Creating Bar Charts in Python

This planning document is intended to support teachers who are delivering the NPA/PDA Data Science or for students who are learning independently. It also aligns with the Data Skills for Work framework.

Contents

Version Control

Version number	Purpose/Change	By	Date
1.0	Published by Effini	John Bell	21 April 2022

Lesson Description

Lesson Overview	Creation and modification of bar charts in Python using the seaborn package.
Topic	Visualisation and Storytelling
Book Chapter(s)	Interpreting data

NPA level	5, 6
PDA level	7, 8
Data skills for work level	Core, Analysis

Lesson Contents

This lesson consists of:

- A lesson plan (this document)
- A PowerPoint presentation, 'Creating Bar Charts in Python'
- 2 Jupyter notebooks:
  - 'creating_bar_charts.ipynb' (for learners)
  - 'creating_bar_charts_with_answers.ipynb' (for teachers)

Learning Intentions

We will be learning about **creating bar charts in Python,** specifically,

- where creating bar charts and other graphs fits into the analysis steps

- how to create and modify **bar charts**

Success Criteria

I can *describe* how creating graphs is part of the analysis steps.

I can *create* and *modify* bar charts in Python.

Knowledge Prerequisites

Learners should know:

- Python programming to at least the level defined in SQA Computer Programming Level 5 (HY2C 45)
- How to use a Jupyter notebook to write, edit and run Python code
- That identifying patterns is part of the analysis steps

Lesson Requirements

	PDA	NPA	Data Skills for work
Qualification	Yes	Yes	Yes
Outcome ID(s)	CD7.3e, CD8.2h	DC5.3c, DC6.3d	c2.1, a2.1, a2.2, a3.1, a3.2
Outcome description(s)	CD7.3e Creating visualisations using software CD8.2h Creating visualisations using software	DC5.3c Create appropriate visualisations from data. DC6.3d Create appropriate visualisations from data.	c2.1 Vocabulary used in data science and analytics a2.1 Use of tools to analyse data a2.2 Selecting suitable visualisations a3.1 Visualisation of data to provide insight a3.2 Visualisation of data to tell stories
Level	7, 8	5, 6	Core, Analysis
Software language	Python	Python	Python
Required equipment /software for student	Lesson: PowerPoint Python notebook: Jupyter notebook environment	Lesson: PowerPoint Python notebook: Jupyter notebook environment	Lesson: PowerPoint Python notebook: Jupyter notebook environment

Jupyter Notebook

There is a Jupyter notebook for this lesson that provides examples and programming tasks for learners, drawn from the examples in the lesson PowerPoint.

The notebook uses Python 3.x and the following packages:

- numpy – for scientific computing
- pandas - for data manipulation
- s3fs - an API to AWS S3 (Simple Storage Service), used to import datasets
- seaborn – for data visualisation
- matplotlib – for data visualisation

The tasks are described in the table below.

Notebook section	Task	Description
Bar Charts	Task 1 - TV shows	Research the number of episodes that are in TV shows you like, create a data frame using this information, and create a bar chart that shows the number of episodes for each TV show.
	Task 2 - Which country had the highest happiness score?	Using a dataset containing the the 'Happiness scores' of 6 countries, create a bar chart that shows the maximum Happiness Score for each country, across the years 2015 to 2019.
	Task 3 - Which country had the smallest area of forest on average?	Create a bar chart showing the average (i.e. mean) forested area each country had between 1990 and 2020.
	Task 4 - What is the most popular colour of shirts that have been bought?	Create a bar chart showing how many transactions there were for each colour of shirt that were purchased from a fashion retailer.
Horizontal Bar Charts	Task 5 - What products were sold?	Create a horizontal bar chart using the **fashion** data frame, that shows the number of transactions for each product (e.g. jacket or gloves).
Adding Chart and Axis Titles	Task 6 - How many babies?	Display the bar chart from **Example 2**, showing how many babies were born in 3 council areas in Scotland between

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		1999 and 2019, with a title and axis titles.
Changing the Colours of Bars	Task 7 - Forests	Display the bar chart from **Task 3** but this time, give it a suitable title and axis titles, and set the colours of the bar to a colour of your choice.
Changing Tick Marks	Task 8 - Finding the best tick mark interval	Display the graph with what you think is the best tick mark interval.
Ordering the Bars	Task 9 - Order the countries alphabetically	Take the bar chart from **Task 2** but this time, order the bars alphabetically, by country.
	Task 10 - Forested areas by country	Take the bar chart from **Task 3** but this time, order the bars alphabetically, by country.
	Task 11 - Order the countries by happiness score	Create a similar horizontal bar chart to that in **Task 9** but this time sort the order of the bars by their value, in descending order, rather than alphabetically.

Datasets

The following datasets are used in this lesson.

Dataset name	Description	Link
statues	The height of some statues.	https://datasets.learn-data.science/statues.csv
caffeine_in_drinks	The amount of caffeine in various popular drinks.	https://datasets.learn-data.science/caffeine_in_drinks.csv
scotland_births_small	The number of babies born in North Lanarkshire, Falkirk and Highland council areas between 1999 and 2019.	https://datasets.learn-data.science/scotland_births_small.csv
world_happiness_scores_small	The 'Happiness scores' of 6 countries between 2015 and 2019.	https://datasets.learn-data.science/world_happiness_scores_small.csv
forest_areas_small	The forested area (in square kilometres) of 5 countries between 1990 and 2010.	https://datasets.learn-data.science/forest_areas_small.csv
fashion_transactions	Sales transactions from a fictional online fashion retailer.	https://datasets.learn-data.science/fashion_transactions.csv

How you can use this lesson

Alternative format

If you require this document in an alternative format, such as large print or a coloured background, please contact

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