od zera...
...do bohatera

EQUINIX

Agenda

1. Czym jest Python
2. kamień/papier/nożyczki
3. Trochę teorii: listy, słowniki, funkcje…
4. Zadanie praktyczne
5. Co dalej… ?

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Wymagania

- ✓ zainstalowany Python na komputerze:
  - najlepiej 3.7, 3.8, 3.9
  - przydane linki:
    - Python: https://www.python.org/
    - Wersje Python dla systemu Windows: https://www.python.org/downloads/windows/
    - Instrukcja jak zainstalować Python na systemie Windows: https://www.youtube.com/watch?v=9Xg0M1Lz020 (instrukcja do 7:54 - nie potrzebujemy Visual Studio)

    - Wersje Python dla systemu macOS: https://www.python.org/downloads/macos/
    - Instrukcja jak zainstalować Python na systemie macOS: https://www.youtube.com/watch?v=ezUCZiMXB20

- ✓ zainstalowany PyCharm CE na komputerze:
  - Najlepiej wersja *Community*
  - Przydatne linki:
    - PyCharm CE https://www.jetbrains.com/pycharm/
    - Wersje dla systemu Windows: https://www.jetbrains.com/pycharm/download/#section=windows
    - Jak zainstalować PyCharm na systemie Windows: https://www.youtube.com/watch?v=z73PyNDgVyQ

    - Wersje dla systemu macOS: https://www.jetbrains.com/pycharm/download/#section=mac
    - Jak zainstalować PyCharm na systemie macOS: https://www.youtube.com/watch?v=K5cAu-Wro3M

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Czym jest Python… ?

- Web Development
- Data Science
- Machine Learning
- Automation

Mar 2022	Mar 2021	Change	Programming Language	Ratings	Change
1	3	▲	Python	14.26%	+3.95%
2	1	▼	C	13.06%	-2.27%
3	2	▼	Java	11.19%	+0.74%
4	4		C++	8.66%	+2.14%
5	5		C#	5.92%	+0.95%

source: https://www.tiobe.com/tiobe-index/

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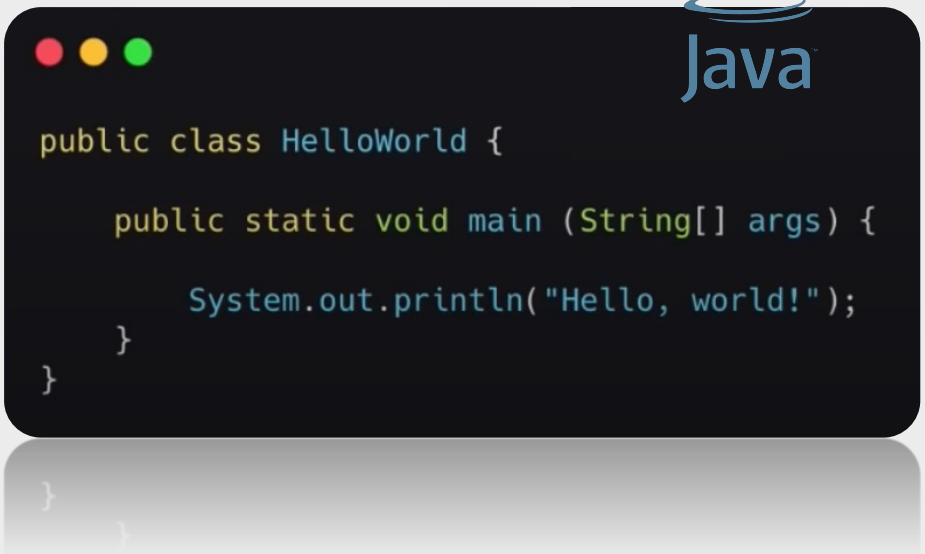
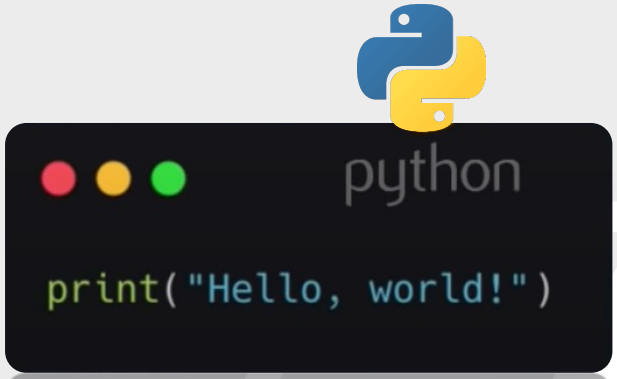
Dlaczego Python… ?

- Prosta składnia (syntax)
- Prosta konfiguracja
- Prosta konfiguracja
- Biblioteki
- Społeczność





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Co dalej

basic

- [x] variables
- [x] conditions
- [x] operators
- [x] control flow
- [x] loops
- [ ] functions
- [x] mutable vs. immutable
- [x] common methods

intermediate

- [ ] object orientated programming (oop)
- [ ] data structures
- [x] comprehension
- [ ] lambda functions
- [ ] *arg & **kwargs
- [ ] inheritance
- [ ] advanced classes
- [ ] pip

advanced

- [ ] decorators
- [ ] generators
- [ ] context manager
- [ ] metaclasses
- [ ] concurrency & parallelism
- [ ] testing
- [ ] build packages
- [ ] cython

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Python Interview Questions!

- What is the difference between %, /, and //?
- What is the difference between del(), clear(), remove(), and pop()?
- What is the difference between sort and sorted?
- What is the difference between indexing and slicing?
- What is the difference list and tuple?
- Explain zip() and enumerate() function.
- What is the lambda function?
- What is the difference between pass, continue and break?
- What is the use of the With statement?
- What is if __name__ == “__main__”?
- What is a docstring?
- What is the difference between instance variable and class variable?

source: https://www.analytixlabs.co.in/blog/python-interview-questions-for-data-science/

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Machine Learning

***past**: make your data tell the story...*
***now**: make your data bring money...*

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Agenda

1. DS. vs. MLE vs. MLOps
2. ML Project Life Cycle
3. Introduction to NumPy & Pandas
4. Classification

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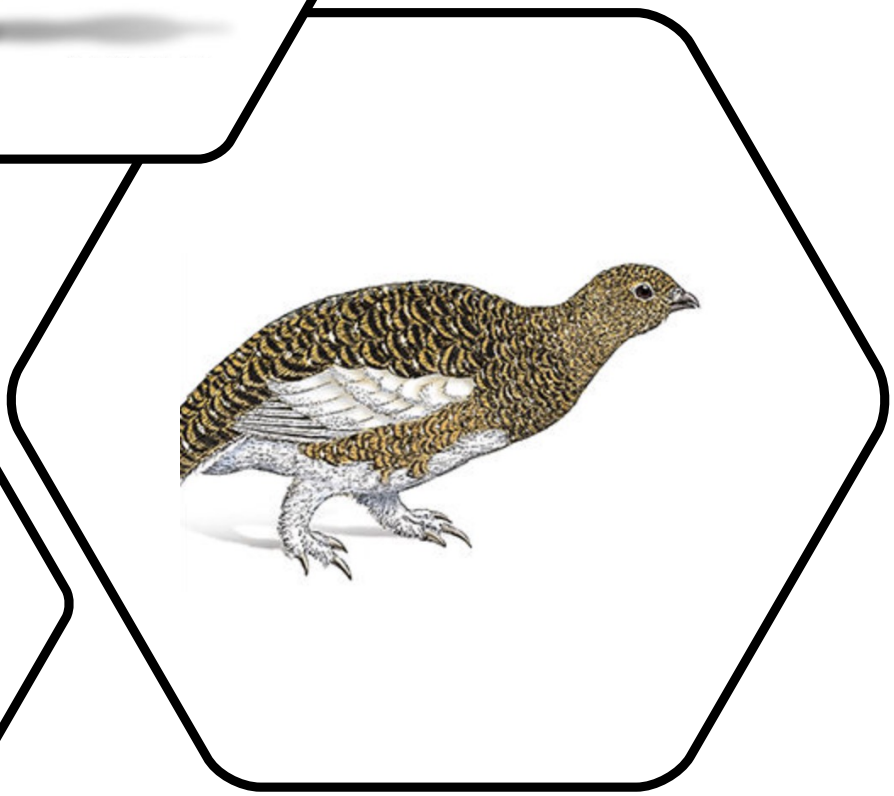
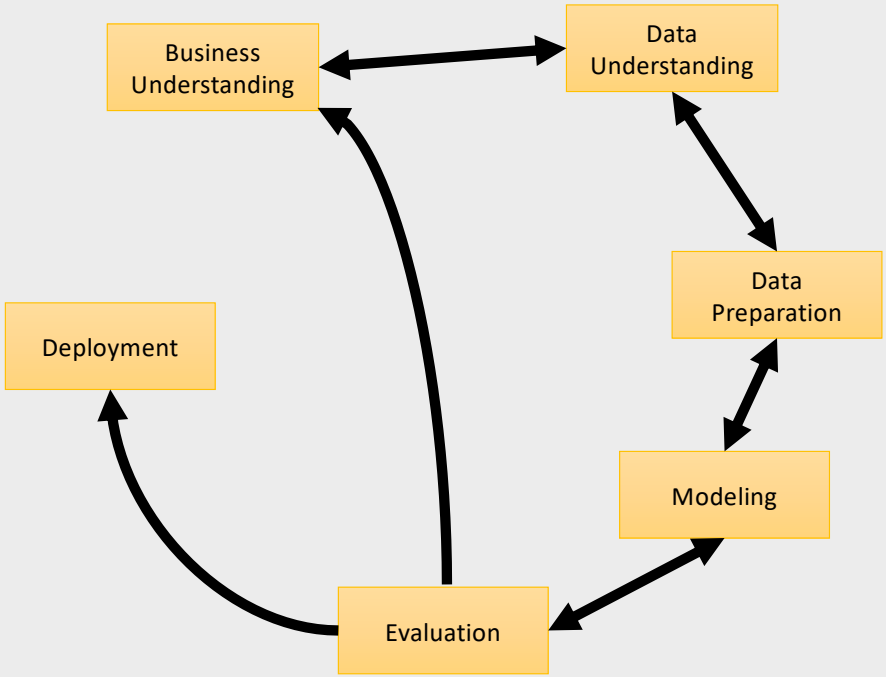
DS vs. MLE vs. MLOps



ML Project Life Cycle



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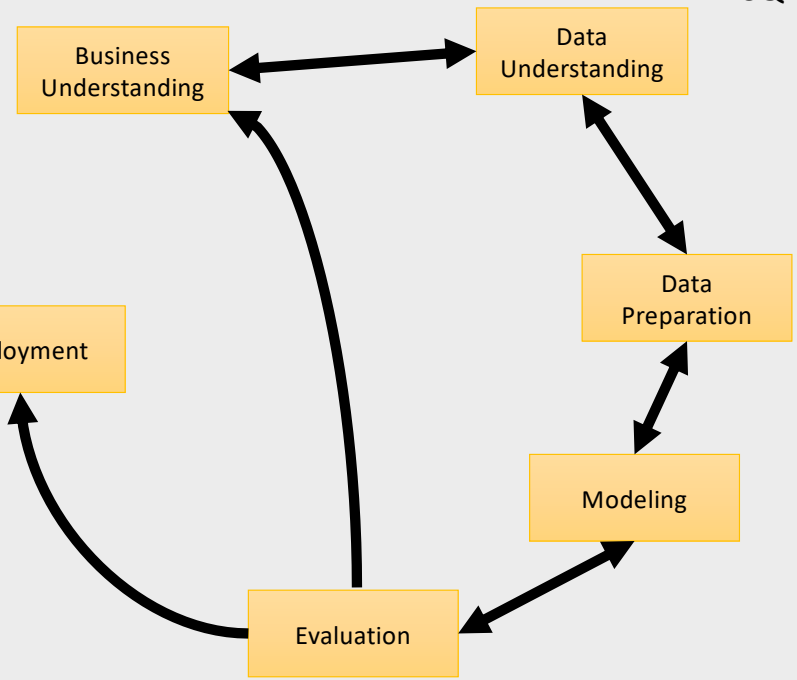
tools example:



SQL

Python:
- Jupyter (IDE)
- pandas
- NumPy

SQL

Python:
- Jupyter (IDE)
- pandas
- NumPy

Python:
- Jupyter (IDE)
- scikit-learn
- TensorFlow/Pytorch

Python:
- matplotlib/plotly
- dash (dashboard)

Tableau/PowerBI

Python:
- PyCharm (IDE)
- OOP
- software development
- flask/FastAPI

Makefile

GCP/AWS (cloud)

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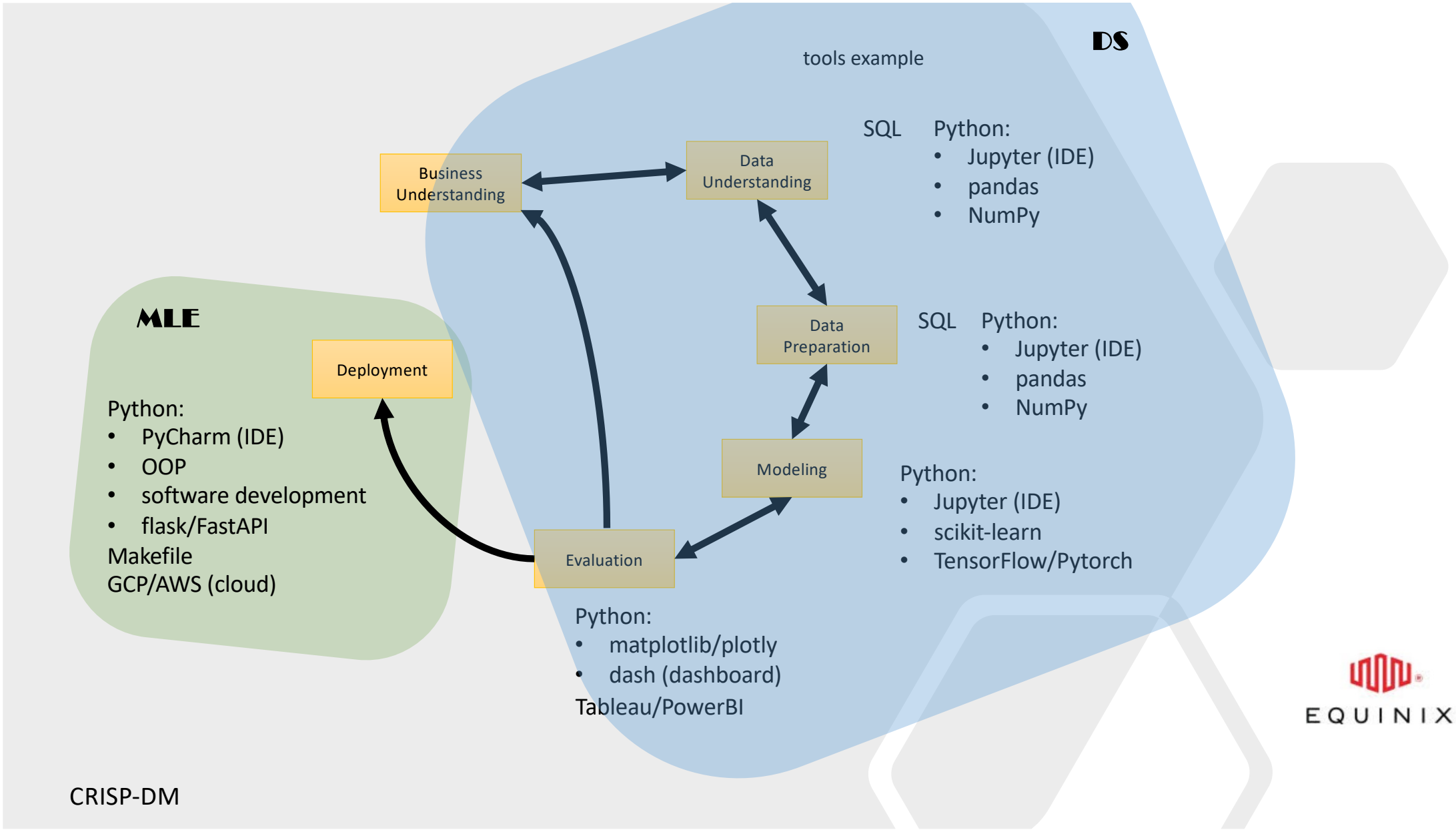

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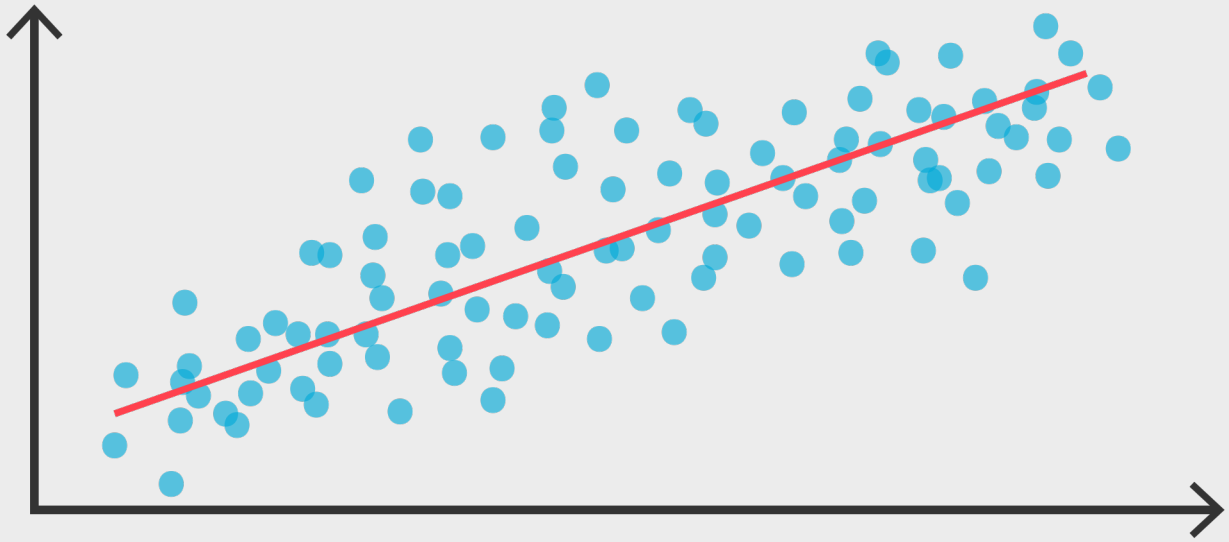
Regression



$$y = a\,x + b + \varepsilon$$

$$\hat{y} = a\,x + b$$

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(y - \hat{y})^2$$

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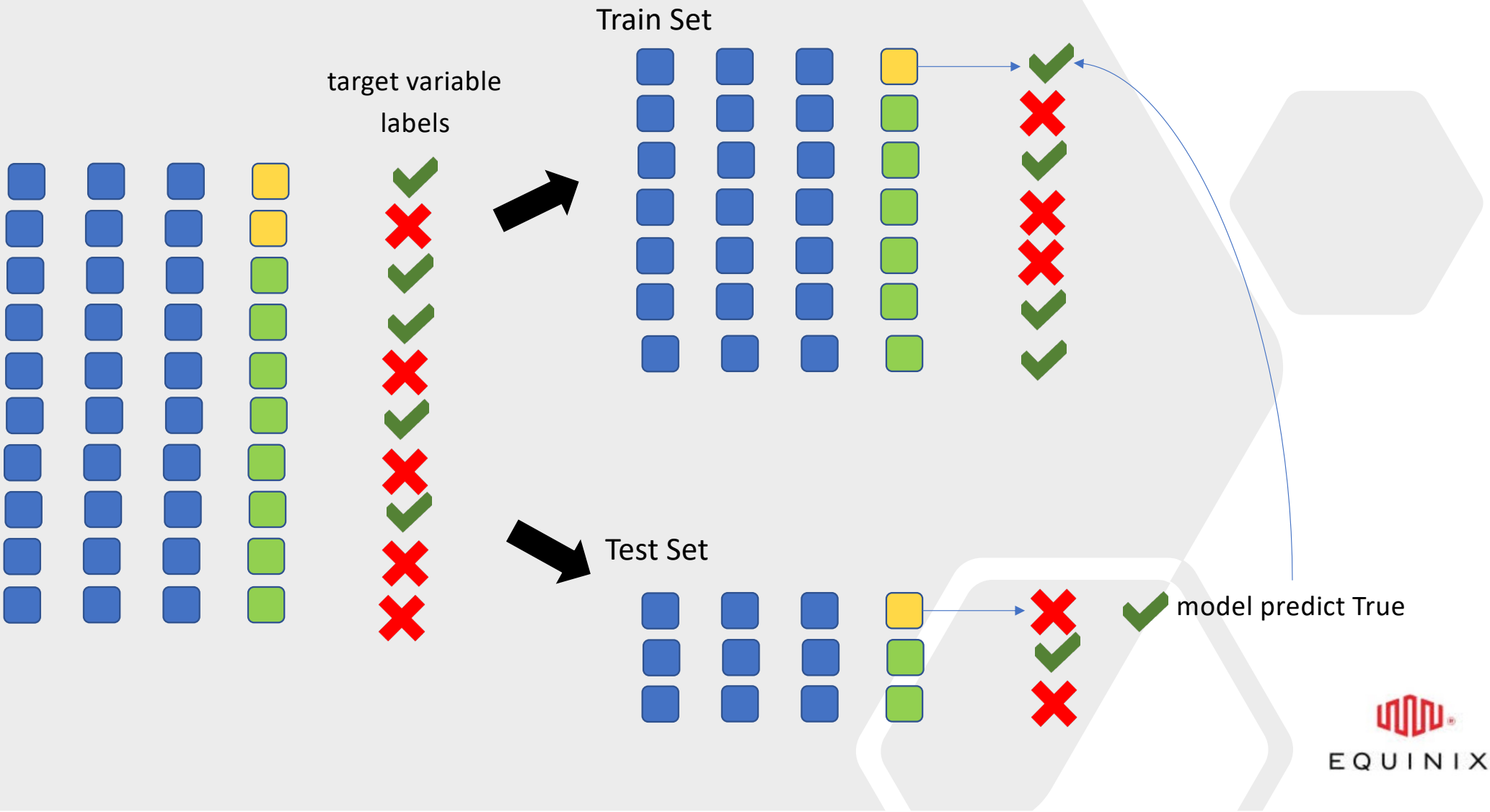
Train Test Split



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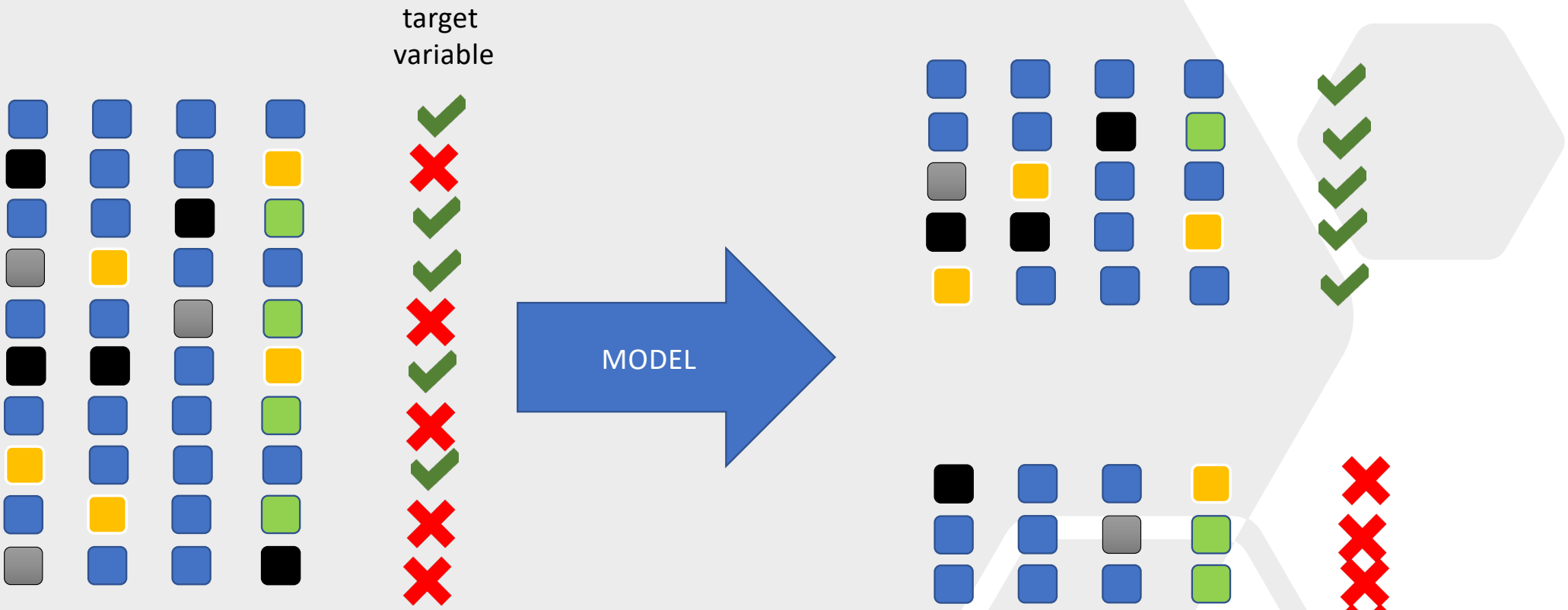
Classification



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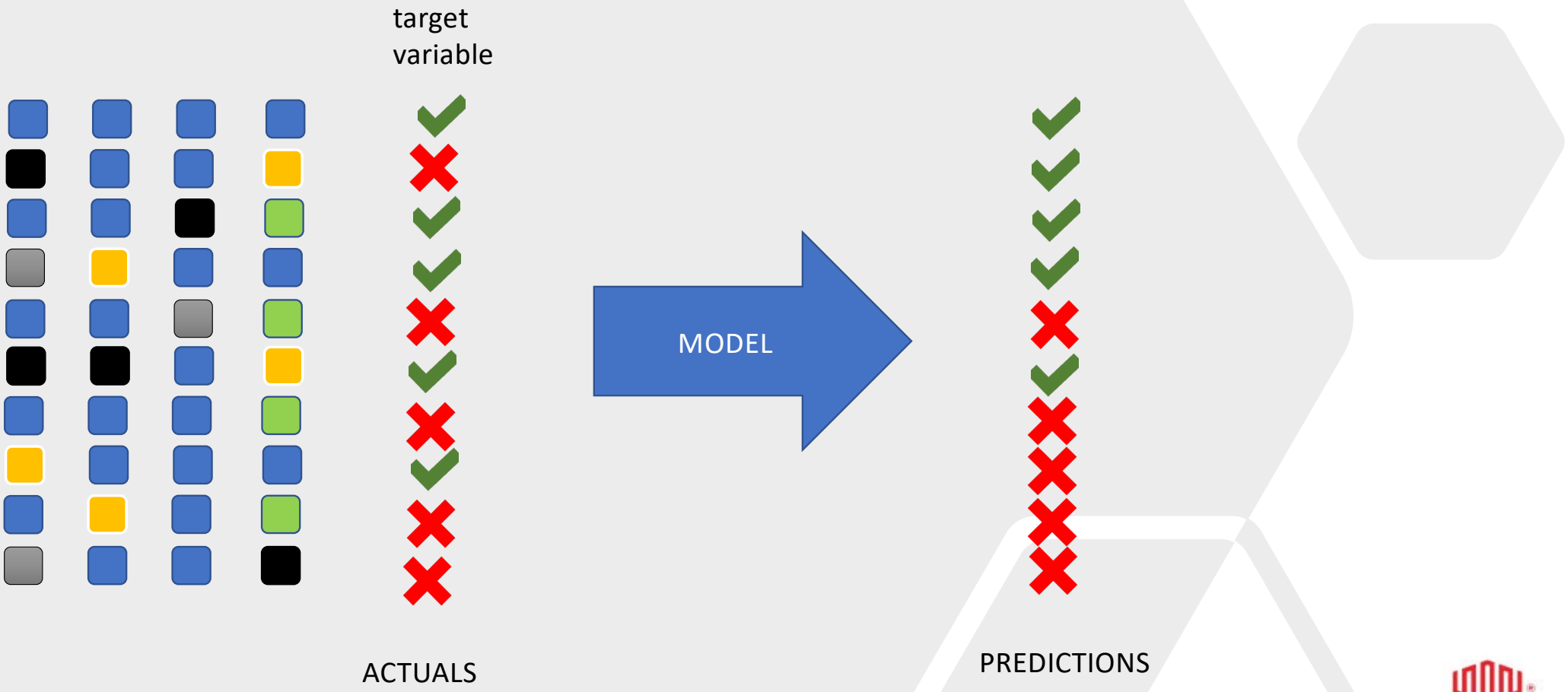
Classification



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Metrices: Accuracy

$$Accuracy = \frac{Number\ of\ Correct\ predictions}{Total\ number\ of\ predictions\ made}$$

ACTUALS

PREDICTIONS

$$ACCURACY = \frac{8}{10} = 0.8$$

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Metrices: Confusion Matrix

ACTUALS PREDICTIONS

		true class: EFR	true class: LFR	total
predicted class	EFR	True Positives (TP)	False Positives (FP)	predicted EFR
predicted class	LFR	False Negatives (FN)	True Negatives (TN)	predicted LFR
		true EFR	true LFR	

https://en.wikipedia.org/wiki/Confusion_matrix

$$PR = \frac{TP}{TP+FP}$$

$$RE = \frac{TP}{TP+FN}$$

$$CA = \frac{TP+TN}{TP+TN+FP+FN}$$

$$F_1 = \frac{2TP}{2TP+FP+FN}$$

TP = 4 FP = 1

FN = 1 TN = 4

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Confusion Matrix from scikit-learn

Sklearn Representation

Scikit learn documentation says — Wikipedia and other references may use a different convention for axes.

A)

Predicted Label \ Actual Label	1	0
1	TP	FP
0	FN	TN

B)

Predicted Label \ Actual Label	0	1
0	TN	FN
1	FP	TP

C)

Actual Label \ Predicted Label	1	0
1	TP	FN
0	FP	TN

D)

Actual Label \ Predicted Label	0	1
0	TN	FP
1	FN	TP

https://towardsdatascience.com/understanding-the-confusion-matrix-from-scikit-learn-c51d88929c79

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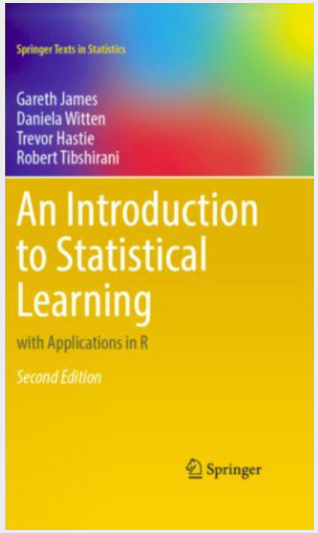
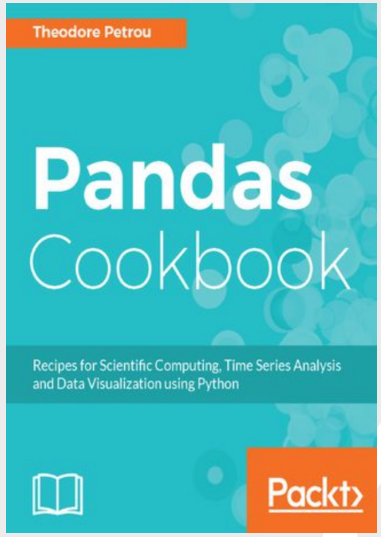
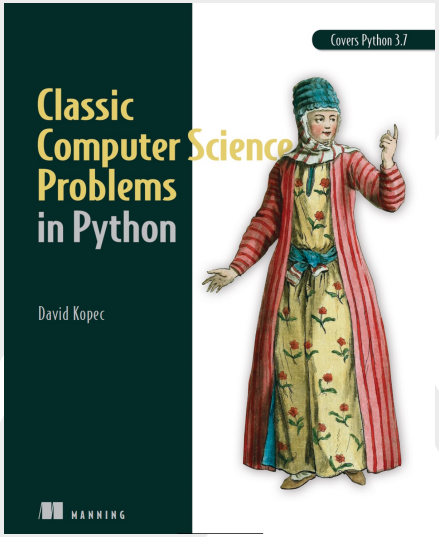
Knowledge resources

- StatQuest: https://www.youtube.com/c/joshstarmer
- Tech with Tim: https://www.youtube.com/c/TechWithTim
- Tech word with Nana: https://www.youtube.com/c/TechWorldwithNana
- Machine Learning Study Groups: https://www.youtube.com/channel/UCMEQFEKrsRFBXnUIreTACxg

- Towards Data Science: https://towardsdatascience.com/
- Machine Learning Mastery: https://machinelearningmastery.com/
- Kaggel: https://www.kaggle.com/







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Interesting technologies

HUGGING FACE

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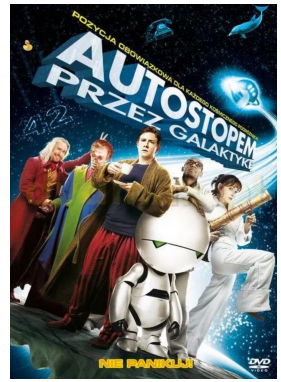
THANK YOU

Easter Egg: Why 42…?

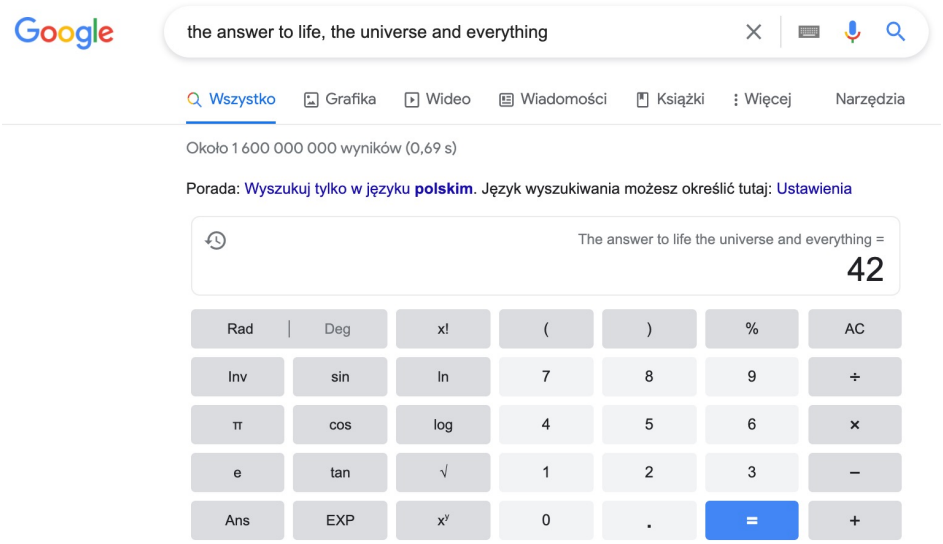
```python
from sklearn.model_selection import train_test_split

X_trian, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
                                                    shuffle=True,
                                                    stratify=y,
                                                    random_state=42)
```



Wielkie pytanie o życie, wszechświat i całą resztę.

https://www.youtube.com/watch?v=aboZctrHfK8



https://www.google.com/search?hl=pl&q=the+answer+to+life%2C+the+universe+and+everything

https://pl.wikipedia.org/wiki/Wielkie_pytanie_o_%C5%BCycie,_wszech%C5%9Bwiat_i_ca%C5%82%C4%85_reszt%C4%99