

# Grafos e Intro a RDF

Slides de Aiden Hogan / adaptadas a este curso

Diego Torres

# Semantic Web: Data, Logic, Query

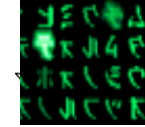
DATA:

Ireland



(Ireland,partOf,Europe)  
(Ireland,isA,Country)  
(Ireland,capital,Dublin)

Dublin



(Ireland,capital,Dublin)  
(Dublin,population,1000000)

LOGIC:  $“(b, \text{capital}, a) \rightarrow (a, \text{partOf}, b)”$   
 $“(a, \text{partOf}, b), (b, \text{partOf}, c) \rightarrow (a, \text{partOf}, c)”$

QUERY:  $“(x, \text{partOf}, y)?”$

OUTPUT:  $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Ireland}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Europe})\}$



RDF:

Resource Description Framework

# RDF (1.1): Un standard de la Web

W3C Recommendation



## RDF 1.1 Concepts and Abstract Syntax

W3C Recommendation 25 February 2014

**This version:**

<http://www.w3.org/TR/2014/REC-rdf11-concepts-20140225/>

**Latest published version:**

<http://www.w3.org/TR/rdf11-concepts/>

**Previous version:**

<http://www.w3.org/TR/2014/PR-rdf11-concepts-20140109/>

**Previous Recommendation:**

<http://www.w3.org/TR/rdf-concepts>

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# Semantic Web: Data

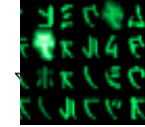
DATA:

Ireland



(Ireland,partOf,Europe)  
(Ireland,isA,Country)  
(Ireland,capital,Dublin)

Dublin

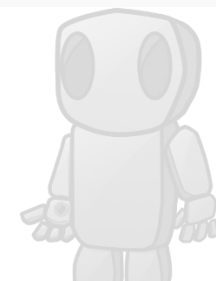


(Ireland,capital,Dublin)  
(Dublin,population,1000000)

LOGIC:  $(b, \text{capital}, a) \rightarrow (a, \text{partOf}, b)$   
 $(a, \text{partOf}, b), (b, \text{partOf}, c) \rightarrow (a, \text{partOf}, c)$

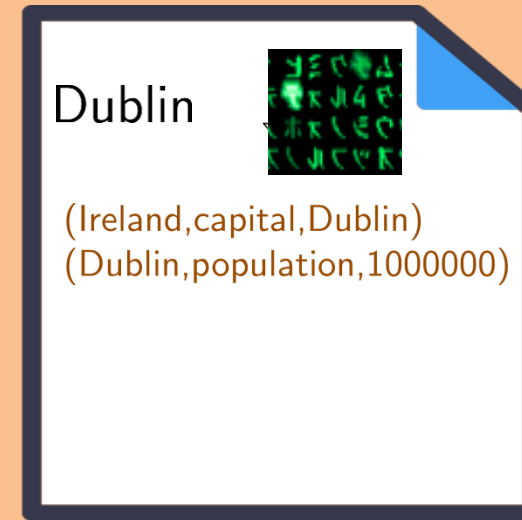
QUERY:  $(x, \text{partOf}, y)?$

OUTPUT:  $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Ireland}),$   
 $(x \mapsto \text{Dublin}, y \mapsto \text{Europe})\}$



# Semantic Web: Data

DATA:



RDF is based on triples:

(Ireland,capital,Dublin)

(*subject,predicate,object*)

# Modelando el mundo en tripletas

<i>subject</i>	<i>predicate</i>	<i>object</i>
Ireland	partOf	Europe
Ireland	a	Country
Ireland	capital	Dublin

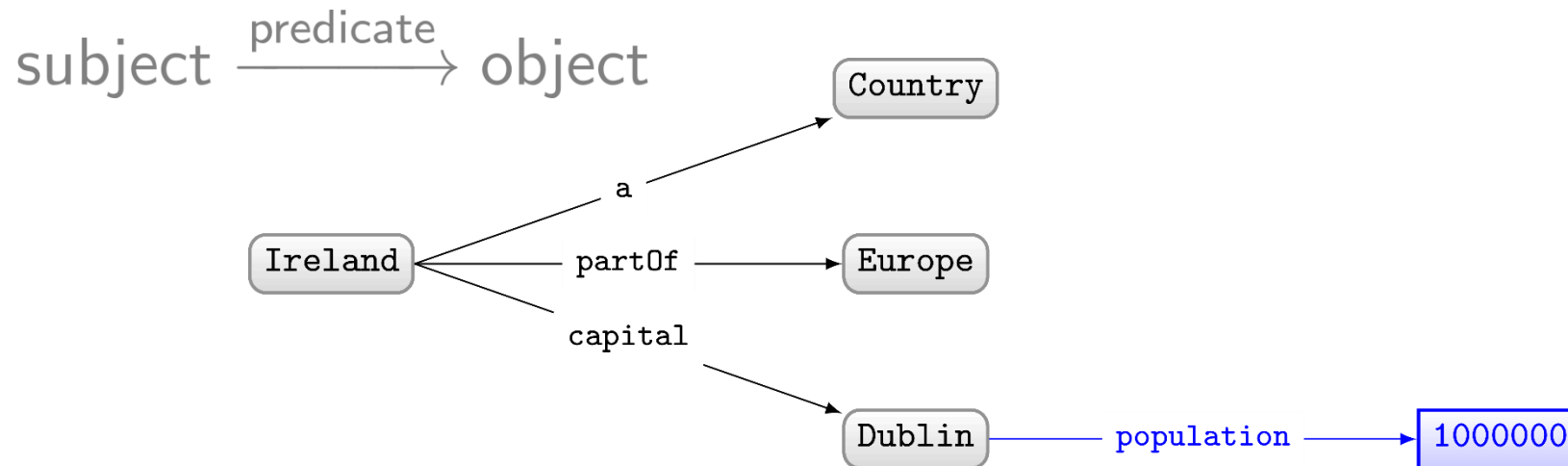
# Concatenar para “integrar” nuevos datos

<i>subject</i>	<i>predicate</i>	<i>object</i>
Ireland	partOf	Europe
Ireland	a	Country
Ireland	capital	Dublin
Dublin	population	1,000,000

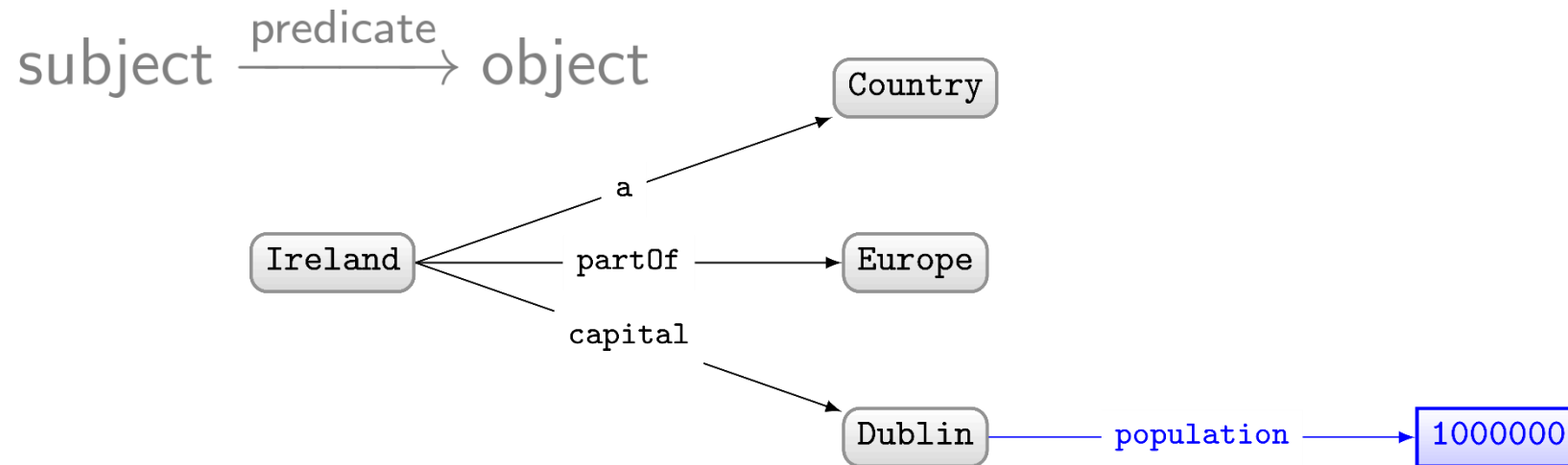


RDF se suele dibujar como un gafo (dirigido, etiquetado)

<i>subject</i>	<i>predicate</i>	<i>object</i>
Ireland	partOf	Europe
Ireland	a	Country
Ireland	capital	Dublin
Dublin	population	1,000,000



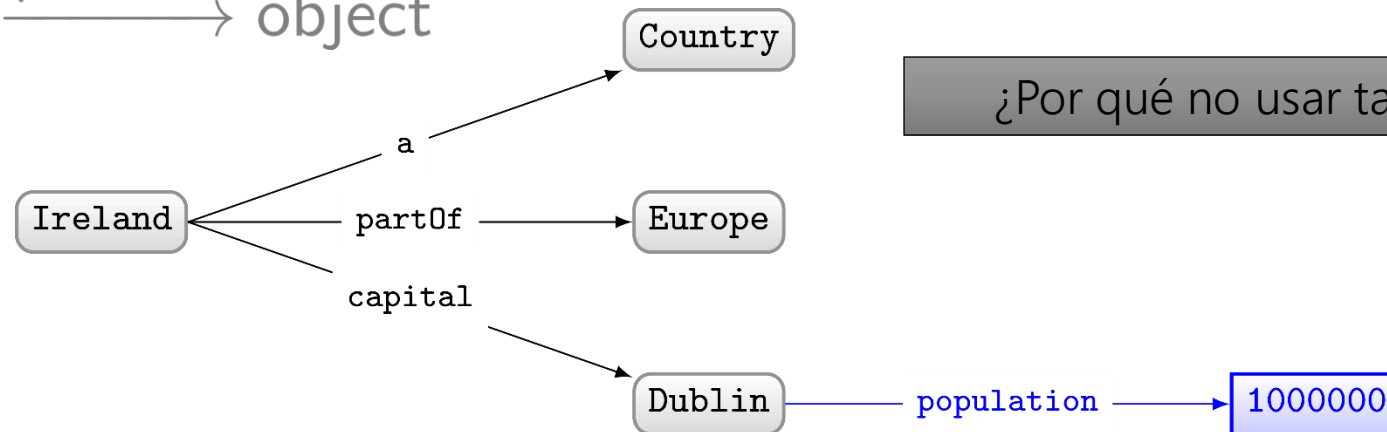
# Un conjunto de tripletas construyen un “Grafo RDF”



# ¿Por qué grafos?

<i>subject</i>	<i>predicate</i>	<i>object</i>
Ireland	partOf	Europe
Ireland	a	Country
Ireland	capital	Dublin
Dublin	population	1,000,000

subject  $\xrightarrow{\text{predicate}}$  object



¿Por qué no usar tablas?

Los Grafos son flexibles

# Bases de datos relacionales ...



# Bases de datos relacionales

## Debit

<u>account</u>	<u>comment</u>	<u>date</u>	<u>time</u>	<u>amount</u>	<u>total</u>	<u>id</u>
7873698669	Initial deposit	2020-21-01	20:02:02	300000	300000	TRCXGU8JSHD
7873698669	C0°0°L Designs	2020-02-06	09:15:33	50000	325000	TRCCIA2J8A0

## Credit

<u>account</u>	<u>comment</u>	<u>date</u>	<u>time</u>	<u>amount</u>	<u>total</u>	<u>id</u>
7873698669	Electricity	2020-02-02	20:00:01	8200	291800	TRCJASJDA9A
7873698669	Heat	2020-02-02	20:00:02	600	291200	TRC81KAQWAS
7873698669	Moviestar	2020-02-02	20:00:03	16200	275000	TRCK8J7JA8D
7873698669	ATM	2020-02-08	16:05:02	100000	225000	TRCPM8A45AD

## Account

<u>number</u>	<u>rut</u>	<u>type</u>	<u>total_clp</u>	<u>total_usd</u>
7873698669	32.000.273-K	Current	225000	344,94

## Client

<u>rut</u>	<u>name</u>	<u>phone</u>	<u>address</u>
32.000.273-K	Kelvin	+56976698463	Campo de Hielo Sur, Depto 273

## Exchange

<u>c1</u>	<u>c2</u>	<u>value</u>
CLP	USD	0,0001533
USD	CLP	652,2750000

Planetas / Datos Relacionados



# Planetas / Datos Relacionados

Planet

name

Mercury

Venus

Earth

Mars

Jupiter

Saturn

Uranus

Neptune

Pluto



# Planetas / Datos Relacionados

Planet	
<u>name</u>	dist
Mercury	
Venus	
Earth	1.00
Mars	
Jupiter	
Saturn	
Uranus	
Neptune	
Pluto	

# Planetas / Datos Relacionados

Planet	
<u>name</u>	<u>dist</u>
Mercury	0.39
Venus	0.72
Earth	1.00
Mars	1.52
Jupiter	
Saturn	
Uranus	
Neptune	
Pluto	49.31

# Planetas / Datos Relacionados

Planet		
<u>name</u>	dist	radius
Mercury	0.39	0.38
Venus	0.72	
Earth	1.00	1.00
Mars	1.52	0.53
Jupiter		10.97
Saturn	9.54	
Uranus	19.19	3.98
Neptune		
Pluto	49.31	

# Planetas / Datos Relacionados

Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

# Planetas / Datos Relacionados



Planet								
<u>name</u>	dist	radius	grav	days	years	temp	ring	moon
Mercury	0.39	0.38	2.8	58.646	0.241	440	false	⊥
Venus	0.72	0.95	8.9	-243.019	0.615	730	false	⊥
Earth	1.00	1.00	9.8	0.997	1.000	288	false	Luna
Mars	1.52	0.53	3.7	1.026	1.880	186	false	Phobos, Deimos
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true	Callisto, Ganymede, ...
Saturn	9.54	9.14	9.1	0.444	29.447	134	true	Titan, Rhea, ...
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true	Oberon, Titania, ...
Neptune	30.07	3.86	11.0	0.671	164.791	53	true	Triton, ...
Pluto	49.31	0.19	0.063	6.39	248.000	44	false	Charon

# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon	
<u>name</u>	<u>planet</u>
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Terra
Oberon	Uranus
Charon	Pluto
...	...

# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon			
<u>name</u>	planet	discoverer	year
Ganimedes	Jupiter	Galileo Galilei	1610
Calisto	Jupiter	Galileo Galilei	1610
Europa	Jupiter	Galileo Galilei	1610
Io	Jupiter	Galileo Galilei	1610
Titan	Saturn	Christiaan Huygens	1655
Triton	Neptune	William Lassell	1846
Luna	Terra	⊥	⊥
Oberon	Uranus	William Herschel	1787
Charon	Pluto	⊥	1978
...	...	...	...



# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
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Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon	
<u>name</u>	<u>planet</u>
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Terra
Oberon	Uranus
Charon	Pluto
...	...

MoonDiscoverer	
<u>name</u>	<u>discoverer</u>
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

MoonDiscYear	
<u>name</u>	<u>year</u>
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
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Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon	
<u>name</u>	planet
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Terra
Oberon	Uranus
Charon	Pluto
...	...

MoonDiscoverer	
<u>name</u>	discoverer
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

MoonDiscYear	
<u>name</u>	year
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados

Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
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Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon	
<u>name</u>	P.name
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
...	...

MoonDiscoverer	
<u>name</u>	discoverer
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

MoonDiscYear	
<u>name</u>	year
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados



Planet							
<u>name</u>	dist	radius	grav	days	years	temp	ring
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
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Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

Moon	
<u>name</u>	P.name
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
...	...

MoonDiscoverer	
<u>name</u>	discoverer
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

MoonDiscYear	
<u>name</u>	year
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados



## Planet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true

## DwarfPlanet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

## Moon

<u>name</u>	<u>P.name</u>
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
...	...

## MoonDiscoverer

<u>name</u>	<u>discoverer</u>
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

## MoonDiscYear

<u>name</u>	<u>year</u>
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados



## Planet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true

## DwarfPlanet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

## Moon

<u>name</u>	<u>P.name</u>
Ganimesdes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
...	...

## MoonDiscoverer

<u>name</u>	<u>discoverer</u>
Ganimesdes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

## MoonDiscYear

<u>name</u>	<u>year</u>
Ganimesdes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
...	...

# Planetas / Datos Relacionados



## Planet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Mercury	0.39	0.38	2.8	58.646	0.241	440	false
Venus	0.72	0.95	8.9	-243.019	0.615	730	false
Earth	1.00	1.00	9.8	0.997	1.000	288	false
Mars	1.52	0.53	3.7	1.026	1.880	186	false
Jupiter	5.20	10.97	22.9	0.414	11.862	152	true
Saturn	9.54	9.14	9.1	0.444	29.447	134	true
Uranus	19.19	3.98	7.8	-0.719	84.017	76	true
Neptune	30.07	3.86	11.0	0.671	164.791	53	true

## DwarfPlanet

<u>name</u>	<u>dist</u>	<u>radius</u>	<u>grav</u>	<u>days</u>	<u>years</u>	<u>temp</u>	<u>ring</u>
Pluto	49.31	0.19	0.063	6.39	248.000	44	false

## Moon

<u>name</u>	<u>parent</u>
Ganimedes	Jupiter
Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
...	...

## MoonDiscoverer

<u>name</u>	<u>discoverer</u>
Ganimedes	Galileo Galilei
Calisto	Galileo Galilei
Europa	Galileo Galilei
Io	Galileo Galilei
Titan	Christiaan Huygens
Triton	William Lassell
Oberon	William Herschel
...	...

## MoonDiscYear

<u>name</u>	<u>year</u>
Ganimedes	1610
Calisto	1610
Europa	1610
Io	1610
Titan	1655
Triton	1846
Oberon	1787
Charon	1978
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Moon	
<u>name</u>	parent
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Calisto	Jupiter
Europa	Jupiter
Io	Jupiter
Titan	Saturn
Triton	Neptune
Luna	Earth
Oberon	Uranus
Charon	Pluto
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Planetas / Graph Data



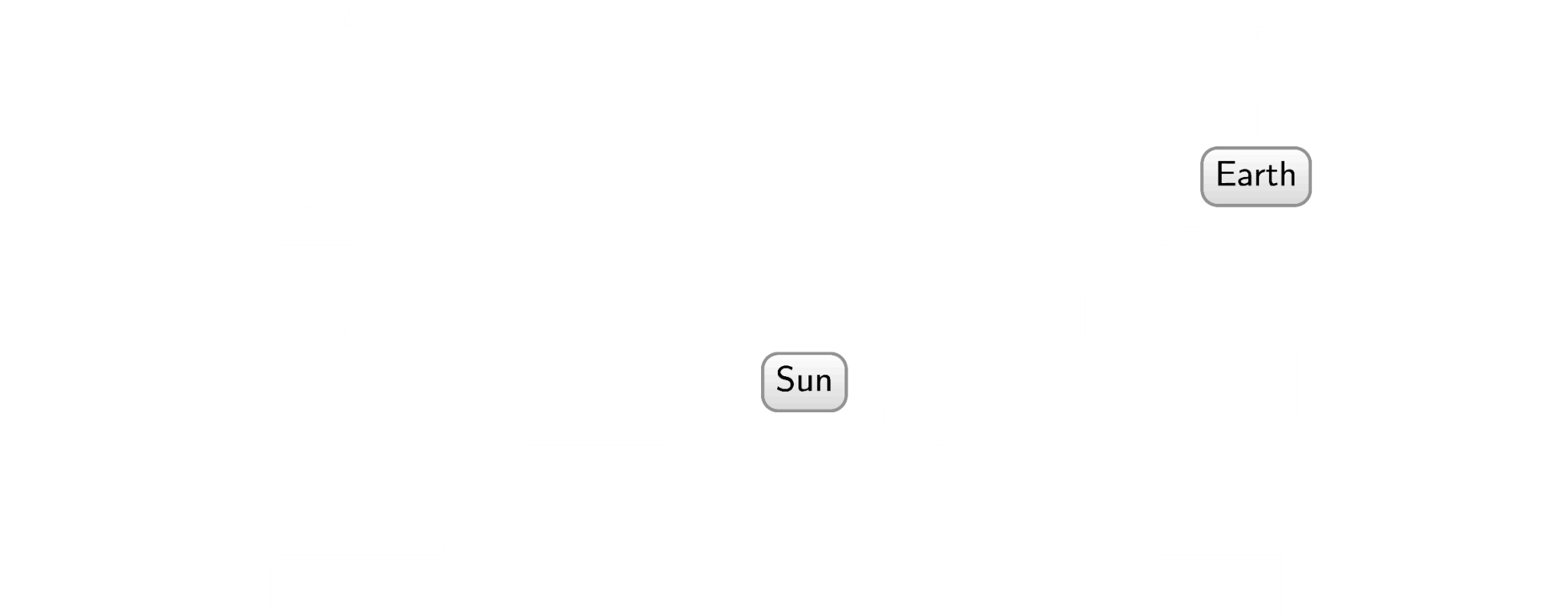
# Planets / Graph Data

# Planets / Graph Data



Earth

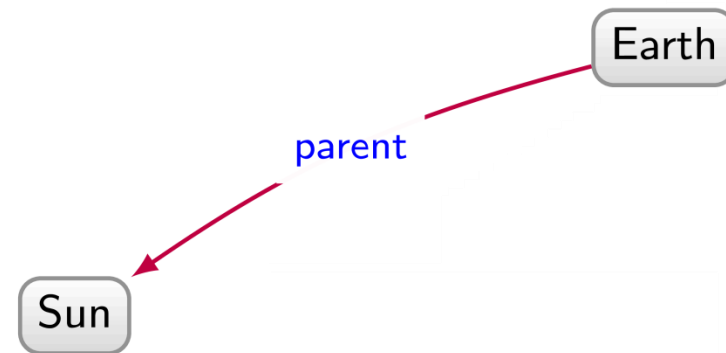
# Planets / Graph Data



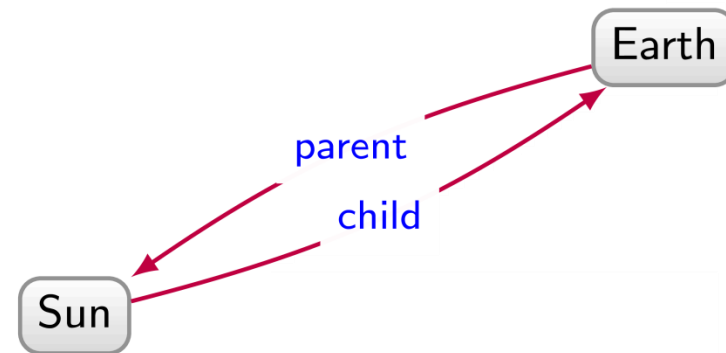
# Planets / Graph Data



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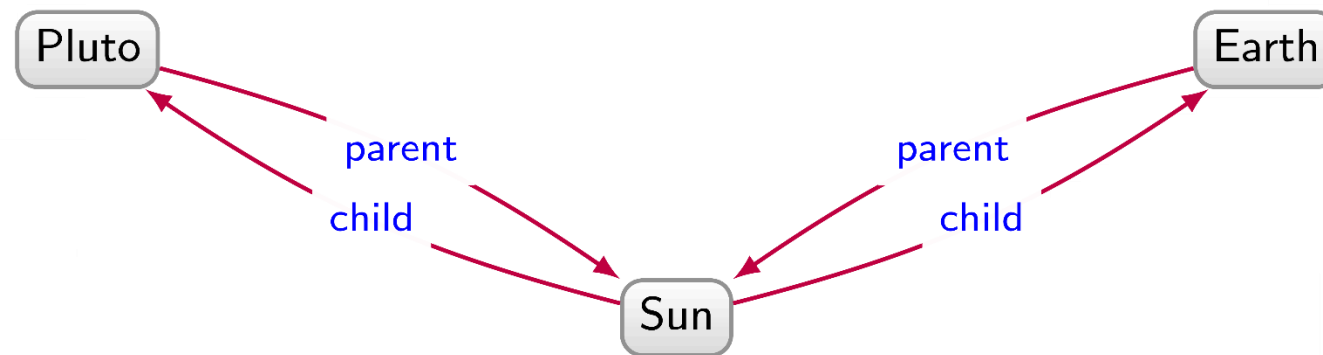


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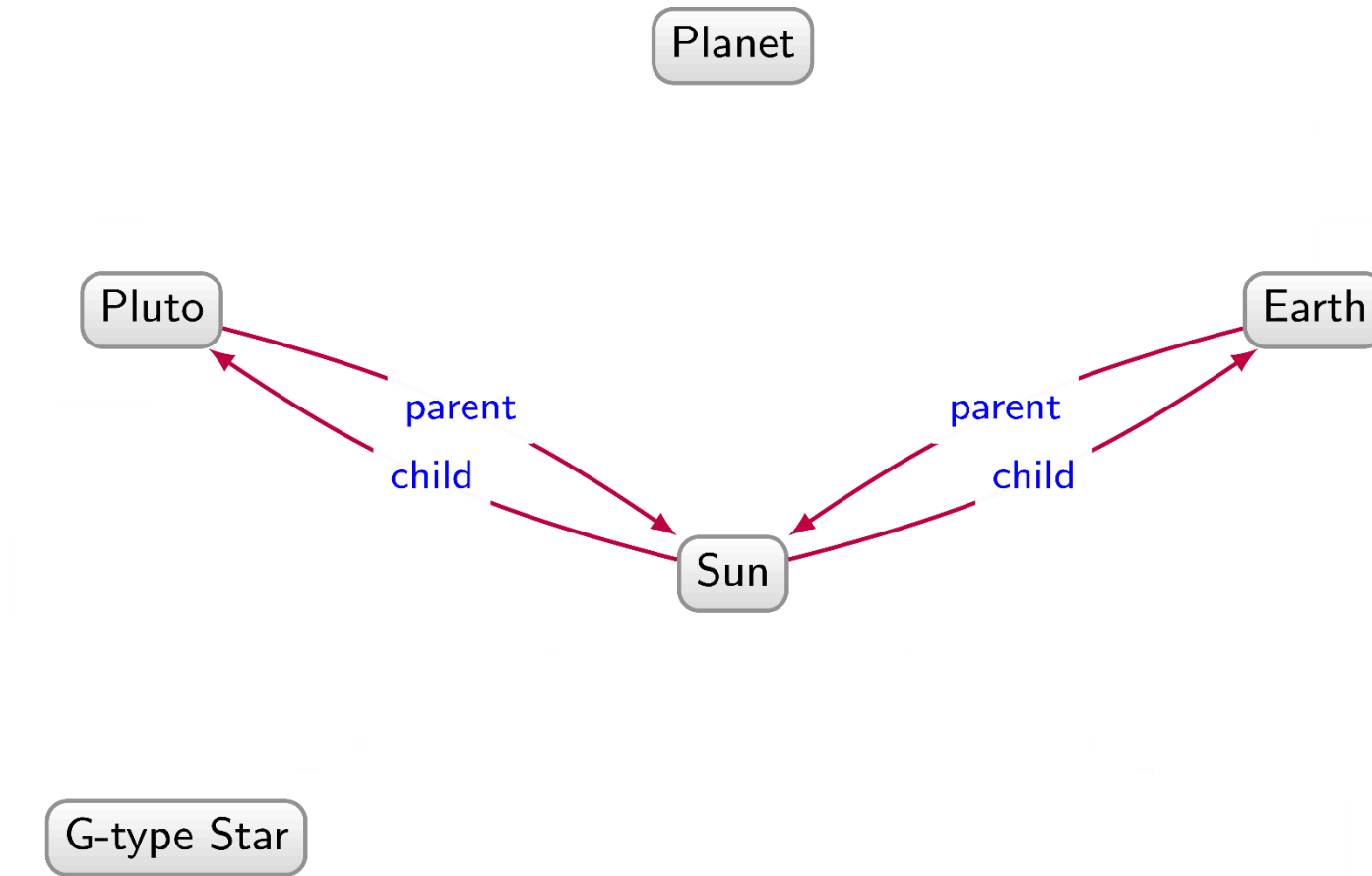




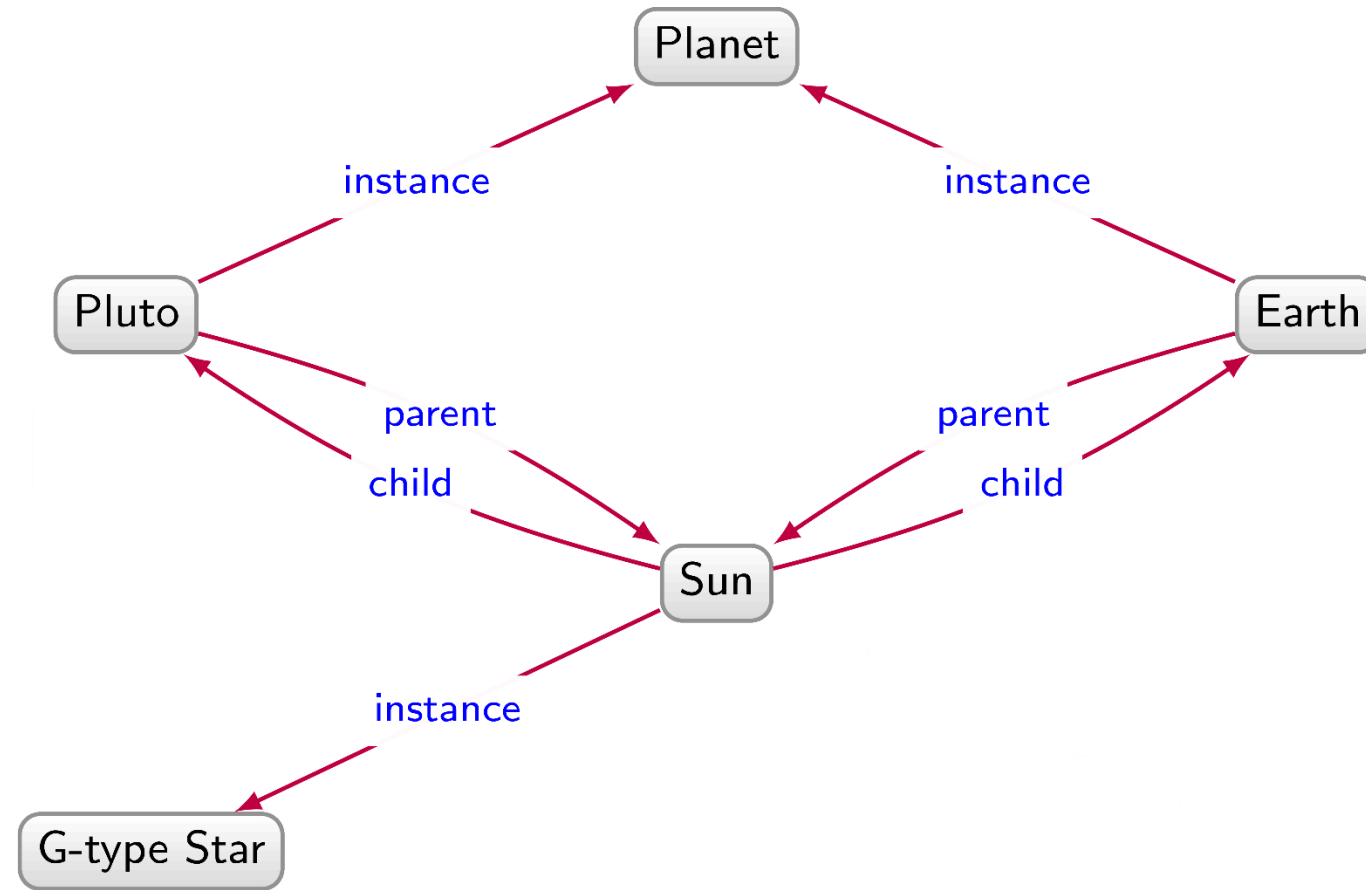
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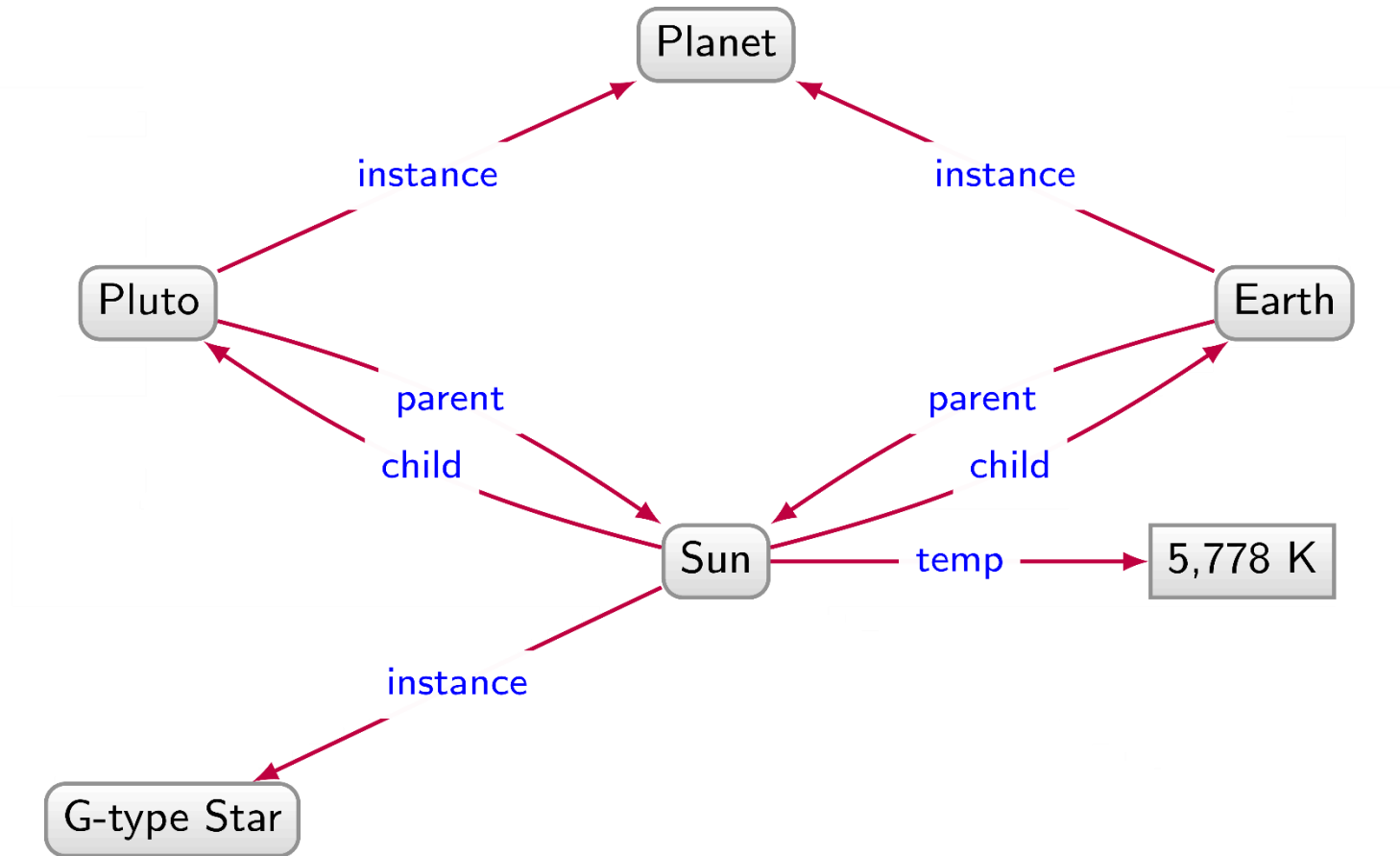
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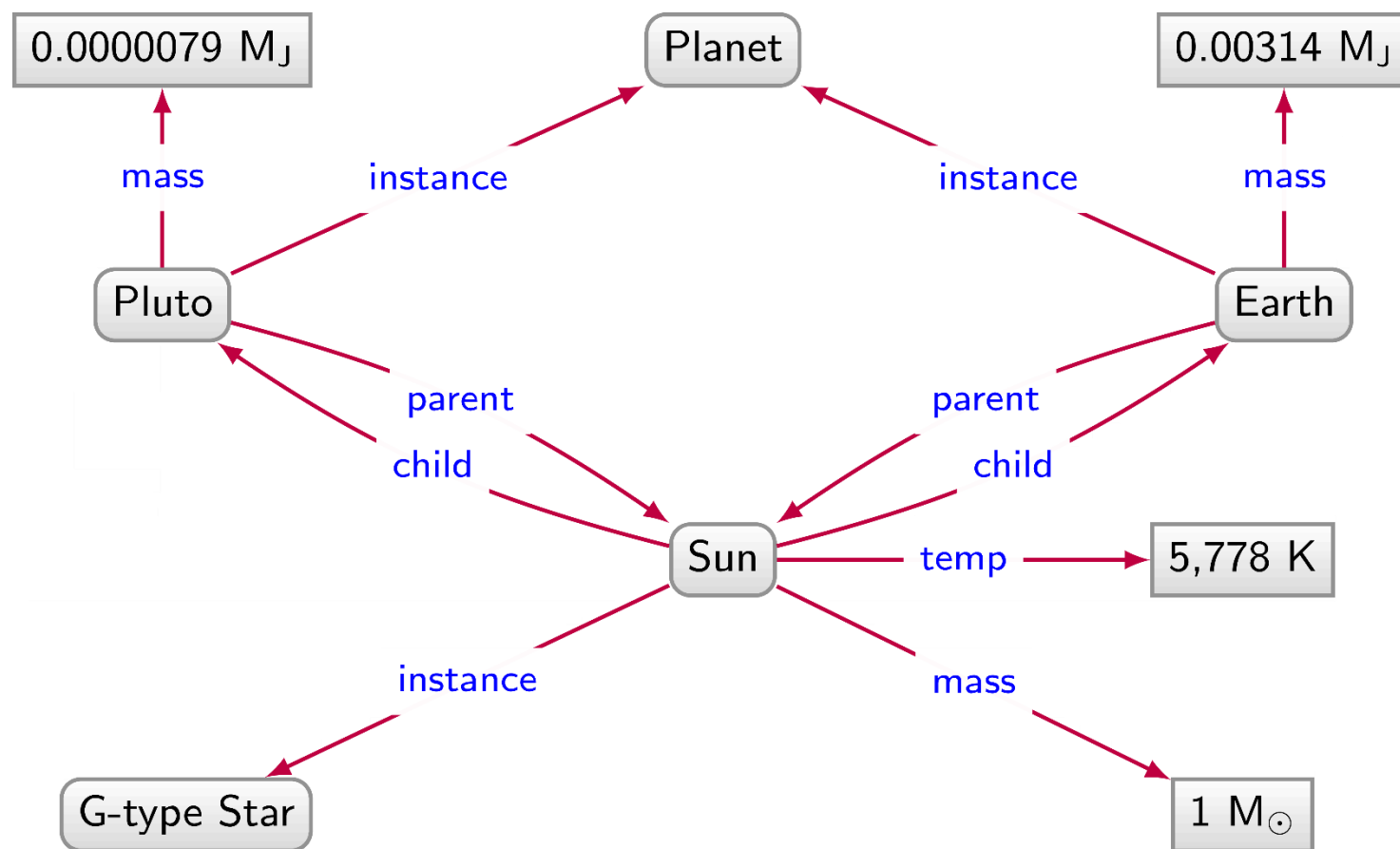
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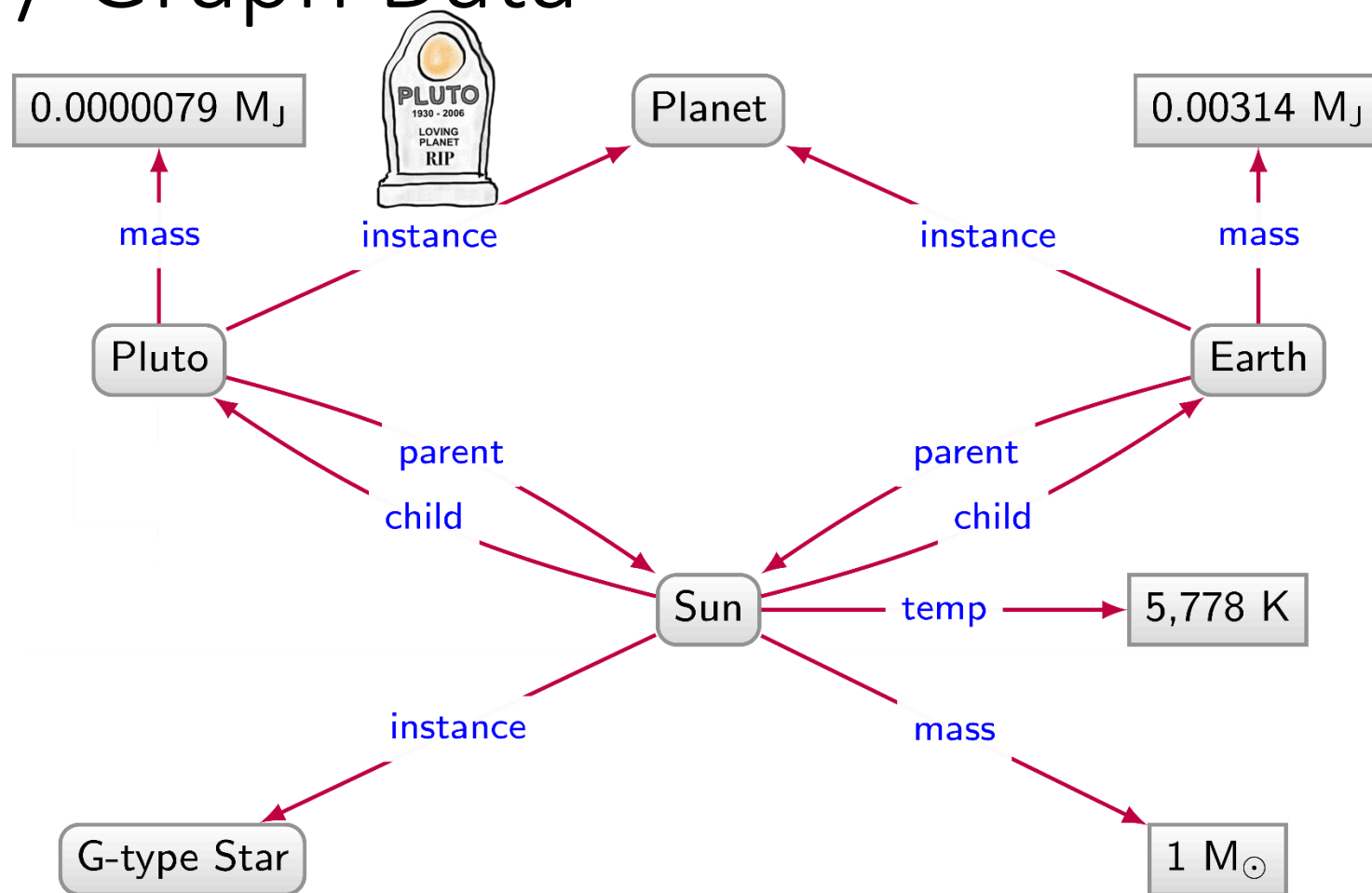
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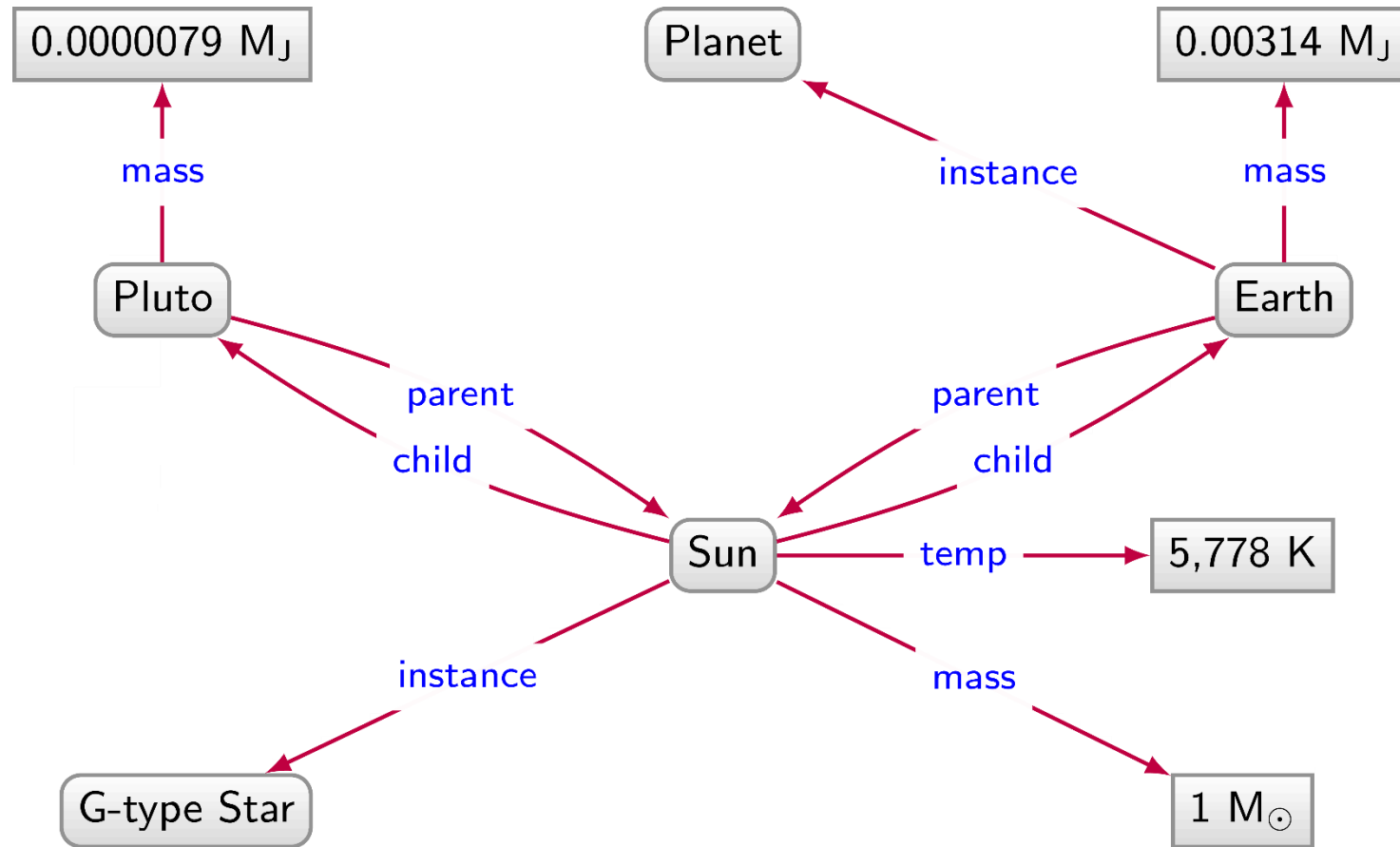
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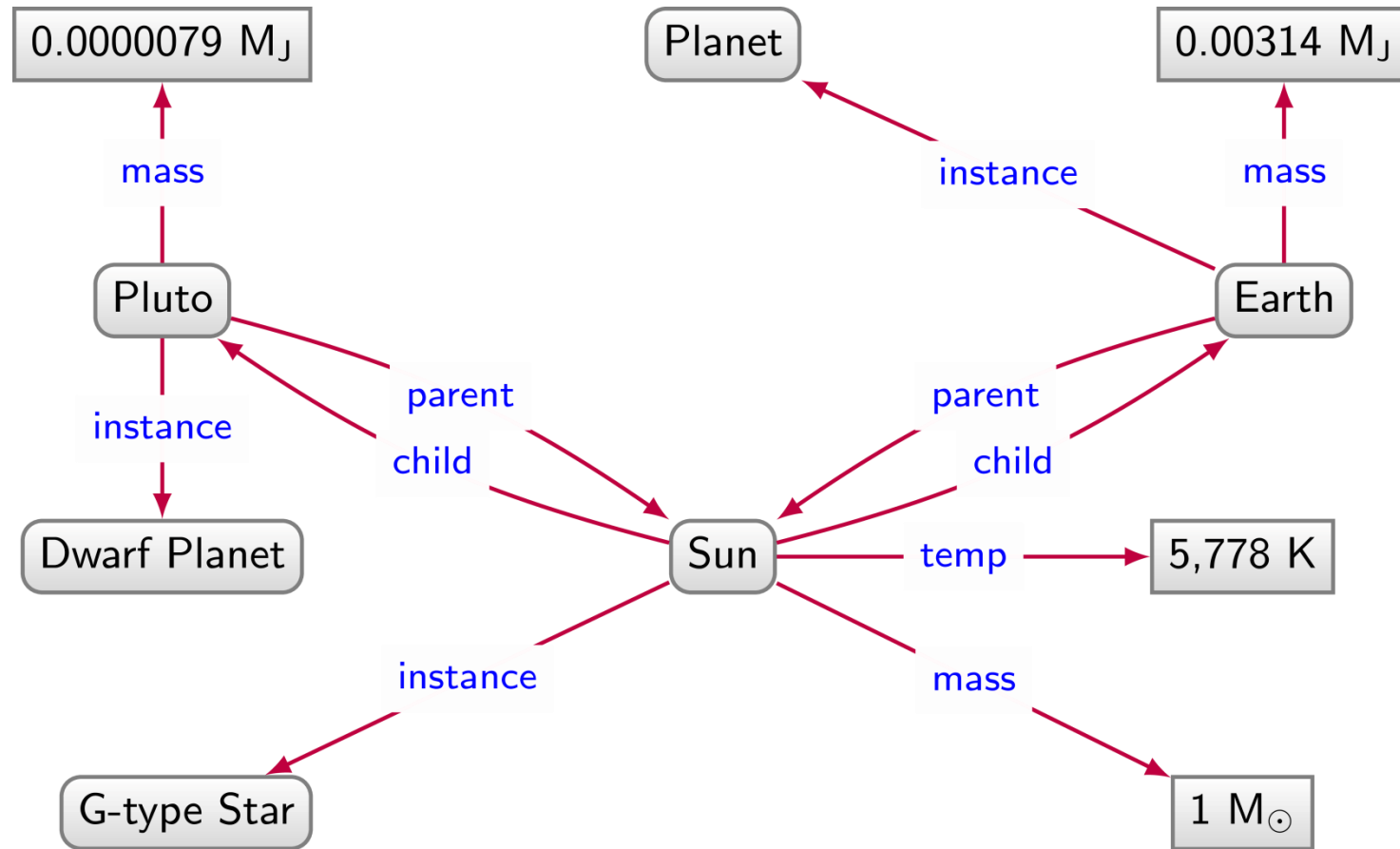
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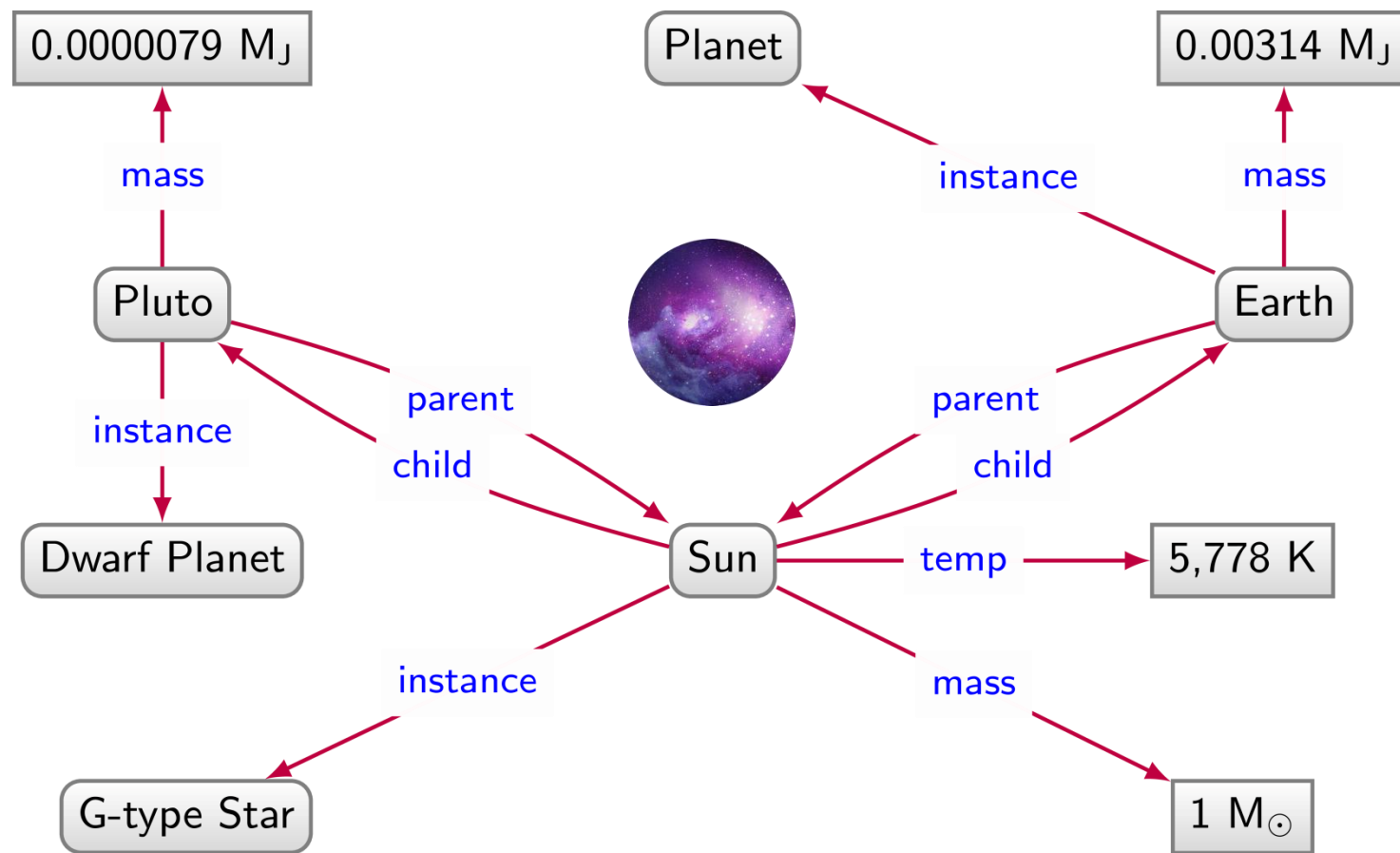


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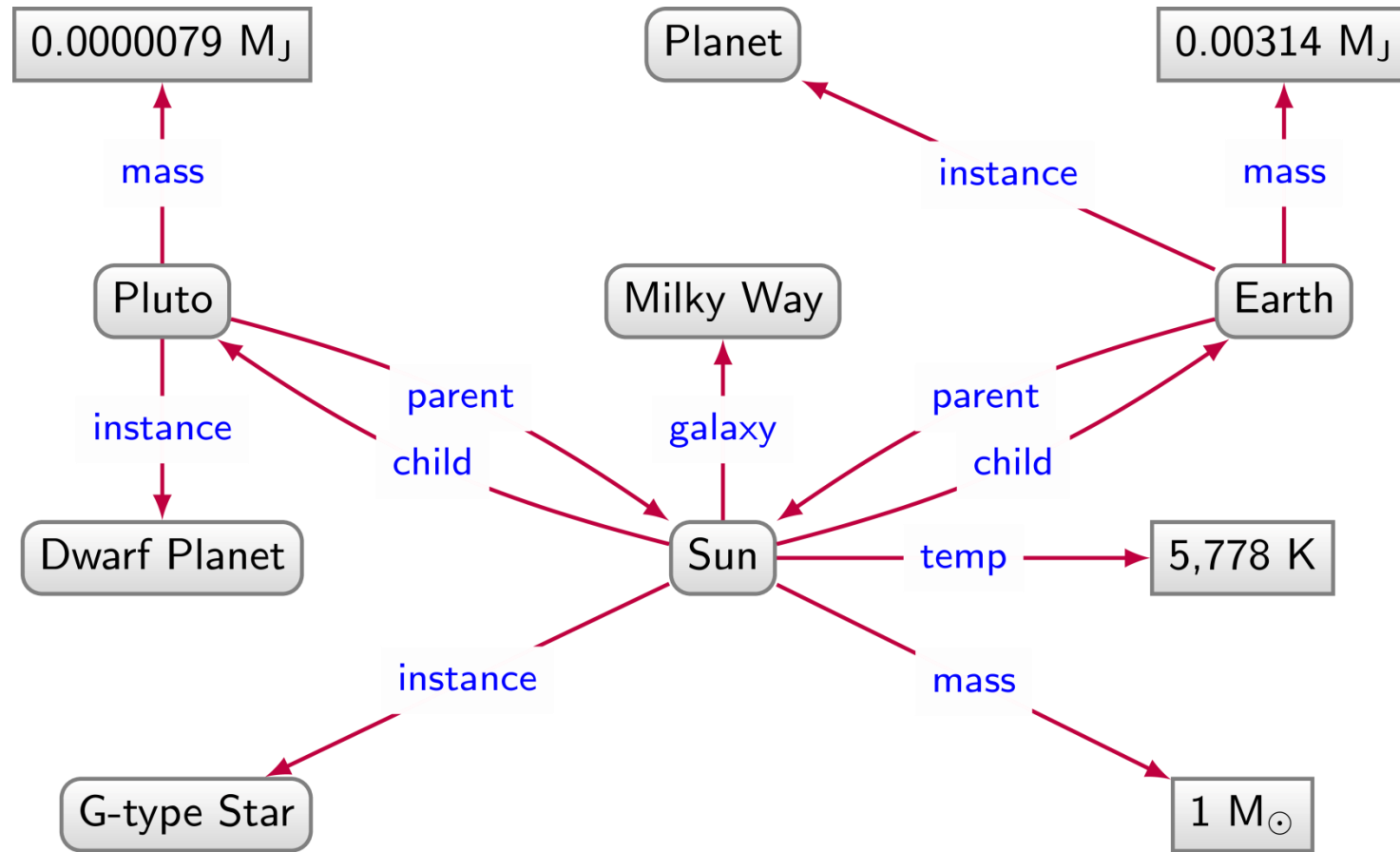




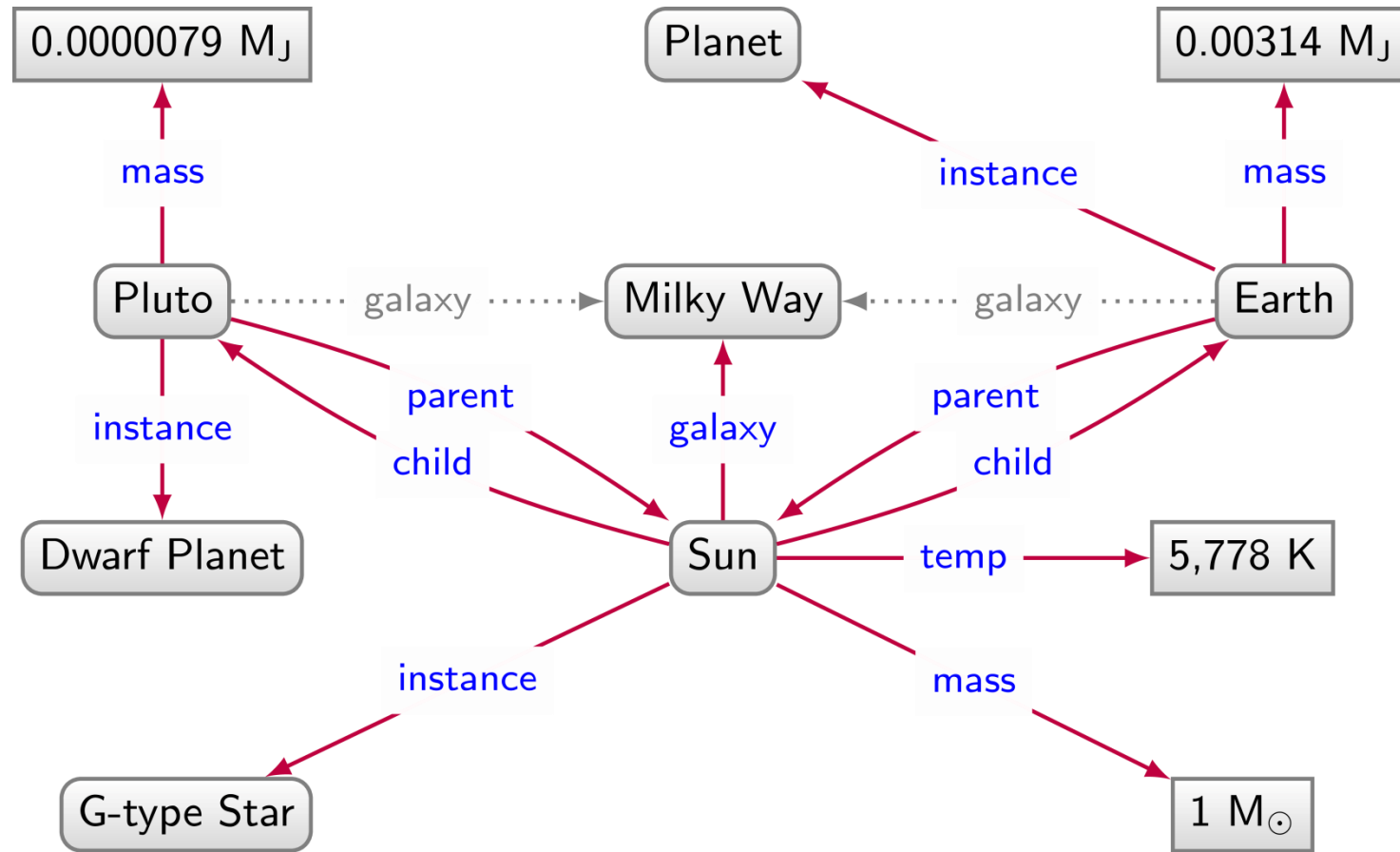
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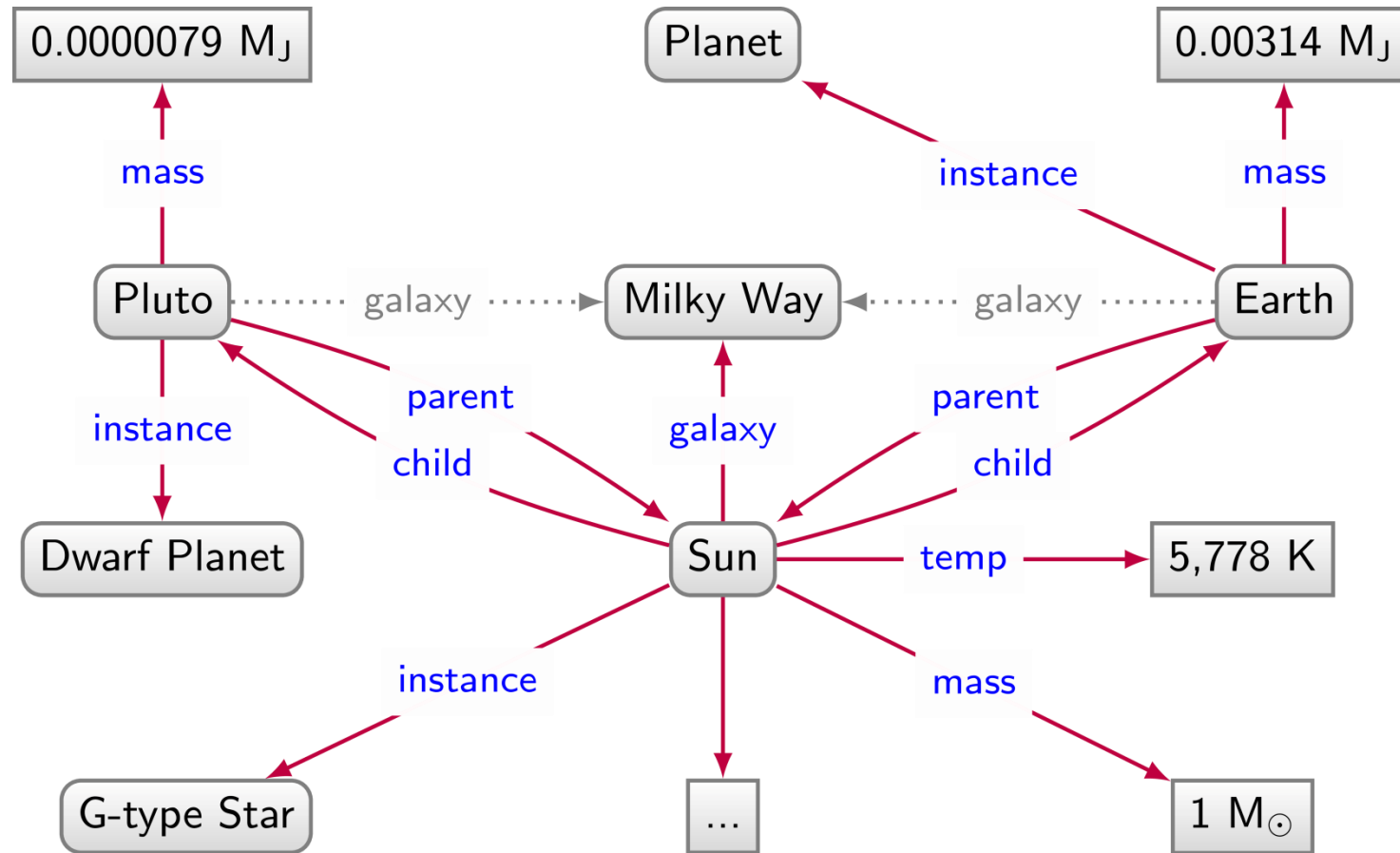
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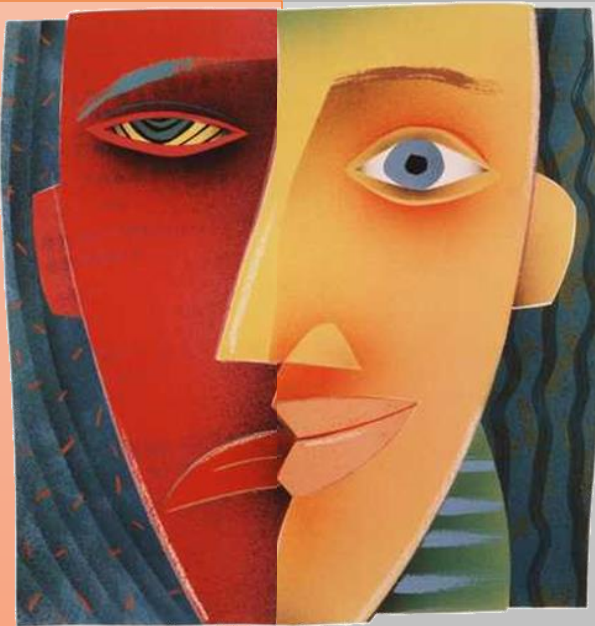
# Planets / Graph Data



# Datos relacionados: Pros and Cons

Planet							
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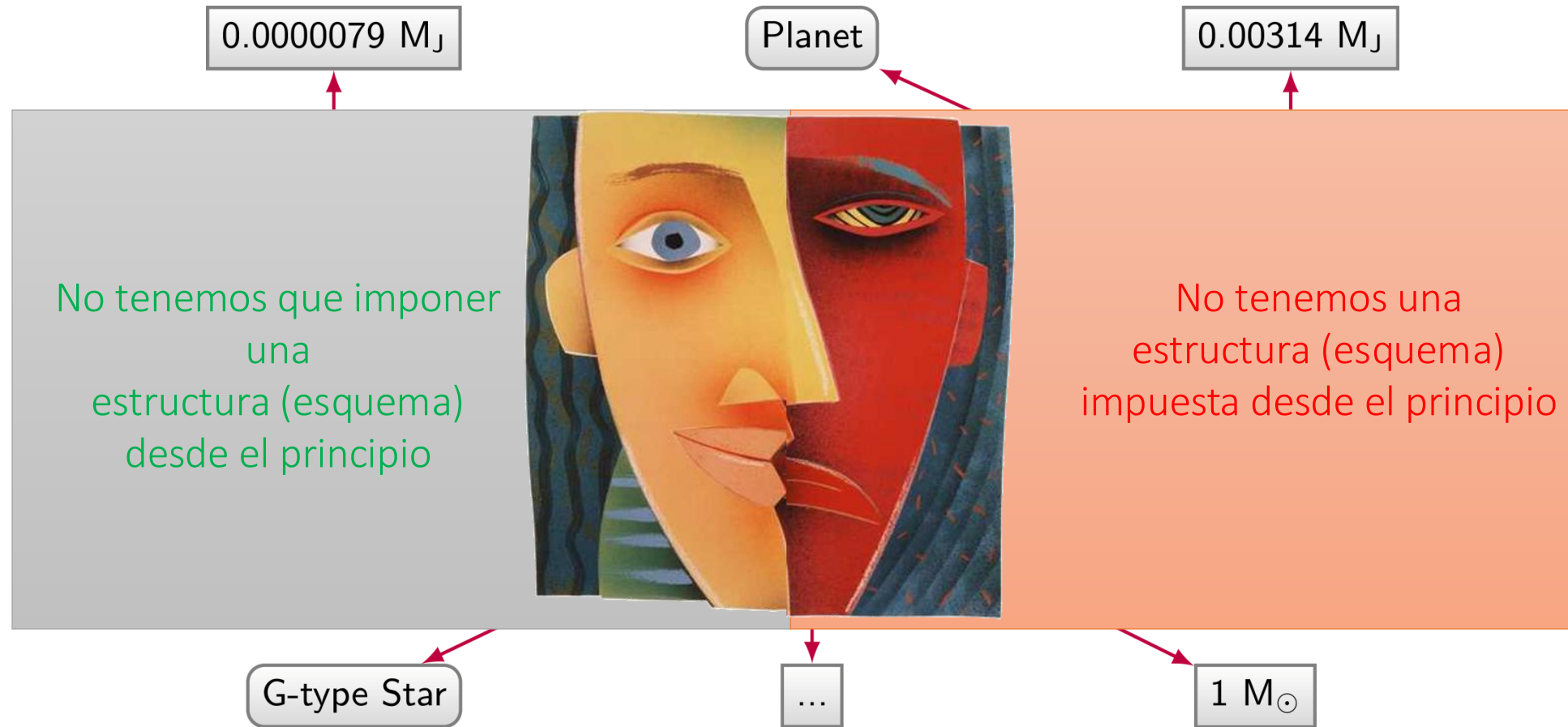
Tenemos que imponer una estructura (esquema) desde el principio



Tenemos una estructura (esquema) impuesta desde el principio

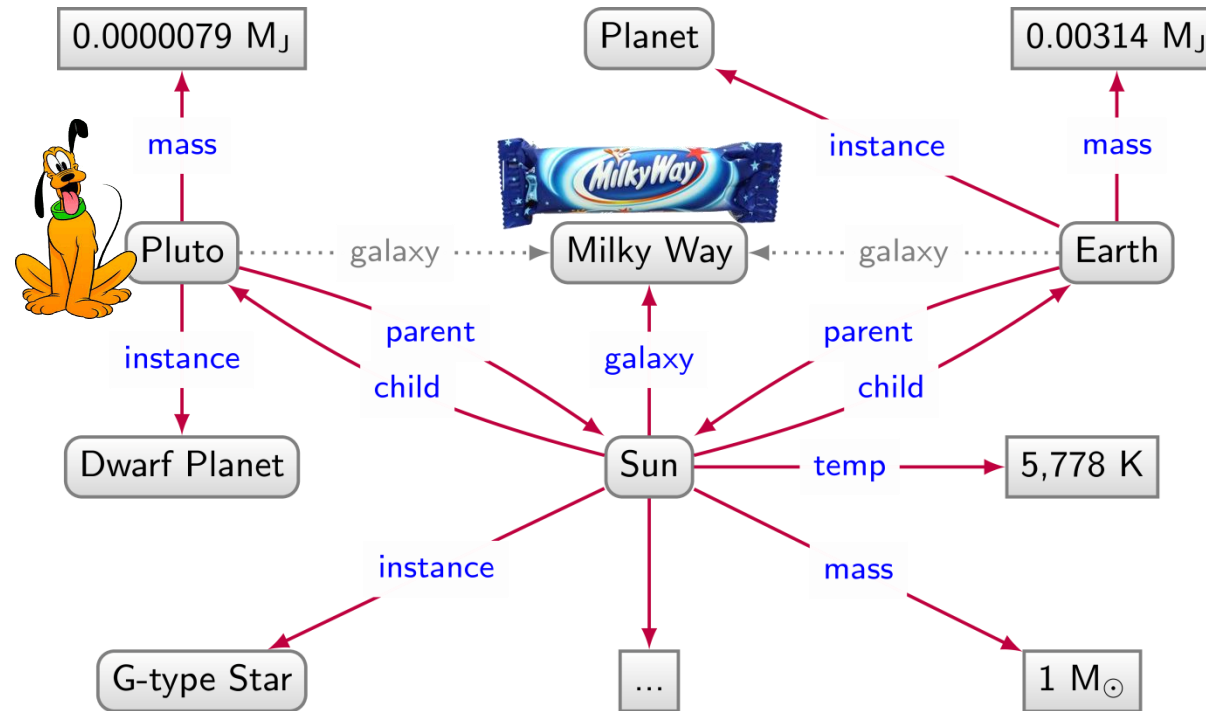
Europa	Jupiter	Europa	Galileo Galilei	Europa	1610
Io	Jupiter	Io	Galileo Galilei	Io	1610
Titan	Saturn	Titan	Christiaan Huygens	Titan	1655
Triton	Neptune	Triton	William Lassell	Triton	1846
Luna	Earth	Oberon	William Herschel	Oberon	1787
Oberon	Uranus	...	...	Charon	1978
Charon	Pluto			...	...
...	...				

# Grafos de datos: Pros and Cons



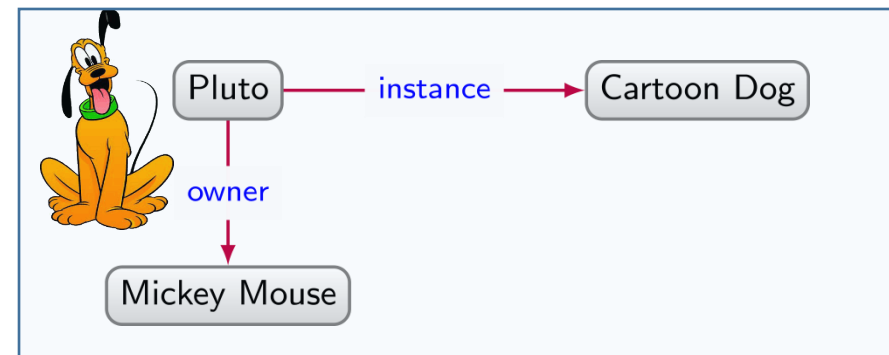
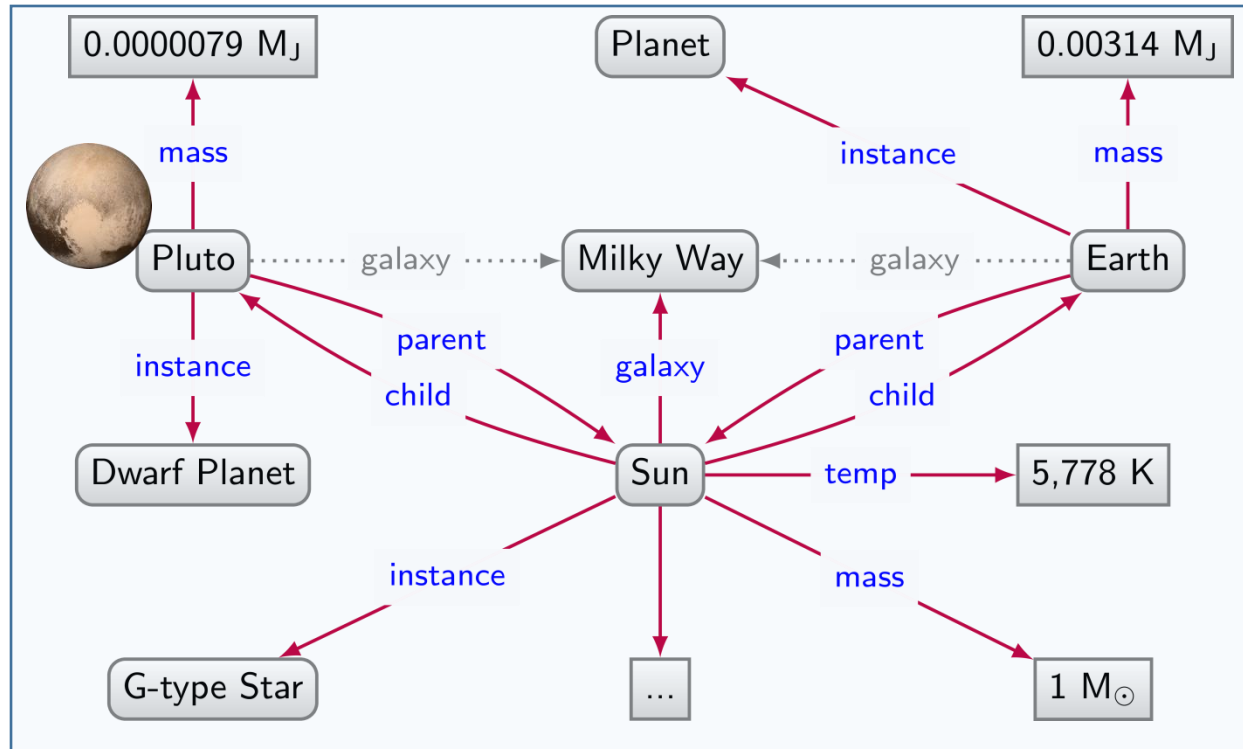
Nombrando cosas

# Nombrando cosas: Los strings no alcanzan





# Nombrando cosas: Los strings no alcanzan



Nombrando cosas en RDF: IRIs

# Necesidad de símbolos/identificadores que no sean ambiguos

- Como estamos en la Web... usamos identificadores Web
- **URL: Uniform Resource Location**
  - La ubicación de un recurso en la Web
  - `http://ex.org/Dubl%C3%ADn.html`
- **URI: Uniform Resource Identifier (RDF 1.0)**
  - Debe ser una ubicación, también un nombre
  - `http://ex.org/Dubl%C3%ADn`
- **IRI: Internationalised Resource Identifier (RDF 1.1)**
  - Una URI que permite caracteres **Unicode**
  - `http://ex.org/Dublín`

# We will use IRIs with prefixes

- `http://ex.org/Dublín` ↔ `ex:Dublín`
  - “`ex:`” denotes a prefix for `http://ex.org/`
  - “`Dublín`” is the local name
- Frequently used prefixes:

Prefix	Value
<code>rdf:</code>	<code>http://www.w3.org/1999/02/22-rdf-syntax-ns#</code>
<code>xsd:</code>	<code>http://www.w3.org/2001/XMLSchema#</code>
<code>rdfs:</code>	<code>http://www.w3.org/2000/01/rdf-schema#</code>
<code>owl:</code>	<code>http://www.w3.org/2002/07/owl#</code>