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User

I'm kanak ; a data science learner. i want to biult a repository at my github profile with my python journey. so, create a 100 days challenge of python for data science with deep (basic to advance)

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Hi Kanak! That's a fantastic idea to build a 100-day Python challenge repository focused on data science, covering basics to advanced topics. Here's a structured plan you can follow, broken down into 4 phases: Basics, Intermediate, Advanced, and Projects/Applications. Each day includes a topic or task with increasing complexity.

100 Days Python Challenge for Data Science

Phase 1: Basics (Days 1-25) Focus: Python fundamentals, data structures, basic programming concepts.

- 1. Python setup & environment (Jupyter, VSCode)
 - 2. Python syntax, variables, data types
 - 3. Basic input/output, print formatting
 - 4. Operators and expressions
 - 5. Conditional statements (if, else, elif)
 - 6. Loops (for, while)
 - 7. Functions: definition, arguments, return values
 - 8. Lists and list operations
 - 9. Tuples and tuple operations
 - 10. Dictionaries and dictionary operations
 - 11. Sets and set operations
 - 12. String manipulation and formatting
 - 13. List comprehensions
 - 14. Exception handling (try, except)
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- 15. File handling (read/write text files)
- 16. Modules and packages (import basics)
- 17. Introduction to virtual environments
- 18. Lambda functions and map/filter/reduce
- 19. Basic debugging and using print statements
- 20. Introduction to Python standard libraries (math, datetime)
- 21. Working with JSON and CSV files
- 22. Introduction to pip and installing packages
- 23. Understanding Python namespaces and scopes
- 24. Recursion basics
- 25. Practice problems combining basics

Phase 2: Intermediate (Days 26-50) Focus: Data manipulation, libraries, and intermediate programming concepts.

- 26. Introduction to NumPy arrays and operations
- 27. Array indexing and slicing in NumPy
- 28. NumPy broadcasting and vectorization
- 29. Introduction to Pandas: Series and DataFrames
- 30. DataFrame indexing, selection, and filtering
- 31. Handling missing data in Pandas
- 32. Data aggregation and groupby in Pandas
- 33. Merging, joining, and concatenating DataFrames
- 34. Data cleaning and preprocessing basics
- 35. Working with dates and times in Pandas
- 36. Introduction to Matplotlib for data visualization
- 37. Plotting line, bar, and scatter plots
- 38. Customizing plots (labels, titles, legends)
- 39. Introduction to Seaborn for statistical plots
- 40. Histograms, boxplots, and heatmaps in Seaborn
- 41. Introduction to regular expressions in Python
- 42. Working with APIs and JSON data
- 43. Introduction to object-oriented programming (OOP)
- 44. Classes, objects, methods, and attributes

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- 45. Inheritance and polymorphism basics
- 46. Decorators and generators
- 47. Writing and using Python scripts
- 48. Introduction to logging in Python
- 49. Profiling and optimizing Python code
- 50. Practice intermediate-level data manipulation problems

Phase 3: Advanced (Days 51-75) Focus: Advanced data science libraries, algorithms, and concepts.

- 51. Introduction to Scikit-learn
- 52. Data preprocessing with Scikit-learn (scaling, encoding)
- 53. Train/test split and cross-validation
- 54. Linear regression from scratch and with Scikit-learn
- 55. Logistic regression and classification metrics
- 56. Decision trees and random forests
- 57. Support Vector Machines (SVM)
- 58. K-Nearest Neighbors (KNN)
- 59. Clustering: K-Means and hierarchical clustering
- 60. Dimensionality reduction: PCA
- 61. Introduction to feature engineering
- 62. Handling imbalanced datasets
- 63. Introduction to natural language processing (NLP)
- 64. Text preprocessing with NLTK/spaCy
- 65. Bag of Words and TF-IDF vectorization
- 66. Sentiment analysis basics
- 67. Introduction to time series analysis
- 68. ARIMA and moving averages
- 69. Introduction to deep learning with TensorFlow/Keras
- 70. Building a simple neural network
- 71. Convolutional Neural Networks (CNN) basics
- 72. Recurrent Neural Networks (RNN) basics
- 73. Transfer learning introduction
- 74. Model deployment basics (Flask API)

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- 75. Practice advanced machine learning problems

Phase 4: Projects & Applications (Days 76-100) Focus: Real-world projects, end-to-end workflows, and portfolio building.

- 76. Exploratory Data Analysis (EDA) project on a dataset
- 77. Data cleaning and feature engineering project
- 78. Build a classification model end-to-end
- 79. Build a regression model end-to-end
- 80. Sentiment analysis project on Twitter data
- 81. Image classification project with CNN
- 82. Time series forecasting project
- 83. Clustering project with customer segmentation
- 84. NLP project: text summarization or chatbot
- 85. Build a recommendation system
- 86. Deploy a machine learning model with Flask
- 87. Create interactive visualizations with Plotly/Dash
- 88. Automate data pipeline with Python scripts
- 89. Web scraping project with BeautifulSoup/Scrapy
- 90. Build a portfolio website with GitHub Pages
- 91. Write detailed README and documentation for projects
- 92. Version control with Git: branching and merging
- 93. Collaborate on an open-source data science project
- 94. Optimize model performance and hyperparameter tuning
- 95. Introduction to cloud platforms (AWS/GCP/Azure basics)
- 96. Containerize your project with Docker
- 97. Build a dashboard for data visualization
- 98. Prepare a data science project presentation
- 99. Reflect on learning and write a blog post
- 100. Plan next steps: advanced topics or specialization

How to organize your GitHub repo?

- Create folders for each phase: `/basics` , `/intermediate` , `/advanced` , `/projects`
- Each day can be a separate Jupyter notebook or Python script with explanations.
- Include a `README.md` with the challenge overview and instructions.
- Add a `requirements.txt` for dependencies.
- Use clear commit messages and update your progress daily.

If you want, I can help you generate starter code or templates for each day. Would you like me to create a sample notebook for Day 1?