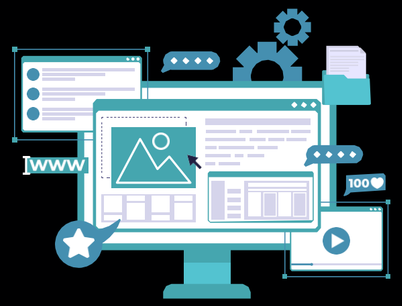
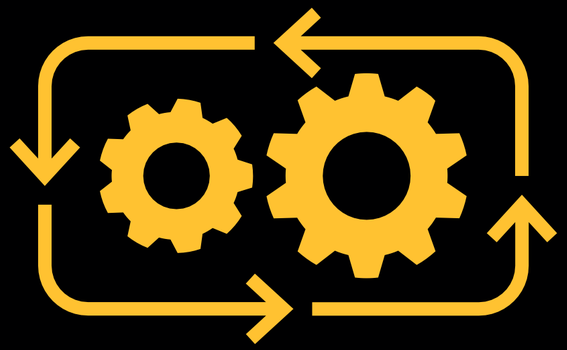
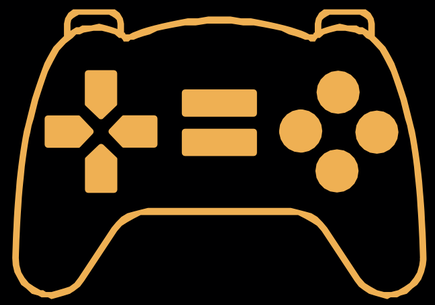
PYTHON SCRIPTING

Why Python?

- Easy to read and learn
- Various existing libraries and frameworks
- Large community and documentation
- Automate our day to day task
- Can create GUI based apps, websites and games


www
100





Python Installation & Setup

python™

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Python on LINUX

SENDING OUTPUT TO TERMINAL..

```
print("Hello World!")
```

COMMENTS

Using #

```
#This is a singleline comment
```

Multi-line comment

```
"""
first line
your comment here
last line
"""
```

Variables

WHAT ARE VARIABLES?

```
name="Paul"

print(name)
```

VARIABLES RULE

- Should not start with number
- No space
- No special character

TYPES OF DATA IN VARIABLES?

```
name="Paul"

age=30

price=25.5

bol=True/False
```

WHAT ARE VARIABLES?

Check type of data

```
print(type(age))
```

ARITHMETIC OPERATIONS?

```
a=10

b=2

print(a+b)
```

We can perform

+,-,/,*

ARITHMETIC OPERATIONS // AND **

To find the

2^5

```
print(2**5)
```

ARITHMETIC OPERATIONS

$$2 \times (3 + 4)^2 \div 5 - C$$

BODMAS rule

PRINTING STRING VARIABLE

```
name="Paul"

print(f'My name is {name}')
```

String Operations

Strings are immutable

We can use ‘Hello’ or “Hello”

Use + to add two strings ‘Hello’ + ‘World’

STRING OPERATIONS

```
msg="Hello World!"

msg.lower()

msg.upper()

msg.title()

msg.split()
```

Lists

- **Ordered Sequence of different types of values**

LISTS

How to define a List?

```
users=['raju', 'sham', 'paul']
```

How to get values from a list?

```
users[0]
users[1]
users[-1]
```

LISTS MODIFY

Adding item to a List?

```
users.append('alex')
```

How to delete values from a list?

```
users.remove('raju')
```

How to modify values from a list?

```
users[1]="Shan"
```

LISTS MODIFY

Adding item to a List at given position?

```
users.insert(1, 'shanu')
```

How to delete values from a list using index no?

```
del users[2]
```

Length of list

```
len(users)
```

LISTS SORTING

Sorting the items in list?

```
users.sort()
users.sort(reverse=True) or
users.reverse()
```

Temporary sorting of items?

```
print(users.sorted())
```

LISTS

Popping the items in list?

```
users.pop()
users.pop(2)
```

SLICING LISTS

Getting first two items

```
users[:2]
```

Getting middle 3 items

```
users.[1:4]
```

Getting last 2 items

```
users.[-2:]
```

NUMERIC LISTS

```
sell=[2, 9, 13, 28, 35, 4, 5C]
```

Getting min or max

```
min(sell)
max(sell)
```

Getting sum of items

```
sum(sell)
```

Tuples

TUPLES

Same as list, however you can't modify the items of Tuple.

Immutable

Ordered

```
days=('mon', 'tue', 'wed')
```

Dictionaries

key:value

DICTIONARY

```
car={'brand':'Audi', 'model':'Q3'}

print("Brand of car is " + car['brand'])

print("Model of car is " + car['model'])
```

DICTIONARY

```
car.get('brand')
```

By using the get() function, if key is not present it return none rather than error.

DICTIONARY MODIFY

Adding item to a Dictionary?

```
car['color']="Red"
```

How to delete values from a dictionary?

```
del car['brand']
```

DICTIONARY LENGTH

Getting no. of key-value a Dictionary?

```
len(car)
```

Sets

Unordered and Unique elements

SETS

```
my_set = {'A', 'B', 'C'}
```

User Interaction

TAKING INPUT FROM USER...

```
name = input("What's your name? ")

age = int(input('Your age'))
```

Conditional Statement

IF-ELSE

```
if age >= 18:
    print("You can vote!")
else:
    print("You can't vote!")
```

IF-ELSE

```
users=['paul', 'raju', 'sham']
if 'paul' in users:
    print("User Exist")
```

```
elist=[]
if elist:
    print('List is not empty')
else:
    print('List is empty')
```

OPERATORS

ELIF

```
if marks >= 80:
    print("1st Division")
elif marks >= C0:
    print("2nd Division")
else:
    print("Failed!")
```

If-else Nesting

Logical Operators

and, or

LOGICAL OPERATORS

```
condition1 and condition2
```

If both conditions are true then true else false

```
condition1 or condition2
```

If any of the condition is true then true

For Loop

Execute a block of code for each item in the sequence
(such as a list, tuple, string, or range)

FOR LOOP

```
for i in 1,2,3,4,5:
    print(i)
```

Other ways to write For loop

```
num=[1,2,3,4,5]
for i in num:
    print(i)
```

FOR LOOP

Other ways to write For loop

```
age_info={'Raju':25, 'Sham':30}

for name, age in age_info.items():
    print("Age of " + name +
          "is " + age)

for name in age_info.keys():
for age in age_info.values():
```

FizzBuzz Program

- The program should add numbers from 1 to a specified number in a list.
- For multiples of 3, it should be "Fizz,"
- For multiples of 5, it should be "Buzz,"
- For numbers multiples of both 3 and 5, it should be "FizzBuzz."
- Print the list

While Loop

WHILE LOOP

```
count=1

while count <= 5:
    print(count)
    count += 1

-----------------------------------
msg=''
while msg != 'quit':
    msg = input("Your message..")
    print(msg)
```

WHILE LOOP

```
active=True

while active:
    msg = input("Your message..")
    if msg == 'exit':
        active=False
```

WHILE LOOP

```
num=[1, 29, 20, 29, 40, 50, 29]

while 29 in num:
    num.remove(29)
```

USEFUL CONCEPTS...

break - to stop the loop

continue - to stop current iteration of loop and start next iteration

BREAK

```
msg=''

while True:
    msg = input("Your message..")
    if msg == 'exit':
        break
    else:
        print(msg)
```

CONTINUE

```
users=[]
name=''

while True:
    name = input("Your name..")
    if msg == 'exit':
        break
    elif name in users:
        print("User already exist")
        continue
    else:
        print(name)
```

Functions

WHAT ARE FUNCTIONS?

- Block of code which perform some task and run when it is called.
- Can be reuse many times in our program which lessen our lines of code.
- We can pass arguments to the method

HOW TO MAKE FUNCTIONS?

Defining a Function

```
def myfun():
    print("Function is called")
```

Calling a Function

```
myfun()
```

ARGUMENTS PASSING FUNCTIONS?

Defining a Function

```
def user_info(name, age):
    print("Name is "+ name)
    print(f"Age is {age}")
```

Calling a Function

```
user_info('raju', 30)
```

DEFAULT VALUES FUNCTIONS?

Defining a Function

```
def user_info(name, age=20):
    print("Name is "+ name)
    print(f"Age is {age}")
```

Calling a Function

```
user_info('sham')
```

NONE ARGUMENT FUNCTIONS?

Defining a Function

```
def user_info(name, age=None):
    print("Name is "+ name)
    if age:
        print(f"Age is {age}")
```

Calling a Function

```
user_info('sham')
```

RETURN RESULT IN FUNCTIONS?

```
def addition(num1, num2):
    sum = num1 + num2
    return sum

print(addition(10, 20))
```

DYNAMIC ARGUMENTS FUNCTIONS

*

```python
def car_detail(brand, *features):
    print(f"Car brand - {brand}")
    for feature in features:
        print(f" - {feature}")


car_detail('Audi', 'Sunroof')
car_detail('Tata', '360cam', 'safe')
```

DYNAMIC ARGUMENTS FUNCTIONS

**

```python
def user_detail(name, **user_info):
    print(f"Name - {name}")
    for key, value in user_info.items():
        print(f" - {key}: {value}")


user_detail('Raju', age=18)
user_detail('Sham', age=18, city='Delhi')
```

FUNCTIONS AS MODULE

Make a file named cal.py

```
def addition(num1, num2):
    sum = num1 + num2
    return sum
```

```
import cal

cal.addition(10, 20)
```

We can pass list as argument in a function

Object Oriented Programming

Classes

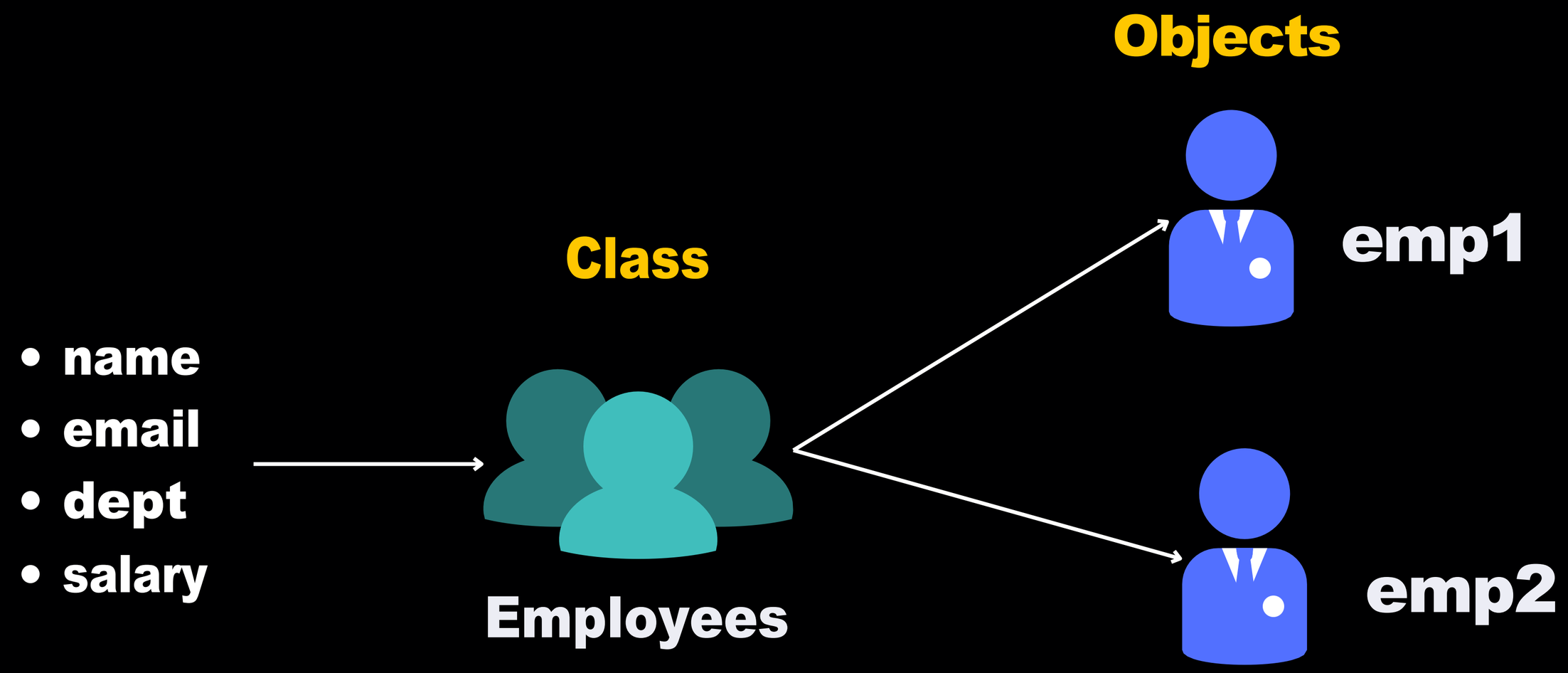
Objects

Classes

A class is a blueprint or a template for creating objects and it defines the structure and behaviour of that objects.

Objects

An object is an instance of a class. with its own unique data and the ability to perform actions


Objects
Class
name
email
dept
salary
Employees
emp1
emp2

```python
class Employee:
    def __init__(self, emp_id, name, department, salary):
        self.emp_id = emp_id
        self.name = name
        self.department = department
        self.salary = salary

    def display_info(self):
        print(f"Employee ID: {self.emp_id}")
        print(f"Name: {self.name}")
        print(f"Department: {self.department}")
        print(f"Salary: {self.salary}")

    def change_department(self, new_department):
        print(f"{self.name} is moving to the {new_department} department.")
        self.department = new_department
```

Creating Objects

```python
# Creating instances of the Employee class
employee1 = Employee(101, "Alice", "HR", 50000)
employee2 = Employee(102, "Bob", "IT", 60000)

# Accessing attributes and methods of the instances
print(employee1.name)  # Output: Alice
print(employee2.department)  # Output: IT

employee1.display_info()
employee2.change_department("Finance")
```

Modifying Attributes

```
# Modifying Attributes
employee1.department="Finance"
print(employee1.department)
```

Working with FILES

Writing into a File

```python
with open('test.txt', 'w') as fo:
    fo.write("This is test message.")
```

```python
with open('test.txt', 'a') as fo:
    fo.write("Adding new line to file.")
```

Reading from a File (whole content)

```python
filename = "user.txt"

with open(filename) as fo:
    content = fo.read()

print(content)
```

Reading from a File (line by line)

```python
filename = "user.txt"

with open(filename) as fo:
    lines = fo.readlines()

for line in lines:
    print(line.rstrip())
```

Exceptional Handling

```python
try:
    print(10/0)
except ZeroDivisionError:
    print("Kindly do not divide by zero")
```

```python
try:
    with open("hola.txt") as f:
        content = f.read()
except FileNotFoundError:
    print("File is not found")
```

```python
try:
    with open("hola.txt") as f:
        content = f.read()
except Exception as e:
    print(e, type(e))
```

Python Modules & Packages

Python Built-in Module

- random
- datetime

```python
import random

# Generate a random float between 0 and 1
random_float = random.random()
print(random_float)
```

```python
import random

# Generate a random integer between 1 and 100
random_integer = random.randint(1, 100)
print(random_integer)
```

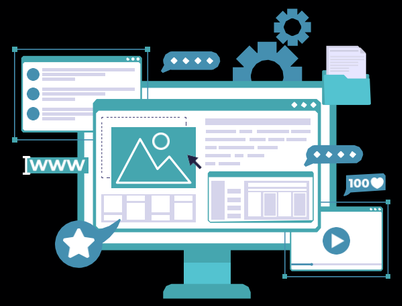
```python
import random

# Generate a random choice from a list
options = ["apple", "banana", "cherry", "date"]
random_choice = random.choice(options)
print(random_choice)
```

Dice Game

What is PyPI & PiP

python™

Package Index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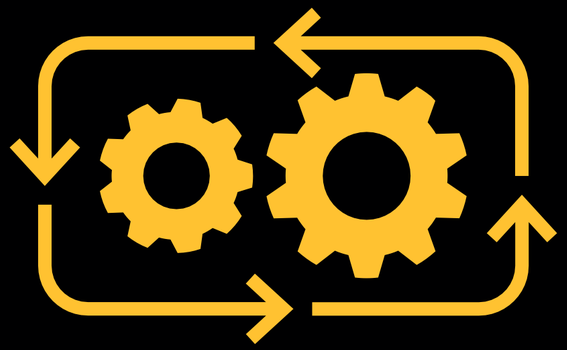
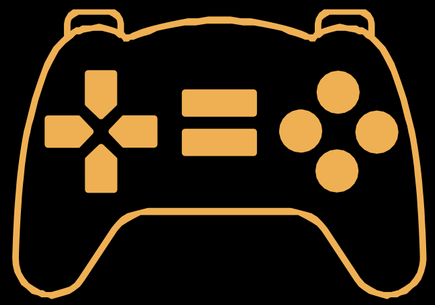




pandas

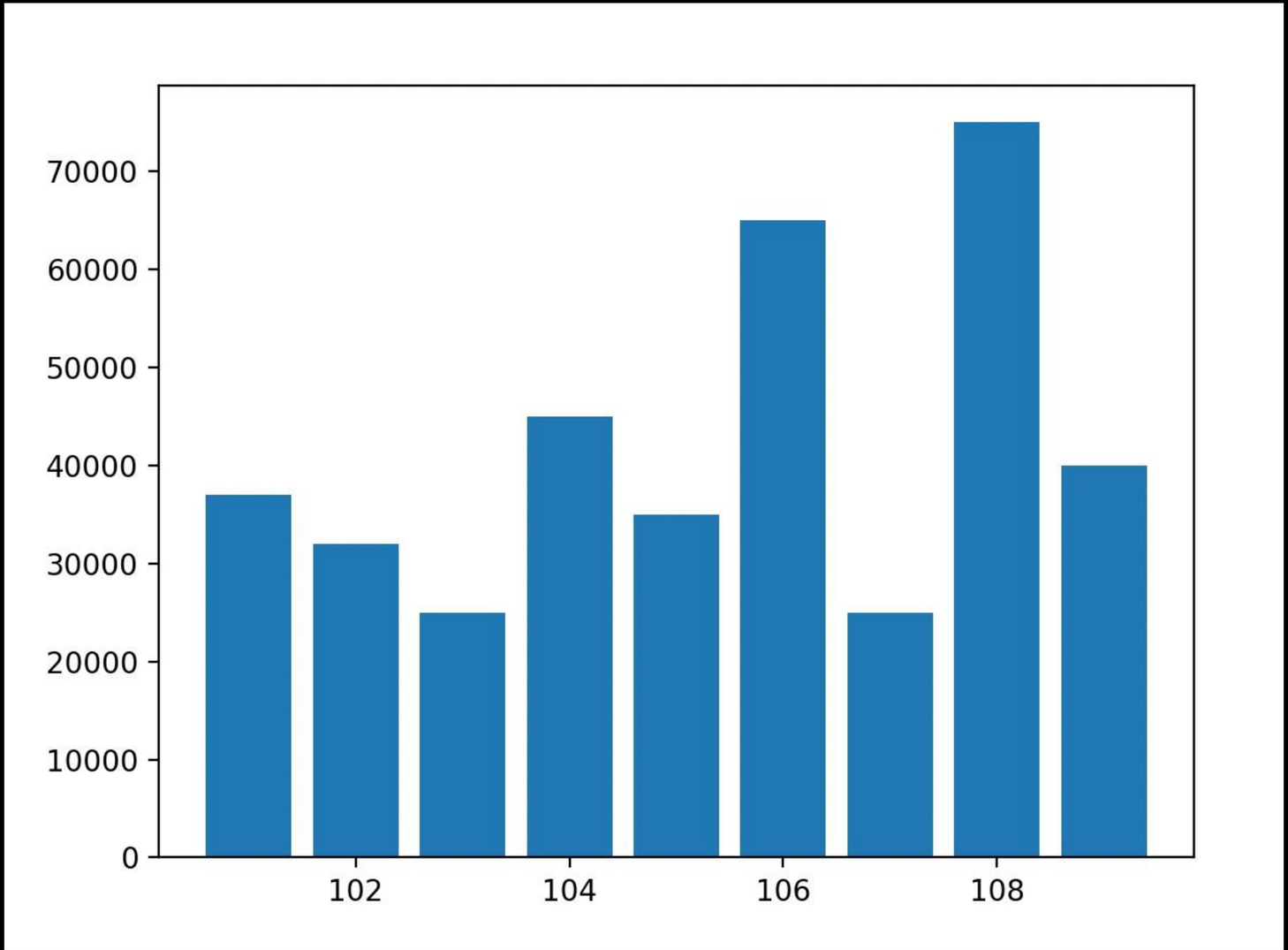
Most powerful and flexible open source data analysis / manipulation tool

emp_id	fname	lname	desig	dept	salary
101	Raju	Rastogi	Manager	Loan	37000
102	Sham	Mohan	Cashier	Cash	32000
103	Baburao	Apte	Associate	Loan	25000
104	Paul	Philip	Accountant	Account	45000
105	Alex	Watt	Associate	Deposit	35000
106	Rick	Watt	Manager	Account	65000
107	Leena	Jhonson	Lead	Cash	25000
108	John	Paul	Manager	IT	75000
109	Alex	Watt	Probation	Loan	40000

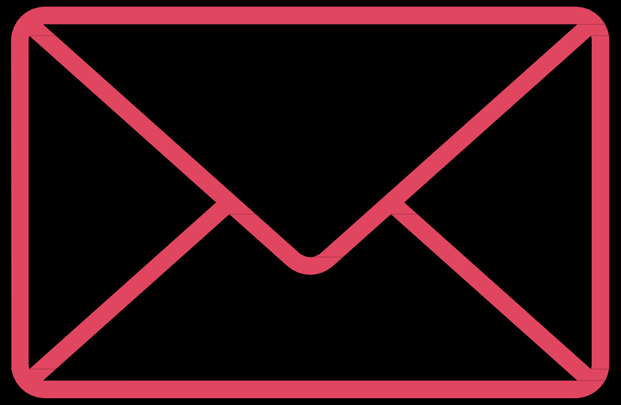
- Print the csv file
- Print only salary column
- Find min and max salary
- Find data of employee with
    - Emp_id 105
    - Max salary
- Find total & average salary of employees
- Print full name of employee id 103

- Change the salary of Sham to 80000
- Remove the data of Leena
- Sort the data with salary (min to max)
- Add a new column ‘bonus’ with value 10% of salary
- Drop the ‘salary’ column

matplotlib


70000
60000
50000
40000
30000
20000
10000
0
102
104
106
108

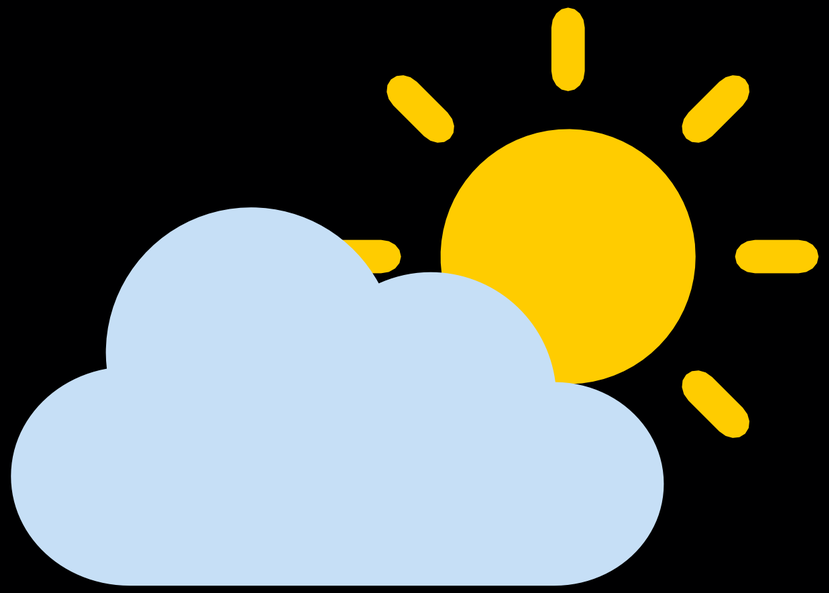
Working with EMAILS



```python
import smtplib

hostname = 'smtp.gmail.com'
email = '<your_email>'
password = '<your_password>'

with smtplib.SMTP(host=hostname) as connection:
    connection.starttls()
    connection.login(user=email, password=password)
    connection.sendmail(
        from_addr=email,
        to_addrs=email,
        msg=f'Subject: Test Python Email\n\n Hi Paul, This is Test Email'
    )
```



Weather Checking App

Working with API

```python
import requests

API_KEY = '<your_api_key>'
city_name = input('Enter the name of the city: ')

url = f'https://api.openweathermap.org/data/2.5/weather?q={city_name}&appid={API_KEY}'

response = requests.get(url)

if response.status_code == 200:
    weather_data = response.json()
    weather_disc = weather_data['weather'][0]['description']
    temp = weather_data['main']['temp'] - 273.15

    # Display weather info
    print(f'Weather in {city_name}: {round(temp, 2)} °C with {weather_disc}')
else:
    print(f'City name {city_name} is not found or incorrect')
```

Assignment

Create a Calculator Program

```
Enter the first number: 10
Enter the next number: 20
+
-
/
*
Select the operation: +
Result of 10 + 20 is 30
Continue the operation with 30? y/n: y
Enter the next number: 50
+
-
/
*
Select the operation: +
Result of 30 + 50 is 80
Continue the operation with 80? y/n:
```

Python Program to Run Linux Commands

THANK YOU