PY03 – ADVANCED PYTHON – WITH KUY3IB

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PYTHON MODULES FOR DIFFERENT WORK AREAS

GRAPHICAL INTERFACE

Python Standard Library comes with TkInter, but you may use external Python modules for more options.

wxPython: Produce truly native user interfaces for their Python applications that run with little or no modifications on Windows, Mac and Linux or other Unix-like systems.

PyGObject: Python package which provides bindings for GObject based libraries such as GTK, GStreamer, WebKitGTK, GLib, GIO, and many more.

Pmw: Toolkit for building high-level compound widgets in Python using the Tkinter module.

WCK : Extension API that allows you to implement all sorts of custom widgets, in pure Python.

Tix: A powerful set of user interface components that expands the capabilities of your Tcl/Tk and Python applications. Using Tix together with Tk may greatly enhance appearance and functionality of an application.

DATABASES

The following open-source modules does allow you to easily access data stored in databases.

MySQLdb: Python DB API-2.0-compliant interface for accessing MySQL databases.

PyGreSQL: An open-source module that interfaces to a PostgreSQL database. It embeds the PostgreSQL query library to allow easy use of the powerful PostgreSQL features from a Python script.

Gadfly: A relational database system implemented in Python based on the SQL Structured Query Language.

SQLAlchemy: A Python SQL toolkit and Object Relational Mapper that gives full power and flexibility of SQL.

KInterbasDB: A Python extension package that implements Python Database API 2.0-compliant support for the open-source relational database Firebird and some versions of its proprietary cousin Borland Interbase.

WEB DEVELOPMENT

Python is a popular language for web development with strong web development module support.

Beautiful Soup: A Python library designed for quick turnaround projects like screen-scraping.

scrape: A Python module for web browsing and scraping.

mechanize: Stateful programmatic web browsing in Python.

libgmail: A pure Python binding to provide access to Google's Gmail web-mail service.

Google Maps: This library brings the Google Maps Platform Web Services to your Python application.

Requests Allows developers to send HTTP/1.1 requests very practically.

Selenium: Helps developers to programmatically open webpages, enter fields, click buttons, and submit forms.

pyquery Allows developers to make jQuery queries on XML documents. The API is as much as possible the similar to jQuery. Pyquery uses LXML for fast XML and HTML manipulation.

IMAGE AND VIDEO MANIPULATION

Python is a very powerful language that can accomplish many tasks such as image manipulation. The Standard Library doesn't provide any image manipulation built-in module, but the following modules may help.

Python Imaging Library (PIL): PIL adds image processing capabilities to your Python interpreter. This library supports many file formats and provides powerful image processing and graphics capabilities.

GDmodule: An interface to the GD library.

VideoCapture: A Win32 Python extension for accessing video devices such as USB WebCams and TV cards.

MoviePy: A Python library for video editing: cutting, concatenations, title insertions, video compositing (non-linear editing), video processing, and producing of custom effects.

pyscreenshot: A cross-platform module that allows to take screenshots without installing 3rd party libraries.

DATA SCIENCE AND MATHS

Python features extensions that may be used for scientific needs such as maths, data science, and engineering.

SciPy: SciPy is a Python-based ecosystem of open-source software for mathematics, science, and engineering.

Matplotlib: A Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python interpreter, the Jupyter notebook, web application servers, and four graphical user interface toolkits.

Pandas: A fast, powerful, flexible and easy-to-use open source data analysis and manipulation tool.

Numpy: A library adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

scikit-learn: A machine learning library built on NumPy, SciPy, and matplotlib for predictive data anlysis.

XGBoost: It is an optimized distributed gradient boosting library designed to be highly efficient, flexible and portable. It implements machine learning algorithms under the Gradient Boosting framework.

PyTorch: An open source machine learning library used for developing and training neural network based deep learning models. Uses dynamic computation, which allows more flexibility in building complex architectures.

TensorFlow: TensorFlow is a software library for machine learning and artificial intelligence. It has a particular focus on training and inference of deep neural networks and uses static computation for data science tasks.

Keras: An open-source software library that provides a Python interface for artificial neural networks.

GAME DEVELOPMENT

Python is a versatile language that helps programmers at many different types of apps, including video games.

Pygame: A set of modules designed for writing video games. Pygame adds functionality on top of the excellent SDL library. This allows you to create fully featured games and multimedia programs in the Python language.

Pyglet: A powerful Python library for developing games and other visually-rich applications.

pyOpenGL: The most common cross platform Python binding to OpenGL and related APIs.

SOUND

Sound manipulation is practically done in Python, thanks to useful modules.

pySonic: A Python wrapper around the high performance, cross platform FMOD sound library.

PyMedia: A Python module for WAV, MP3, Ogg, AVI, DivX, DVD, CD-DA etc. file manipulations. It allows to parse, demultiplex, multiplex, decode and encode all supported formats.

PMIDI: The PMIDI library wraps the Windows MIDI Streams library for use in Python. Using PMIDI, developers may generate synthesized musical sequences on the fly in their code for playback to users.

Mutagen: A module to handle audio metadata. It supports FLAC, M4A, Musepack, MP3, Ogg FLAC, Ogg Speex, Ogg Theora, Ogg Vorbis, True Audio, and WavPack audio files.

MICROSOFT WINDOWS

If you are developing applications for Microsoft Windows, the following modules can help make your app better integrated with the OS. Note that there are other systems such as linux, mac and so on.

pywin32: A wrapper of Python that allows us to interact with COM objects and automate Windows applications with Python. You may do anything that a Microsoft Application can do through python.

PyRTF: A set of Python classes that make it possible to produce RTF documents from Python programs.

WMI: The Python WMI module is a lightweight wrapper on top of the pywin32 extensions and hides some of the messy plumbing needed to get Python to talk to the WMI API.

Py2exe converts Python scripts into executable Windows programs, able to run without requiring a Python installation. Pyinstaller is also an alternative and practical module on this mission.

MAC OS

Python integrates very well with Mac OS. The following modules are very helpful if you are developing for Apple's OS. These modules especially help in doing system wide data-file access operations.

py2app: A Python setuptools command that does allow you to make standalone Mac OS X application bundles and plugins from Python scripts.

PyObjC: PyObjC is a bridge between Python and Objective-C. It allows full featured Cocoa applications to be written in pure Python.

USB AND SERIAL PORTS

Did you know that using Python, you may access your computer's USB and Serial ports? The following modules does help when you need to accomplish such tasks.

PyUSB aims to be an easy-to-use Python module to access USB devices. PyUSB relies on a native system library for USB access. Currently, it works out of the box with libusb 0.1, libusb 1.0, libusbx, libusb-win32 and OpenUSB, and works with any Python version starting at 2.4, including Python 3 releases.

PySerial: Python serial port access library.

USPP is a multi-platform Python module to access serial ports. At the moment, it only works in Windows.

PYTHON WEB DEVELOPMENT FRAMEWORKS

Many of today's big tech companies such as Google, Netflix, Instagram, are selecting Python frameworks for web development. Python gives a wide scope of frameworks to developers. There are two types of Python frameworks – Full Stack Framework and Non-Full Stack Framework. The full-stack Python frameworks give full support to developers including basic components like form generators, form validation, and template layouts.

1. DJANGO

Django, a free and open-source Python framework, enables developers to develop complex code and apps quickly. Django framework assists in developing quality web applications. It is among the best python frameworks and is used for the quick development of APIs and web applications. Example

2. CHERRYPY

CherryPy, almost ten years old now, has proved to be exceptionally quick and stable. It is an open-source Python web development framework that embeds its own multi-hung server. It can run on any working framework that supports Python. It has a strong configuration system for developers and deployers. Example

3. PYRAMID

Pyramid frameworks are versatile and can be used for both easy and difficult projects. It is the most valued web framework among experienced Python developers by virtue of its transparency and measured quality. This framework is flexible and allows users to develop basic web apps via a minimalistic approach. Example

4. GROK

Grok framework is a web framework based on the Zope toolkit technology. It gives an agile development experience to developers by concentrating on two general principles – convention over configuration and DRY (Don't Repeat Yourself) and is developed to speed up the application development process. Example

5. TURBOGEARS

TurboGears is a data-driven full-stack web application Python framework. It is designed to overcome the inadequacies of various extensively used web and mobile app development frameworks. It empowers software engineers to begin developing web applications with an insignificant setup. Example

6. WEB2PY

Web2py accompanies a debugger, code editor as well as a deployment tool to enable you to build and debug the code, as well as test and keep up web applications. It's a cross-platform framework that underpins Windows, Unix/Linux, Mac, Google App Engine, and different other platforms. Example

7. FLASK

Flask is a Python framework accessible under the BSD license, which is inspired by the Sinatra Ruby framework. Flask relies upon the Werkzeug WSGI toolbox and Jinja2 template. The main purpose is to help develop a strong web application base. It was originally designed for applications that are open-ended. Example

8. BOTTLE

Bottle is one of the best Python web framework, which falls under the class of small-scale frameworks. Originally, it was developed for building web APIs. Also, Does not have external dependencies. Example

PYTHON COMMUNITIES

Aside from Stack Overflow and Bosch Python communities, external Python related communities are as:

1. PYSLACKERS

PySlackers is a growing and inclusive community of Python enthusiasts ranging from those just starting to those who have built their entire careers around it. This community has a range of resources from the main presence on Slack to community projects. You may also find community specific resources.

2. REAL PYTHON

The Real Python Member's Slack is an English-speaking Python community with members located all over the world. Everyone is welcome, no matter how much experience you have. If you're friendly and like Python then Real Python would love to have you on board. It also has colorful training pages about modules.

3. FULL STACK PYTHON

Full Stack Python is a non-profit with the mission to "promote, protect, and advance the Python programming language, and to support and facilitate the growth of a diverse and international community of Python programmers." Anyone has an active interest in the Python community may join the PSF as a member.

4. NHS PYTHON

Led by enthusiasts and advocates, the NHS Python Community for Healthcare is an open community to practice the use of the python programming language (open code) in the NHS and healthcare sector.

5. PYTHONISTACAFÉ

PythonistaCafe is an invite-only, online community of Python and software development enthusiasts helping each other succeed and grow. Inside PythonistaCafe, you may interact with professional developers and hobbyists who share their experiences—so you can learn from them and avoid the same mistakes.

PYTHON.ORG

Python community is vast, diverse, and aims to grow each other. The developer community's user base is enthusiastic and dedicated to spreading the use of language far and wide. Python community can help support the beginner, the expert, and adds to the ever-increasing open-source knowledge base. The community is also working on improving transparency, providing the community with opportunities to interact with them, and being responsive to raised suggestions. This may be named as the official Python community.

6. HACKEREARTH

The HackerEarth platform uses artificial intelligence to give users access to more than 2,500 questions used by Fortune 50 companies in several coding challenges and programming interviews. The community provides a real-time coding interview environment to test users' coding skills in Java, Python, and C++. They also avail an excellent opportunity for programmers to become familiar with coding interview questions and formats.

7. OPENEDG PYTHON INSTITUTE COMMUNITY

Join OpenEDG Python Institute Community on social media and interact with Python enthusiasts from all over the world! Introduce yourself to the community, get involved in discussions, take free courses, receive your exam discount voucher, and get certified. For getting certified, exam fee's may apply.

PYTHON BOOKS

1. PYTHON CRASH COURSE

Python Crash Course by Eric Matthews is a fast-paced and comprehensive introduction to Python language for beginners who wish to learn Python programming and write useful programs. The book aims to get you up to speed fast enough and have you writing real programs in no time at all.

2. HEAD-FIRST PYTHON

Head-First Python by Paul Barry is the best book to learn python, a quick and easy fix for you if you wish to learn the basics of Python programming without having to slog through counterproductive tutorials and books. It makes use of a visual format rather than a text-based approach, helping you to see and learn better.

3. LEARN PYTHON-3 THE HARD WAY

Learn Python 3 the Hard Way by Zed A. Shaw is a collection of 52 brilliantly crafted exercises. The book is perfect for total beginners who have not coded before, junior developers, and professionals who need to brush up their skills. The book requires you to learn practical coding by practicing exercises.

4. FLUENT PYTHON

Fluent Python by Luciano Ramalho is a hands-on guide that helps you learn how to write useful Python code by using the most neglected yet best features of the language. The author takes you through the features and libraries of the language and helps you make the code shorter, faster, and readable.

5. INTRODUCTION TO MACHINE LEARNING WITH PYTHON

Throughout this book, you learn about the steps required to produce a rich machine-learning application using Python and sci-kit-learn library. The book introduces you to the fundamental concepts and uses of machine learning before moving on to the pros and cons of popular machine learning algorithms.

6. AUTOMATE WITH PYTHON

This book is one of the best international selling Python books that teaches Python 3 to everyone, including technically inclined beginners. The books give you step-by-step instructions and walk you through each program, teaching you to write programs quickly and efficiently in Python in automation tasks.

7. LEARNING PYTHON

The author of this book, Mark Lutz, gives a comprehensive, in-depth introduction to the core Python language based on his training course. The latest version of the book encourages you to write efficient, high-quality code. This is also one of the best books to learn Python.

8. PYTHON ONE LINERS

Python One-Liners may teach you how to read and write "one-liners": concise statements of useful functionality packed into a single line of code. You may learn how to systematically unpack and understand any line of Python code, and write eloquent, powerfully compressed Python like an expert. While reading this book a thing to keep in mind may be that using one liners all the time may not be pythonic and may be harder to understand. But ternary operations and list comprehensions are classified as pythonic approaches.

Is there a Python book that encapsulates every Python knowledge? No, developer needs to select based on?

FINAL REMARKS

WHAT ARE THE REQUIRED SKILLS FOR PYTHON DEVELOPERS?

The technical skills required for different Python related jobs, differ with unique job requirements. But we may specify some larger areas of knowledge that may be required for Python developers:

- Expertise in core Python and experience
- Sound knowledge of Web frameworks
- Object Relational Mappers knowledge
- Skills of Data Scientists (SQL, Statistics etc.)
- AI, ML and Deep Learning Knowledge (Portfolio)
- Good understanding of Multi-Process Architecture
- Analytical skills, design skills
- Communication skills, version control
- Front-End technologies knowledge
- The Ability of integration
- Knowledge of Server-Side templating language
- Knowledge of user authorization and authentication
- Python event-driven programming
- Good debugging and unit test skills
- Code versioning tool understanding
- Database schemas producing ability
- Multiple delivery platforms understanding
- Logical thinking and problem-solving ability

But, looking at the requirements listed in job posts may be a more reliable approach to directly see the technical skills that are required.

With this method, user may narrow down the technical requirements, and find out that (for example) mySQL, Linux, Dockers are required.

Generally, having a portfolio to show your experience, past projects (with summary presentations) and connections may be helpful.

Giving numerical data and brand names to prove and make it more understandable is recommended. Also if available, giving competition data, results are recommended. (Kaggle, AI Competitions, Hackathons etc.)

RECOMMENDED PRACTICES WHILE CODING

- Writing well-structured code and follow style guidelines
- Having proper comments and documentation
- Proper naming of variables, classes, functions and modules (PEP-8)
- Writing modular and flexible code
- Using virtual environments for minimum size
- Adding readme, license and user guide to programs

INTERNATIONAL DATA SCIENCE COMPETITION WEBSITES

Besides Kaggle, these are some of the machine learning / data science competition websites:

○ DrivenData is open to everyone around the world (with the exception of OFAC sanctioned countries. Current competitions include Alzheimer's research, hateful meme detection, predicting flu vaccines, and more.
○ CrowdANALYTIX features competitions like cement quality forecasting, with participants from around the world. Currently, competitions are slowing down, but there's also a blog to learn more about data science.
○ Signate is basically Japan's Kaggle and has current competitions about vehicle driving image recognition, flattening the curve, and more. Also, please look at CodaLab French based platform for data science.
○ Zindi is a pan-African data science competition platform with challenges including African language NLP, insurance recommendations, a mental health chatbot, and more.
○ Alibaba's Tianchi platform boasts 400,000 data scientists on its platform, working on challenges like image-based 3D shape retrieval, 3D object reconstruction, and instance segmentation.
○ Analytics Vidhya, is India's go-to data science competition platform, with current challenges including loan prediction, sales prediction, times series forecasting, recommendation engines, and more.