

Laboratorium 12

Model danych w bazie danych Neo4j

Cele

- Przygotowanie środowiska pracy.
- Zapoznanie się z bazą danych Neo4j.
- Zapoznanie się z językiem zapytań Cypher.

Środowisko pracy

Neo4j Desktop

Instalacja Neo4j Desktop

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Free. Get Started Today.

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Includes Neo4j Enterprise 5.26.0 for Developers
[Learn more | System Requirements](#)

Are you a Startup?

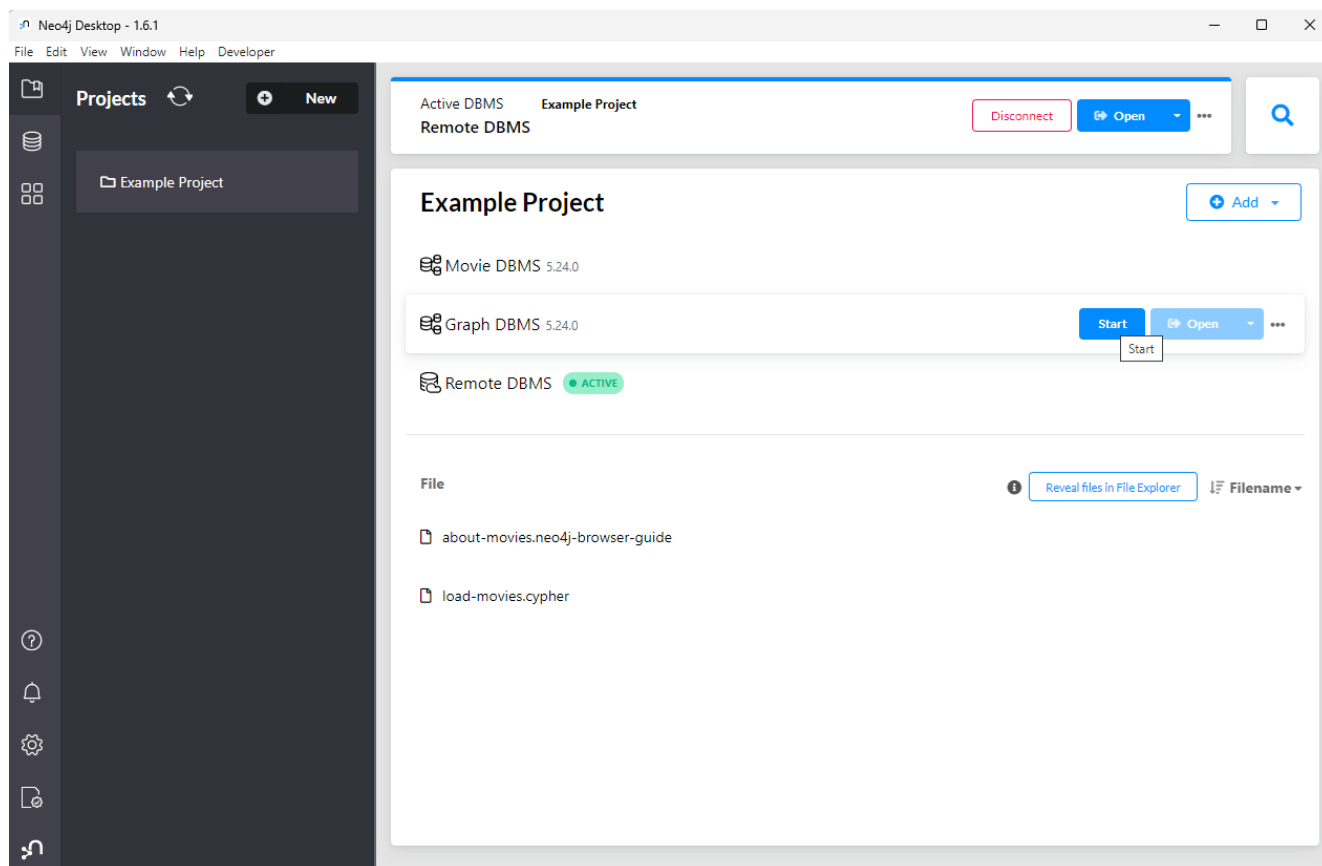
Get started on AuraDB for Free today and avoid the overhead costs of self-hosted deployment. [Neo4j Startup Program](#)

[Download Neo4j Server](#) [Download Drivers](#) [Integrations & Connectors](#)

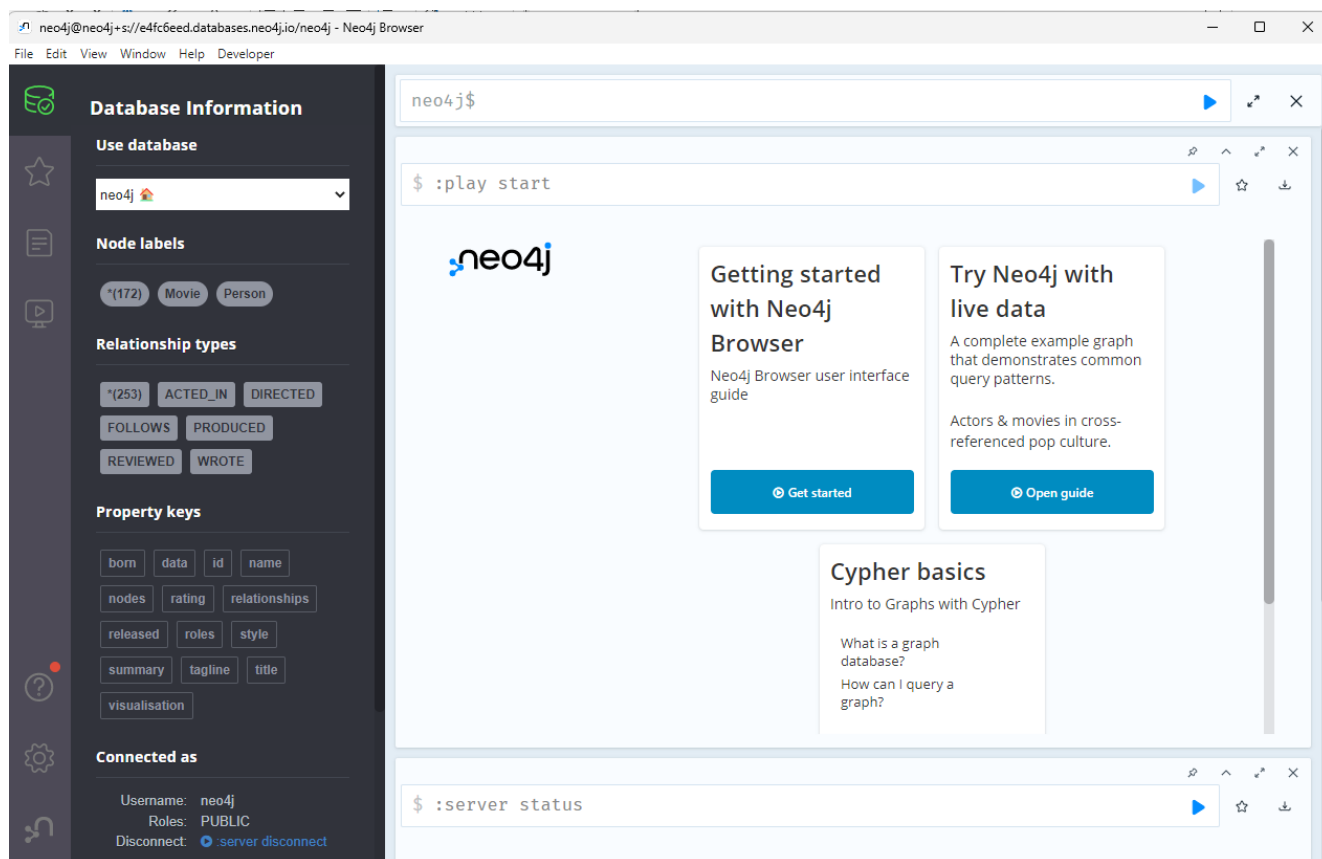
Wskazówki dotyczące instalacji bazy Neo4j.

Linux	https://neo4j.com/docs/operations-manual/current/installation/linux/
Mac / Windows	https://neo4j.com/download/

Interfejs Neo4j Desktop



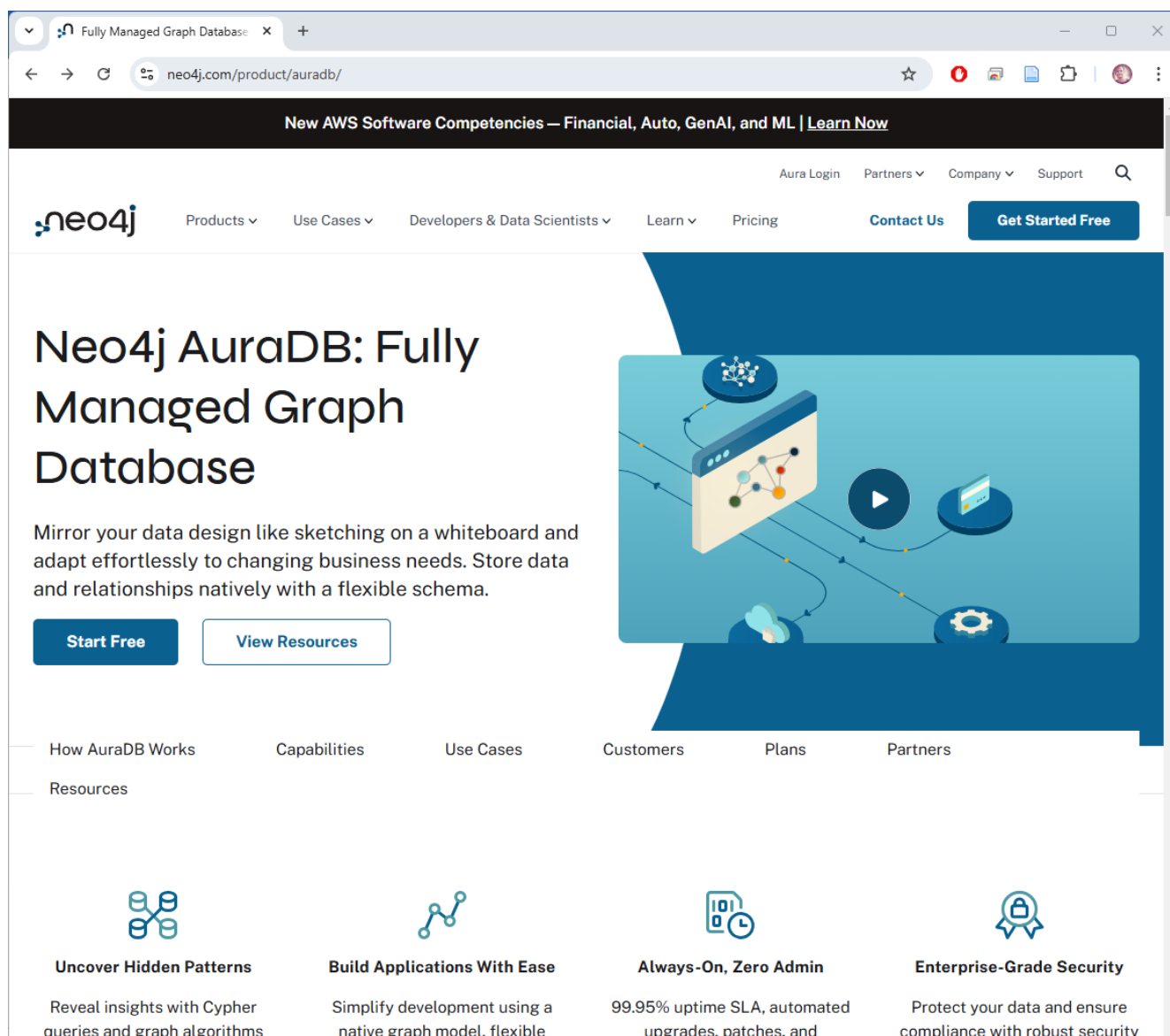
Interfejs Neo4j Browser



Usługa chmurowa Neo4j AuraDB

Neo4j AuraDB	https://neo4j.com/cloud/platform/aura-graph-database/
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Utworzenie darmowego konta



The screenshot displays the Neo4j AuraDB product page. The browser address bar shows the URL `neo4j.com/product/auradb/`. The page features a dark blue header with the Neo4j logo and navigation links: Products, Use Cases, Developers & Data Scientists, Learn, Pricing, Contact Us, and a Get Started Free button. A banner section highlights the product with the title "Neo4j AuraDB: Fully Managed Graph Database" and a description: "Mirror your data design like sketching on a whiteboard and adapt effortlessly to changing business needs. Store data and relationships natively with a flexible schema." Below the banner are two buttons: "Start Free" and "View Resources". A horizontal menu lists various sections: How AuraDB Works, Capabilities, Use Cases, Customers, Plans, Partners, and Resources. The main content area is divided into four columns, each with an icon and a heading: "Uncover Hidden Patterns" (graph icon), "Build Applications With Ease" (code icon), "Always-On, Zero Admin" (server icon), and "Enterprise-Grade Security" (shield icon). Each column contains a brief description of the feature.

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Products Use Cases Developers & Data Scientists Learn Pricing Contact Us [Get Started Free](#)

Neo4j AuraDB: Fully Managed Graph Database

Mirror your data design like sketching on a whiteboard and adapt effortlessly to changing business needs. Store data and relationships natively with a flexible schema.


[Start Free](#) [View Resources](#)

How AuraDB Works Capabilities Use Cases Customers Plans Partners Resources




Uncover Hidden Patterns

Reveal insights with Cypher queries and graph algorithms




Build Applications With Ease

Simplify development using a native graph model. flexible



Always-On, Zero Admin

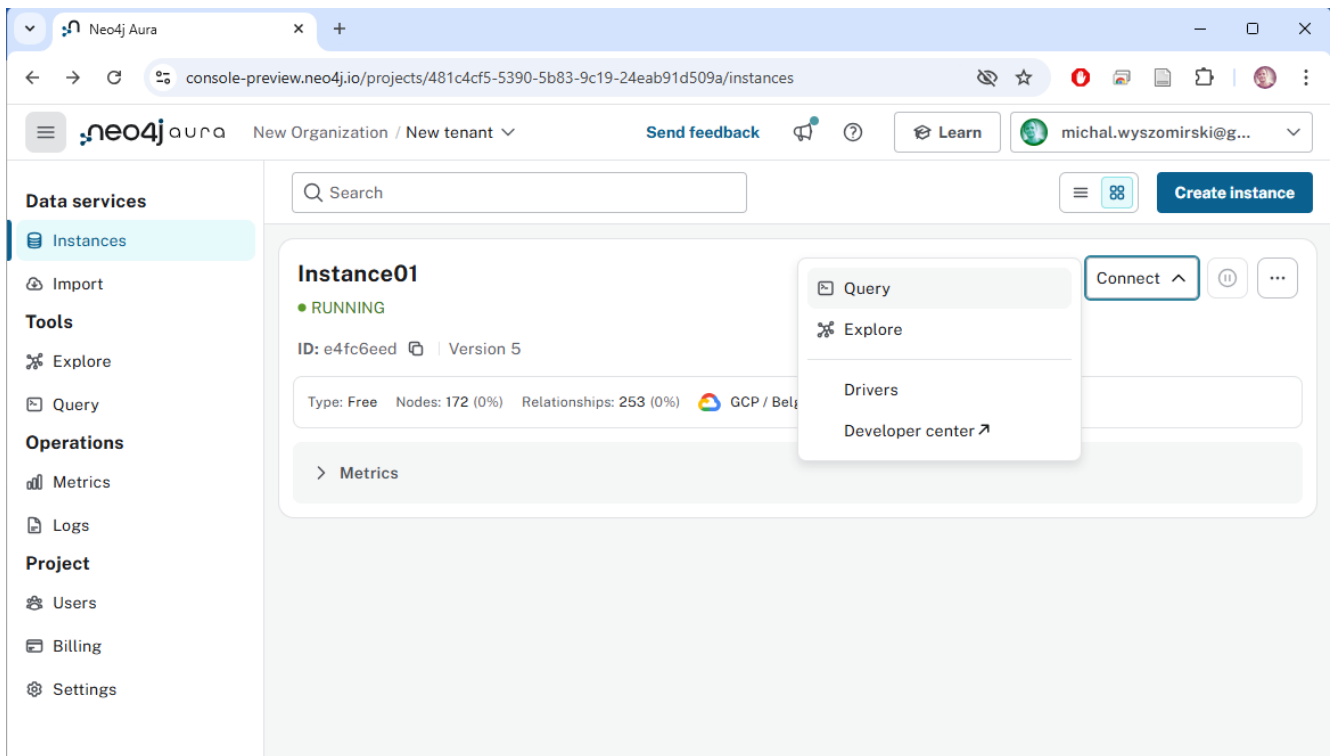
99.95% uptime SLA, automated upgrades, patches, and



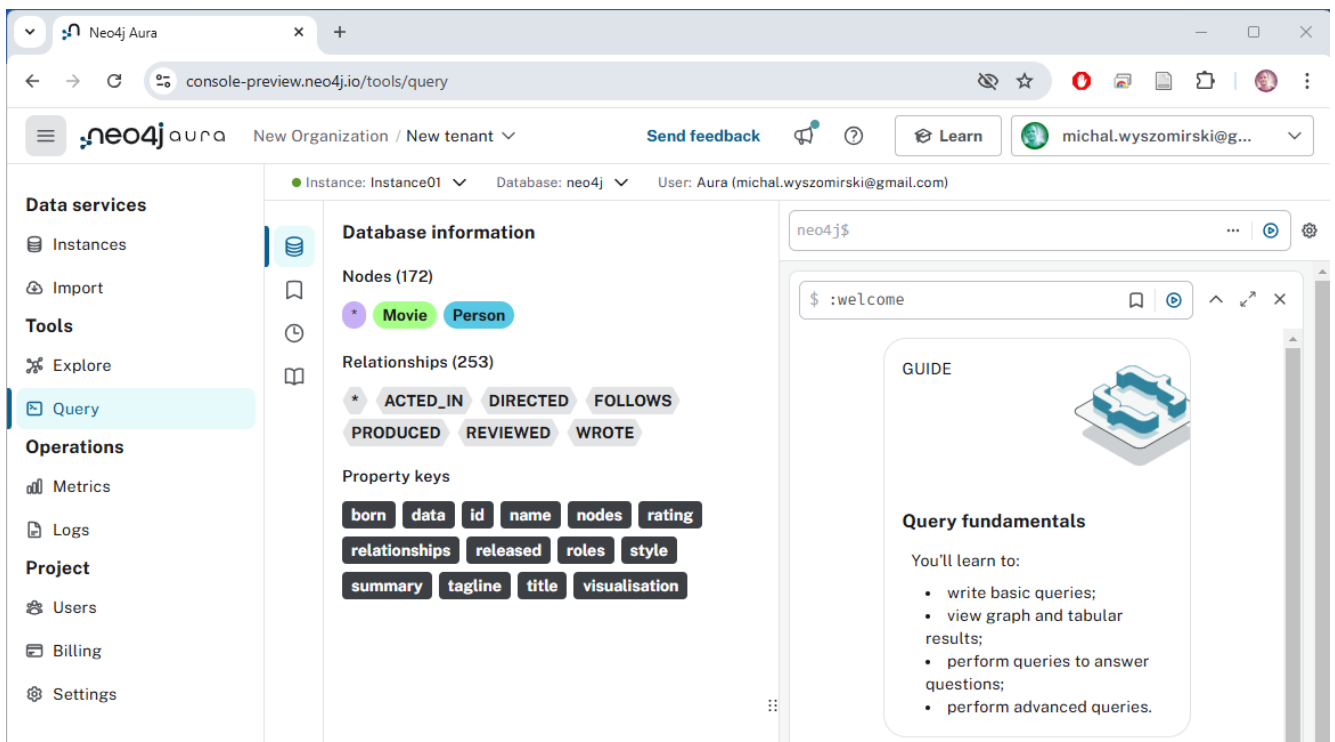
Enterprise-Grade Security

Protect your data and ensure compliance with robust security

Otwarcie interfejsu zapytań (Query Browser)



Okno zapytań (Query Browser)



Okno zapytań (Query Browser) – stara wersja

The screenshot displays the Neo4j Query Browser interface in a web browser. The address bar shows the URL: `browser.neo4j.io/?connectURL=neo4j%2Bs%3A%2F%2Fneo4j%40e4fc6eed.databases.neo4j.io%2F`. The interface includes a sidebar with icons for home, star, and play. The main content area features a query input field with `neo4j$` and a `$:play start` button. Below the input field, there are three promotional cards: "Try the new Browser preview!", "Try Neo4j with live data", and "Cypher basics". The "Try Neo4j with live data" card includes a description of a complete example graph and a button to "Open guide". The "Cypher basics" card includes a description of a graph database and a button to "Start querying". At the bottom, the connection status is displayed: "Connected to Neo4j" and "You are connected as user neo4j to neo4j+s://e4fc6eed.databases.neo4j.io:7687". A note states: "Connection credentials are not stored in your web browser."

neo4j\$

\$:play start

neo4j

Try the new Browser preview!
Switch to the preview experience to access all the latest features.
Let's go

Try Neo4j with live data
A complete example graph that demonstrates common query patterns.
Actors & movies in cross-referenced pop culture.
Open guide

Cypher basics
Intro to Graphs with Cypher
What is a graph database?
How can I query a graph?
Start querying

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\$:server connect

Connected to Neo4j
Nice to meet you.

You are connected as user neo4j to neo4j+s://e4fc6eed.databases.neo4j.io:7687
Connection credentials are not stored in your web browser.

Język Cypher

Operacje CRUD na węzłach

Operacja CREATE

```
CREATE (:Miasto {nazwa:"Warszawa"});
```

```
CREATE (m:Miasto {nazwa:"Warszawa"})  
RETURN m;
```

Operacja SELECT

```
MATCH (m:Miasto)  
WHERE m.nazwa = "Warszawa"  
RETURN m;
```

```
MATCH (m:Miasto {nazwa: "Warszawa"})  
RETURN m;
```

Operacja UPDATE

```
MATCH (m:Miasto)
WHERE m.nazwa = "Warszawa"
SET m.ludnosc = 2000000
RETURN m;
```

```
MATCH (m:Miasto {nazwa: "Warszawa"})
SET m.ludnosc = 2000000
RETURN m;
```

```
MATCH (m:Miasto)
WHERE m.nazwa = "Warszawa"
REMOVE m.ludnosc
RETURN m;
```

```
MATCH (m:Miasto {nazwa: "Warszawa"})
REMOVE m.ludnosc
RETURN m;
```

Operacja DELETE

```
MATCH (m:Miasto)
WHERE m.nazwa = "Warszawa"
DELETE m;
```

```
MATCH (m:Miasto {nazwa: "Warszawa"})
DELETE m;
```


Operacje CRUD na krawędziach

```
MATCH (c:miasto {nazwa:"Warszawa"}),
      (v:woj {nazwa:"Mazowieckie"})
CREATE (c)-[:JEST_W]->(v);

MATCH (warszawa:miasto {nazwa:"Warszawa"}),
      (mazowieckie:woj {nazwa:"Mazowieckie"})
CREATE (warszawa)-[:JEST_W]->(mazowieckie);

CREATE (warszawa:miasto {nazwa:"Warszawa"}),
      (mazowieckie:woj {nazwa:"Mazowieckie"}),
      (warszawa)-[:JEST_W]->(mazowieckie);

CREATE (warszawa:miasto {nazwa:"Warszawa"}),
      (mazowieckie:woj {nazwa:"Mazowieckie"}),
      (warszawa)-[:JEST_W]->(mazowieckie);

MERGE (c:miasto {nazwa:"Warszawa"}),
      (v:woj {nazwa:"Mazowieckie"})
CREATE (c)-[:JEST_W]->(v);

MATCH (c:miasto {nazwa:"Warszawa"})-[r]-(v:woj {nazwa:"Mazowieckie"})
RETURN c,r,v;

MATCH (n:kraj {nazwa:"Polska"})-[r]-(m:miasto {nazwa:"Warszawa"})
SET r.value = 1000
RETURN n,m;

MATCH (n:kraj {nazwa:"Polska"})-[r]-(m:miasto {nazwa:"Warszawa"})
SET r.value = NULL
RETURN n,m;

MATCH (n:kraj {name:"Polska"})-[r]-(m:Miasto {nazwa: "Warszawa"})
REMOVE r.value
RETURN n,m;

MATCH ()-[r:JEST_W]-()
DELETE r;

MATCH (:miasto)-[r:JEST_W]-(:woj)
DELETE r;

MATCH
  (:miasto {nazwa:"Warszawa"})-[r:JEST_W]-(:woj {nazwa:"Mazowieckie"})
DELETE r;
```

Samouczek Movie Graph

```
:start movie graph
```

Przykład danych administracyjnych

Dane źródłowe w pliku adm.cypher

Zapytania omawiane na wykładzie

```
MATCH (k:kraj) WHERE k.nazwa = "Polska" RETURN k;

MATCH (w:woj) WHERE w.nazwa = "opolskie" RETURN w;

MATCH (g1:gmina {nazwa:"Dobrcz"}),
      (g2:gmina {nazwa:"Łochów"})
RETURN g1,g2;

MATCH (w:woj {nazwa:"kujawsko-pomorskie"})-[r1]->(p:powiat)-[r2]-
>(g:gmina)
RETURN w,r1,p,r2,g;

MATCH p =(gmina {nazwa:"Dobrcz"})-[:ZAWIERA*2]-(g:gmina)
RETURN p;

MATCH p =(gmina {nazwa:"Dobrcz"})-[:ZAWIERA*4]-(g:gmina)
RETURN p;

MATCH (g1:gmina {nazwa:"Dobrcz"}),
      (g2:gmina {nazwa:"Koronowo"}),
      p = shortestPath((g1)-[*..6]-(g2))

MATCH (g1:gmina {nazwa:"Dobrcz"}),
      (g2:gmina {nazwa:"Chełmno"}),
      p = shortestPath((g1)-[*..6]-(g2))
RETURN p;

MATCH (g1:gmina {nazwa:"Dobrcz"}),
      (g2:gmina {nazwa:"Łochów"}),
      p = shortestPath((g1)-[*..6]-(g2))
RETURN p;
```

Neo4j i Python

Nawiązanie połączenia z bazą Neo4j z poziomu aplikacji w języku Python

```
from neo4j import GraphDatabase

driver = GraphDatabase.driver("bolt://localhost:7687", auth=(user,
password))

session = driver.session()

query = "CREATE (...)"

session.run(query)

...

session.close
```

Odnosiniki

Neo4j Download Center	https://neo4j.com/download-center/
Neo4j Documentation	https://neo4j.com/docs/
Podręcznik: "Graph Databases"	https://neo4j.com/graph-databases-book/
Wykorzystanie Neo4j z poziomu języka Python	https://neo4j.com/docs/api/python-driver/current/