Tema AI 13

Tuesday, January 10, 2023 11:35 PM

$P(G_\Delta \mid O_\Delta, A_\Delta) = ?$

var. ascunse – F, X

$$P(G_\Delta \mid O_\Delta, A_\Delta) = \alpha \cdot \sum_f \sum_x P(G_\Delta, A_\Delta, f, O_\Delta, x) =$$

$$= \alpha \cdot \sum_f \sum_x P(G_\Delta) \cdot P(A_\Delta) \cdot P(f \mid G_\Delta, A_\Delta) \cdot P(O_\Delta \mid f) \cdot P(x \mid f)$$

$$= \alpha P(G_\Delta) P(A_\Delta) \Big[P(F_\Delta \mid G_\Delta, A_\Delta) \cdot P(O_\Delta \mid F_\Delta) \cdot P(X_\Delta \mid F_\Delta) +$$
$$P(F_N \mid G_\Delta, A_\Delta) \cdot P(O_\Delta \mid F_N) \cdot P(X_\Delta \mid F_N) +$$
$$P(F_\Delta \mid G_\Delta, A_\Delta) \cdot P(O_\Delta \mid F_\Delta) \cdot P(X_N \mid F_\Delta) +$$
$$P(F_N \mid G_\Delta, A_\Delta) \cdot P(O_\Delta \mid F_N) \cdot P(X_N \mid F_N) \Big]$$

$$= \alpha \cdot 0{,}1 \cdot 0{,}05 \Big[\underbrace{0{,}8 \cdot 0{,}6 \cdot 0{,}5}_{30} + \frac{240}{1000} = 0{,}24$$
$$0{,}2 \cdot 0{,}2 \cdot 0{,}1 + \frac{6}{1000} = 0{,}006 \Big) 0{,}48$$
$$0{,}8 \cdot 0{,}6 \cdot 0{,}5 = 0{,}24$$
$$0{,}2 \cdot 0{,}2 \cdot 0{,}9 \Big] = \frac{36}{1000} = 0{,}036$$

$$= \alpha \cdot 0{,}005 \qquad 0{,}52 \qquad 0{,}04$$

$$= \boxed{0{,}0026\alpha}$$

$$P(G_N \mid O_\Delta, A_\Delta) = \alpha \cdot \sum_f \sum_x P(G_N, A_\Delta, f, O_\Delta, x) =$$

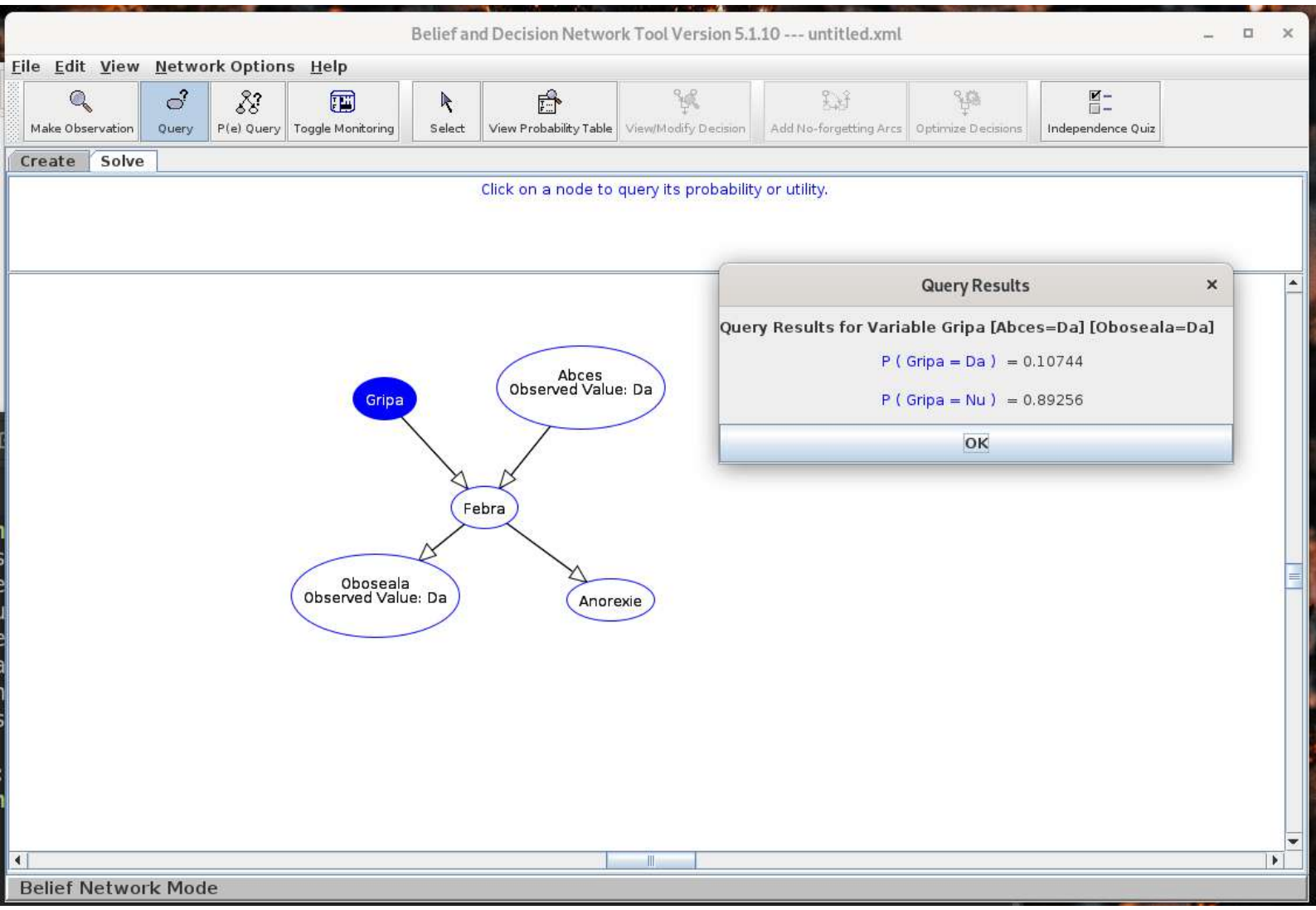
$$= \alpha \cdot \sum_f \sum_x P(G_N) \cdot P(A_\Delta) \cdot P(f \mid G, A_\Delta) \cdot P(O_\Delta \mid f) \cdot P(x \mid f)$$

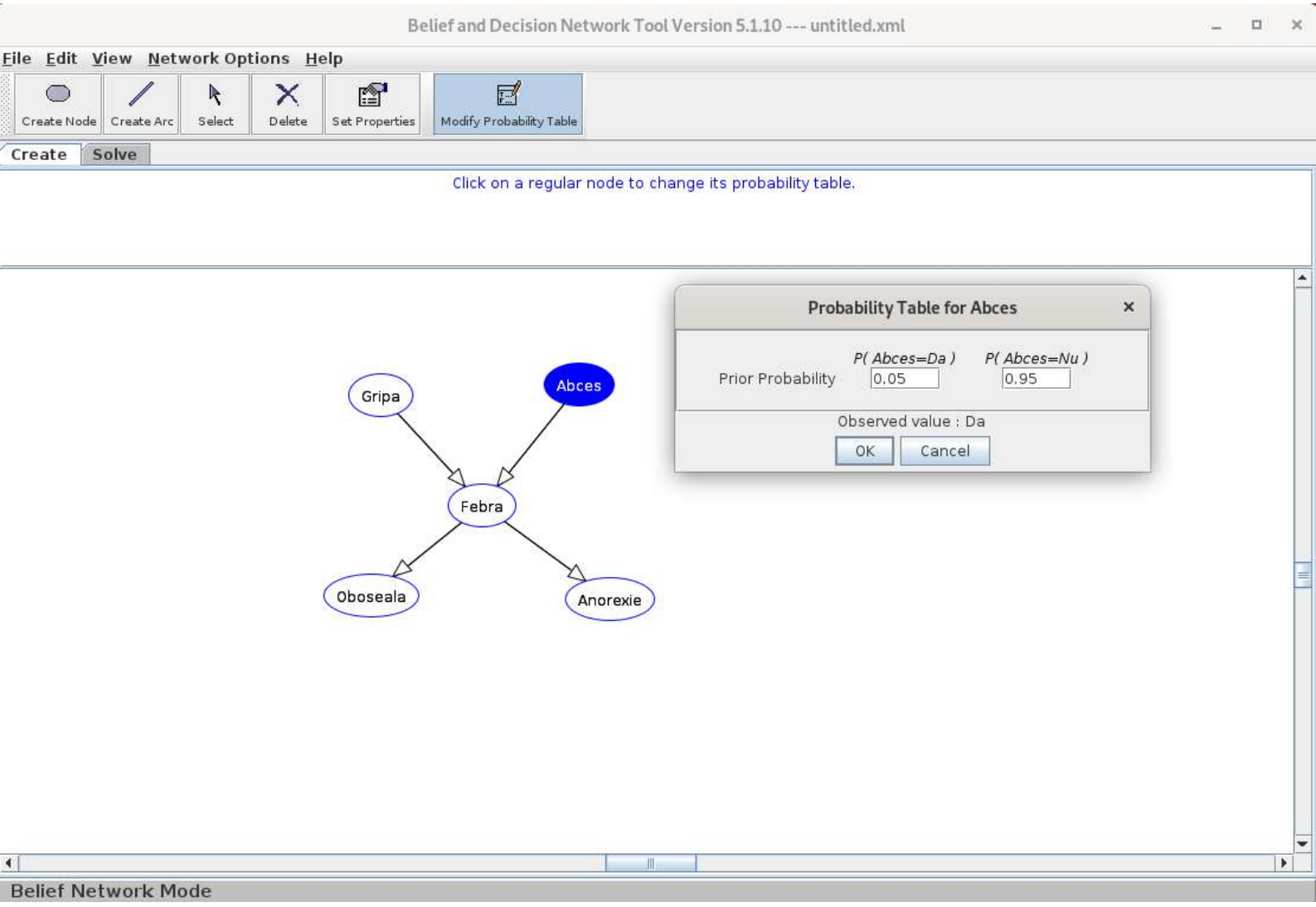
$$= \alpha P(G_N) P(A_\Delta) \Big[P(F_\Delta \mid G_N, A_\Delta) \cdot P(O_\Delta \mid F_\Delta) \cdot P(X_\Delta \mid F_\Delta) +$$
$$P(F_N \mid G_N, A_\Delta) \cdot P(O_\Delta \mid F_N) \cdot P(X_\Delta \mid F_N) +$$
$$P(F_\Delta \mid G_N, A_\Delta) \cdot P(O_\Delta \mid F_\Delta) \cdot P(X_N \mid F_\Delta) +$$
$$P(F_N \mid G_N, A_\Delta) \cdot P(O_\Delta \mid F_N) \cdot P(X_N \mid F_N) \Big]$$

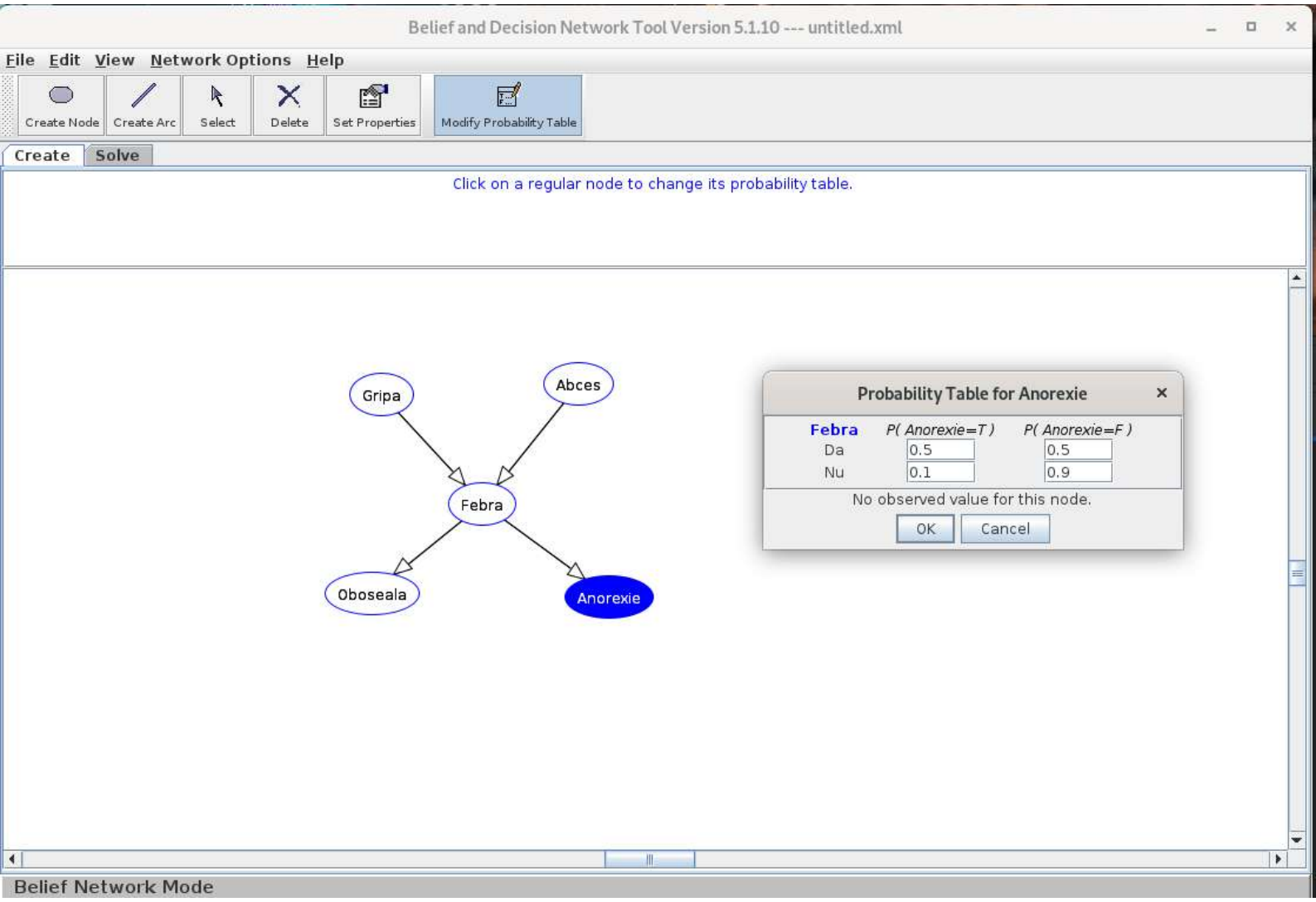
$$= \alpha \cdot 0{,}9 \cdot 0{,}05 \Big(\underbrace{0{,}25 \cdot 0{,}6 \cdot 0{,}5}_{150} \quad \frac{75}{1000} = 0{,}075 \quad 0{,}15$$
$$0{,}75 \cdot 0{,}2 \cdot 0{,}1 = \frac{150}{1000} = 0{,}015$$
$$0{,}25 \cdot 0{,}6 \cdot 0{,}5 = 0{,}075 \quad 0{,}13$$
$$\underbrace{0{,}75 \cdot 0{,}2 \cdot 0{,}9}_{150} \Big) = \frac{135}{1000} = 0{,}135 \quad 0{,}15$$

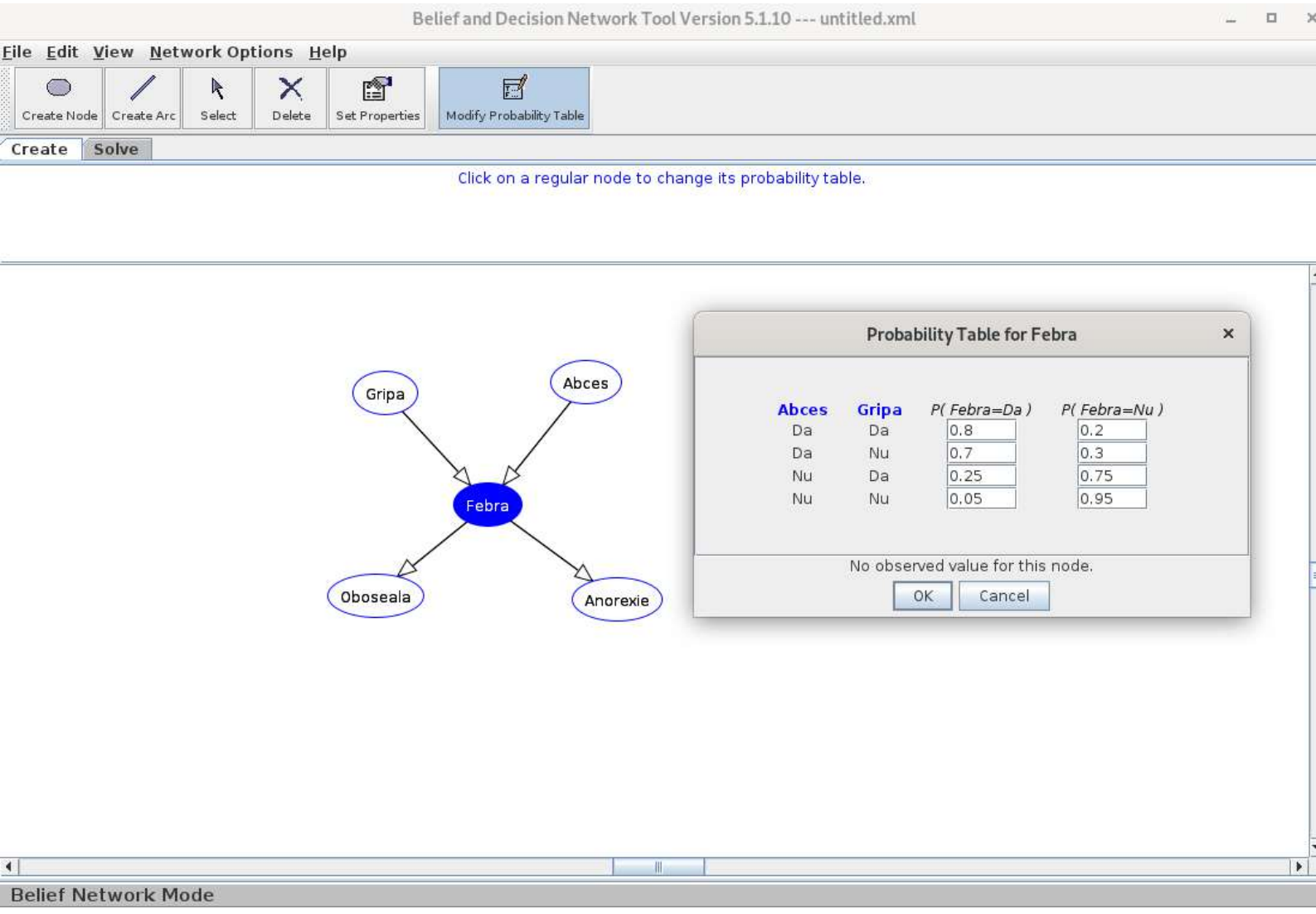
$$= 0{,}0045\alpha \cdot 0{,}13 = 0{,}00135\alpha$$

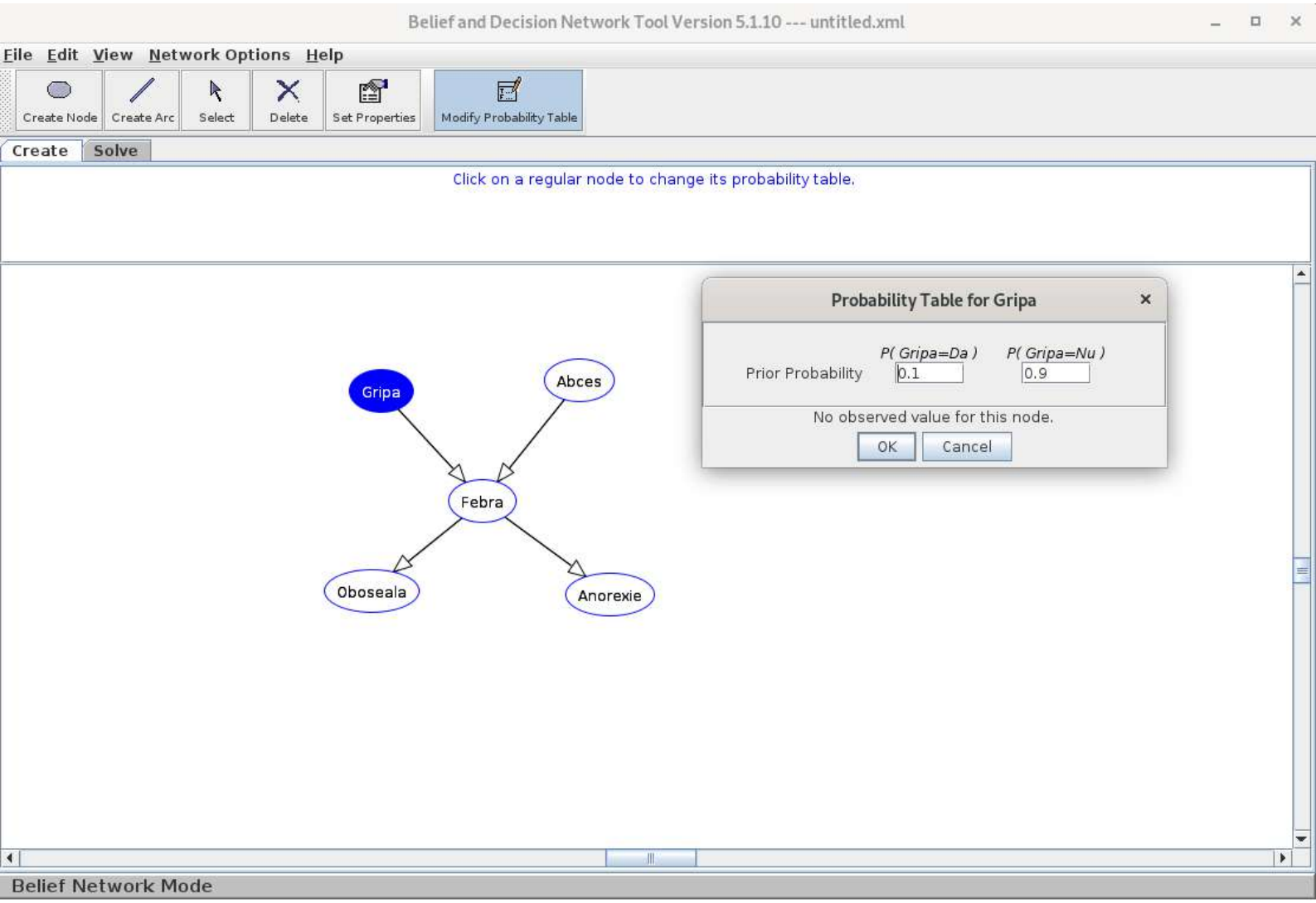
$$P_{final} = \frac{0{,}0026\alpha}{0{,}0026\alpha + 0{,}00135\alpha} = \frac{0{,}0026}{0{,}00161\alpha} \approx 0{,}1614$$

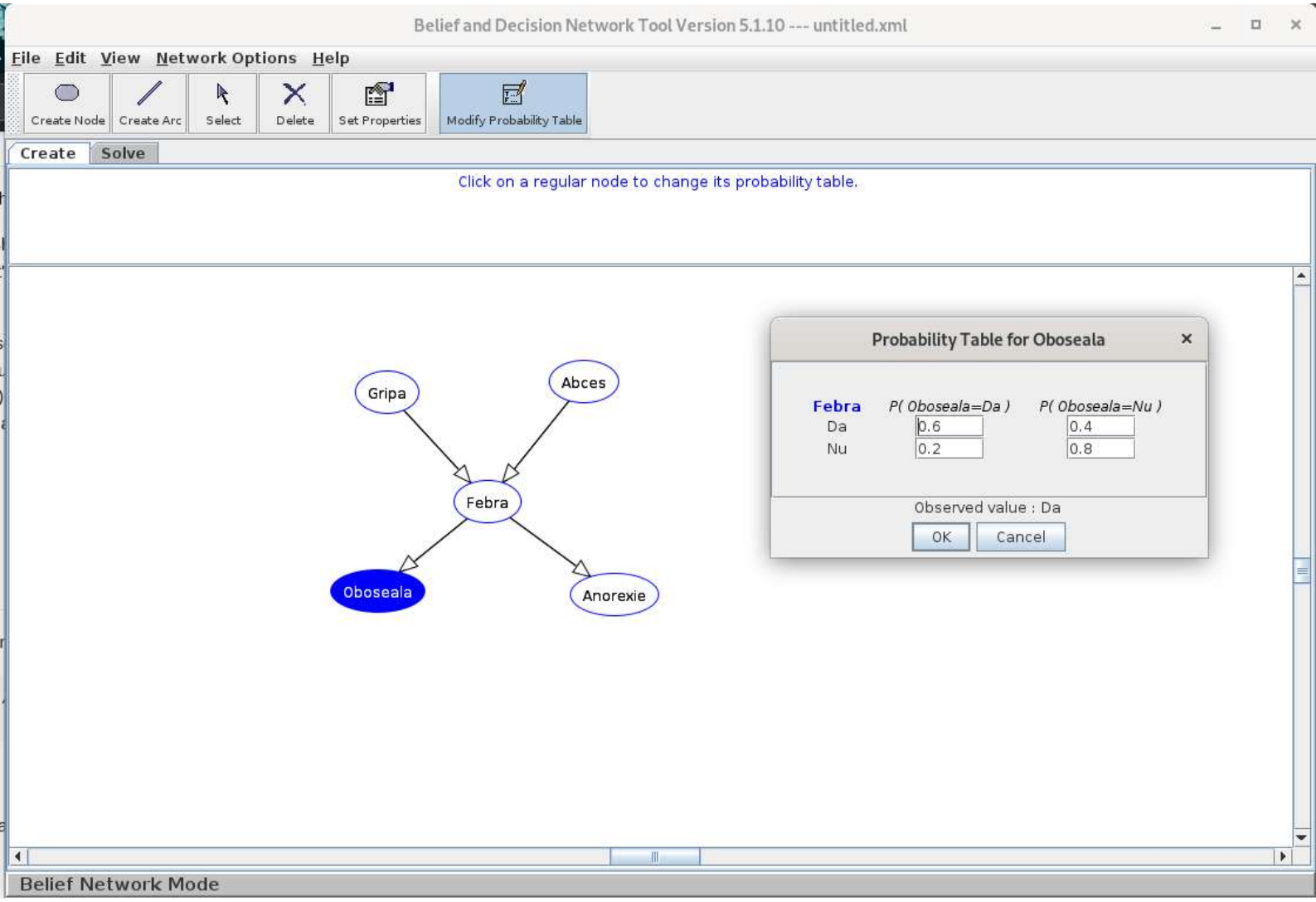

Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Make Observation
Query
P(e) Query
Toggle Monitoring
Select
View Probability Table
View/Modify Decision
Add No-forgetting Arcs
Optimize Decisions
Independence Quiz
Create
Solve
Click on a node to query its probability or utility.
Gripa
Abces
Observed Value: Da
Febra
Oboseala
Observed Value: Da
Anorexie
Query Results
Query Results for Variable Gripa [Abces=Da] [Oboseala=Da]
P (Gripa = Da) = 0.10744
P (Gripa = Nu) = 0.89256
OK
Belief Network Mode

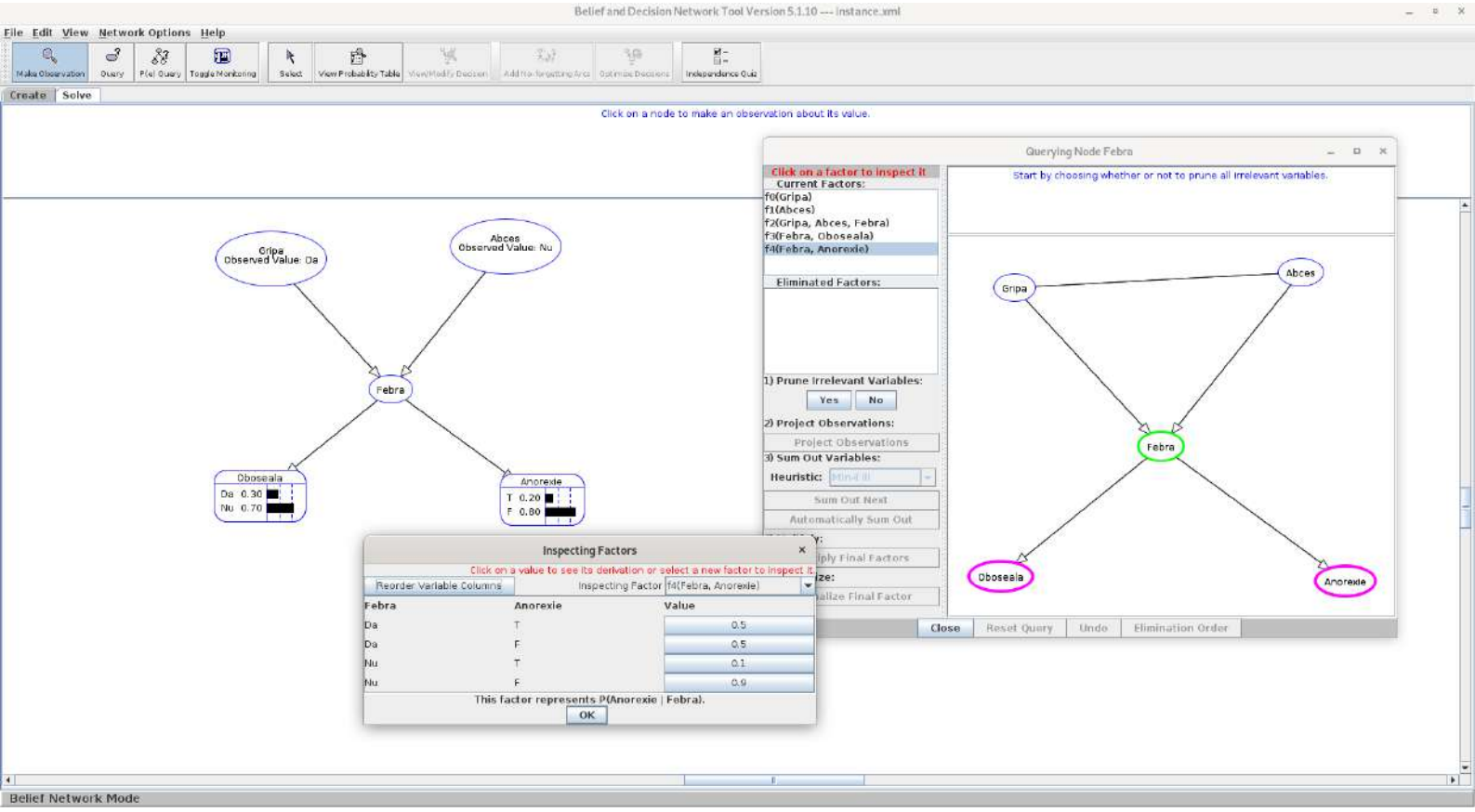

Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Create Node
Create Arc
Select
Delete
Set Properties
Modify Probability Table
Create
Solve
Click on a regular node to change its probability table.
Gripa
Abces
Febra
Oboseala
Anorexie
Probability Table for Abces
P(Abces=Da)
P(Abces=Nu)
Prior Probability
0.05
0.95
Observed value : Da
OK
Cancel
Belief Network Mode

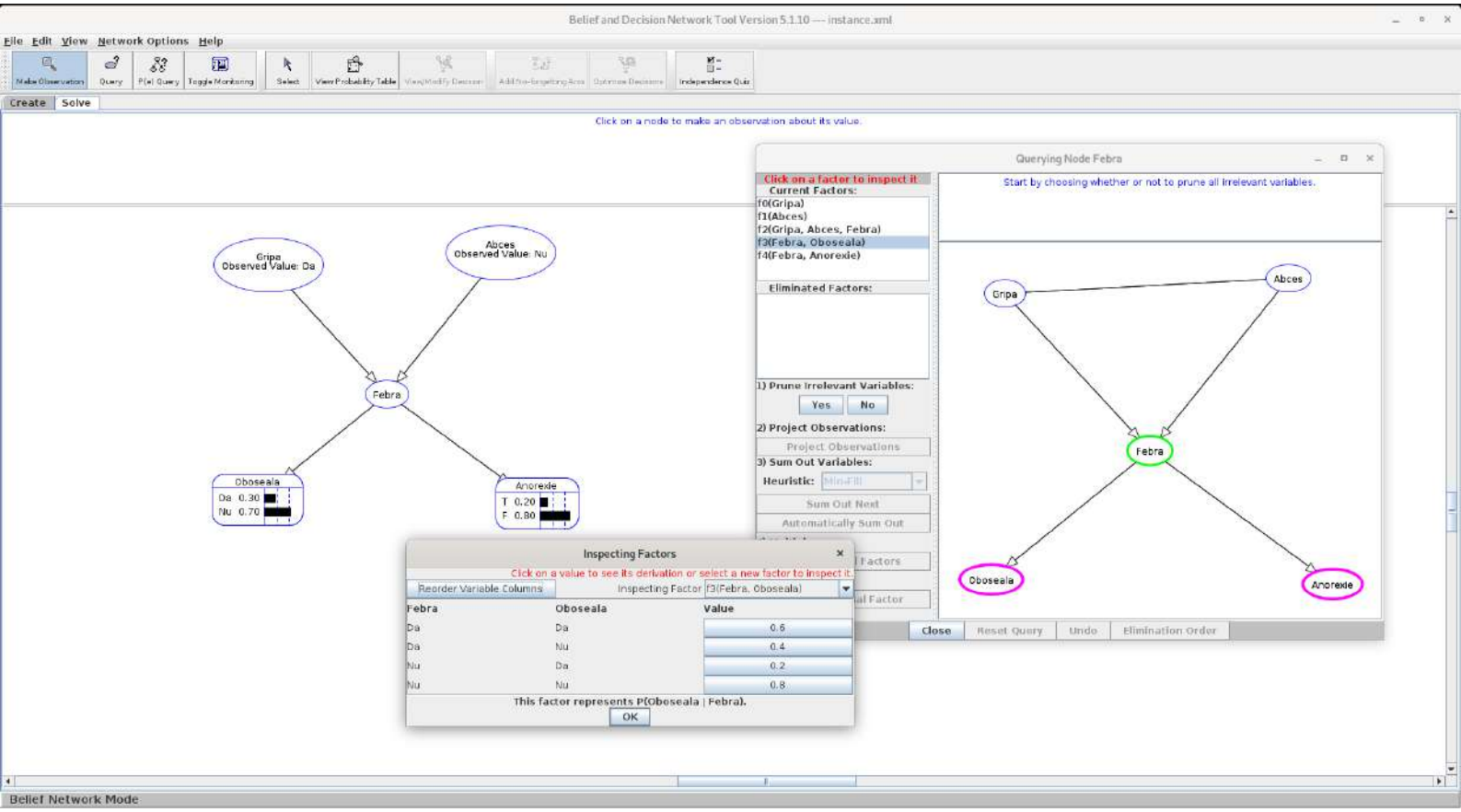

Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Create Node
Create Arc
Select
Delete
Set Properties
Modify Probability Table
Create
Solve
Click on a regular node to change its probability table.
Gripa
Abces
Febra
Oboseala
Anorexie
Probability Table for Anorexie
Febra
P(Anorexie=T)
P(Anorexie=F)
Da
0.5
0.5
Nu
0.1
0.9
No observed value for this node.
OK
Cancel
Belief Network Mode

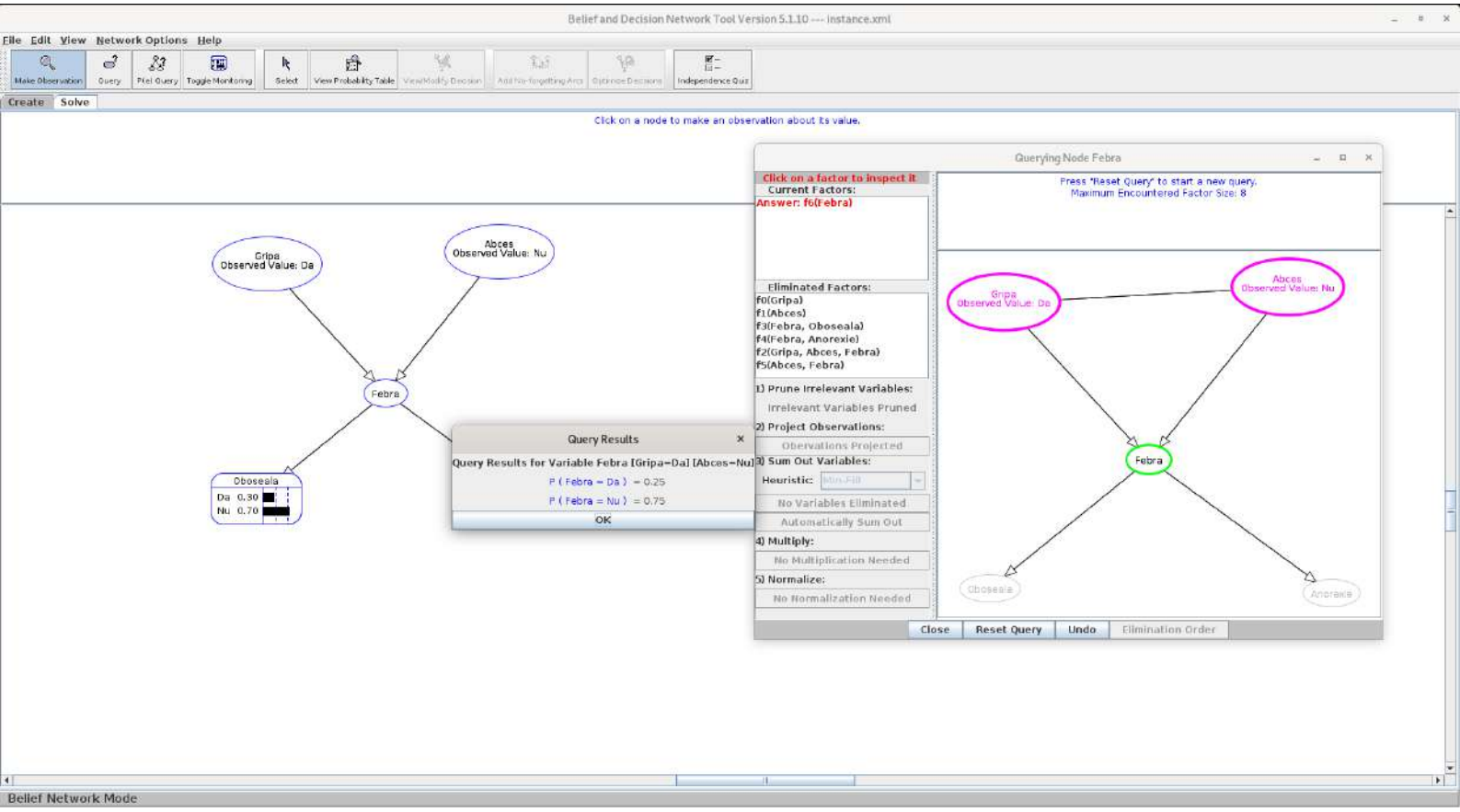

Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Create Node
Create Arc
Select
Delete
Set Properties
Modify Probability Table
Create
Solve
Click on a regular node to change its probability table.
Gripa
Abces
Febra
Oboseala
Anorexie
Probability Table for Febra
Abces
Gripa
P(Febra=Da)
P(Febra=Nu)
Da Da 0.8 0.2
Da Nu 0.7 0.3
Nu Da 0.25 0.75
Nu Nu 0.05 0.95
No observed value for this node.
OK
Cancel
Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Create Node
Create Arc
Select
Delete
Set Properties
Modify Probability Table
Create
Solve
Click on a regular node to change its probability table.
Gripa
Abces
Febra
Oboseala
Anorexie
Probability Table for Gripa
P(Gripa=Da)
P(Gripa=Nu)
Prior Probability
0.1
0.9
No observed value for this node.
OK
Cancel
Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- untitled.xml
File Edit View Network Options Help
Create Node
Create Arc
Select
Delete
Set Properties
Modify Probability Table
Create
Solve
Click on a regular node to change its probability table.
Gripa
Abces
Febra
Oboseala
Anorexie
Probability Table for Oboseala
Febra
P(Oboseala=Da)
P(Oboseala=Nu)
Da
0.6
0.4
Nu
0.2
0.8
Observed value : Da
OK
Cancel
Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- instance.xml
File Edit View Network Options Help
Make Observation
Query
P(e) Query
Toggle Monitoring
Select
View Probability Table
View/Modify Decision
Add No-forgetting Arcs
Optimize Decisions
Independence Quiz
Create
Solve
Click on a node to make an observation about its value.
Gripa
Observed Value: Da
Abces
Observed Value: Nu
Febra
Oboseala
Da 0.30
Nu 0.70
Anorexie
T 0.20
F 0.80
Querying Node Febra
Click on a factor to inspect it
Current Factors:
f0(Gripa)
f1(Abces)
f2(Gripa, Abces, Febra)
f3(Febra, Oboseala)
f4(Febra, Anorexie)
Eliminated Factors:
1) Prune Irrelevant Variables:
Yes
No
2) Project Observations:
Project Observations
3) Sum Out Variables:
Heuristic:
Sum Out Next
Automatically Sum Out
Start by choosing whether or not to prune all irrelevant variables.
Gripa
Abces
Febra
Oboseala
Anorexie
Close
Reset Query
Undo
Elimination Order
Inspecting Factors
Click on a value to see its derivation or select a new factor to inspect it.
Reorder Variable Columns
Inspecting Factor
f4(Febra, Anorexie)
Febra
Anorexie
Value
Da
T
0.5
Da
F
0.5
Nu
T
0.1
Nu
F
0.9
This factor represents P(Anorexie | Febra).
OK
Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- instance.xml
File Edit View Network Options Help
Make Observation
Query
Plot Query
Toggle Monitoring
Select
View Probability Table
View/Modify Decision
Add/Re-target(ing) Arcs
Optimize Decisions
Independence Quiz
Create
Solve
Click on a node to make an observation about its value.
Gripa
Observed Value: Da
Abces
Observed Value: Nu
Febra
Oboseala
Da 0.30
Nu 0.70
Anorexie
T 0.20
F 0.80
Querying Node Febra
Click on a factor to inspect it:
Current Factors:
f0(Gripa)
f1(Abces)
f2(Gripa, Abces, Febra)
f3(Febra, Oboseala)
f4(Febra, Anorexie)
Eliminated Factors:
1) Prune Irrelevant Variables:
Yes
No
2) Project Observations:
Project Observations
3) Sum Out Variables:
Heuristic:
MinFill
Sum Out Next
Automatically Sum Out
Start by choosing whether or not to prune all irrelevant variables.
Gripa
Abces
Febra
Oboseala
Anorexie
Close
Reset Query
Undo
Elimination Order
Inspecting Factors
Click on a value to see its derivation or select a new factor to inspect it.
Reorder Variable Columns
Inspecting Factor
f3(Febra, Oboseala)
Febra
Oboseala
Value
Da
Da
0.6
Da
Nu
0.4
Nu
Da
0.2
Nu
Nu
0.8
This factor represents P(Oboseala | Febra).
OK
Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- instance.xml
File Edit View Network Options Help
Make Observation
Query
Pkt Query
Toggle Monitoring
Select
View Probability Table
View/Modify Decision
Add No-forgetting Arcs
Optimize Decisions
Independence Quiz
Create
Solve
Click on a node to make an observation about its value.
Gripa
Observed Value: Da
Abces
Observed Value: Nu
Febra
Oboseala
Da 0.30
Nu 0.70
Query Results
Query Results for Variable Febra [Gripa=Da] [Abces=Nu]
P (Febra = Da) = 0.25
P (Febra = Nu) = 0.75
OK
Querying Node Febra
Click on a factor to inspect it
Current Factors:
Answer: f6(Febra)
Press "Reset Query" to start a new query.
Maximum Encountered Factor Size: 8
Eliminated Factors:
f0(Gripa)
f1(Abces)
f3(Febra, Oboseala)
f4(Febra, Anorexie)
f2(Gripa, Abces, Febra)
f5(Abces, Febra)
1) Prune Irrelevant Variables:
Irrelevant Variables Pruned
2) Project Observations:
Observations Projected
3) Sum Out Variables:
Heuristic:
No Variables Eliminated
Automatically Sum Out
4) Multiply:
No Multiplication Needed
5) Normalize:
No Normalization Needed
Gripa
Observed Value: Da
Abces
Observed Value: Nu
Febra
Oboseala
Anorexie
Close
Reset Query
Undo
Elimination Order
Belief Network Mode

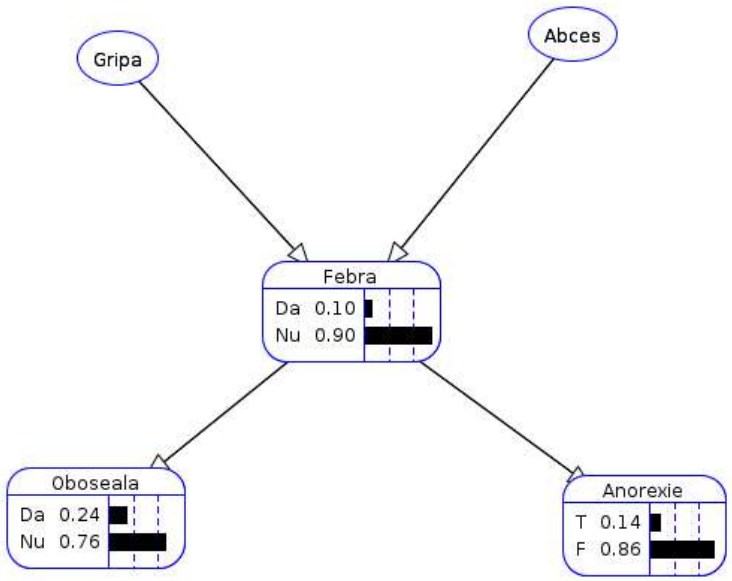
Belief and Decision Network Tool Version 5.1.10 --- instance.xml

File Edit View Network Options Help

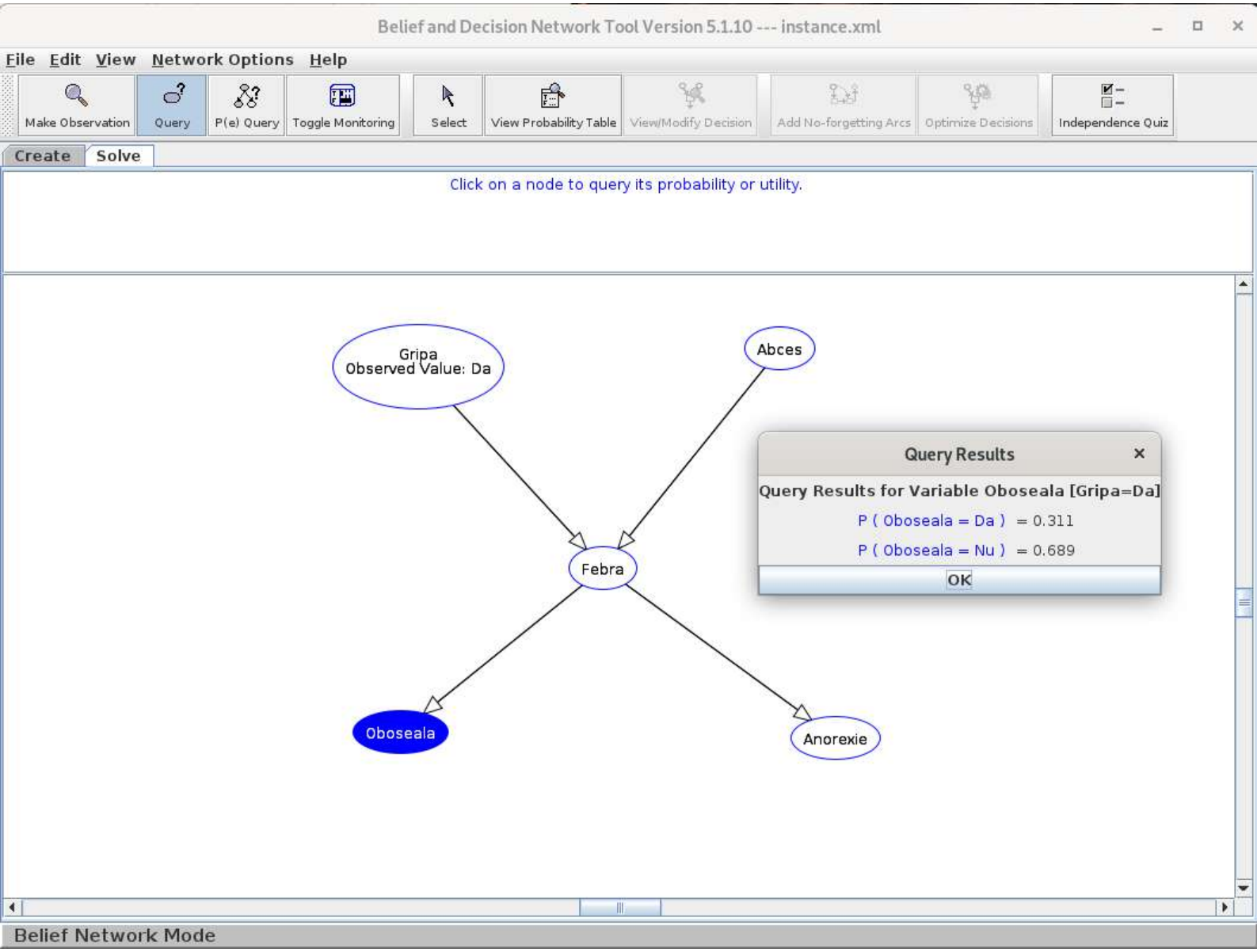
Make Observation | Query | P(e) Query | Toggle Monitoring | Select | View Probability Table | View/Modify Decision | Add No-forgetting Arcs | Optimize Decisions | Independence Quiz

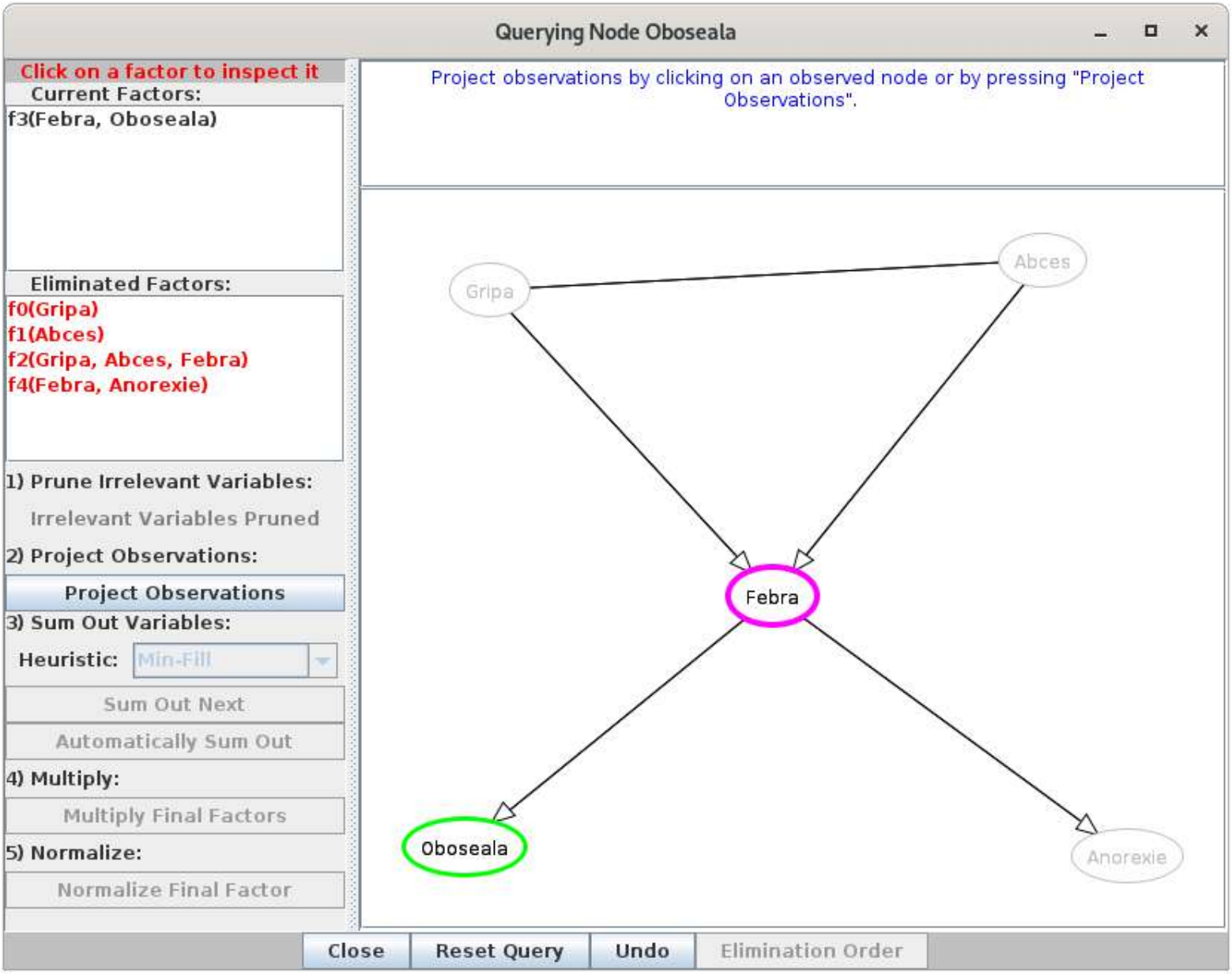
Create Solve

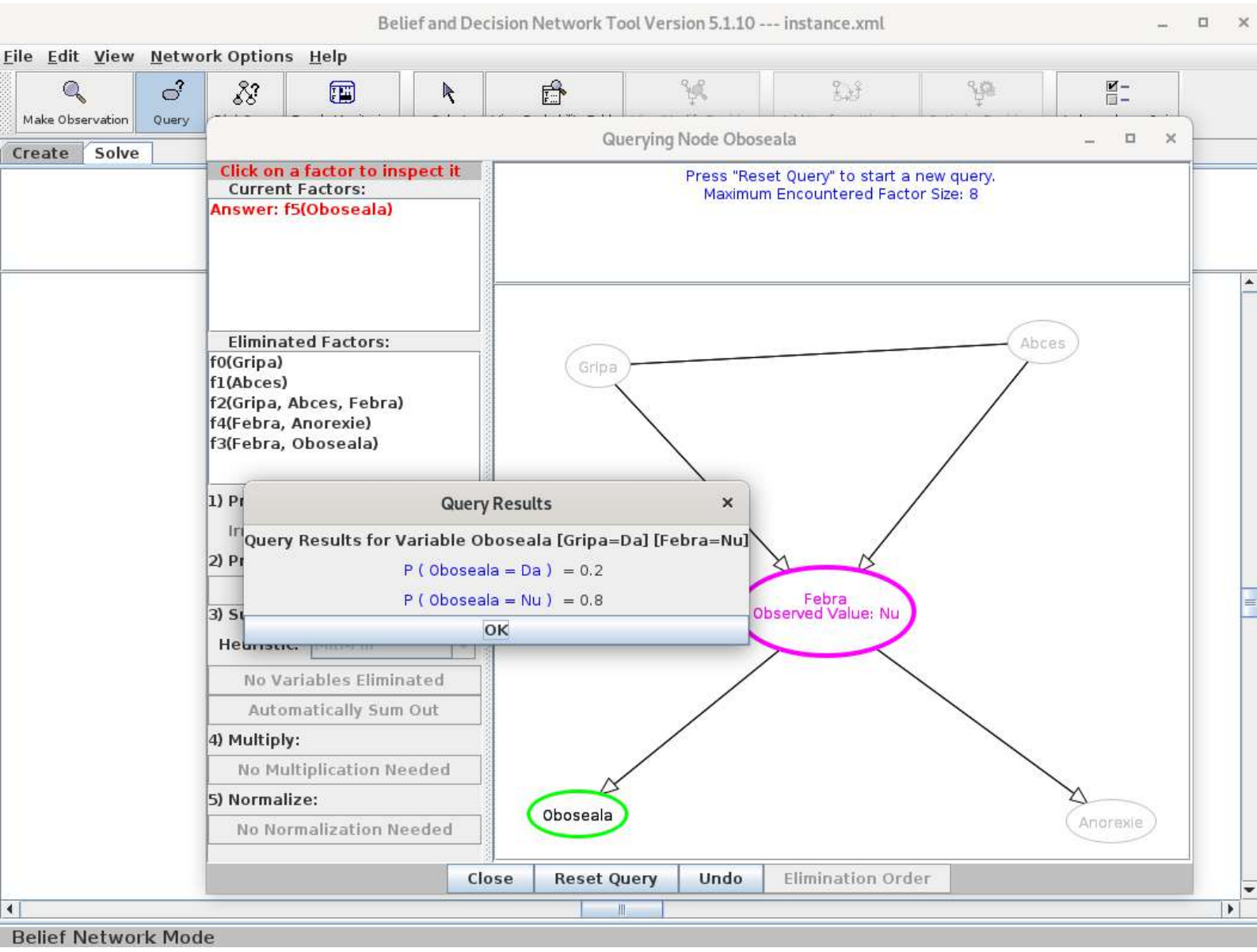
Click on an entity and drag the mouse to move it.



Belief Network Mode


Belief and Decision Network Tool Version 5.1.10 --- instance.xml
File Edit View Network Options Help
Make Observation
Query
P(e) Query
Toggle Monitoring
Select
View Probability Table
View/Modify Decision
Add No-forgetting Arcs
Optimize Decisions
Independence Quiz
Create
Solve
Click on a node to query its probability or utility.
Gripa
Observed Value: Da
Abces
Febra
Oboseala
Anorexie
Query Results
Query Results for Variable Oboseala [Gripa=Da]
P (Oboseala = Da) = 0.311
P (Oboseala = Nu) = 0.689
OK
Belief Network Mode


Querying Node Oboseala
Click on a factor to inspect it
Current Factors:
f3(Febra, Oboseala)
Eliminated Factors:
f0(Gripa)
f1(Abces)
f2(Gripa, Abces, Febra)
f4(Febra, Anorexie)
1) Prune Irrelevant Variables:
Irrelevant Variables Pruned
2) Project Observations:
Project Observations
3) Sum Out Variables:
Heuristic:
Min-Fill
Sum Out Next
Automatically Sum Out
4) Multiply:
Multiply Final Factors
5) Normalize:
Normalize Final Factor
Project observations by clicking on an observed node or by pressing "Project Observations".
Gripa
Abces
Febra
Oboseala
Anorexie
Close
Reset Query
Undo
Elimination Order


Belief and Decision Network Tool Version 5.1.10 --- instance.xml
File Edit View Network Options Help
Make Observation
Query
Create
Solve
Querying Node Oboseala
Click on a factor to inspect it
Current Factors:
Answer: f5(Oboseala)
Eliminated Factors:
f0(Gripa)
f1(Abces)
f2(Gripa, Abces, Febra)
f4(Febra, Anorexie)
f3(Febra, Oboseala)
Press "Reset Query" to start a new query.
Maximum Encountered Factor Size: 8
Query Results
Query Results for Variable Oboseala [Gripa=Da] [Febra=Nu]
P (Oboseala = Da) = 0.2
P (Oboseala = Nu) = 0.8
OK
No Variables Eliminated
Automatically Sum Out
4) Multiply:
No Multiplication Needed
5) Normalize:
No Normalization Needed
Gripa
Abces
Febra
Observed Value: Nu
Oboseala
Anorexie
Close
Reset Query
Undo
Elimination Order
Belief Network Mode