

Part 4 - Follow-up on Schema Discovery and Graph Query Formulation Tasks Understanding

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TEST ID *

La tua risposta

Bacterian Pangenome Schema

Please take the time to look and understand the schema. Please ask questions if something is not clear. Note that no background knowledge about bioinformatics is required to successfully complete this task.



Q1. Explain your understanding of the SCHEMA (in general). What is it and what is it used for. *

La tua risposta

Q2. What is the use of COLLECT keyword in Cypher? *

La tua risposta

Q3. In which other programming language/tool is there something similar to COLLECT? Does it remind you of something you've used before? *

La tua risposta

Q4. What is the use of WITH keyword in Cypher? *

La tua risposta

Q5. In which other programming language/tool is there something similar to WITH? Does it remind you of something you've used before? *

La tua risposta

Q6. Given this question : **Write a Cypher query that returns each distinct node label together with its corresponding set of properties.** Which of the following query is correct? *

1 . MATCH (n) RETURN DISTINCT labels(n) AS labels, keys(n) AS properties

2 .

MATCH (n) RETURN DISTINCT labels(n) AS labels, collect(distinct keys(n)) AS properties

3. MATCH (n) RETURN DISTINCT labels(n) AS labels, collect(keys(n)) AS properties

☐ Query 1

☐ Query 2

☐ Query 3

☐ Queries 1 and 2

☐ Queries 2 and 3

☐ Queries 1 and 3

☐ Queries 1,2 and 3

Q7. Given this question : **Write a Cypher query that returns each distinct node label together with its corresponding set of properties.** *

Given the following queries, explain the difference between them.

1 . MATCH (n) RETURN DISTINCT labels(n) AS labels, keys(n) AS properties

2 .

MATCH (n) RETURN DISTINCT labels(n) AS labels, collect(distinct keys(n)) AS properties

3. MATCH (n) RETURN DISTINCT labels(n) AS labels, collect(keys(n)) AS properties

La tua risposta

Q8. Given this question : **Write a Cypher query that returns each distinct node label together with its corresponding set of properties.** Which of the following query is correct? *

1. MATCH (n) RETURN DISTINCT labels(n), collect(keys(n)) AS properties

2. MATCH (n) WITH DISTINCT labels(n) AS labels, n RETURN labels, collect(keys(n)) AS properties

☐ Query 1

☐ Query 2

☐ Queries 1 and 2

Q9. Given this question : **Write a Cypher query that returns each distinct node label together with its corresponding set of properties.** *

Given the following queries, explain the difference between them.

1. MATCH (n) RETURN DISTINCT labels(n), collect(keys(n)) AS properties
2. MATCH (n) WITH DISTINCT labels(n) AS labels, n RETURN labels, collect(keys(n)) AS properties

La tua risposta

Q10. Given this question : **Write a Cypher query to return each pangenome, together with its associated genes.** *

Which of the following query is correct?

1 . MATCH (p:Pangenome)--(f:Family)--(g:Gene) RETURN distinct p.name, g.name;

2 . MATCH (g:Gene)-[:IS_IN_FAMILY]->(:Family)-[:IS_IN_PANGENOME]->(p:Pangenome) RETURN p.name as pangenomeName, COLLECT(g.name) AS genes

3. MATCH (gene:Gene)-[:IS_IN_FAMILY]->(family:Family)-[:IS_IN_PANGENOME]->(pangenome:Pangenome) RETURN pangenome, gene

☐ Query 1

☐ Query 2

☐ Query 3

☐ Queries 1 and 2

☐ Queries 2 and 3

☐ Queries 1 and 3

☐ Queries 1,2 and 3

Q11. Given this question : **Write a Cypher query to return each pangenome, together with its associated genes.** *

Given the following queries, explain the difference between them.

1 . MATCH (p:Pangenome)--(f:Family)--(g:Gene) RETURN distinct p.name, g.name;

2 . MATCH (g:Gene)-[:IS_IN_FAMILY]->(:Family)-[:IS_IN_PANGENOME]->(p:Pangenome) RETURN p.name as pangenomeName, COLLECT(g.name) AS genes

3. MATCH (gene:Gene)-[:IS_IN_FAMILY]->(family:Family)-[:IS_IN_PANGENOME]->(pangenome:Pangenome) RETURN pangenome, gene

La tua risposta

Q12. Given this question: **Write a Cypher query to return each pangenome, together with its associated spots. State also how many answers it returns. Are both of the following queries correct?** *

1. MATCH (s:Spot)<-[:IS_IN_SPOT]-(:RGP)<-[:IS_IN_RGP]-(:g:Gene)-[:IS_IN_FAMILY]->(:Family)-[:IS_IN_PANGENOME]->(p:Pangenome) RETURN p.name as pangenome, COLLECT(s.name) AS spots

2. MATCH (sp:Spot)<-[:IS_IN_SPOT]-()-<-[:IS_IN_RGP]-()-[:IS_IN_FAMILY]->()-[:IS_IN_PANGENOME]->(p:Pangenome)
RETURN distinct p.name, sp.name

☐ Ye

☐ No

Q13. Explain the answer of the previous question *

La tua risposta

Q14. If a query has the following return statements:

*

RETURN a, COLLECT (b)

Would you assume based on this formulation that the names of b unique? Please motivate your answer.

La tua risposta

Q15. Given this question : Write a Cypher query to return each **pangenome** and its **modules** that contain at least a pair of **gene families** that are more than 80% identical. *

Which of the following query is correct?

1. MATCH (p:Pangenome)<--()-->(m:Module)<--(f1:Family)<-[r:IS_SIMILAR]-(f2:Family)
WHERE f1 <> f2 AND r.coverage >= 0.8
RETURN p.name

2. MATCH (p:Pangenome)<-[IS_IN_PANGENOME]-(f:Family)-[IS_IN_MODULE]->(m:Module), (p:Pangenome)<-[IS_IN_PANGENOME]-(f:Family)-[sim:IS_SIMILAR]->(f2:Family) WHERE sim.coverage >= 0.8 return p.name as Pan-genome

- ☐ Query 1
- ☐ Query 2
- ☐ Queries 1 and 2

Q16. Given this question : **Write a Cypher query to return each pangenome and its associated modules that contain at least a pair of gene families that are more than 80% identical.** *

What is the difference between the following queries?

```
1. MATCH (p:Pangenome)-->(m:Module)--(f1:Family)--[r:IS_SIMILAR]-
(f2:Family)
WHERE f1 <> f2 AND r.identity >= 0.8
RETURN p.name
```

```
2 . MATCH (p:Pangenome)-[:IS_IN_PANGENOME]-(f:Family)-[:IS_IN_MODULE]->
(m:Module), (p:Pangenome)-[:IS_IN_PANGENOME]-(f:Family)-[sim:IS_SIMILAR]->
(f2:Family) WHERE sim.identity >= 0.8 return p.name as Pan-genome
```

La tua risposta

Q17. Given a query in which the pattern contains two nodes with the same label, for example: *

```
1 MATCH (p:Pangenome)-->(m:Module)--(f1:Family)--[r:IS_SIMILAR]-
(f2:Family)
```

```
2 .MATCH (p:Pangenome)-[:IS_IN_PANGENOME]-(f1:Family)-[:IS_IN_MODULE]->
(m:Module), (p:Pangenome)-[:IS_IN_PANGENOME]-(f1:Family)-
[sim:IS_SIMILAR]->(f2:Family) WHERE sim.identity >= 0.8 return p.name
as Pangenome
```

The two nodes **f1** and **f2** are different? Could they be the same node? Motivate your answer.

La tua risposta

Q18. Given this question : **Write a Cypher query that returns pairs of inter-pangenome families that both contain annotations and that are more than 80% identical.** *

Which of the following query is correct?

1. MATCH (p:Pangenome)-[:IS_IN_PANGENOME]-(f:Family) MATCH (p2:Pangenome)-[:IS_IN_PANGENOME]-(f2:Family) MATCH (f)-[:IS_SIMILAR]->(f2) WHERE s.identity >= 0.8 and p <> p2 and f is not null and f2 is not null RETURN f.name, f2.name

2. MATCH (p1:Pangenome)-[:IS_IN_PANGENOME]-(f1:Family)-[r1:IS_SIMILAR]-(f2:Family)-[:IS_IN_PANGENOME]-(p2:Pangenome) WHERE r1.identity >= 0.8 AND p1.taxid <> p2.taxid AND f1.annotation IS NOT NULL AND f2.annotation IS NOT NULL RETURN f1.name, f2.name

- ☐ Query 1
- ☐ Query 2
- ☐ Queries 1 and 2

Q19. Given this question : **Write a Cypher query that returns pairs of inter-pangenome families that both contain annotations and that are more than 80% identical.** *

What is the difference between the following queries?

```
1 MATCH (p:Pangenome)-[:IS_IN_PANGENOME]-(f:Family) MATCH
(p2:Pangenome)-[:IS_IN_PANGENOME]-(f2:Family) MATCH (f)-[s:IS_SIMILAR]->
(f2) WHERE s.identity >= 0.8 and p <> p2 and f is not null and f2 is not null
RETURN f.name, f2.name
```

```
2. MATCH (p1:Pangenome)-[:IS_IN_PANGENOME]-(f1:Family)-[r1:IS_SIMILAR]-(f2:Family)
-[:IS_IN_PANGENOME]-(p2:Pangenome)
WHERE r1.identity >= 0.8
AND p1.taxid <> p2.taxid
AND f1.annotation IS NOT NULL
AND f2.annotation IS NOT NULL
RETURN f1.name, f2.name
```

La tua risposta

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