO programs using **sudo** and **python3**:

```
sudo python3 program.py
```

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9. Nano / File Handling Commands

Create or edit a file

```
nano program.py
```

Save & exit nano

- Save: `CTRL + O` → Enter
- Exit: `CTRL + X`

List files

```
ls
```

Remove a file

```
rm filename.py
```

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10. GPIO Discipline (NON-NEGOTIABLE)

Always use BCM mode in Python 3:

```
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
```

Never mix **BCM** and **BOARD**.

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11. Minimal GPIO Test (Python 3)

```
nano test_gpio.py
```

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BCM)
GPIO.setup(17, GPIO.OUT)

GPIO.output(17, GPIO.HIGH)
time.sleep(1)
GPIO.output(17, GPIO.LOW)

GPIO.cleanup()
```

Run:

```
sudo python3 test_gpio.py
```

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12. Common Errors & Meaning

Error	Meaning
ModuleNotFoundError	Python 3 library not installed
Permission denied	Forgot sudo
SSL / pip error	Wrong system date
GPIO not working	BCM / BOARD mismatch

13. Exam-Safe Statements

- "Raspberry Pi runs Python 3 programs on Linux OS"
- "GPIO pins are 3.3V and not 5V tolerant"
- "BCM mode is used for GPIO addressing"
- "Incorrect system date can affect package installation"