



42 Exciting Python Project Ideas & Topics for Beginners [2020]



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Python Project Ideas

Python is one of the most popular programming languages currently. It looks like this trend is about to continue in 2020 and beyond. So, if you are a Python enthusiast, the best thing you can do is work on some real-time **Python project ideas**.

We, here at upGrad, believe in a practical approach as theoretical knowledge won't be of help in a real-time work environment. In this article, we will look at some interesting **Python project ideas** which beginners can work on to enhance their Python knowledge to test. In this article, you will find 42 **top python projects ideas** for beginners to get hands-on experience on Python.

Moreover, project-based learning helps improve student knowledge. That's why most of the upGrad courses cover case studies and assignments based on real-world problems. This technique is ideally for, but not limited to, beginners in programming skills.

But first, let's address the more pertinent question that must be lurking in your mind: **why to build Python projects?**

When it comes to careers in software development, it is a must for aspiring developers to work on their own projects. Developing real-world projects

If you work on live projects, it will help:

- **To boost your confidence** – As you work with real tools and techniques, you will become more confident about your strengths while also identifying improvement points.
- **To experiment** – You will need to acquaint yourself with new tools and technologies while working on a python project. The more you learn about edge development tools, environments, libraries, the broader will be your experimentation with your projects. The more you experiment with different **python project ideas**, the more knowledge you gain.
- **To know the nitty-gritty of SDLC** – When you develop a project from scratch, you will gain a deeper understanding of how the software development life cycle functions. With time you will learn how to plan before writing the code, test the code, manage the testing process, fix bugs, deploy the code, and also maintain your software product from time to time.
- **To master the concepts of programming** – One of the biggest advantages of building real-world projects is that with continuous practice, you will reinforce the concepts and patterns of programming in different languages.

Must Read: [Python Interview Questions](#)



So, here are a few **Python Projects for beginners** you can work on:

Python Project Ideas: Beginners Level

This list of **python project ideas for students** is suited for beginners, just starting out with Python or Data Science in general. These **python project ideas** will get you going with all the practicalities you need to succeed in as a Python developer.

Further, if you're looking for **Python project ideas for final year**, this will get you going. So, without further ado, let's jump straight into some **Python project ideas** that will strengthen your base and allow you to climb up the ladder.

1. Mad Libs Generator

One of the best ideas to start experimenting with hands-on **python projects for students** is working on Mad Libs Generator. This is the perfect project for

user-inputted data. The program design is such that it will ask users to enter inputs that will be considered as a Mad Lib. Mad lib is one of the python projects for beginners.

The input could be anything, an adjective, a noun, a pronoun, etc. Once all the inputs are entered, the application will take the data and arrange the inputs into a template form. Sound fun, right?

2. Number Guessing

This is one of the **simple python projects** yet an exciting one. You can make a mini-game. Make a program in which the computer randomly chooses a number between 1 to 10, 1 to 100, or any range. Then give users a hint to guess the number. Every time the user guesses wrong, he gets another clue, and his score goes up. The clue can be multiples, divisible, greater or smaller, or a combination of all three.



You will also need functions to compare the inputted number with the given number, to compute the difference between the two, and to check whether the number was inputted or not in this python project.

3. Text-based Adventure Game

setting, and based on the user input, it will provide descriptions for each is one of the interesting python projects.



Movement direction is crucial here – you must create walls and set the directions in which the users can move through the rooms, set movement restrictions, include a tracker that can track how far a user has walked or moved in the space.

4. Dice Rolling Simulator



As the name of the program suggests, we will be imitating a rolling dice. One of the interesting python projects and will generate a random number each time the program runs, and the users can use the dice repeatedly for as long as they want. When the user rolls the dice, the program will generate a random number between 1 and 6 (as on a standard dice).

grab a number within 1 to 6 and print it. This beginner-level python project will help build a strong foundation for fundamental programming concepts.

5. Hangman

This is more of a “guess the word” game. The core concepts you have to understand while developing this project are variables, random, integer, strings, char, input, output, and boolean. In the game, users have to enter letter guesses, and they will have a limited number of guesses (a counter variable is needed for limiting the number of guesses). This is one of the interesting python projects to begin with.

You can create a pre-organized list of words that users can grab words from. You must include specific functions to check whether or not a user has entered a single letter or if the input letter is in the hidden word, to if the user has already inputted a single letter, and to print the correct outcomes (letters).

6. Contact Book



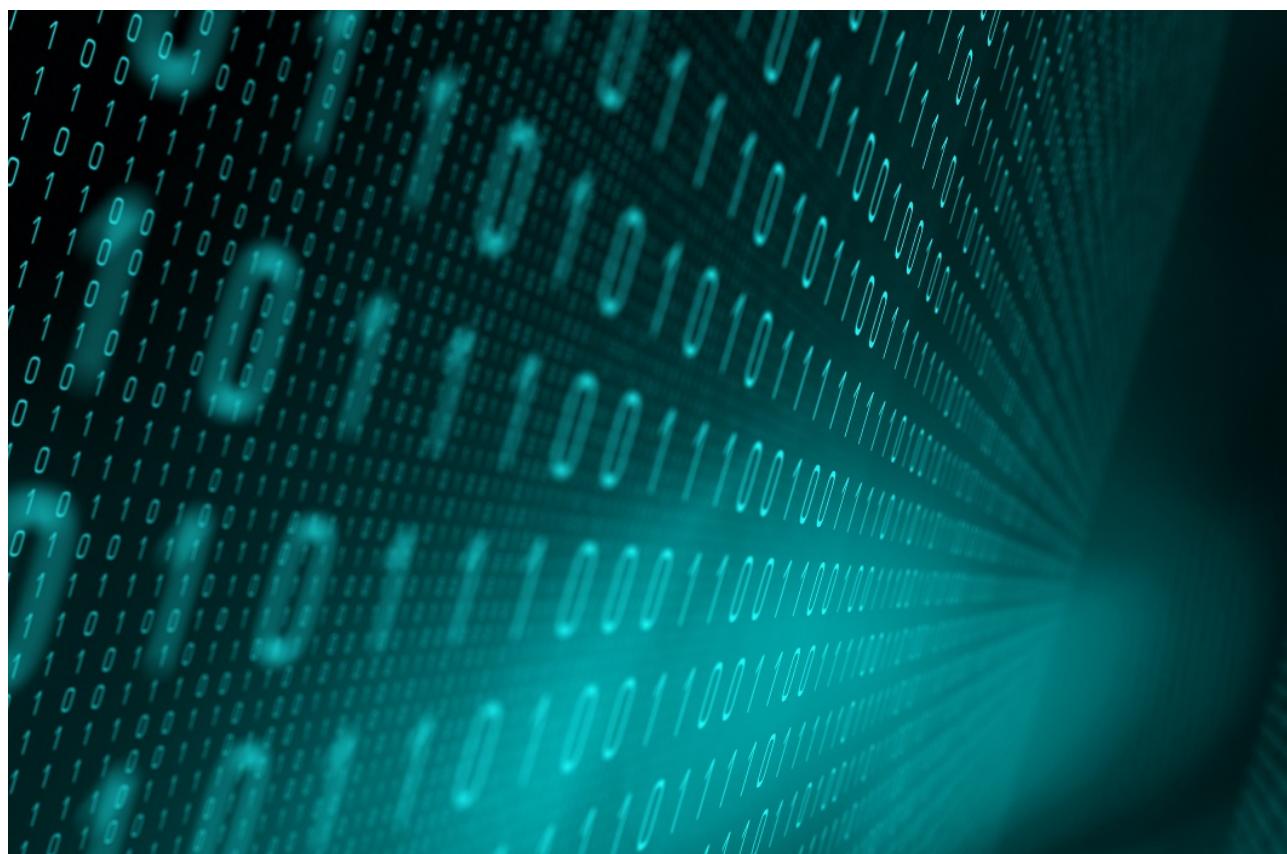
This is one of the excellent python projects for beginners. Everyone uses book to save contact details, including name, address, phone number, an email address. This is a command-line project where you will design a co application that users can use to save and find contact details. The applic should also allow users to update contact information, delete contacts, ar contacts. The SQLite database is the ideal platform for saving contacts.

7. Email Slicer

This is one of the convenient python projects that has a lot of use in the fi program helps get you the username and domain name from an email ad

8. Binary search algorithm

Have you ever heard the proverb, “finding a needle in a haystack.” This problem is designed to do just that- by using a binary search algorithm. You can create a list of random numbers between 0 to 100, with every succeeding number having a difference of 2 between them.



When the user inputs a random number, the program will check if that number is included in the list. It will do so by creating two halves of the list. If the program finds the number in the first half of the list, it will eliminate the other half.

This python project idea will help you create an implement an algorithm searches for an element in a list.

9. Desktop Notifier App

Have you ever wondered how notifications work? This small python proj throw some light on this. The desktop notifier apps run on your system a a piece of information after a fixed interval of time. We suggest you use li as notify2, requests, etc. to build such a program.

10. Python Story Generator



This is a fun but exciting python project which will work wonders with ki nutshell, the program will ask users for inputs such as the name of a place etc. and then build a story around the data. The story will be the same always with little variation with the input.

11. YouTube video downloader



One of the best ideas to start experimenting with your hands-on python projects is working on a YouTube video downloader. More than a billion people watch YouTube every month. Sometimes there are videos we like to download permanently. YouTube doesn't give you that option, but you can create a simple UI and the ability to download YouTube videos in different formats and qualities. This project looks tough, but it is straightforward when you start it.

12. Python Website Blocker



When we surf the internet, many unwanted websites keep showing up. T
the useful python projects where you can build a program that blocks cer

13. Spin a Yarn

Things get more interesting here since strings are infinitely more comple with at the beginning.

The program first prompts the user to enter a series of inputs. These can be an adjective, a preposition, a proper noun, etc. Once all the inputs are placed in a premade story template using concatenation. In the end, the template is printed out to read some unintended madness!

14. What's the word?

This name focuses on the user having to guess the randomly generated word. We can create a list from which the word would have to be guessed and also ask for the number of guesses allowed.

After this, you can create the rules yourself! When the user inputs the word, we indicate whether the alphabet written appears in this particular position. You will need a function to check if the user is inputting alphabets or numbers and display error messages appropriately.

15. Rock, Paper, Scissors

We again use the random function here. You make a move first and then program makes one. To indicate the move, you can either use a single alp input an entire string. A function will have to be set up to check the valid move.



Using another function, the winner of that round is decided. You can then have an option of playing again or decide a pre-determined number of moves in the game.

16. Leap it!

In this python project, you input a year and check whether it is a leap year or not. For this, you'll have to create a function that recognizes the pattern of leap years. You can start by trying to fit the inputted year into the pattern. In the end, you can print the result using a boolean expression.

17. Find out, Fibonacci!

You input a number and the function created checks whether the number is part of the Fibonacci sequence or not. The underlying workings are similar to those in the ‘Leap it!’ program.

One common theme in all the above projects is that they will help you to understand the basics right. You will be the developer and the bug fixer. Not to mention, you will be closing working with creating and implementing a variety of functions along with working with variables, strings, integers, operators, etc. Just like $2 + 2$ is the first block of your mathematics knowledge, so are these concepts, and learning them in a fun way through building projects will help to understand and remember them more.

These are some of the most straightforward **Python project ideas** for you to try on. Once you finish these, let's move to the next level.

Python Project Ideas: Intermediate Level

18. Calculator



Although there isn't much use of a calculator, however, building your own calculator will make you familiar with a library like Tkinter in which you can place buttons to perform different operations and display results on a screen.

It is another utility app in which the user can set a timer, and the app notifications when time is up.

20. Random Password Generator

Creating a strong password and remembering it is a tedious task. You can program that intakes some words from the user and then generates a random password using those words. The user can remember the password with the words he gave as an input.

21. Random Wikipedia Article

This is a complicated yet straightforward program. The program searches and fetches a random article. Then it asks the user if he wants to read that or not. If the answer is yes, the material is shown; otherwise, another random article is presented.

22. Reddit Bot



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This is one of the excellent python project ideas for beginners. Reddit is a platform, and many people want to be online as much as they can. You can a bot that monitors subreddits and reports whenever they find something. This will save Redditors a lot of time and provide helpful information with it.

Python is known for building outstanding command-line applications. You can create your program, which can help you send emails to other people. This will ask your credentials and the content of the email, then send the data via the created command line.

24. Alarm Clock



This is one of the interesting python project ideas. People all across the globe use alarm clock applications. It is quite a simple Command Line Interface (CLI) application for an intermediate-level developer. However, this project is

clock, it will pick a random YouTube link from the text file and play the Y video.

25. Tic-Tac-Toe

We all have fond memories of playing Tic-Tac-Toe with our friends in school? It is one of the most fun games you can play anywhere – all you need is paper! Usually, two players can play Tic-Tac-Toe at a time. The game uses a 3×3 square grid.

While the first player puts “X” in any one of the squares, and the second player puts an “O” in any square. This process will continue until all the squares are filled with each player putting X and O alternatively. The player who succeeds in getting three consecutive X or O on the grid horizontally, vertically, or diagonally wins the game.

You can use the Pygame library for building this project. Pygame is loaded with the modules you need for computer graphics and sound.

26. Steganography

Steganography is the art of hiding a secret message in another form of message, for example, hiding a coded message in an image or video. You can create a program that protects messages inside pictures for you.

27. Currency converter



This is a simple GUI application that you can develop using Python. As you can guess by the name, you will build a currency converter that can convert currencies from one unit to another, for example, converting Indian rupee into pound or vice versa.

The design of this application will be straightforward – the main focus should be the primary function, that is, converting currency units from one to another. Tkinter, the standard Python interface to the Tk GUI toolkit shipped along with Python, will be used to build the GUI.

28. Post-it Notes

post-it notes. The main goal of building this application is to allow users to store their post-it notes wherever they go (since it is on a digital platform).

The application should have an option for account creation, different layouts for post-it notes, and a categorization feature to allow users to segment their notes. You can consider using [Django](#) for this project since it has an in-built user authentication feature.

29. Site Connectivity Checker

The job of a site connectivity checker is to visit a URL and display the status of the URL, that is, whether or not it is a live URL. Usually, site connectivity checker visits URLs at regular intervals and return the results each time. This project will follow the same lines – it will check the live status of URLs. Site connectivity checker is one of the interesting python projects for beginners.

You must design the code for this application from scratch. As for your choice of protocols, you can either opt for [TCP](#) or [ICMP](#). You can use [click](#), [docopt](#), or [argparse](#) frameworks for adding commands that will enable users to add and delete URLs from the list of URLs they want to check.

30. Directory Tree Generator

A Directory Tree Generator lets you visualize the relationship between files and directories, thereby making it easier to understand the positioning of file.

for the project.

Read: [Python Developer Salary in India](#)

These are some **intermediate Python project ideas** on which you can work. You can also check out [beginner Python projects](#). If you still like to test your knowledge and take on some tough projects, then here are some advanced Python project ideas.

Python Project Ideas: Advanced Level

31. Speed Typing Test



Let's start advanced python project ideas for beginners. Do you remember the typing test game which was used in Windows XP and before? You can create a similar program that tests your typing speed. First, you need to create a Tkinter library like Tkinter. Then create a fun typing test that displays the user's accuracy, and words per minute in the end. You can also find source code of the program online.

32. Content Aggregator

The internet is filled with websites, articles, and information. When we want something, it is tough to go through each of them. For this use, you can create

which content they want. It is very much like Google but unbiased. And it's a perfect idea for your next python project!

33. Bulk File Rename/ Image Resize Application

This is an advanced project which needs you to be well-versed in Machine Learning. We will begin by teaching the program on how to pre-process data, then it can perform few resize and rename images tasks. As the program starts learning, it can perform bulk functions at once.

34. Python File Explorer

This is a significant project as it will test your knowledge on the various components of Python. You need to build an app that anyone uses to explore the files in their system. You can also add features like searching and copy-paste. Tkinter is a commendable choice for this project as it makes the development of GUI applications fast and easy.

To create the Python File Explorer using Tkinter, you have to import the `filedialog` module from Tkinter. This module is designed for opening files and directories and saving them.

35. Plagiarism Checker

language processing library along with the Google search API to create a program that searches the first few pages of Google and checks for plagiarism.

36. Web Crawler

A web crawler is an automated program script that surfs the internet and extracts content of a particular webpage. A web crawler is one of the most useful projects to find up-to-date information. You will need to use a multi-threaded approach for such a program. You can use Python's [request](#) module to make the requests or you can use Scrapy. It is Python's open-source web crawling framework especially designed for web scraping and extracting data by using APIs.

37. Music Player

Everyone likes listening to music; you can also create your music player as a Python app. Other than playing music, your program can explore your file directories and select songs to play. This is one of the creative python projects you might face is creating a music player with an interactive interface that can be used by regular users.

The app will have a neat interface that will allow users to browse through different songs, increase/decrease volume, display the name of the song, artist, album. The project will mainly involve the basics of Python programming, database management, algorithm construction, and data processing.

38. Price Comparison Extension

then show you the best deal. It is a convenient program, as many businesses use this small program. You can use this extension for groceries, stationery, and more.

39. Expense Tracker

As you can guess by the name, an expense tracker is a software application that helps you keep track of your expenses, and even analyze the expenses. In this project, you will build a simple expense tracker that can keep track of the expenses.

Expense tracker is one of the trending python projects which should also perform statistical analysis to give accurate insights to users on their expenses. This way, users can plan their expenses better. You can use PySimpleGUI to create a user-friendly interface for this application, and even Python libraries like Pandas and NumPy can be handy tools for the project.

40. Regex Query Tool

Regular search tools often fail to produce the desired results for specific queries. For example, if you want to find all the dates in a text file, or if you want to find all the URLs in a text file, what you need is a Regex Query Tool. In simple words, a regex query tool is a tool that takes a regular expression as input and checks if it matches the given strings, which means that when you enter a query in this tool, it will check if the query is valid or not. It will also check the validity of your query.

If the regex can match patterns in the text query entered by the user, it will highlight the matching patterns for the user by highlighting all the matching patterns. A Regex Query Tool is one such tool that can be used for this purpose.

re library is the perfect tool for running the query strings on the user-inp

41. Instagram Photo Downloader



and it is quite similar to the above command line app as this app will use credentials to open your account and then look for your friend's ID and download their photos. This app would be handy when people want to delete pages just the images.

42. Quiz Application

This is one of the interesting python project ideas to create. This is a standard application that presents a set of carefully curated questions to the users (questionnaire), allows them to answer the same, and displays the correct answers. It also informs the user if they are wrong. Each test will display the final score of the user. The application can have an account creation option, wherein some users can be appointed as Admins.

These Admins can create tests for other users. In this way, the tests and content can continue to be updated. This application requires a database to store all the questions, answers, and scores of the users. You can also include additional features like timers for tests.

Also read: [Python Interview Questions & Answers](#)

Which project platform should you choose?

It is essential to develop your software projects on a specific platform so that (particularly those lacking technical expertise) can also use your product.

Web

Web applications are software projects that can run on the Web. Anyone with an internet connection can access web applications on any device – no need to download them separately. Thus, if you want to make a software available for public use, the Web is the ideal platform for such applications.

Web applications are elaborate projects having both back-end and front-end components. The back-end refers to the business logic of your application that manipulates data, stores the data, and performs various operations. The front-end is the part that users can see and interact with. Keeping back-end as the focus of your application, you must also learn the basics of front-end development with languages like JavaScript, HTML, and CSS.

However, if you work with Python, it can take care of all your back-end and front-end development needs. Python has an exclusive library that eliminates the need for learning front-end languages like JavaScript, HTML, and CSS – Anvil. Apart from this, there are many other Python-based web frameworks like Django, Flask, Web2Py, CherryPy, and many more, to name a few.

Desktop GUI

Since desktop applications are widely used by people across the globe, building a desktop application is a great project idea for both freshers and intermediate learners.

need for creating desktop applications.

Python comes with several frameworks for building desktop applications. PySimpleGUI is a user-friendly Python framework, [PyQt5](#) is one of the most popular Python-based GUI frameworks.

Once you develop a desktop GUI, you can even make it compatible with a wide range of major operating systems (Linux, Windows, or macOS) by compiling it into a single executable code for the OS you wish to run it on.

Command-Line

Command-Line Applications are those applications/programs where user interaction is entirely dependent on the terminal and shell. These applications function in a console window. As such, they are devoid of any form of graphical interface for the users to see. Thus, to use command-line applications, users have to enter specific commands – while users can enter their input (commands using [ASCII](#) characters, the app will also provide the output through ASCII).

Naturally, command-line applications demand a certain level of technical knowledge of commands. Although they aren't as user-friendly as web or desktop applications, command-line applications are robust and powerful. Python has a range of command-line frameworks, including click, docopt, Plac, Cliff, and Python-

In this article, we have covered **42 Python project ideas**. We started with beginner projects which you can solve with ease. Once you finish with these **python projects**, I suggest you go back, learn a few more concepts and intermediate projects. When you feel confident, you can then tackle the advanced projects. If you wish to improve your python skills, you need to get your hands on these **Python project ideas**.

I hope you will learn a lot while working on these python projects. If you are interested in learning data science to be in the front of fast-paced technological advancements, check out upGrad & IIIT-B's [**PG Diploma in Data Science**](#) and upskill yourself for the future.

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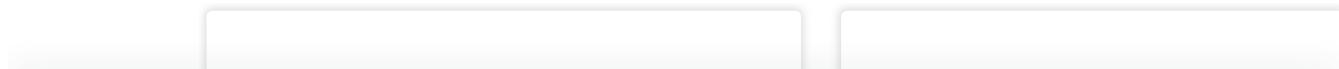
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