# Graph pattern matching semantics

**First openCypher Implementers Meeting** 

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Graph pattern matc	hing semantics	are not aware of the semantic still get the ed result.
<u>Isomorphism</u>	<u>Cyphermorphism</u>	<u>Homomorphism</u>
<ul> <li>Two query vertices may not map to the same data vertex</li> <li>Semantic for multi-graphs is undefined</li> </ul>	<ul> <li>Two query edges may not map to the same data edge</li> </ul>	<ul> <li>No restriction</li> </ul>
less restrictive (more powerful)		
	easier to get started with	

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For most queries, this works very well: users



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# Pros and cons of the different semantics

- They all have the same worst-case time complexity: O(n<sup>k</sup>) (n = num. data vertices, k = num. query vertices)
  - However, if we apply iso/cypher-morphism to recursive path queries, things blow up
- Isomorphism & cyphermorphism have limitations (see previous slide)
- Homomorphism may return more matches than expected and requires additional non-equality constraints
- Isomorphism & cyphermorphism don't translate as well to/from SQL



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