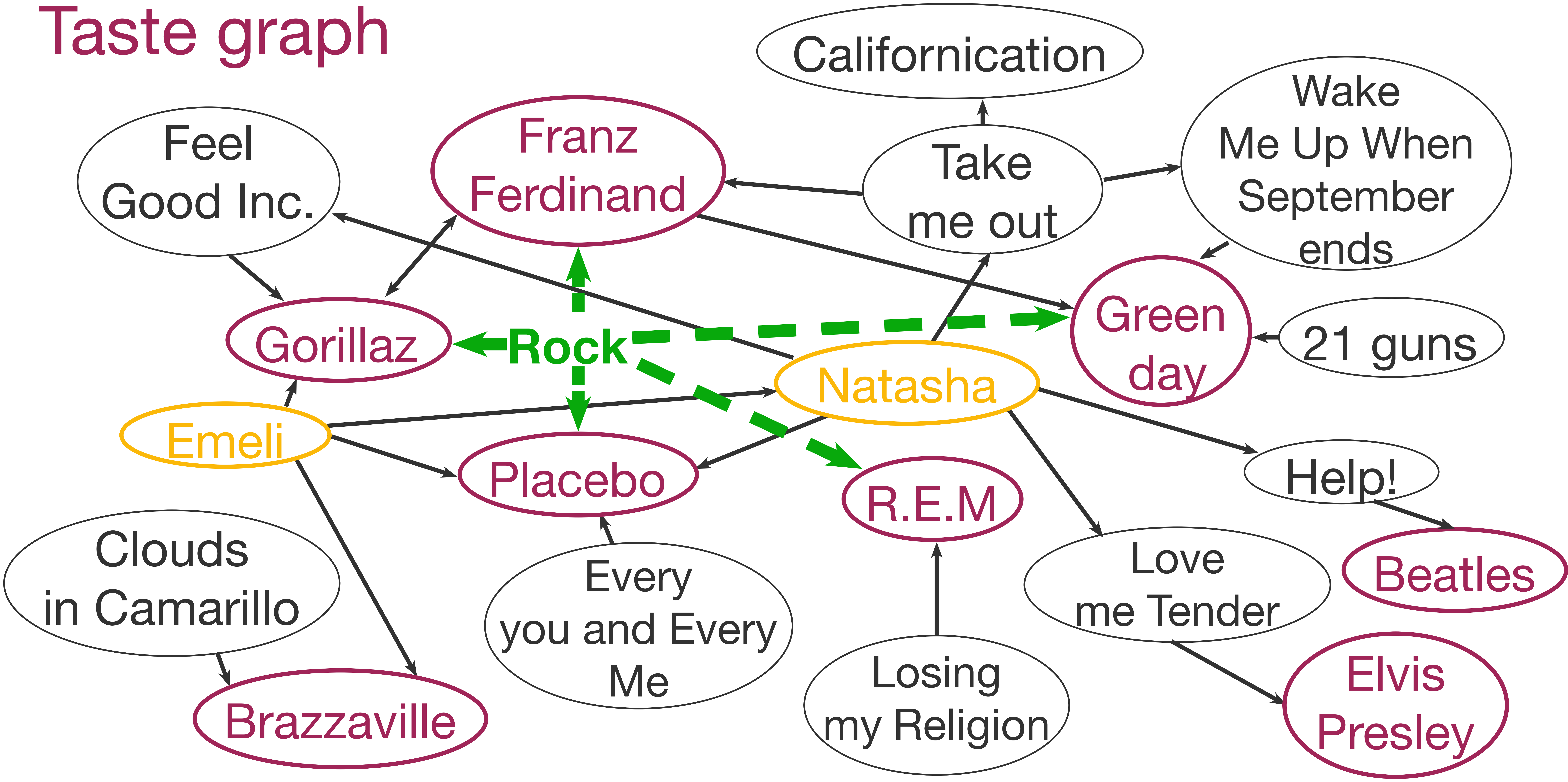
Taste graph: components

OK.RU

одноклассники
Messages
87
Discussions
8
Notifications
Friends
Guests
Feedback
Music
Video
Green Day – Boulevard Of Broken Dreams
1:04 / 4:20
Now playing
Download
Post as status
+ Add
Popular music
Collections
Upload music
Purchased
My radio
My music
3
Friends' music
Никита Макаров
424
Alexander Tobol
182
Алексей Сенников
39
Юлия Крупцова
186
Ирина Счастливая
408
Search for music
Search
Пикник – Бал
4:32
Найк Борзов – Виктория
3:29
Green Day – Boulevard Of Broken Dreams
4:20
Placebo – Special Needs
5:17
Three Days Grace – Break
3:13
Choose Station
Pop rock
Мумий Тролль, Ночные Снайперы and others
Indie rock
Placebo and others
Russian Pop
Metal

Taste graph


Californication
Feel Good Inc.
Franz Ferdinand
Take me out
Wake Me Up When September ends
Gorillaz
Rock
Green day
21 guns
Natasha
Emeli
Placebo
R.E.M
Help!
Clouds in Camarillo
Every you and Every Me
Love me Tender
Beatles
Losing my Religion
Brazzaville
Elvis Presley

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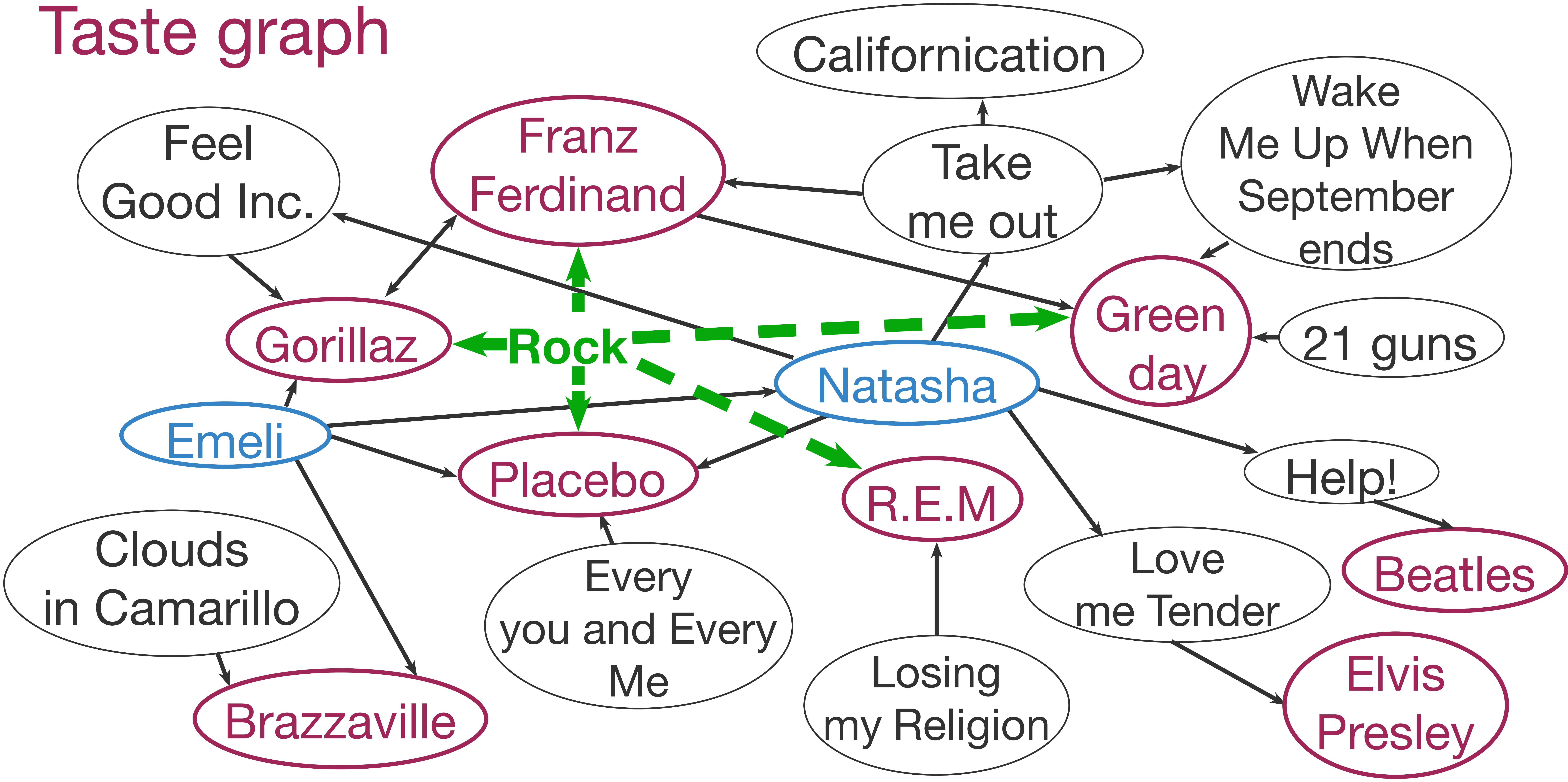

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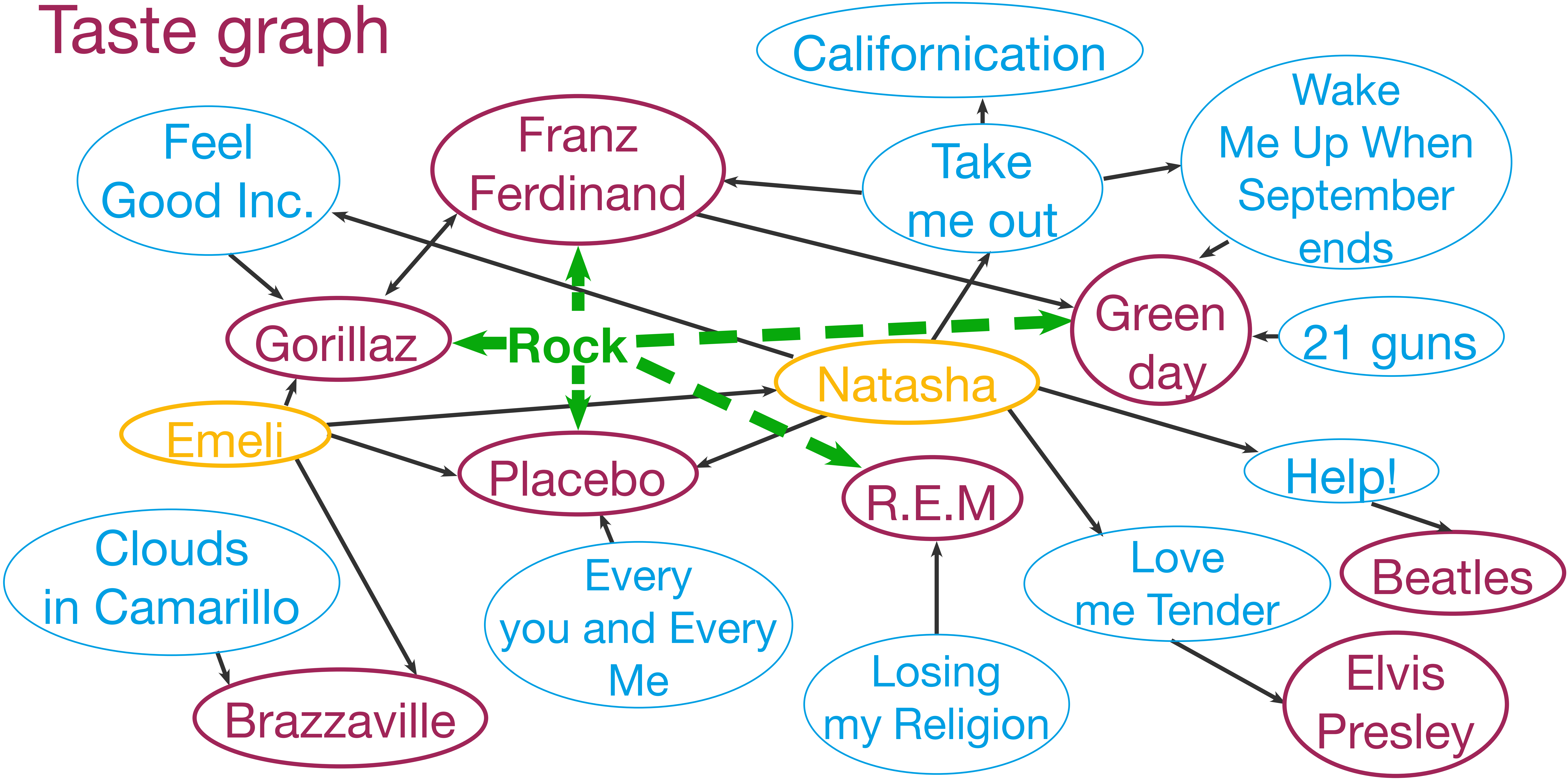
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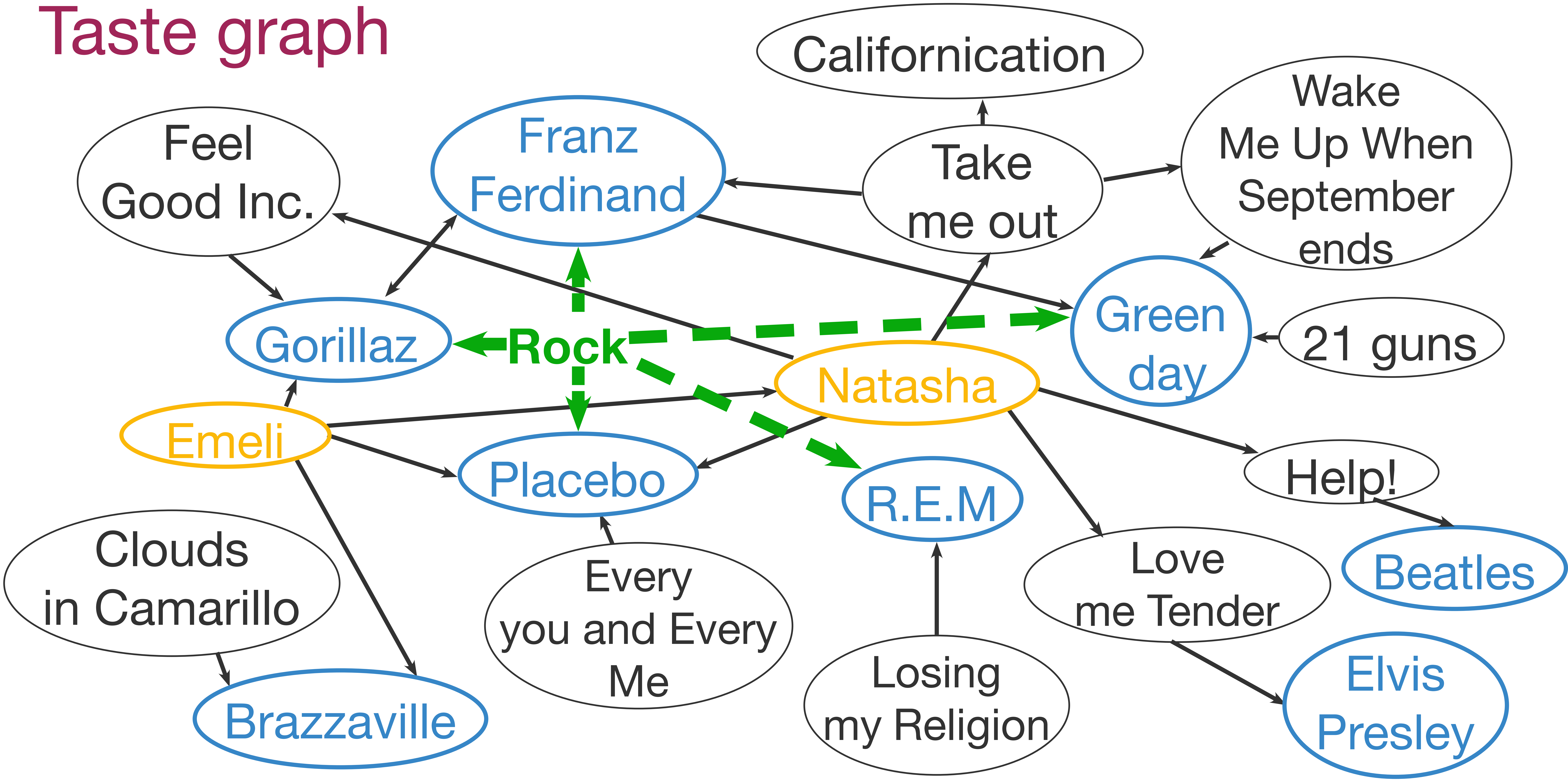

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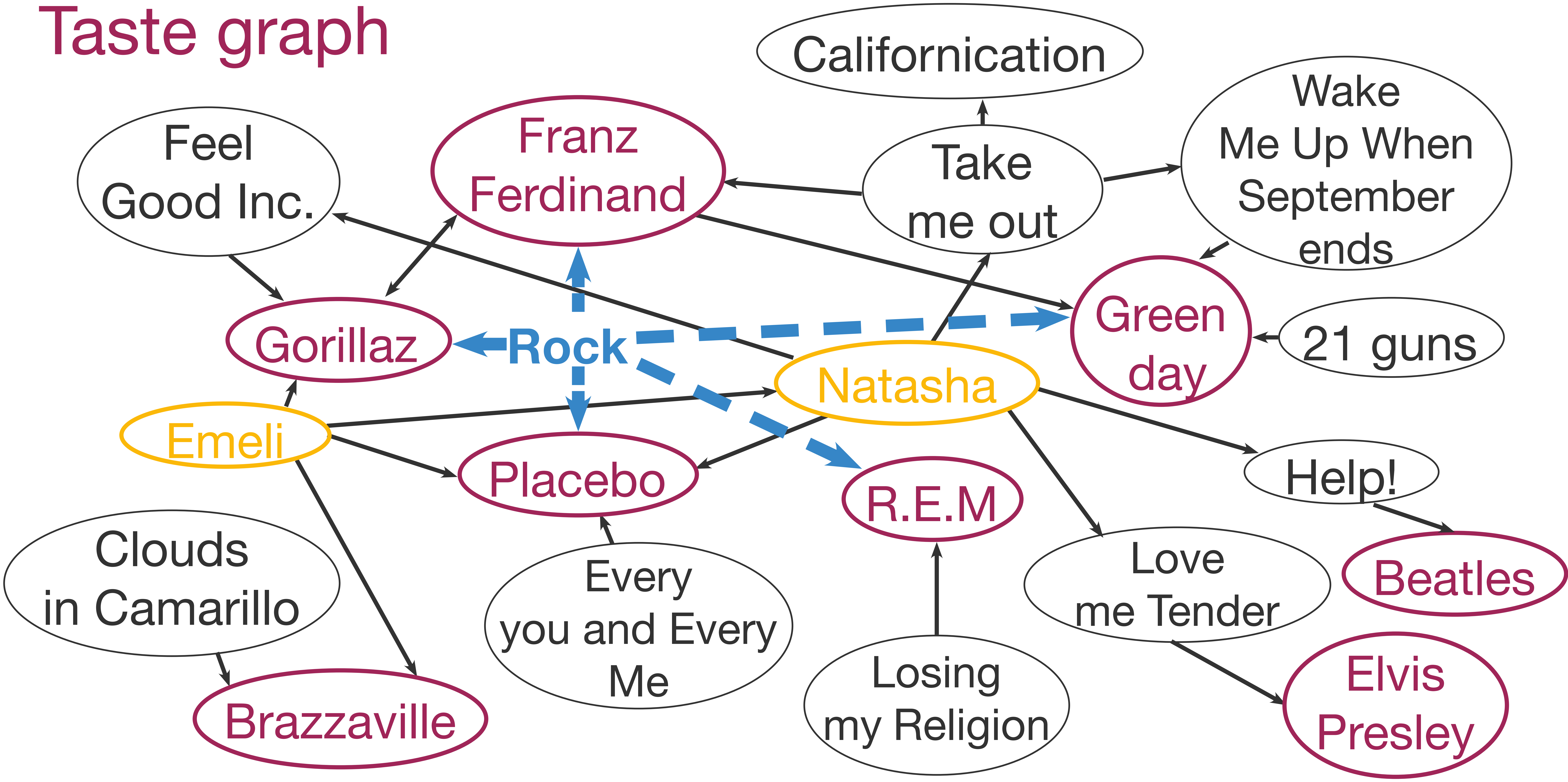

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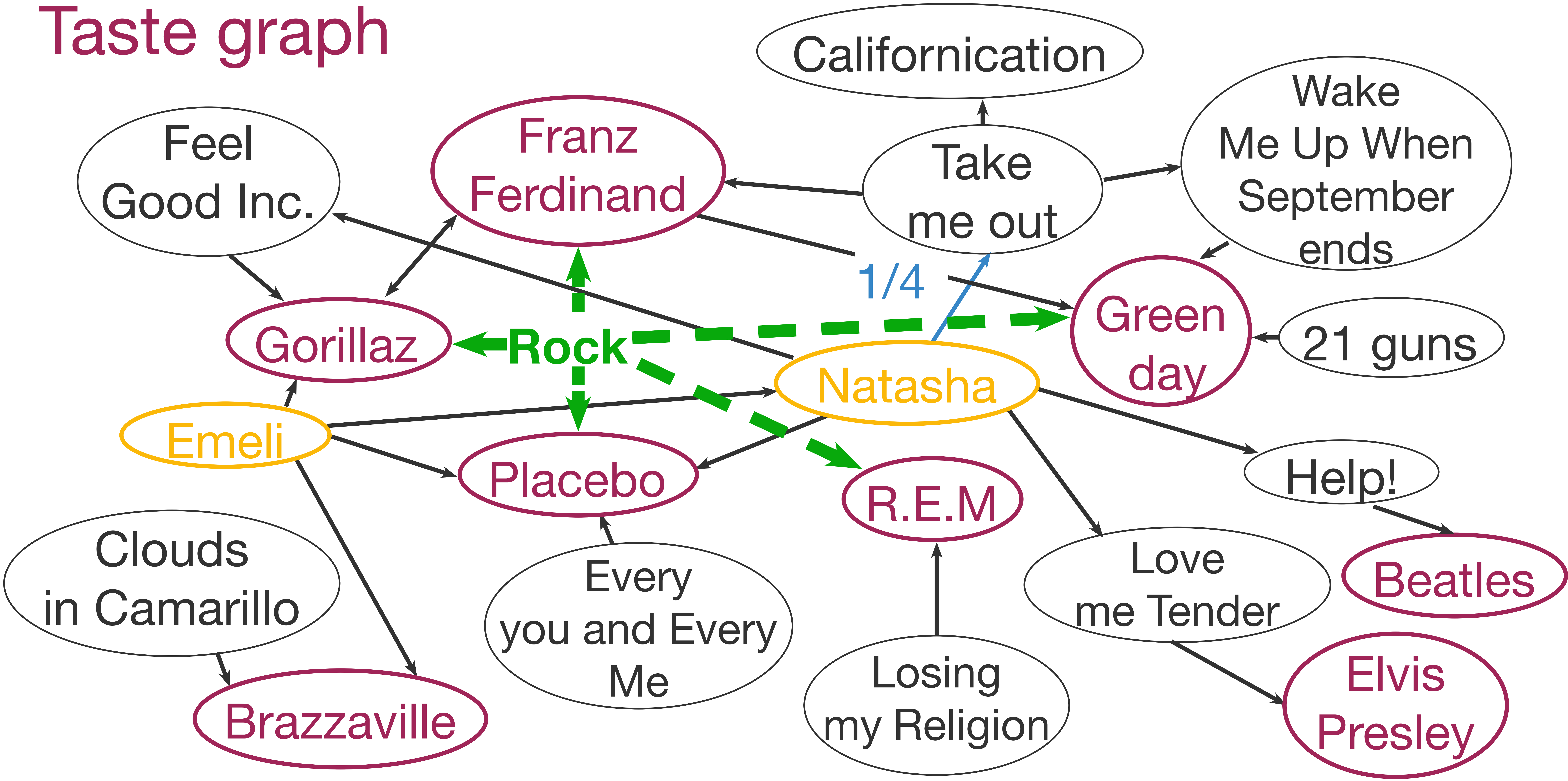

Californication
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1/4
Gorillaz
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Green day
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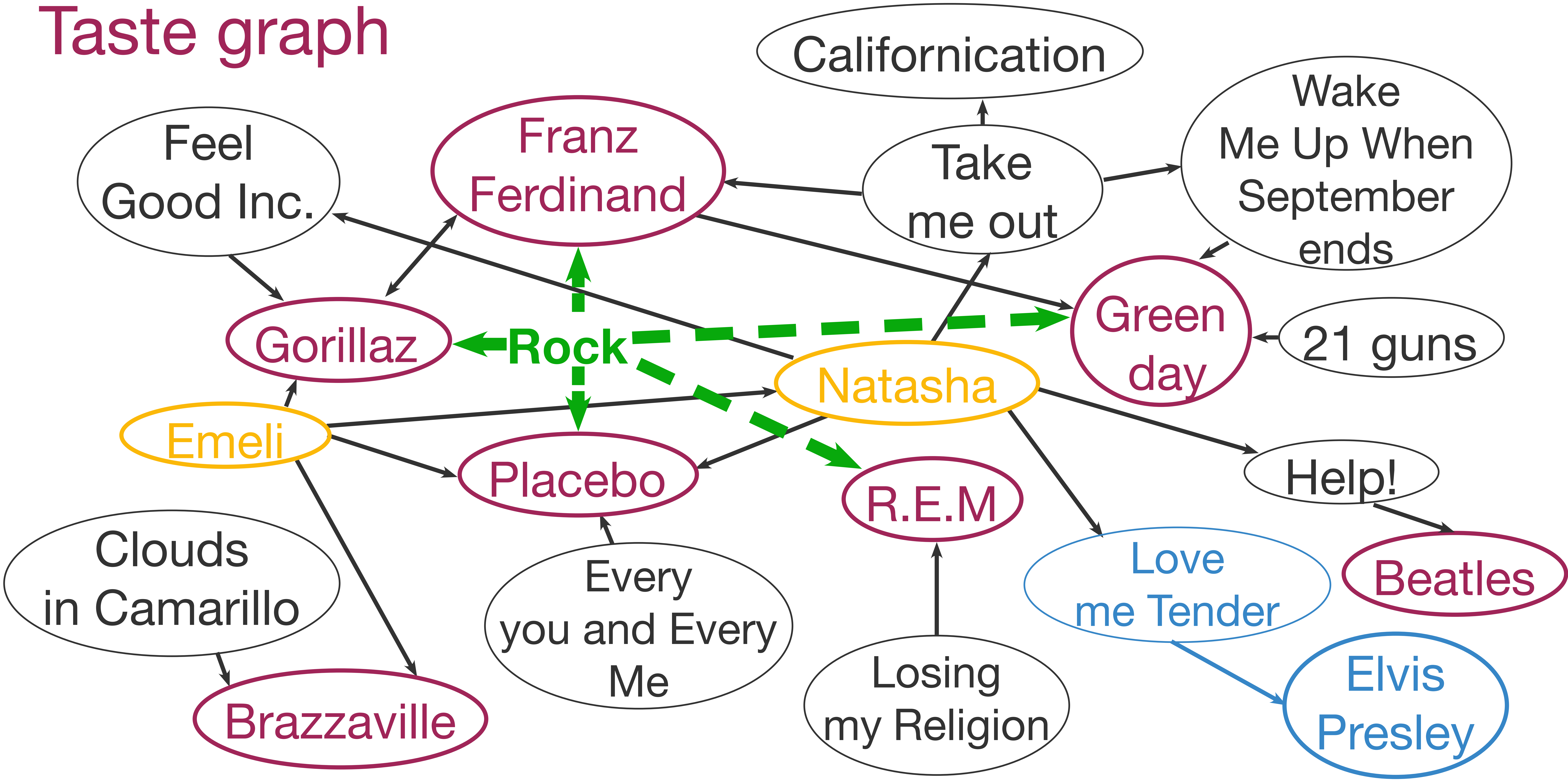
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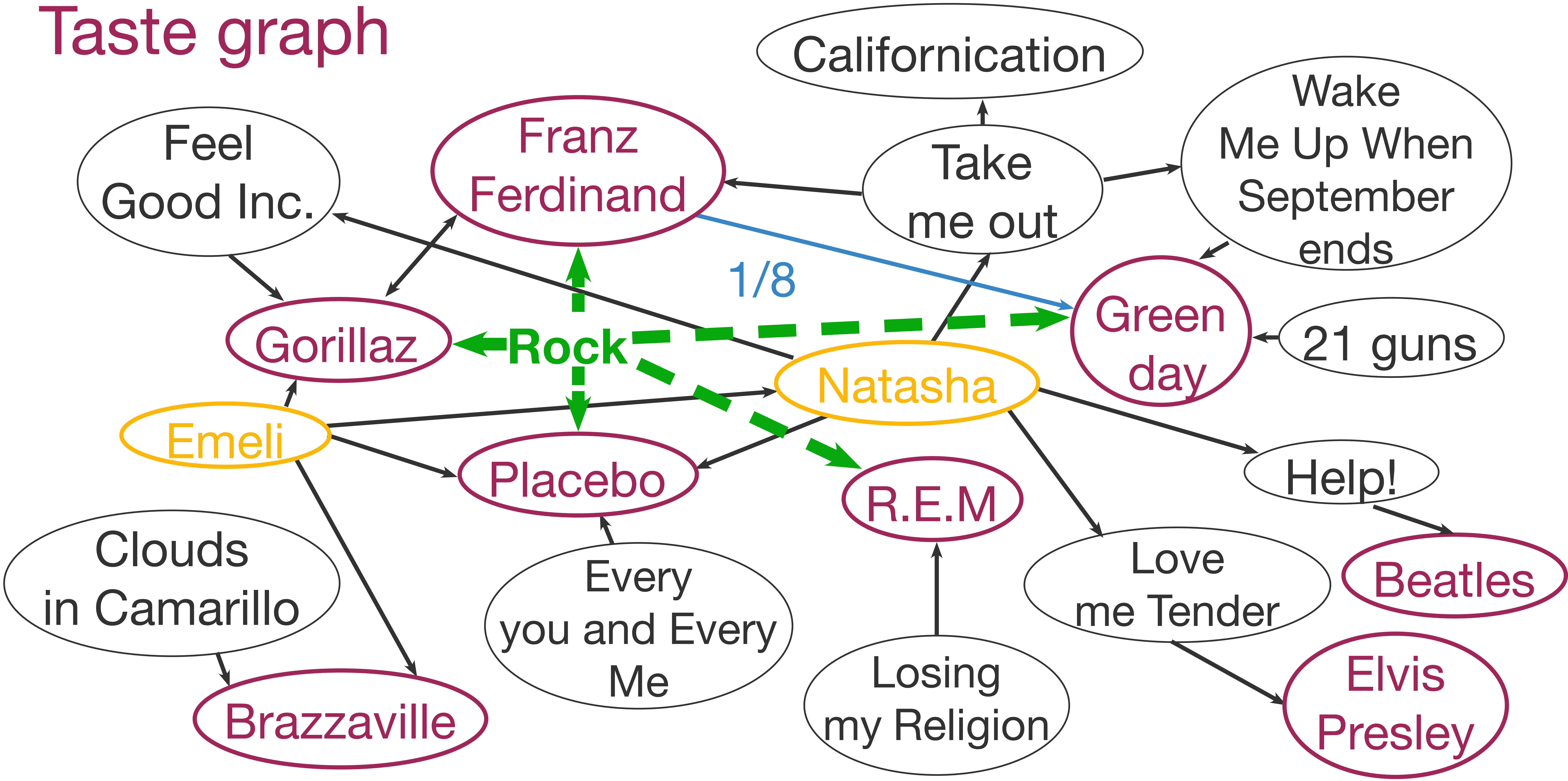

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1/8
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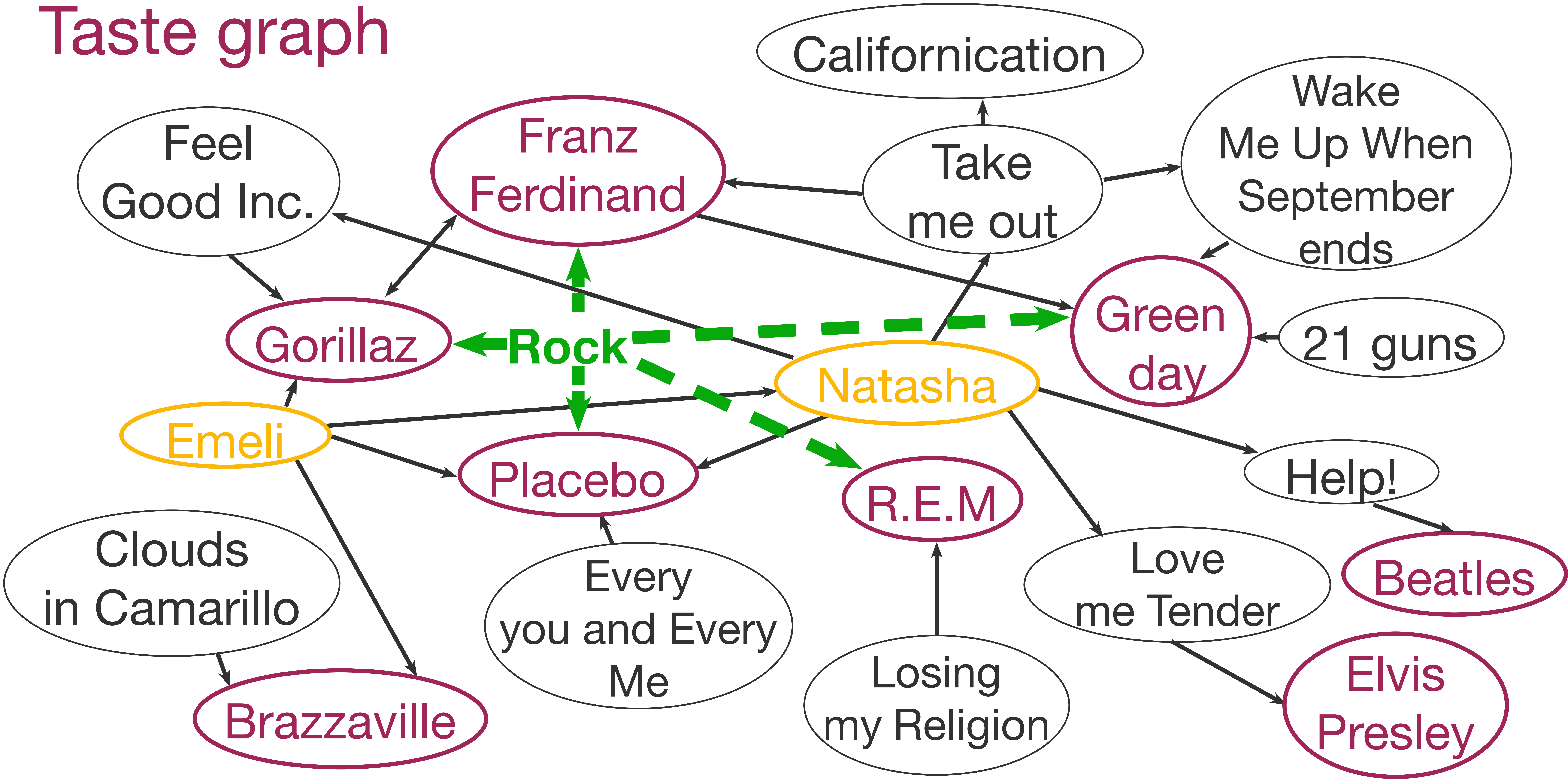
1. History of users’ activity
2. Content information
3. Social data

Taste graph



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$$\langle V, \theta, T_V, \tau_V, E, T_E, \tau_E, R, \omega \rangle \text{ - taste graph}$$

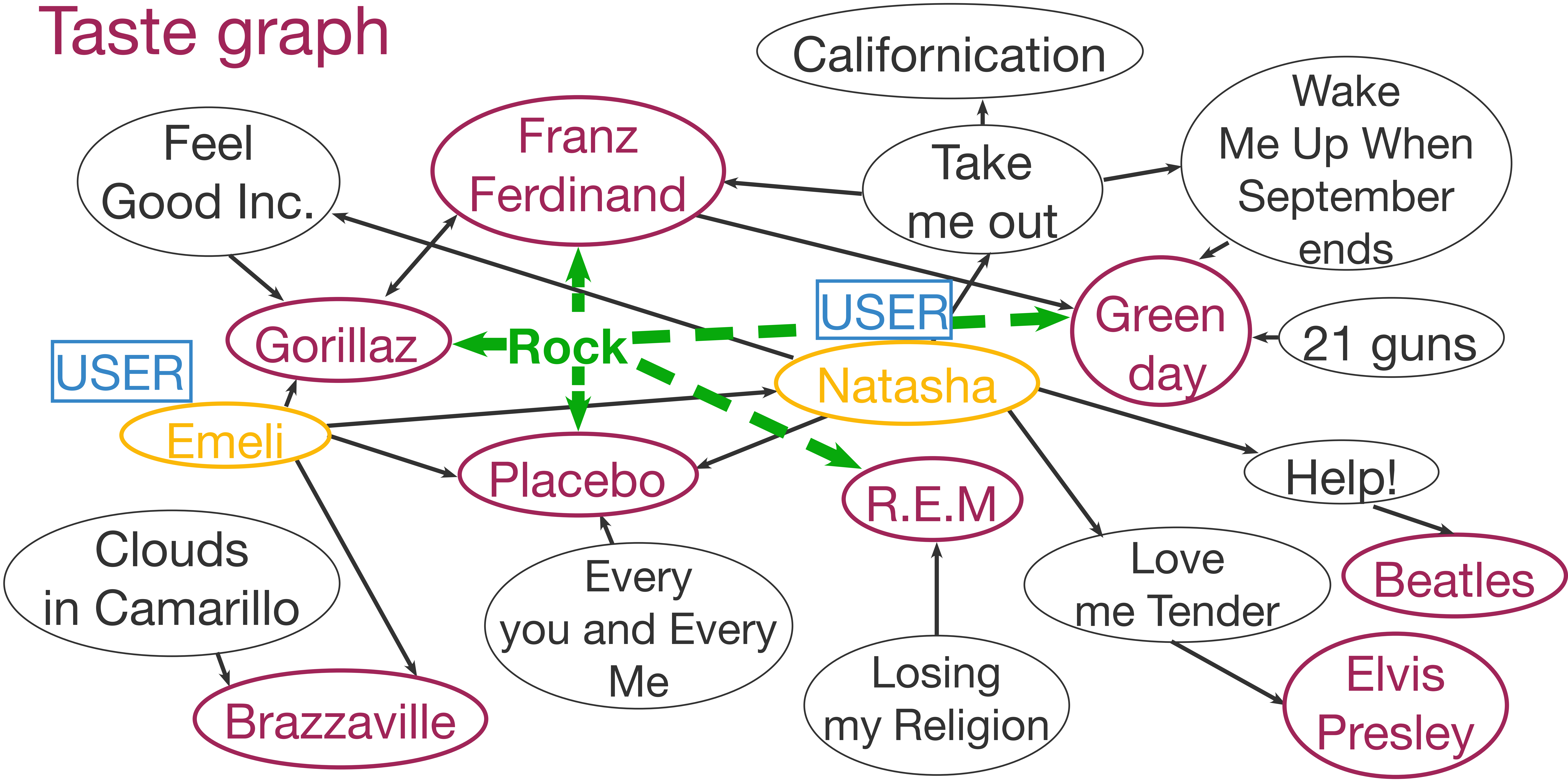
V - vetrices

$\theta \in V$ - zero balancing vertex

T_V - vertex types

$\tau_V : V \to T_V$ function matching vertex and its type

Taste graph



Californication
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USER
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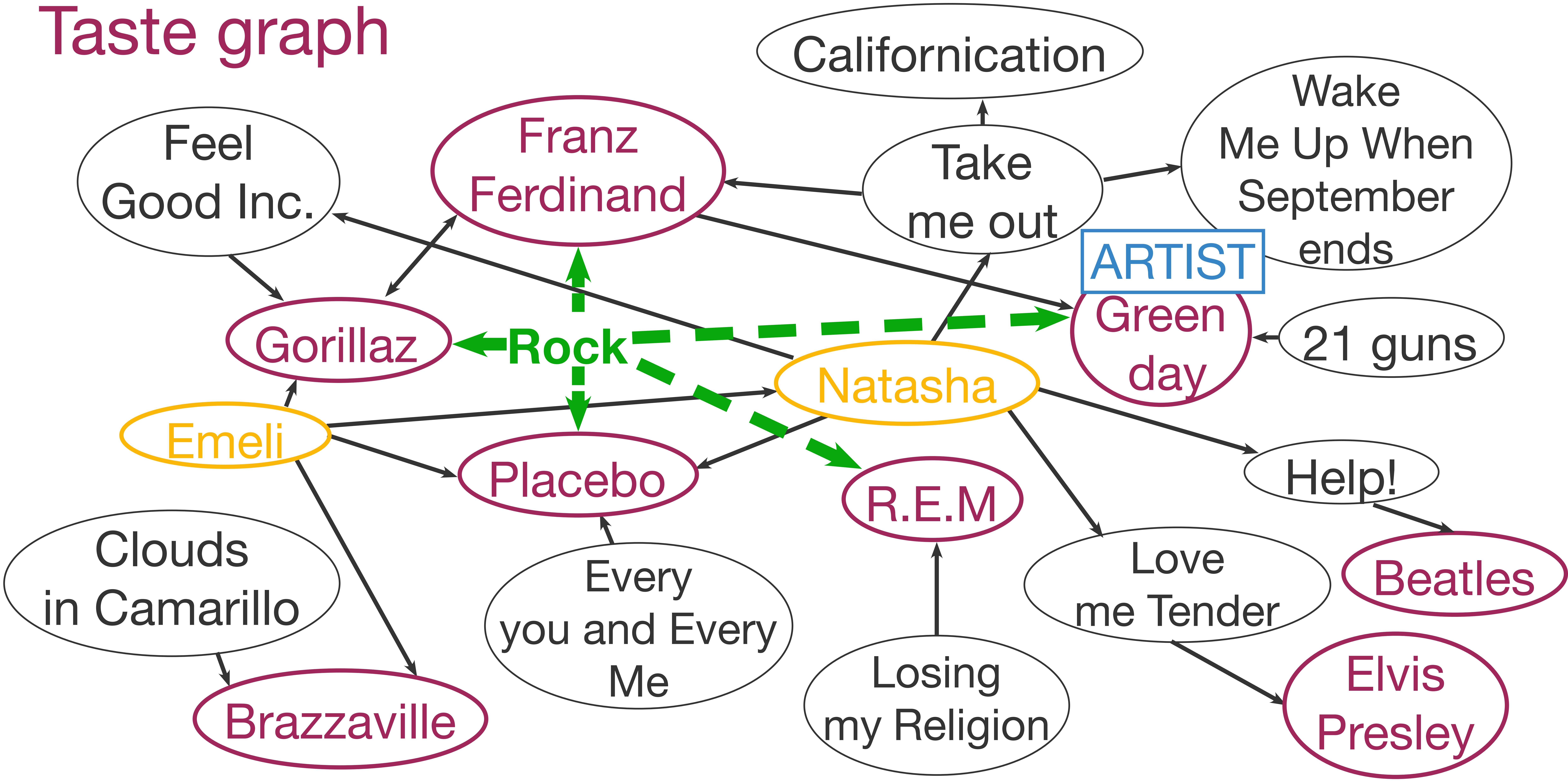

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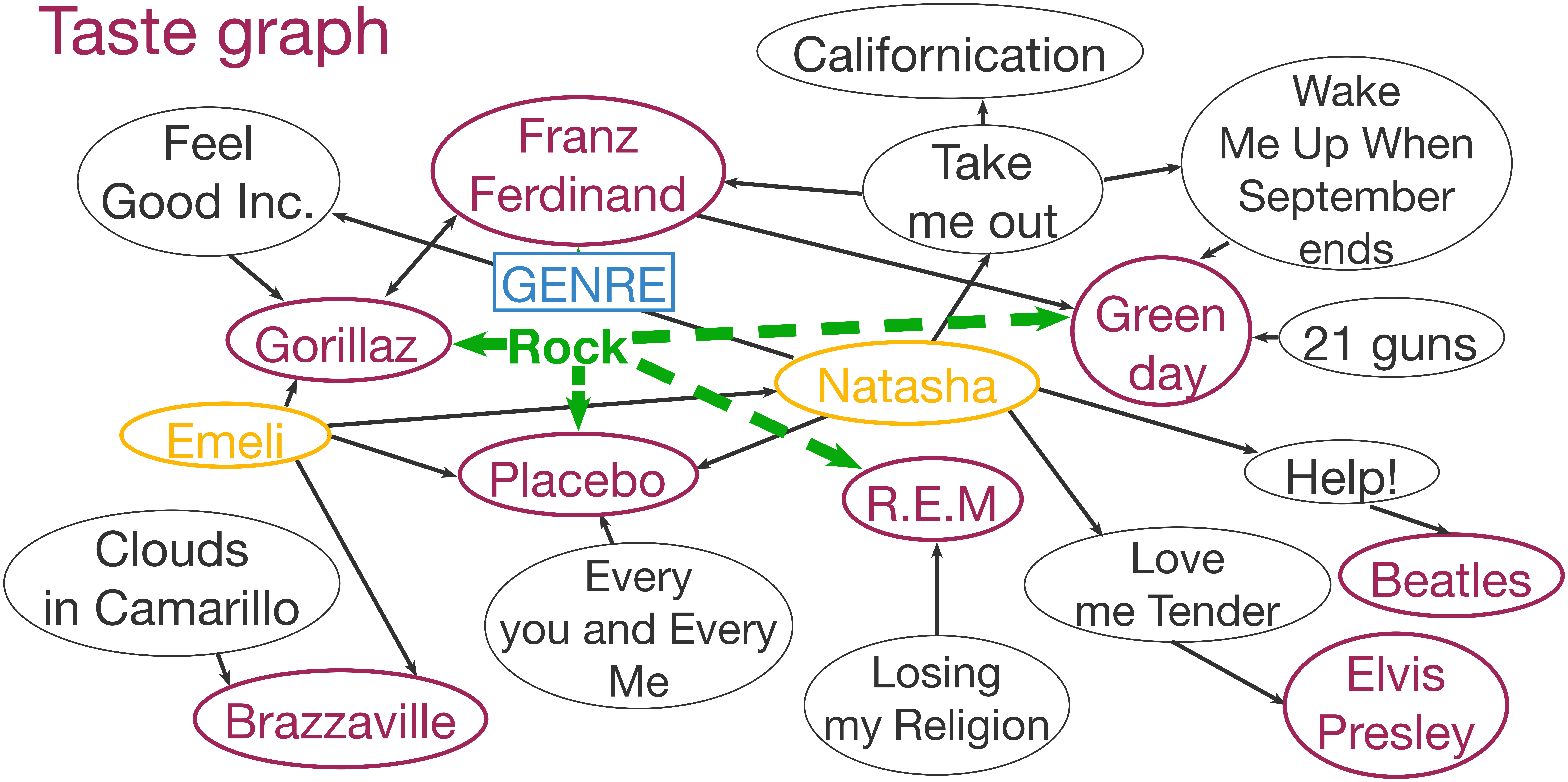
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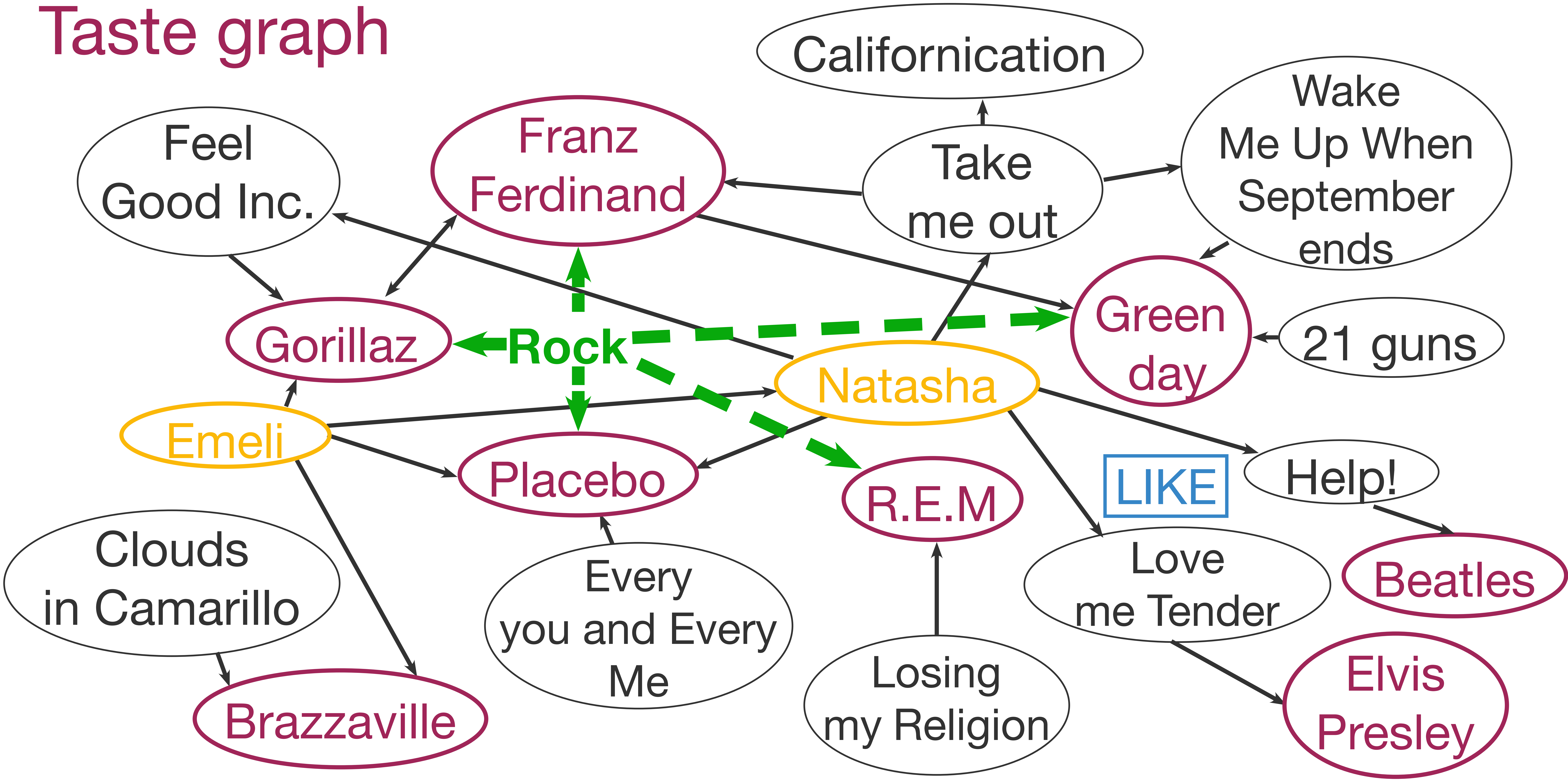
Taste graph



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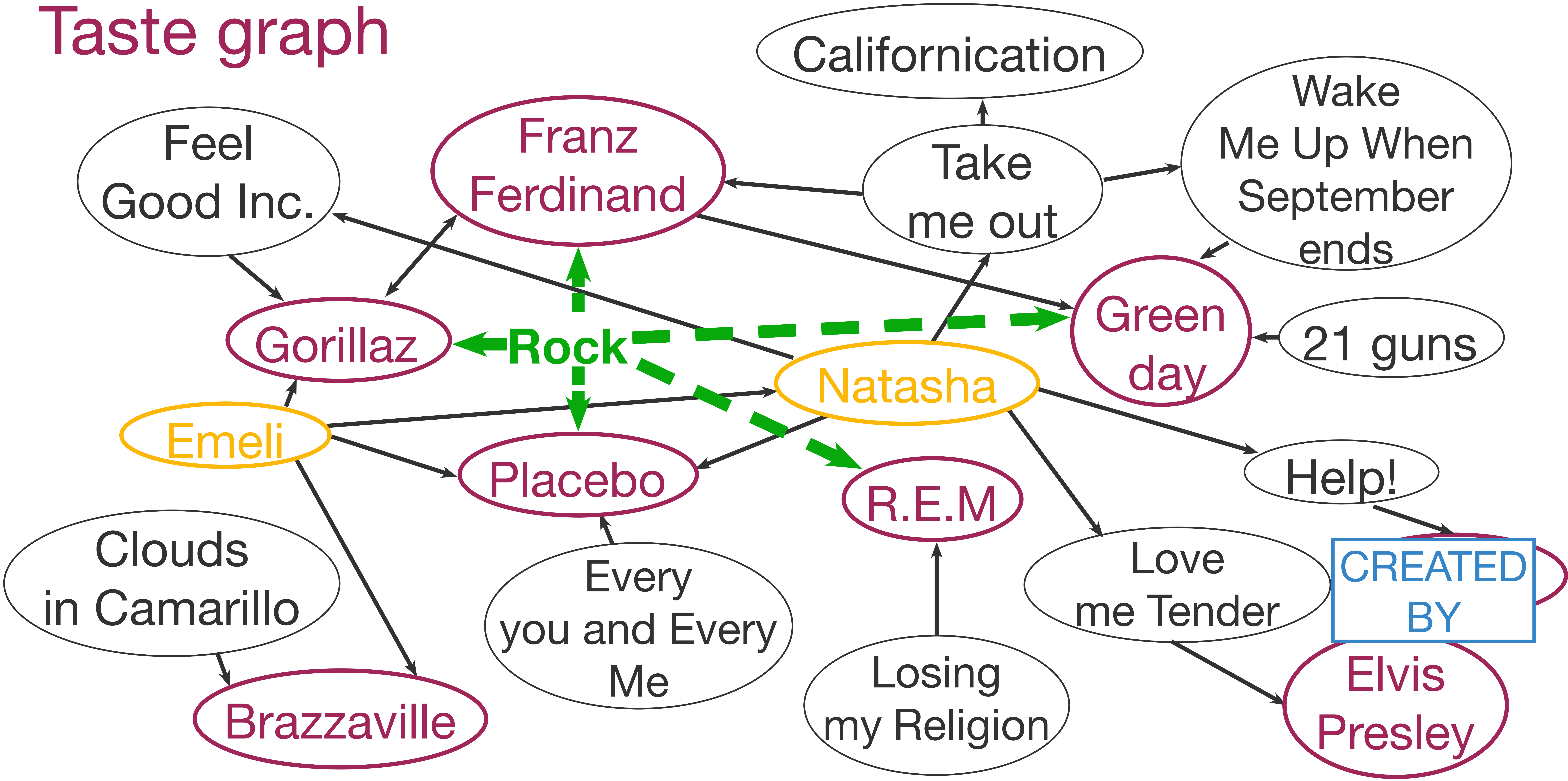

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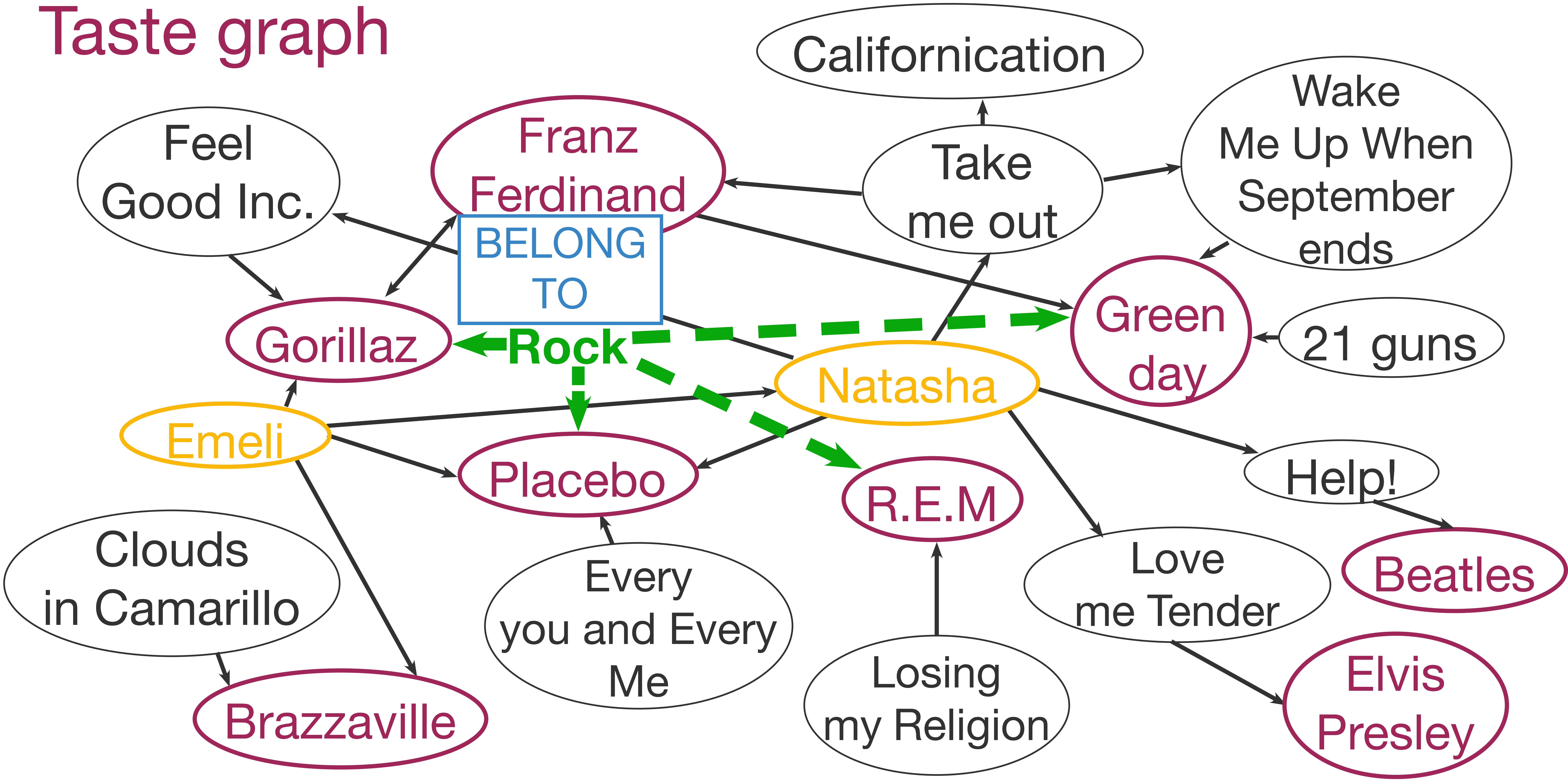
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$\omega : E \to [0, 1]$ weight function matching each edge to its weight

A set of outgoing edges of type $t \; in T_E$ from a vertex $v \in V$ is defined as

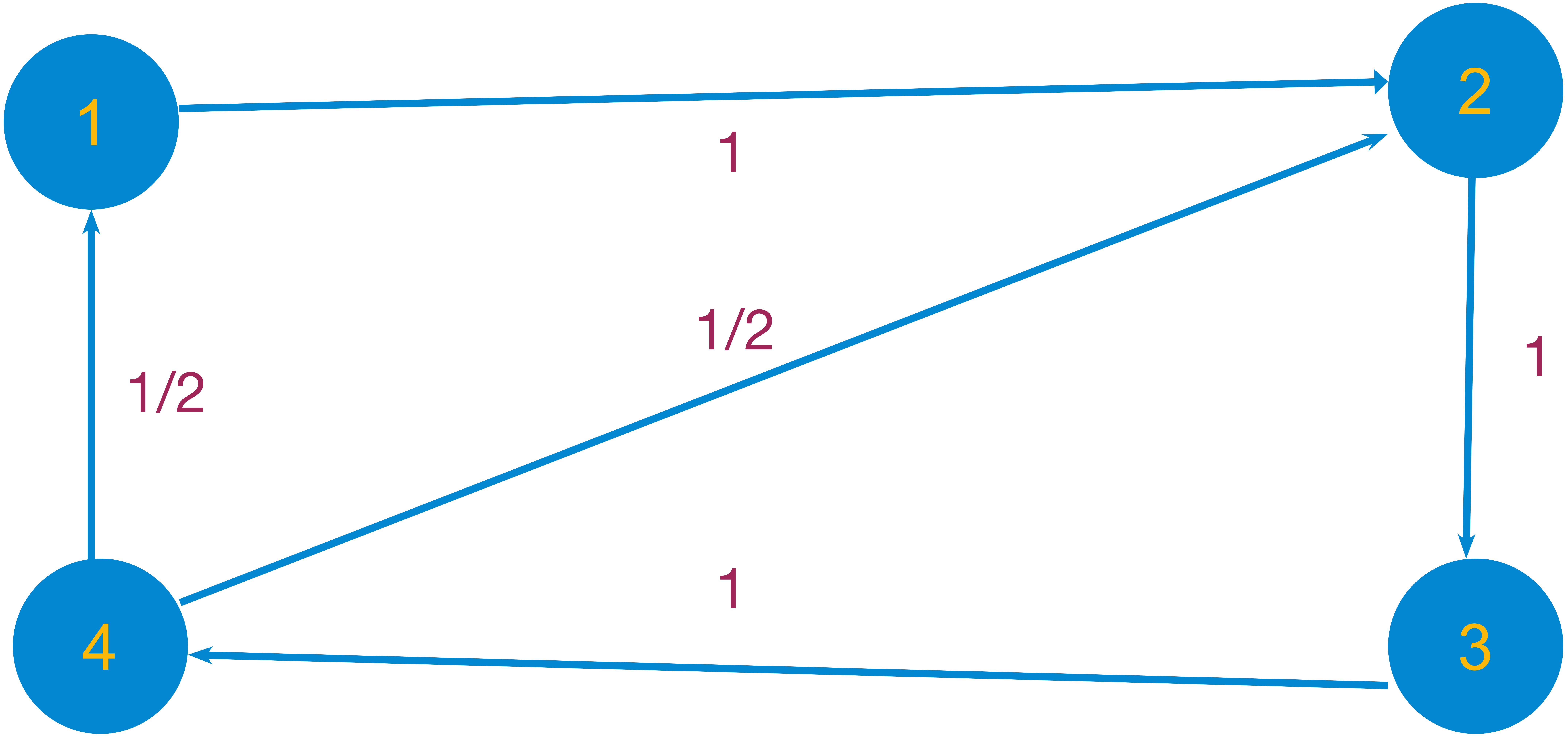
$$out(v, t) = \{e \in E | \tau_e(e) = t \text{ and } \exists v' \in V : R(e) = (v, v')\}$$

Taste graph G must satisfy the condition:

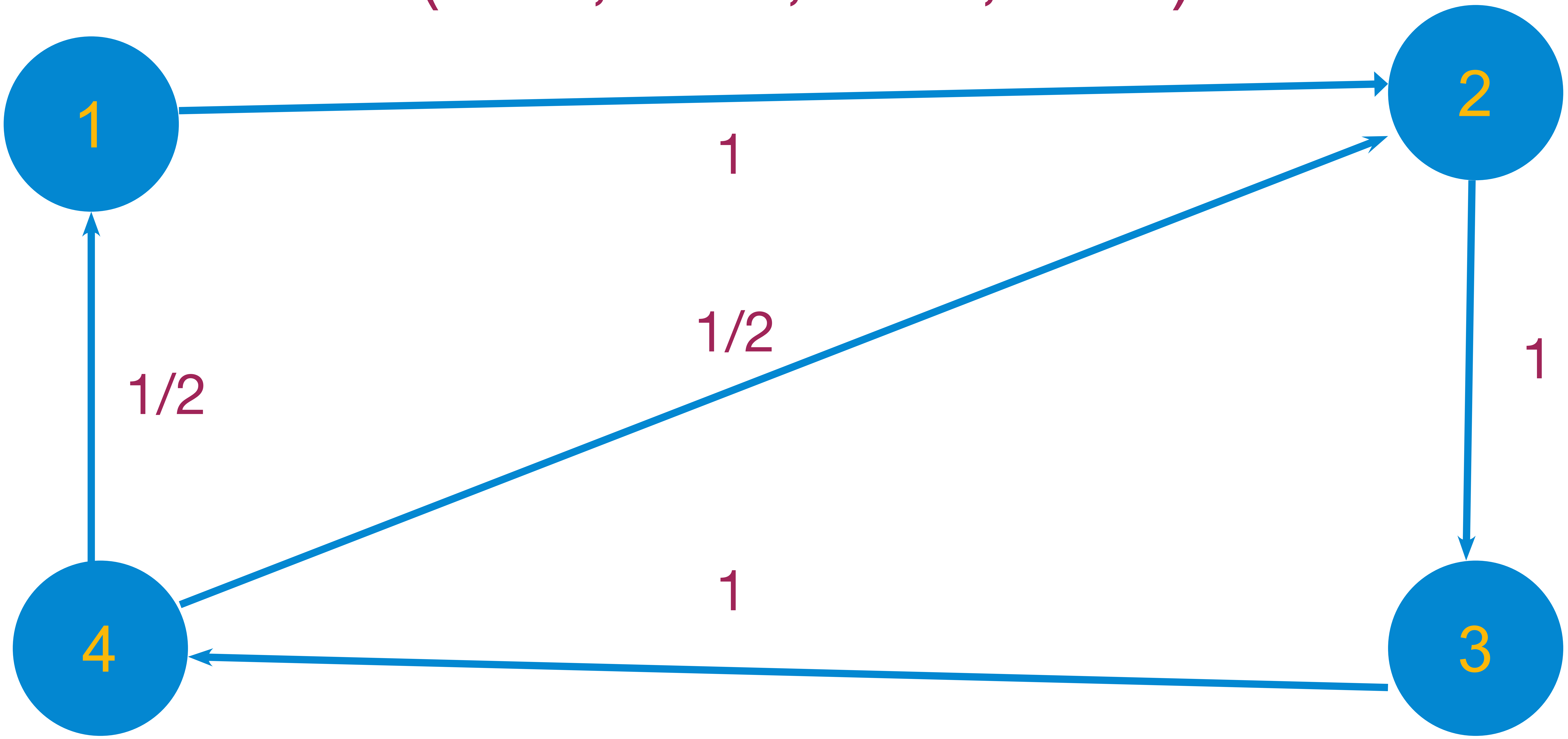
$$\forall v \in V, t \in T_E : \sum_{e \in out(v,t)} \omega(e) = 1$$

Stochastic graph

$$\forall v \in V, t \in T_E : \sum_{e \in out(v,t)} \omega(e) = 1$$



The stationary distribution: (0.25, 0.25, 0.25, 0.25)



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Taste graph G must satisfy the condition:

$$\forall v \in V, t \in T_E : \sum_{e \in out(v,t)} \omega(e) = 1$$

Taste graph G is partly stochastic.

Balancing function $\beta : T_E \to [0,1]$:

$$\forall t_v \in T_V : \sum_{t_e \in T_E} \beta(t_v, t_e) = 1$$

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Balanced weight function $\omega_\beta : E \to [0, 1]$:

$$w_\beta(e) = w(e) * \beta\left(\tau_V(\mathit{first}(R(e))), \tau_e(e)\right)$$

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Balanced weight function $\omega_\beta : E \to [0,1]$:

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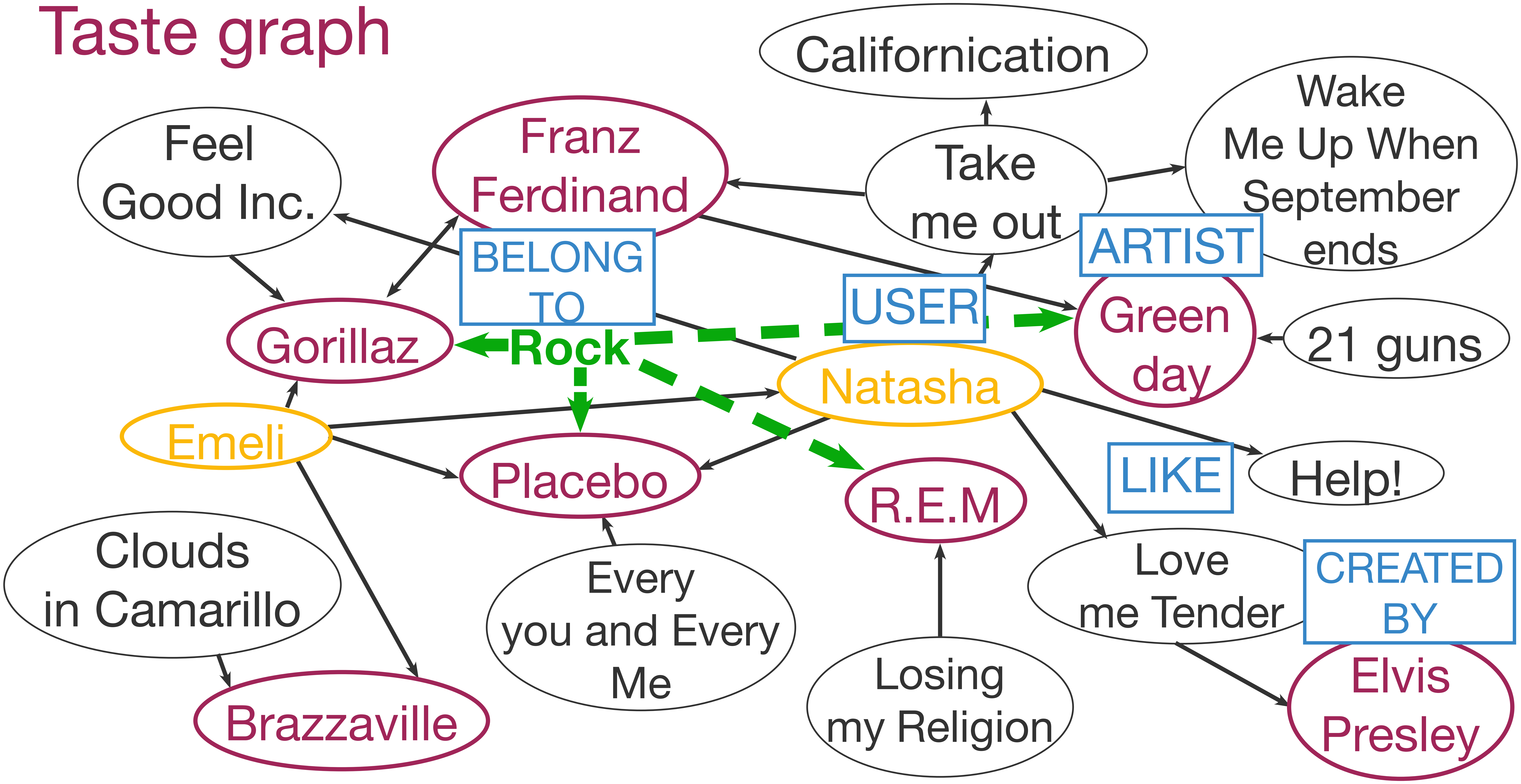
Under weight function β graph G is stochastic:

$$\forall v \in V : \sum_{t_e \in T_E, e \in out(v, t_e)} \omega_\beta(e) = 1$$

Taste graph



Californication
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Feel Good Inc.
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Take me out
ARTIST
BELONG TO
USER
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Placebo
R.E.M
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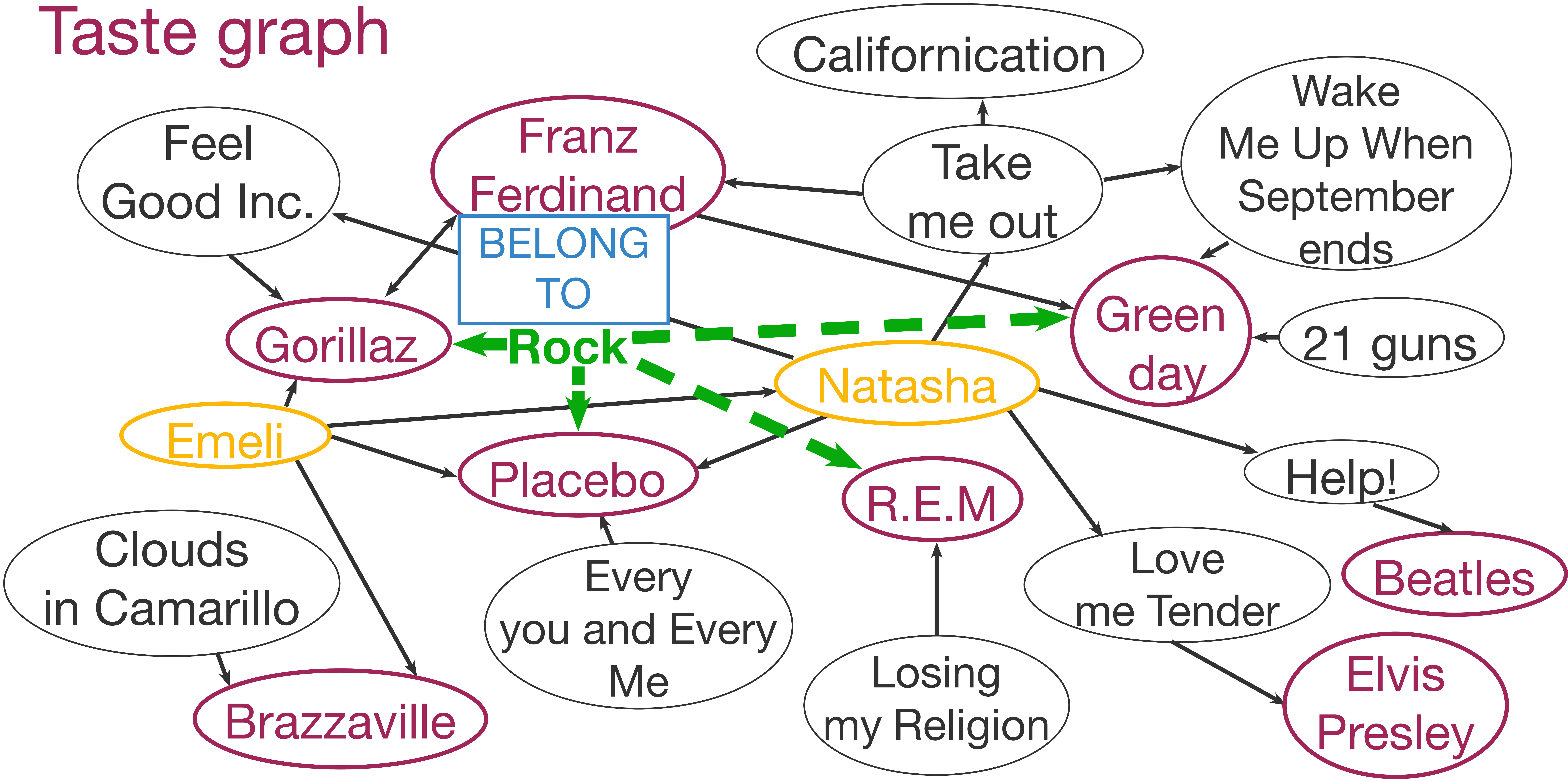
Love me Tender
CREATED BY
Elvis Presley
Losing my Religion
Brazzaville

- Different parts of the taste graph should be constructed independently and then combined together

Taste graph



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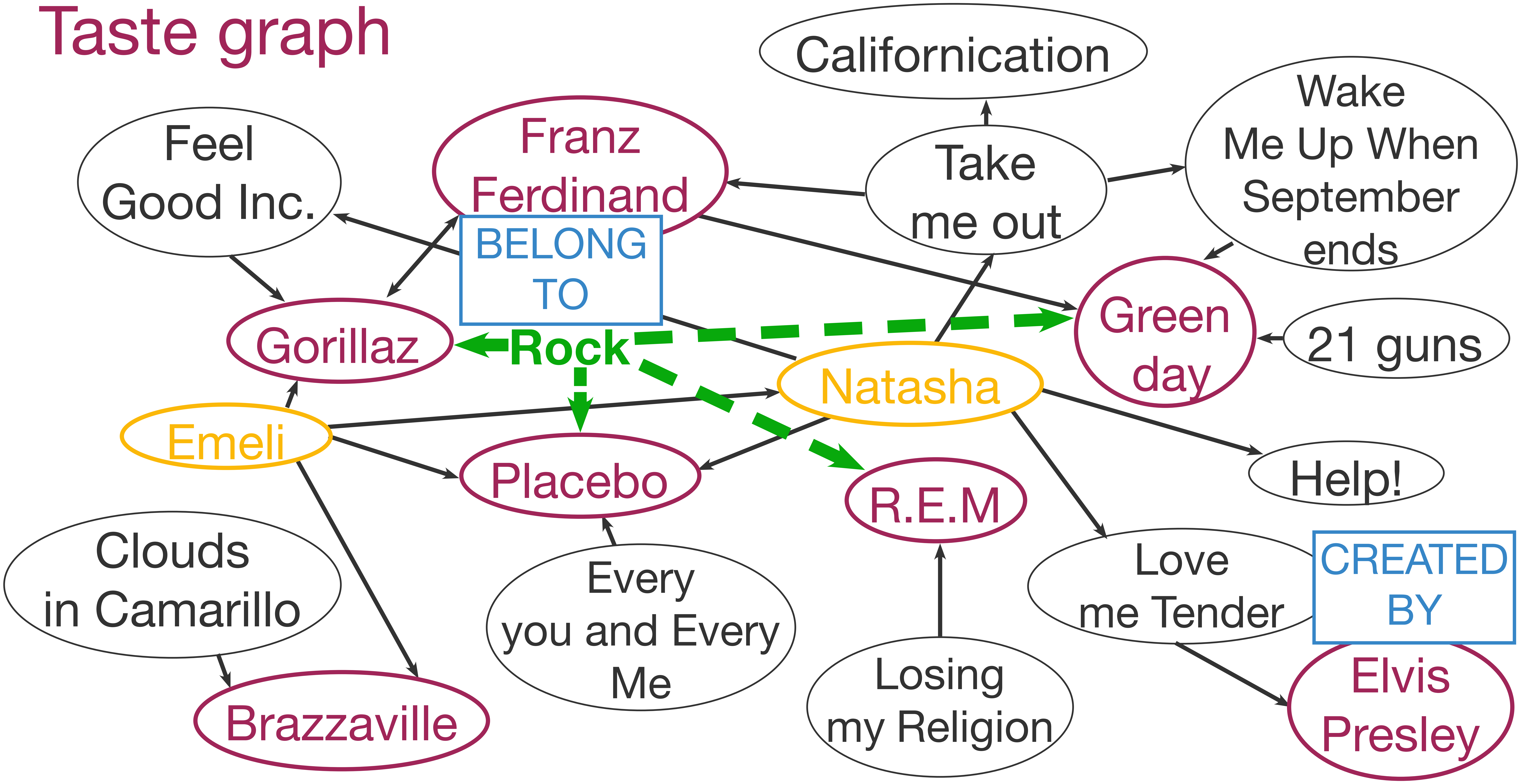

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Losing my Religion
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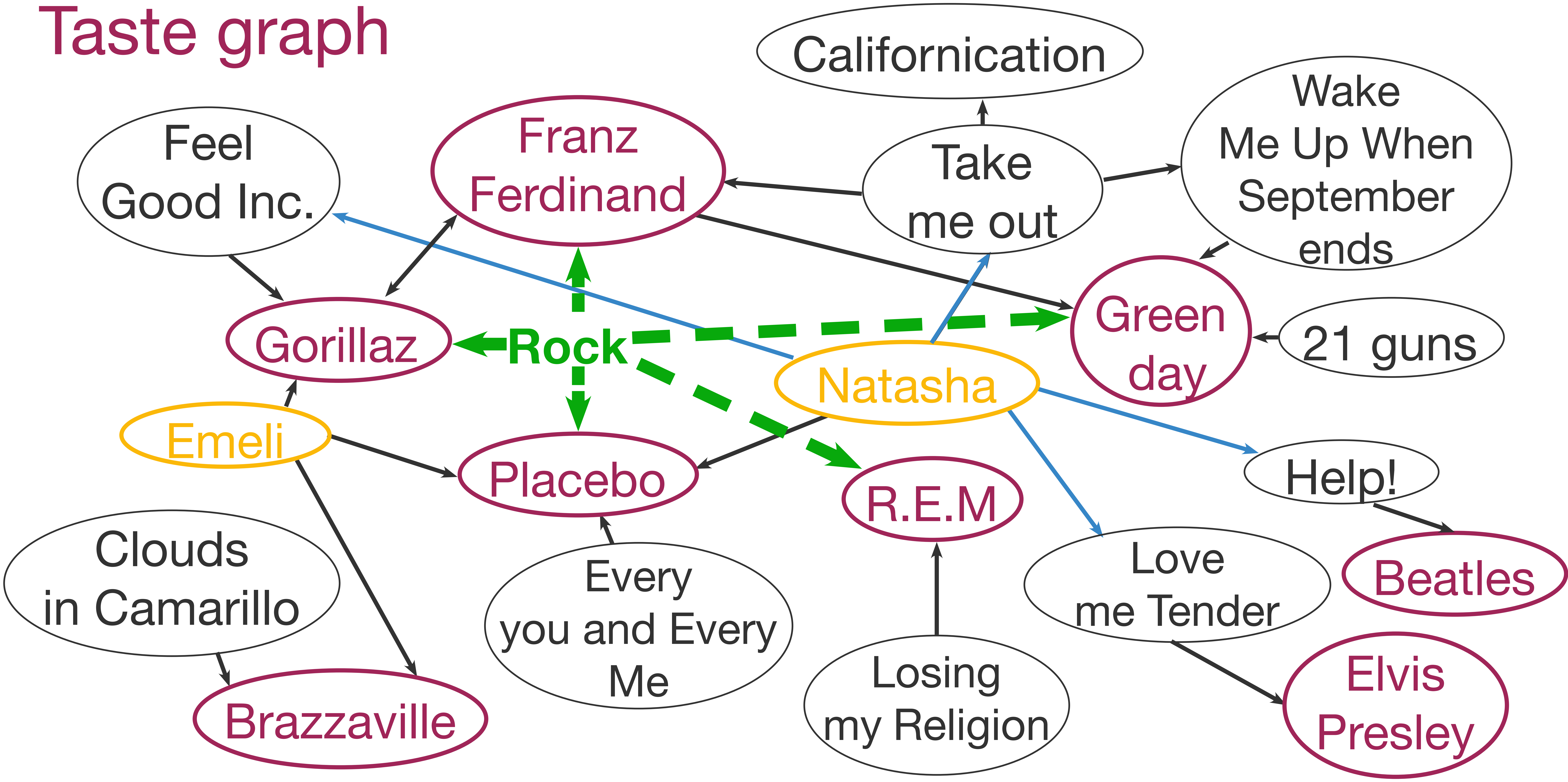
- Different parts of the taste graph to be constructed independently and then combined
- Different parts of the graph can be updated at a different frequency, depending on the natural dynamics of the part

Balancing function $\beta : T_E \to [0, 1]$:

$$\forall t_v \in T_V : \sum_{t_e \in T_E} \beta(t_v, t_e) = 1$$

- increasing the weight of user–track links we increase the impact of collaborative recommendations

Taste graph



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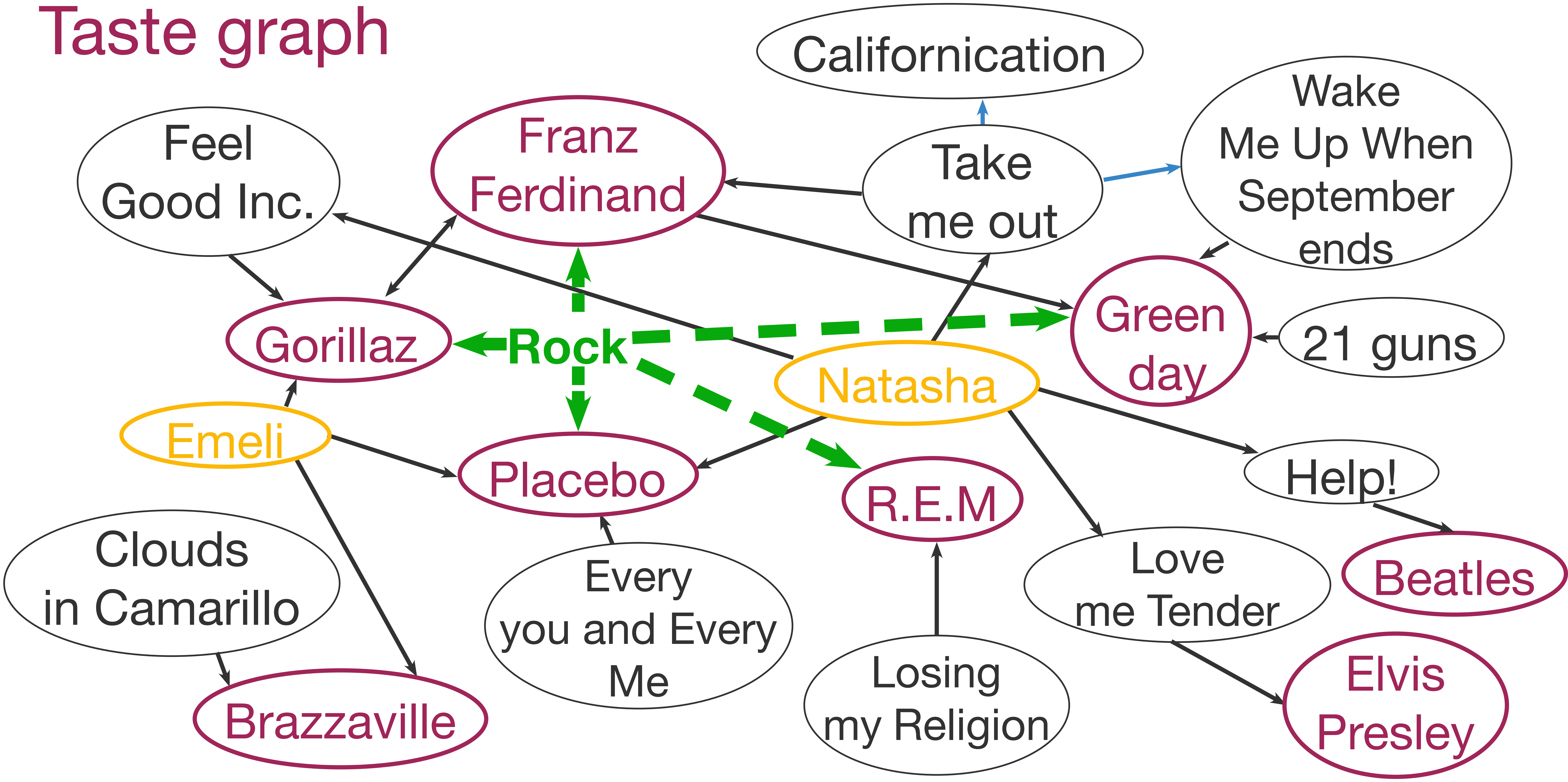

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- increasing the weight of user–track links we increase the impact of collaborative recommendations
- decreasing the impact of social recommendations.

$$\langle V, \theta, T_V, \tau_V, E, T_E, \tau_E, R, \omega \rangle \text{ - taste graph}$$

V - vetrices

$\boxed{\theta \in V \text{ - zero balancing vertex}}$

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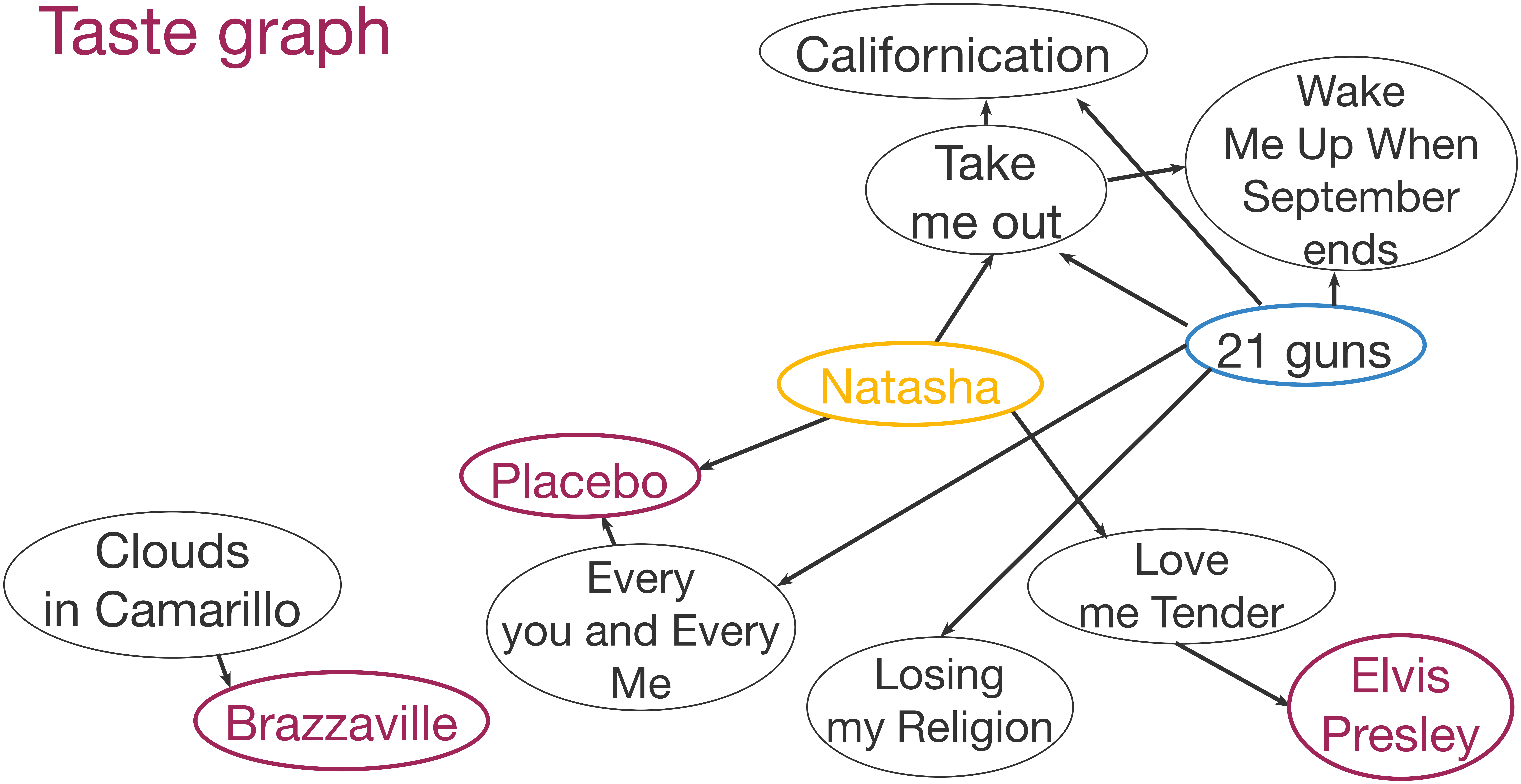

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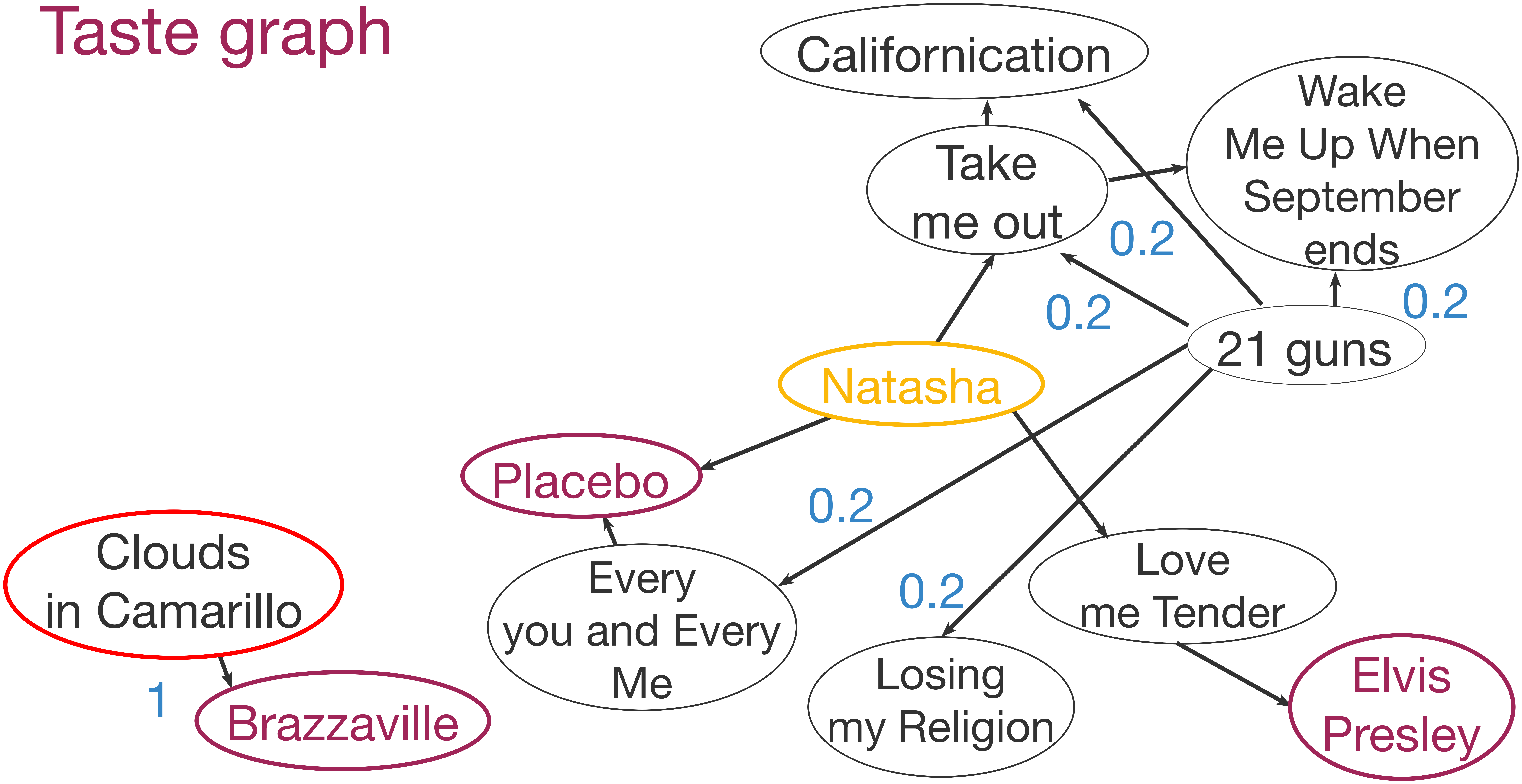
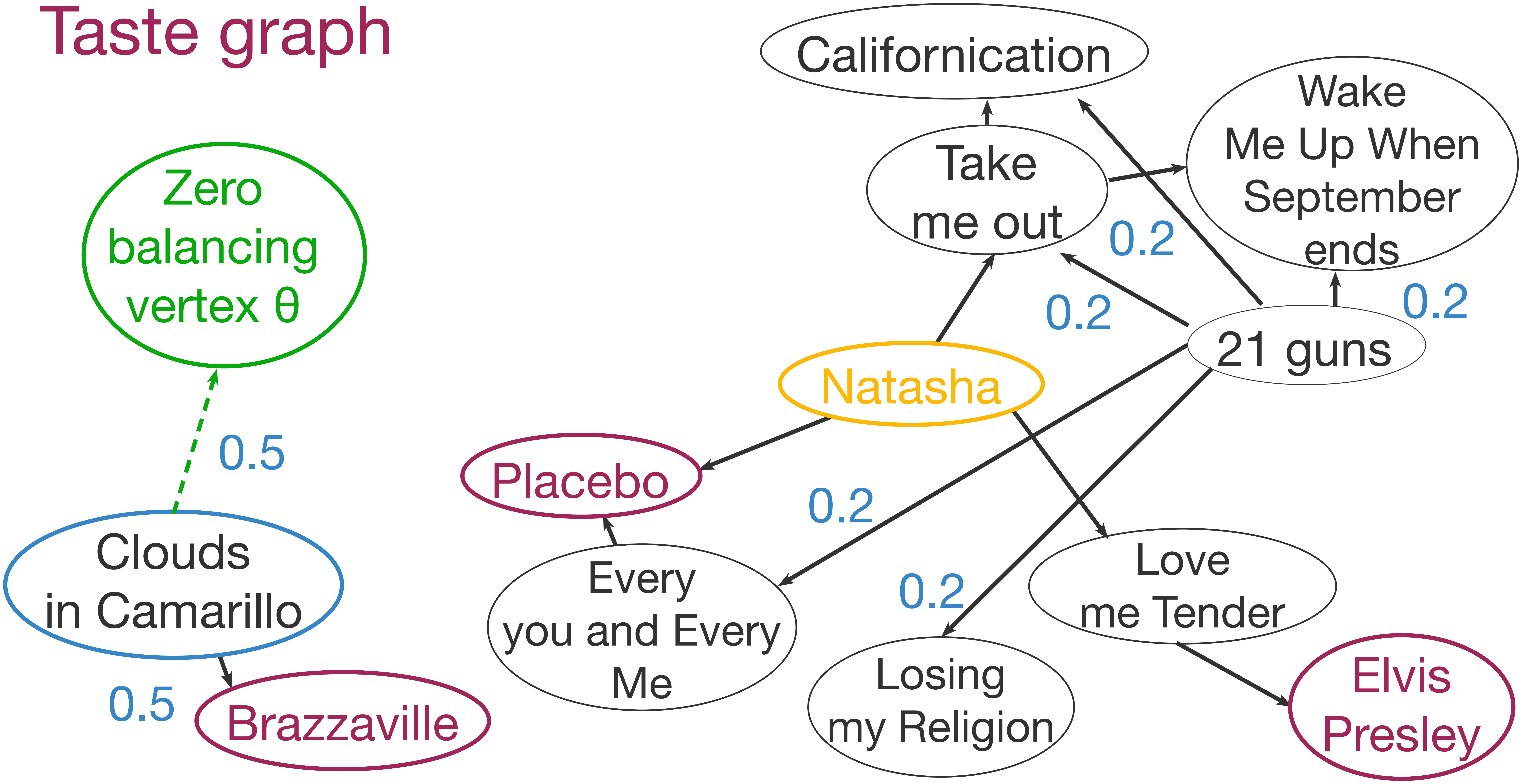


Californication
Take me out
Wake Me Up When September ends
0.2
0.2
0.2
21 guns
Natasha
Placebo
0.2
Clouds in Camarillo
Every you and Every Me
0.2
Love me Tender
Losing my Religion
1
Brazzaville
Elvis Presley

Taste graph



Californication
Wake Me Up When September ends
Take me out
0.2
0.2
0.2
21 guns
Zero balancing vertex θ
Natasha
0.5
Placebo
0.2
Clouds in Camarillo
Every you and Every Me
0.2
Love me Tender
Losing my Religion
0.5
Brazzaville
Elvis Presley

Summary

- you can answer the question: “What parts does the taste graph consist of?”