

```

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;;;                                     ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: American Food Specific ;;;
;;;                                     ;;;
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;;; Meal Type

(defrule full-meal-american (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user american]
          [or [meal ?user lunch]
              [meal ?user dinner]]]
  then [full-meal-american ?user yes])

(defrule dessert-meal-american (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user american]
          [meal ?user dessert]]
  then [dessert-meal-american ?user yes])

(defrule full-meal-american-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-american ?user yes]
  then [and [dessert-meal-american ?user no]
          [having-dessert ?user no]])

(defrule dessert-meal-american-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user american]
          [meal ?user dessert]]
  then [full-meal-american ?user no])

;;; Figure out meat

;;; General selection

(defrule meat-type-healthy-american (:backward :certainty 1.0 :importance 96)
  if [and [food-ethnicity ?user american]
          [full-meal-american ?user yes]
          [health-conscious ?user yes]]
  then [meat-american-round1 ?user poultry/seafood])

(defrule meat-type-not-healthy-american (:backward :certainty 1.0 :importance 95)
  if [and [food-ethnicity ?user american]
          [full-meal-american ?user yes]
          [health-conscious ?user no]]
  then [meat-american-round1 ?user pork/beef])

;;; final selection

(defrule bbq-american (:backward :certainty 1.0 :importance 94)
  if [and [food-ethnicity ?user american]
          [full-meal-american ?user yes]
          [meat-american-round1 ?user pork/beef]
          [is-south ?user yes]
          [is-summer ?user yes]
          [use-bbq-sauce ?user yes]]
  then [final-meat ?user BBQ])

(defrule beef-american (:backward :certainty 1.0 :importance 93)
  if [and [food-ethnicity ?user american]
          [full-meal-american ?user yes]]

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;;; Inference Rules (For importance, higher values go first.)   ;;;
;;; Domain: Caribbean Food Specific                             ;;;
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;;; Meal Type

(defrule full-meal-caribbean (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user caribbean]
        [or [meal ?user lunch]
            [meal ?user dinner]]]
  then [full-meal-caribbean ?user yes])

(defrule dessert-meal-caribbean (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user caribbean]
        [meal ?user dessert]]
  then [dessert-meal-caribbean ?user yes])

(defrule full-meal-caribbean-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-caribbean ?user yes]
  then [and [dessert-meal-caribbean ?user no]
          [having-dessert ?user no]])

(defrule dessert-meal-caribbean-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user caribbean]
        [meal ?user dessert]]
  then [full-meal-caribbean ?user no])

;;; Figure out meat

;;; General selection

(defrule meat-type-healthy-caribbean (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user caribbean]
        [full-meal-caribbean ?user yes]
        [health-conscious ?user yes]]
  then [meat-caribbean-round1 ?user poultry/seafood])

(defrule meat-type-not-healthy-caribbean (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user caribbean]
        [full-meal-caribbean ?user yes]
        [health-conscious ?user no]]
  then [meat-caribbean-round1 ?user pork/beef])

;;; final selection

(defrule pork-caribbean (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user caribbean]
        [meat-caribbean-round1 ?user pork/beef]
        [is-expensive ?user yes]]
  then [pork ?user yes])

(defrule pork-caribbean-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user caribbean]
        [meat-caribbean-round1 ?user pork/beef]
        [is-expensive ?user no]]
  then [pork ?user no])

(defrule pork-caribbean-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user caribbean]

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;;; Meal Type

(defrule full-meal-italian (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user italian]
        [or [meal ?user lunch]
            [meal ?user dinner]]]
  then [full-meal-italian ?user yes])

(defrule dessert-meal-italian (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user italian]
        [meal ?user dessert]]
  then [dessert-meal-italian ?user yes])

(defrule full-meal-italian-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-italian ?user yes]
  then [and [dessert-meal-italian ?user no]
          [having-dessert ?user no]])

(defrule dessert-meal-italian-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user italian]
        [meal ?user dessert]]
  then [full-meal-italian ?user no])

(defrule vegetarian (:backward :certainty 1.0 :importance 10)
  if [is-vegetarian ?user yes]
  then [cheese-meal-italian ?user yes])

;;; Figure out meat

;;; General selection

(defrule meat-type-healthy-italian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
        [full-meal-italian ?user yes]
        [health-conscious ?user yes]]
  then [seafood/poultry-italian ?user yes])

(defrule meat-type-healthy-italian-no1 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
        [full-meal-italian ?user yes]
        [health-conscious ?user no]]
  then [seafood/poultry-italian ?user no])

;;; final selection

(defrule meat-type-not-healthy-italian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
        [full-meal-italian ?user yes]
        [health-conscious ?user no]]
  then [beef ?user yes])

(defrule meat-type-not-healthy-italian-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
        [full-meal-italian ?user yes]
        [health-conscious ?user yes]]
  then [beef ?user no])

(defrule seafood-italian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]

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        [seafood/poultry-italian ?user yes]
        [is-near-coast ?user yes]]
then [seafood ?user yes])

(defrule seafood-italian-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
          [seafood/poultry-italian ?user yes]
          [is-near-coast ?user no]]
  then [seafood ?user no])

(defrule poultry-italian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
          [seafood/poultry-italian ?user yes]
          [is-near-coast ?user no]]
  then [poultry ?user yes])

(defrule poultry-italian-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
          [seafood/poultry-italian ?user yes]
          [is-near-coast ?user yes]]
  then [poultry ?user no])

        ;;; ethnicity specific

(defrule cheese-italian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
          [full-meal-italian ?user yes]
          [lactose-tolerant ?user yes]]
  then [has-cheese ?user yes])

(defrule cheese-italian-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user italian]
          [full-meal-italian ?user yes]
          [lactose-tolerant ?user no]]
  then [has-cheese ?user no])

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;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Mexican Food Specific ;;;
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        ;;; Meal Type

(defrule full-meal-mexican (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user mexican]
          [or [meal ?user lunch]
              [meal ?user dinner]]]
  then [full-meal-mexican ?user yes])

(defrule dessert-meal-mexican (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user mexican]
          [meal ?user dessert]]
  then [dessert-meal-mexican ?user yes])

(defrule full-meal-mexican-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-mexican ?user yes]
  then [and [dessert-meal-mexican ?user no]
           [having-dessert ?user no]])

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(defrule dessert-meal-mexican-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user mexican]
        [meal ?user dessert]]
  then [full-meal-mexican ?user no])

  ;;; Figure out meat

  ;;; General selection

(defrule meat-type-healthy-mexican (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [health-conscious ?user yes]]
  then [poultry ?user yes])

(defrule meat-type-healthy-mexican-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [health-conscious ?user no]]
  then [poultry ?user no])

(defrule meat-not-type-healthy-mexican (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [health-conscious ?user no]]
  then [meat-mexican-round1 ?user pork/beef])

  ;;; final selection

(defrule meat-not-type-healthy-mexican-beef (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [meat-mexican-round1 ?user pork/beef]
        [is-expensive ?user yes]]
  then [beef ?user yes])

(defrule meat-not-type-healthy-mexican-beef-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [meat-mexican-round1 ?user pork/beef]
        [is-expensive ?user no]]
  then [beef ?user no])

(defrule meat-not-type-healthy-mexican-pork (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [meat-mexican-round1 ?user pork/beef]
        [is-expensive ?user no]]
  then [pork ?user yes])

(defrule meat-not-type-healthy-mexican-pork-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
        [full-meal-mexican ?user yes]
        [meat-mexican-round1 ?user pork/beef]
        [is-expensive ?user no]]
  then [pork ?user no])

  ;;; ethnicity specific

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(defrule spicy-mexican (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
         [full-meal-mexican ?user yes]
         [is-spicy ?user yes]]
  then [use-chili ?user yes])
```

```
(defrule spicy-mexican-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
         [full-meal-mexican ?user yes]
         [is-spicy ?user no]]
  then [use-chili ?user no])
```

```
(defrule cheese-mexican (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
         [full-meal-mexican ?user yes]
         [lactose-tolerant ?user yes]]
  then [has-cheese ?user yes])
```

```
(defrule cheese-mexican-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user mexican]
         [full-meal-mexican ?user yes]
         [lactose-tolerant ?user no]]
  then [has-cheese ?user no])
```

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;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Chinese Food Specific ;;;
;;;                                                                    ;;;
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;;; Meal Type
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(defrule full-meal-chinese (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user chinese]
         [or [meal ?user lunch]
             [meal ?user dinner]]]
  then [full-meal-chinese ?user yes])
```

```
(defrule dessert-meal-chinese (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user chinese]
         [meal ?user dessert]]
  then [dessert-meal-chinese ?user yes])
```

```
(defrule full-meal-chinese-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-chinese ?user yes]
  then [and [dessert-meal-chinese ?user no]
         [having-dessert ?user no]])
```

```
(defrule dessert-meal-chinese-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user chinese]
         [meal ?user dessert]]
  then [full-meal-chinese ?user no])
```

```
;;; Figure out meat
```

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;;; General selection
```

```
(defrule meat-type-healthy-chinese (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user chinese]
```



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        [full-meal-chinese ?user yes]
        [health-conscious ?user yes]]
then [meat-chinese-round1 ?user poultry/seafood])

(defrule meat-type-unhealthy-chinese (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [health-conscious ?user no]]
  then [meat-chinese-round1 ?user pork/beef])

;;; final selection

(defrule meat-seafood-chinese (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user poultry/seafood]
      [is-near-coast ?user yes]]
  then [seafood ?user yes])

(defrule meat-seafood-chinese-no (:backward :certainty 1.0 :importance 11)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user pork/beef]]
  then [seafood ?user no])

(defrule meat-seafood-chinese-no2 (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user poultry/seafood]
      [is-near-coast ?user no]]
  then [seafood ?user no])

(defrule meat-poultry-chinese (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user poultry/seafood]
      [is-near-coast ?user no]]
  then [poultry ?user yes])

(defrule meat-poultry-chinese-no (:backward :certainty 1.0 :importance 11)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user pork/beef]]
  then [poultry ?user no])

(defrule meat-poultry-chinese-no2 (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user poultry/seafood]
      [is-near-coast ?user yes]]
  then [poultry ?user no])

(defrule meat-beef-chinese (:backward :certainty 1.0 :importance 10)
  if [and
      [food-ethnicity ?user chinese]
      [full-meal-chinese ?user yes]
      [meat-chinese-round1 ?user pork/beef]
      [is-expensive ?user yes]]
  then [beef ?user yes])

(defrule meat-beef-chinese-no (:backward :certainty 1.0 :importance 11)

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;;;                                     ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Middle Eastern Food Specific ;;;
;;;                                     ;;;
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;;; Meal Type

(defrule full-meal-middle-eastern (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user middle-eastern]
        [or [meal ?user lunch]
            [meal ?user dinner]]]
  then [full-meal-middle-eastern ?user yes])

(defrule dessert-meal-middle-eastern (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user middle-eastern]
        [meal ?user dessert]]
  then [dessert-meal-middle-eastern ?user yes])

(defrule full-meal-middle-eastern-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-middle-eastern ?user yes]
  then [and [dessert-meal-middle-eastern ?user no]
          [having-dessert ?user no]])

(defrule dessert-meal-middle-eastern-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user middle-eastern]
        [meal ?user dessert]]
  then [full-meal-middle-eastern ?user no])

;;; Figure out meat

;;; General selection

(defrule meat-type-healthy-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
        [full-meal-middle-eastern ?user yes]
        [health-conscious ?user yes]]
  then [meat-middle-eastern-round1 ?user poultry/seafood])

(defrule meat-type-not-healthy-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
        [full-meal-middle-eastern ?user yes]
        [health-conscious ?user no]]
  then [meat-middle-eastern-round1 ?user beef/lamb])

;;; final selection

(defrule meat-type-poultry-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
        [full-meal-middle-eastern ?user yes]
        [meat-middle-eastern-round1 ?user poultry/seafood]
        [is-near-coast ?user no]]
  then [poultry ?user yes])

(defrule meat-type-poultry-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
        [full-meal-middle-eastern ?user yes]
        [meat-middle-eastern-round1 ?user poultry/seafood]
        [is-near-coast ?user yes]]
  then [poultry ?user no])

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```
(defrule meat-type-poultry-middle-eastern-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]]
  then [poultry ?user no])

(defrule meat-type-seafood-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user poultry/seafood]
          [is-near-coast ?user yes]]
  then [seafood ?user yes])

(defrule meat-type-seafood-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user poultry/seafood]
          [is-near-coast ?user no]]
  then [seafood ?user no])

(defrule meat-type-seafood-middle-eastern-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]]
  then [seafood ?user no])

(defrule meat-type-lamb-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]
          [like-indian ?user yes]]
  then [lamb ?user yes])

(defrule meat-type-lamb-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]
          [like-indian ?user no]]
  then [lamb ?user no])

(defrule meat-type-lamb-middle-eastern-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user poultry/seafood]]
  then [lamb ?user no])

(defrule meat-type-beef-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]
          [like-indian ?user no]]
  then [beef ?user yes])

(defrule meat-type-beef-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
          [full-meal-middle-eastern ?user yes]
          [meat-middle-eastern-round1 ?user beef/lamb]
          [like-indian ?user yes]]
  then [beef ?user no])
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```
(defrule meat-type-beef-middle-eastern-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
         [full-meal-middle-eastern ?user yes]
         [meat-middle-eastern-round1 ?user poultry/seafood]]
  then [beef ?user no])
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```
;;; ethnicity specific
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(defrule tarragon-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
         [full-meal-middle-eastern ?user yes]
         [likes-savory ?user yes]]
  then [use-tarragon ?user yes])
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(defrule tarragon-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
         [full-meal-middle-eastern ?user yes]
         [likes-savory ?user no]]
  then [use-tarragon ?user no])
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(defrule dill-middle-eastern (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
         [full-meal-middle-eastern ?user yes]
         [likes-savory ?user yes]]
  then [use-dill ?user yes])
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```
(defrule dill-middle-eastern-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user middle-eastern]
         [full-meal-middle-eastern ?user yes]
         [likes-savory ?user no]]
  then [use-dill ?user no])
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;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Indian Food Specific ;;;
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;;; Meal Type
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(defrule full-meal-indian (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user indian]
         [or [meal ?user lunch]
             [meal ?user dinner]]]
  then [full-meal-indian ?user yes])
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```
(defrule dessert-meal-indian (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user indian]
         [meal ?user dessert]]
  then [dessert-meal-indian ?user yes])
```

```
(defrule full-meal-indian-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-indian ?user yes]
  then [and [dessert-meal-indian ?user no]
         [having-dessert ?user no]])
```

```
(defrule dessert-meal-indian-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user indian]
```

```

        [meal ?user dessert]]
then [full-meal-indian ?user no])

;;; Figure out meat

(defrule meat-type-poultry-indian(:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [health-conscious ?user yes]]
  then [poultry ?user yes])

(defrule meat-type-poultry-indian-no(:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [health-conscious ?user no]]
  then [poultry ?user no])

(defrule meat-type-lamb-indian(:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [health-conscious ?user no]]
  then [lamb ?user yes])

(defrule meat-type-lamb-indian-no(:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [health-conscious ?user yes]]
  then [lamb ?user no])

;;; ethnicity specific

(defrule spicy-indian (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [is-spicy ?user yes]]
  then [use-curry ?user yes])

(defrule spicy-indian-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user indian]
          [full-meal-indian ?user yes]
          [is-spicy ?user no]]
  then [use-curry ?user no])

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: French Food Specific ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

;;; Meal Type

(defrule full-meal-french (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user french]
          [or [meal ?user lunch]
              [meal ?user dinner]]]
  then [full-meal-french ?user yes])

(defrule dessert-meal-french (:backward :certainty 1.0 :importance 91)

```

```

if [and [food-ethnicity ?user french]
        [meal ?user dessert]]
then [dessert-meal-french ?user yes])

(defrule full-meal-french-exclusion (:forward :certainty 1.0 :importance 90)
  if [full-meal-french ?user yes]
  then [and [dessert-meal-french ?user no]
          [having-dessert ?user no]])

(defrule dessert-meal-french-exclusion (:backward :certainty 1.0 :importance 91)
  if [and [food-ethnicity ?user french]
        [meal ?user dessert]]
  then [full-meal-french ?user no])

;;; Figure out meat

;;; General selection

(defrule meat-type-healthy-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french]
        [full-meal-french ?user yes]
        [health-conscious ?user yes]]
  then [meat-french-round1 ?user poultry/seafood])

(defrule meat-type-unhealthy-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [health-conscious ?user no]]
  then [meat-french-round1 ?user pork/gamebird])

;;; final selection

(defrule meat-seafood-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [meat-french-round1 ?user poultry/seafood]
        [is-near-coast ?user yes]]
  then [seafood ?user yes])

(defrule meat-seafood-french-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [meat-french-round1 ?user poultry/seafood]
        [is-near-coast ?user no]]
  then [seafood ?user no])

(defrule meat-seafood-french-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [meat-french-round1 ?user pork/gamebird]]
  then [seafood ?user no])

(defrule meat-poultry-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [meat-french-round1 ?user poultry/seafood]
        [is-near-coast ?user no]]
  then [poultry ?user yes])

(defrule meat-poultry-french-no (:backward :certainty 1.0 :importance 10)

```

```

if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes]
        [meat-french-round1 ?user poultry/seafood]
        [is-near-coast ?user yes]]
then [poultry ?user no])

(defrule meat-poultry-french-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes]
          [meat-french-round1 ?user pork/gamebird]]
  then [poultry ?user no])

(defrule meat-gamebird-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user pork/gamebird]
          [exotic-taste ?user yes]]
  then [gamebird ?user yes])

(defrule meat-gamebird-french-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user pork/gamebird]
          [exotic-taste ?user no]]
  then [gamebird ?user no])

(defrule meat-gamebird-french-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user poultry/seafood]]
  then [gamebird ?user no])

(defrule meat-pork-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user pork/gamebird]
          [exotic-taste ?user no]]
  then [pork ?user yes])

(defrule meat-pork-french-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user pork/gamebird]
          [exotic-taste ?user yes]]
  then [pork ?user no])

(defrule meat-pork-french-no2 (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [meat-french-round1 ?user poultry/seafood]]
  then [pork ?user no])

;;; ethnicity specific

(defrule garlic-french (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
          [full-meal-french ?user yes ]
          [on-date ?user no]]
  then [use-garlic ?user yes])

```



```
(defrule garlic-french-no (:backward :certainty 1.0 :importance 10)
  if [and [food-ethnicity ?user french ]
        [full-meal-french ?user yes ]
        [on-date ?user yes]]
  then [use-garlic ?user no])
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: General Rules Based on Ethnicities ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
;;; Dessert fixer
```

```
(defrule desserter1 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [poultry ?user no])
```

```
(defrule desserter2 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [beef ?user no])
```

```
(defrule desserter3 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [lamb ?user no])
```

```
(defrule desserter4 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [seafood ?user no])
```

```
(defrule desserter5 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [shellfish ?user no])
```

```
(defrule desserter6 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [gamebird ?user no])
```

```
(defrule desserter7 (:backward :certainty 1.0 :importance 5)
  if [meal ?user dessert]
  then [pork ?user no])
```

```
;;;;;
```

```
(defrule no-meat (:forward :certainty 1.0 :importance 90)
  if [meal ?user dessert]
  then [final-meat ?user none])
```

```
(defrule no-meat2 (:forward :certainty 1.0 :importance 90)
  if [final-meat ?user none]
  then [and [beef ?user no]
           [seafood ?user no]
           [poultry ?user no]
           [pork ?user no]
           [lamb ?user no]
           [gamebird ?user no]
           [shellfish ?user no]])
```

```
(defrule BBQ (:forward :certainty 1.0 :importance 90)
  if [final-meat ?user bbq]
  then [and [beef ?user yes]
         [seafood ?user no]
         [poultry ?user yes]
         [pork ?user yes]
         [lamb ?user no]
         [gamebird ?user no]
         [shellfish ?user no]])
```

```
(defrule beef (:forward :certainty 1.0 :importance 91)
  if [beef ?user yes]
  then [and [seafood ?user no]
         [poultry ?user no]
         [pork ?user no]
         [lamb ?user no]
         [gamebird ?user no]
         [shellfish ?user no]])
```

```
(defrule seafood (:forward :certainty 1.0 :importance 90)
  if [seafood ?user yes]
  then [and [beef ?user no]
         [poultry ?user no]
         [pork ?user no]
         [lamb ?user no]
         [gamebird ?user no]
         [shellfish ?user yes]])
```

```
(defrule poultry (:forward :certainty 1.0 :importance 90)
  if [poultry ?user yes]
  then [and [beef ?user no]
         [seafood ?user no]
         [pork ?user no]
         [lamb ?user no]
         [gamebird ?user no]
         [shellfish ?user no]])
```

```
(defrule pork (:forward :certainty 1.0 :importance 90)
  if [pork ?user yes]
  then [and [beef ?user no]
         [seafood ?user no]
         [poultry ?user no]
         [lamb ?user no]
         [gamebird ?user no]
         [shellfish ?user no]])
```

```
(defrule lamb (:forward :certainty 1.0 :importance 90)
  if [lamb ?user yes]
  then [and [beef ?user no]
         [seafood ?user no]
         [poultry ?user no]
         [pork ?user no]
         [gamebird ?user no]
         [shellfish ?user no]])
```

```
(defrule gamebird (:forward :certainty 1.0 :importance 90)
  if [gamebird ?user yes]
  then [and [beef ?user no]
         [seafood ?user no]
         [poultry ?user no]
```

```

        [pork ?user no]
        [lamb ?user no]
        [shellfish ?user no]])

(defrule shellfish (:forward :certainty 1.0 :importance 90)
  if [shellfish ?user yes]
  then [and [beef ?user no]
          [seafood ?user no]
          [poultry ?user no]
          [pork ?user no]
          [lamb ?user no]
          [gamebird ?user no]])

(defrule no-pasta (:forward :certainty 1.0 :importance 99)
  if [or [food-ethnicity ?user american]
        [food-ethnicity ?user french]
        [food-ethnicity ?user caribbean]
        [food-ethnicity ?user mexican]
        [food-ethnicity ?user indian]
        [food-ethnicity ?user middle-eastern]
        [food-ethnicity ?user chinese]]
  then [is-pasta ?user no])

(defrule no-cheese (:forward :certainty 1.0 :importance 99)
  if [or [lactose-tolerant ?user no]
        [or [food-ethnicity ?user american]
            [food-ethnicity ?user french]
            [food-ethnicity ?user caribbean]
            [food-ethnicity ?user indian]
            [food-ethnicity ?user middle-eastern]
            [food-ethnicity ?user chinese]]]]
  then [has-cheese ?user no])

;;; the sauces yes or no rules

(defrule BBQ-sauce-yes (:backward :certainty 1.0 :importance 99)
  if [or [use-bbq-sauce-r1 ?user yes]
        [and [use-bbq-sauce-r1 ?user maybe]
              [and [is-south ?user yes]
                    [is-summer ?user yes]]]]]
  then [use-bbq-sauce ?user yes])

(defrule BBQ-sauce-no (:backward :certainty 1.0 :importance 99)
  if [or [use-bbq-sauce-r1 ?user no]
        [and [use-bbq-sauce-r1 ?user maybe]
              [or [is-south ?user no]
                  [is-summer ?user no]]]]]
  then [use-bbq-sauce ?user no])

(defrule tomato-sauce-yes (:backward :certainty 1.0 :importance 99)
  if [or [has-tomatoes-r1 ?user yes]
        [and [has-tomatoes-r1 ?user maybe]
              [or [and [lactose-tolerant ?user no]
                      [is-summer ?user yes]]
                  [and [lactose-tolerant ?user yes]
                      [is-summer ?user yes]]]]]]
  then [has-tomatoes ?user yes])

(defrule tomato-sauce-no (:backward :certainty 1.0 :importance 99)
  if [or [has-tomatoes-r1 ?user no]

```

```

    [and [has-tomatoes-r1 ?user maybe]
         [or [and [lactose-tolerant ?user no]
                  [is-summer ?user no]]
              [and [lactose-tolerant ?user yes]
                    [is-summer ?user no]]]]]
then [has-tomatoes ?user no])

(defrule cream-sauce-yes (:backward :certainty 1.0 :importance 99)
  if [or [use-cream-sauce-r1 ?user yes]
         [and [use-cream-sauce-r1 ?user maybe]
               [lactose-tolerant ?user yes]]]
  then [use-cream-sauce ?user yes])

(defrule cream-sauce-no (:backward :certainty 1.0 :importance 99)
  if [or [use-cream-sauce-r1 ?user no]
         [and [use-cream-sauce-r1 ?user maybe]
               [lactose-tolerant ?user no]]]
  then [use-cream-sauce ?user no])

(defrule curry-sauce-yes (:backward :certainty 1.0 :importance 99)
  if [or [use-curry-sauce-r1 ?user yes]
         [and [use-curry-sauce-r1 ?user maybe]
               [use-curry ?user yes]]]
  then [use-curry-sauce ?user yes])

(defrule curry-sauce-no (:backward :certainty 1.0 :importance 99)
  if [or [use-curry-sauce-r1 ?user no]
         [and [use-curry-sauce-r1 ?user maybe]
               [use-curry ?user no]]]
  then [use-curry-sauce ?user no])

;;; the herbs/sauces
;;; This is a real cheap way to do this, there has to be a simpler way

(defrule american-herbs-sauces (:forward :certainty 1.0 :importance 99)
  if [food-ethnicity ?user american]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]
            [use-dill ?user no]
            [use-caribbean ?user no]
            [use-bbq-sauce-r1 ?user maybe]
            [use-light-sauce ?user no]
            [has-tomatoes-r1 ?user no]
            [use-cream-sauce-r1 ?user no]

```

```
[use-curry-sauce-r1 ?user no]
[is-pasta ?user no]
[lamb ?user no]
[gamebird ?user no]])
```

```
(defrule caribbean-herbs-sauces (:forward :certainty 1.0 :importance 99)
  if [food-ethnicity ?user caribbean]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user no]
            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]
            [use-dill ?user no]
            [use-caribbean ?user yes]
            [use-bbq-sauce-r1 ?user no]
            [use-light-sauce ?user yes]
            [has-tomatoes-r1 ?user maybe]
            [use-cream-sauce-r1 ?user maybe]
            [use-curry-sauce-r1 ?user no]
            [is-pasta ?user no]
            [lamb ?user no]
            [gamebird ?user no]
           ])
```

```
(defrule italian-herbs-sauces (:forward :certainty 1.0 :importance 99)
  if [food-ethnicity ?user italian]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]
            [use-dill ?user no]
            [use-caribbean ?user yes]
            [use-bbq-sauce-r1 ?user no]
```

```
[use-light-sauce ?user no]
[has-tomatoes-r1 ?user maybe]
[use-cream-sauce-r1 ?user maybe]
[use-curry-sauce-r1 ?user no]
[is-pasta ?user yes]
[lamb ?user no]
[gamebird ?user no]])
```

```
(defrule mexican-herbs-sauces (:forward :certainty 1.0 :importance 99)
```

```
  if [food-ethnicity ?user mexican]
```

```
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
```

```

            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]
            [use-dill ?user no]
            [use-caribbean ?user yes]
            [use-bbq-sauce-r1 ?user no]
            [use-light-sauce ?user yes]
            [has-tomatoes-r1 ?user maybe]
            [use-cream-sauce-r1 ?user maybe]
            [use-curry-sauce-r1 ?user no]
            [lamb ?user no]
            [gamebird ?user no]
            [seafood ?user no]
            [shellfish ?user no]])
```

```
(defrule chinese-herbs-sauces (:forward :certainty 1.0 :importance 99)
```

```
  if [food-ethnicity ?user chinese]
```

```
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
```

```

            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
```

```
[use-dill ?user no]
[use-caribbean ?user yes]
[use-bbq-sauce-r1 ?user no]
[use-light-sauce ?user yes]
[has-tomatoes-r1 ?user no]
[use-cream-sauce-r1 ?user maybe]
[use-curry-sauce-r1 ?user no]
[is-pasta ?user no]
[lamb ?user no]
[gamebird ?user no]])
```

```
(defrule middle-eastern-herbs-sauces (:forward :certainty 1.0 :importance 99)
  if [food-ethnicity ?user middle-eastern]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]

            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]

            [use-caribbean ?user yes]
            [use-bbq-sauce-r1 ?user no]
            [use-light-sauce ?user yes]
            [has-tomatoes-r1 ?user no]
            [use-cream-sauce-r1 ?user maybe]
            [use-curry-sauce-r1 ?user no]
            [is-pasta ?user no]
            [pork ?user no]
            [gamebird ?user no]
           ])
```

```
(defrule indian-herbs-sauces (:forward :certainty 1.0 :importance 99)
  if [food-ethnicity ?user indian]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]

            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
            [use-garlic ?user yes]
```

```
[use-pepper ?user no]
[use-mustard ?user yes]
[use-ginger ?user yes]
[use-dill ?user no]
[use-caribbean ?user yes]
[use-bbq-sauce-r1 ?user no]
[use-light-sauce ?user no]
[has-tomatoes-r1 ?user no]
[use-cream-sauce-r1 ?user maybe]
[use-curry-sauce-r1 ?user maybe]
[is-pasta ?user no]
[beef ?user no]
[pork ?user no]
[gamebird ?user no]
[seafood ?user no]
[shellfish ?user no]
])
```

```
(defrule french-herbs-sauces (:forward :certainty 1.0 :importance 99)
```

```
  if [food-ethnicity ?user french]
  then [and [use-mint ?user no]
            [use-sage ?user yes]
            [use-cinnamon ?user yes]
            [use-black-pepper ?user yes]
            [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user no]
            [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-tarragon ?user yes]
            [use-thyme ?user no]
            [use-clove ?user no]
```

```
            [use-pepper ?user no]
            [use-mustard ?user yes]
            [use-ginger ?user yes]
            [use-dill ?user no]
            [use-caribbean ?user yes]
            [use-bbq-sauce-r1 ?user no]
            [use-light-sauce ?user yes]
            [has-tomatoes-r1 ?user maybe]
            [use-cream-sauce-r1 ?user maybe]
            [use-curry-sauce-r1 ?user no]
            [is-pasta ?user no]
            [lamb ?user no]
            [beef ?user no]])
```

```
;;;;;;;;;;;;;
;;;                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Drink Type Preference ;;;
;;;                                                    ;;;
;;;;;;;;;;;;;
```

```
(defrule sweet-drinks (:backward :certainty 1.0 :importance 60)
```

```
  if [prefers-fruit-punch ?user yes]
  then [prefers-sweet-wines ?user yes])
```



```
(defrule sweet-drinks2 (:backward :certainty 1.0 :importance 60)
  if [prefers-fruit-punch ?user no]
  then [prefers-sweet-wines ?user no])
```

```
(defrule dry-drinks (:backward :certainty 1.0 :importance 59)
  if [prefers-iced-tea ?user yes]
  then [prefers-dry-wines ?user yes])
```

```
(defrule dry-drinks2 (:backward :certainty 1.0 :importance 59)
  if [prefers-iced-tea ?user no]
  then [prefers-dry-wines ?user no])
```

```
(defrule wine-exclusion1 (:forward :certainty 1.0 :importance 69)
  if [prefers-sweet-wines ?user yes]
  then [prefers-dry-wines ?user no])
```

```
(defrule wine-exclusion2 (:forward :certainty 1.0 :importance 69)
  if [prefers-dry-wines ?user yes]
  then [prefers-sweet-wines ?user no])
```

```
;;; The following rules are used as a second layer of knowledge. It
;;; helps to determine some facts that the user does not know
;;; To implement it as a "backup" or "secondary" layer, i need to
;;; change the values for these domain from simple booleans to a list of values
;;; and then have the check for a "I don't know" response in the antecedent
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Location ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
(defrule near-coast1 (:backward :certainty 1.0 :importance 10)
  if [or [is-near-coast-r1 ?user yes]
        [and [is-near-coast-r1 ?user idk]
              [or [goes-to-the-beach ?user yes]
                  [has-boat ?user yes]]]]]
  then [is-near-coast ?user yes])
```

```
(defrule near-coast-no (:backward :certainty 1.0 :importance 10)
  if [or [is-near-coast-r1 ?user no]
        [and [is-near-coast-r1 ?user idk]
              [or [goes-to-the-beach ?user no]
                  [has-boat ?user no]]]]]
  then [is-near-coast ?user no])
```

```
(defrule warm-state (:backward :certainty 1.0 :importance 58)
  if [and [minimum-temp ?user ?x]
          (> ?x 0)]
  then [is-south ?user yes])
```

```
(defrule warm-state-no (:backward :certainty 1.0 :importance 58)
  if [and [minimum-temp ?user ?x]
          (< ?x 0)]
  then [is-south ?user no])
```

```
(defrule cold-n-country (:backward :certainty 1.0 :importance 58)
  if [or [and [minimum-temp ?user ?x]
              (< ?x 0)
              [likes-country ?user yes]]
      [says-pop ?user yes]]
  then [is-midwest ?user yes])
```

```
(defrule midwest-no (:backward :certainty 1.0 :importance 58)
  if [and [minimum-temp ?user ?x]
         (< ?x 0)
         [likes-country ?user no]
         [says-pop ?user no]]
  then [is-midwest ?user no])
```

```
;;;;;
;;;                                     ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Health Conscious ;;;
;;;                                     ;;;
;;;;;
```

```
(defrule health-conscious-yes (:backward :certainty 1.0 :importance 90)
  if [or [health-conscious-r1 ?user yes]
         [and [health-conscious-r1 ?user idk]
              [or [has-dieted-in-past-year ?user yes]
                  [exercises ?user yes]
                  [follows-the-pyramid ?user yes]
                  [is-vegetarian ?user yes]]]]]
  then [health-conscious ?user yes])
```

```
(defrule health-conscious-no (:backward :certainty 1.0 :importance 90)
  if [or [health-conscious-r1 ?user no]
         [and [health-conscious-r1 ?user idk]
              [has-dieted-in-past-year ?user no]
              [exercises ?user no]
              [follows-the-pyramid ?user no]
              [is-vegetarian ?user no]]]]
  then [health-conscious ?user no])
```

```
;;;;;
;;;                                     ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Savory Food ;;;
;;;                                     ;;;
;;;;;
```

```
(defrule likes-savory (:backward :certainty 1.0 :importance 58)
  if [or [like-savory-r1 ?user yes]
         [and [like-savory-r1 ?user idk]
              [or [has-herb-garden ?user yes]
                  [has-several-spices ?user yes]
                  [enjoy-steak-sauce ?user yes]]]]]
  then [likes-savory ?user yes])
```

```
(defrule likes-savory-no (:backward :certainty 1.0 :importance 58)
  if [or [like-savory-r1 ?user no]
         [and [like-savory-r1 ?user idk]
              [has-herb-garden ?user no]]]
  then [likes-savory ?user no])
```





```
(defrule lactose-tolerant (:backward :certainty 1.0 :importance 82)
  if [or [lactose-tolerant-r1 ?user yes]
        [and [lactose-tolerant-r1 ?user idk]
              [or [eat-cheese ?user yes]
                  [drink-milk ?user yes]
                  [eat-ice-cream ?user yes]]]]]
  then [lactose-tolerant ?user yes])
```

```
(defrule lactose-intolerant (:backward :certainty 1.0 :importance 81)
  if [or [lactose-tolerant-r1 ?user no]
        [and [lactose-tolerant-r1 ?user idk]
              [eat-cheese ?user no]
              [drink-milk ?user no]
              [eat-ice-cream ?user no]]]]]
  then [lactose-tolerant ?user no])
```

```
;;;;;
;;;                                     ;;;
;;; Inference Rules (For importance, higher values go first.) ;;;
;;; Domain: Wine Choices                                     ;;;
;;;                                     ;;;
;;;;;
```

```
;;;;;
;;;                                     ;;;
;;; Pinot Noir                                             ;;;
;;;                                     ;;;
;;;;;
```

```
(defrule pinot-noir-1 (:backward :certainty 1.0 :importance 98)
  if [and [or [poultry ?user yes]
              [pork ?user yes]
              [lamb ?user yes]]
        [or [use-mint ?user yes]
              [use-sage ?user yes]
              [use-cinnamon ?user yes]]]
        [has-cheese ?user yes]
        [prefers-sweet-wines ?user yes]]]
  then [wine-to-drink ?user pinot-noir])
```

```
(defrule pinot-noir-2 (:backward :certainty 0.4 :importance 87)
  if [and [or [poultry ?user yes]
              [pork ?user yes]
              [lamb ?user yes]]
        [has-cheese ?user yes]
        [prefers-sweet-wines ?user yes]]]
  then [wine-to-drink ?user pinot-noir])
```

```
(defrule pinot-noir-3 (:backward :certainty 0.6 :importance 86)
  if [and [or [poultry ?user yes]
              [pork ?user yes]
              [lamb ?user yes]]
        [or [use-mint ?user yes]
              [use-sage ?user yes]
              [use-cinnamon ?user yes]]]
        [prefers-sweet-wines ?user yes]]]
  then [wine-to-drink ?user pinot-noir])
```

```
(defrule pinot-noir-4 (:backward :certainty 0.8 :importance 85)
  if [and [or [poultry ?user yes]
              [pork ?user yes]
              [lamb ?user yes]]
      [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user pinot-noir])
```

```
(defrule pinot-noir-5 (:backward :certainty 0.4 :importance 84)
  if [and [or [use-mint ?user yes]
              [use-sage ?user yes]
              [use-cinnamon ?user yes]]
      [has-cheese ?user yes]
      [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user pinot-noir])
```

```
(defrule pinot-noir-6 (:backward :certainty 0.2 :importance 83)
  if [and [has-cheese ?user yes]
          [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user pinot-noir])
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Cabernet Sauvignon                                               ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
(defrule cabernet-sauvignon-1 (:backward :certainty 1.0 :importance 97)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]
      [has-tomatoes ?user yes]
      [or [use-bay-leaf ?user yes]
          [use-parsley ?user yes]
          [use-nutmeg ?user yes]
          [use-chili ?user yes]
          [use-curry ?user yes]]
      [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])
```

```
(defrule cabernet-sauvignon-2 (:backward :certainty 0.7 :importance 83)
  if [and [is-pasta ?user yes]
          [has-tomatoes ?user yes]
          [or [use-bay-leaf ?user yes]
              [use-parsley ?user yes]
              [use-nutmeg ?user yes]
              [use-chili ?user yes]
              [use-curry ?user yes]]
          [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])
```

```
(defrule cabernet-sauvignon-3 (:backward :certainty 0.7 :importance 83)
  if [and [has-cheese ?user yes]
          [has-tomatoes ?user yes]
          [or [use-bay-leaf ?user yes]
              [use-parsley ?user yes]
              [use-nutmeg ?user yes]
              [use-chili ?user yes]]
```

```

        [use-curry ?user yes]]
    [prefers-sweet-wines ?user yes]]
then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-4 (:backward :certainty 0.8 :importance 83)
  if [and    [or [beef ?user yes]
                 [lamb ?user yes]]
         [or [has-cheese ?user yes]
             [is-pasta ?user yes]]
         [or [use-bay-leaf ?user yes]
             [use-parsley ?user yes]
             [use-nutmeg ?user yes]
             [use-chili ?user yes]
             [use-curry ?user yes]]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-5 (:backward :certainty 0.6 :importance 83)
  if [and    [is-pasta ?user yes]
         [or [use-bay-leaf ?user yes]
             [use-parsley ?user yes]
             [use-nutmeg ?user yes]
             [use-chili ?user yes]
             [use-curry ?user yes]]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-6 (:backward :certainty 0.6 :importance 83)
  if [and    [has-cheese ?user yes]
         [or [use-bay-leaf ?user yes]
             [use-parsley ?user yes]
             [use-nutmeg ?user yes]
             [use-chili ?user yes]
             [use-curry ?user yes]]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-7 (:backward :certainty 0.7 :importance 83)
  if [and    [or [beef ?user yes]
                 [lamb ?user yes]]
         [or [has-cheese ?user yes]
             [is-pasta ?user yes]]
         [has-tomatoes ?user yes]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-8 (:backward :certainty 0.4 :importance 83)
  if [and    [is-pasta ?user yes]
         [has-tomatoes ?user yes]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-9 (:backward :certainty 0.4 :importance 83)
  if [and    [has-cheese ?user yes]
         [has-tomatoes ?user yes]
         [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-10 (:backward :certainty 0.6 :importance 83)
  if [and    [or [beef ?user yes]

```

```

        [lamb ?user yes]]
    [or [has-cheese ?user yes]
        [is-pasta ?user yes]]
    [prefers-sweet-wines ?user yes]]
then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-11 (:backward :certainty 0.5 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
        [is-pasta ?user yes]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-12 (:backward :certainty 0.5 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
        [has-cheese ?user yes]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-13 (:backward :certainty 0.4 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-14 (:backward :certainty 0.8 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [has-tomatoes ?user yes]
        [or [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-15 (:backward :certainty 0.5 :importance 83)
  if [and [is-pasta ?user yes]
        [has-tomatoes ?user yes]
        [or [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-16 (:backward :certainty 0.5 :importance 83)
  if [and [has-cheese ?user yes]
        [has-tomatoes ?user yes]
        [or [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-17 (:backward :certainty 0.6 :importance 83)

```



```
if [and [or [beef ?user yes]
            [lamb ?user yes]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [or [use-bay-leaf ?user yes]
            [use-parsley ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]]]
then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-18 (:backward :certainty 0.4 :importance 83)
  if [and [is-pasta ?user yes]
          [or [use-bay-leaf ?user yes]
              [use-parsley ?user yes]
              [use-nutmeg ?user yes]
              [use-chili ?user yes]
              [use-curry ?user yes]]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-19 (:backward :certainty 0.4 :importance 83)
  if [and [has-cheese ?user yes]
          [or [use-bay-leaf ?user yes]
              [use-parsley ?user yes]
              [use-nutmeg ?user yes]
              [use-chili ?user yes]
              [use-curry ?user yes]]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-20 (:backward :certainty 0.5 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
          [or [has-cheese ?user yes]
              [is-pasta ?user yes]
              [has-tomatoes ?user yes]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-21 (:backward :certainty 0.2 :importance 83)
  if [and [is-pasta ?user yes]
          [has-tomatoes ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-22 (:backward :certainty 0.2 :importance 83)
  if [and [has-cheese ?user yes]
          [has-tomatoes ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-23 (:backward :certainty 0.4 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
          [or [has-cheese ?user yes]
              [is-pasta ?user yes]]]
  then [wine-to-drink ?user cabernet-sauvignon])

(defrule cabernet-sauvignon-24 (:backward :certainty 0.3 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
          [is-pasta ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])
```

```
(defrule cabernet-sauvignon-25 (:backward :certainty 0.3 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]
      [has-cheese ?user yes]]
  then [wine-to-drink ?user cabernet-sauvignon])
```

```
(defrule cabernet-sauvignon-26 (:backward :certainty 0.2 :importance 83)
  if [and [or [beef ?user yes]
              [lamb ?user yes]]]
  then [wine-to-drink ?user cabernet-sauvignon])
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Merlot                                                            ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
(defrule merlot-1 (:backward :certainty 1.0 :importance 96)
  if [and [or [beef ?user yes]
              [gamebird ?user yess]
              [lamb ?user yes]
              [seafood ?user yes]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]
      [or [use-oregano ?user yes]
          [use-basil ?user yes]
          [use-nutmeg ?user yes]
          [use-chili ?user yes]
          [use-curry ?user yes]
          [use-garlic ?user yes]]
      [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])
```

```
(defrule merlot-2 (:backward :certainty 0.8 :importance 83)
  if [and [or [beef ?user yes]
              [gamebird ?user yess]
              [lamb ?user yes]
              [seafood ?user yes]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]
      [or [use-oregano ?user yes]
          [use-basil ?user yes]
          [use-nutmeg ?user yes]
          [use-chili ?user yes]
          [use-curry ?user yes]
          [use-garlic ?user yes]]
      [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])
```

```
(defrule merlot-3 (:backward :certainty 0.8 :importance 83)
  if [and [or [beef ?user yes]
              [gamebird ?user yess]
              [lamb ?user yes]
              [seafood ?user yes]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]
      [or [use-oregano ?user yes]
          [use-basil ?user yes]]
```

```

        [use-nutmeg ?user yes]
        [use-chili ?user yes]
        [use-curry ?user yes]
        [use-garlic ?user yes]]
    [prefers-sweet-wines ?user yes]]
then [wine-to-drink ?user merlot])

(defrule merlot-4 (:backward :certainty 0.6 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]
             [is-pasta ?user yes]]
        [or [has-tomatoes ?user yes]
             [use-bbq-sauce ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])

(defrule merlot-5 (:backward :certainty 0.4 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-tomatoes ?user yes]
             [use-bbq-sauce ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])

(defrule merlot-6 (:backward :certainty 0.4 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]
             [is-pasta ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])

(defrule merlot-7 (:backward :certainty 0.3 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user merlot])

(defrule merlot-8 (:backward :certainty 0.8 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]
             [is-pasta ?user yes]]
        [or [has-tomatoes ?user yes]
             [use-bbq-sauce ?user yes]]
        [or [use-oregano ?user yes]
             [use-basil ?user yes]
             [use-nutmeg ?user yes]
             [use-chili ?user yes]]
  then [wine-to-drink ?user merlot])

```

```

        [use-curry ?user yes]
        [use-garlic ?user yes]]]
then [wine-to-drink ?user merlot])

(defrule merlot-9 (:backward :certainty 0.6 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]
        [or [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]
            [use-garlic ?user yes]]]]
  then [wine-to-drink ?user merlot])

(defrule merlot-10 (:backward :certainty 0.6 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [or [use-oregano ?user yes]
            [use-basil ?user yes]
            [use-nutmeg ?user yes]
            [use-chili ?user yes]
            [use-curry ?user yes]
            [use-garlic ?user yes]]]]
  then [wine-to-drink ?user merlot])

(defrule merlot-11 (:backward :certainty 0.4 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]]]
  then [wine-to-drink ?user merlot])

(defrule merlot-12 (:backward :certainty 0.2 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]]]
  then [wine-to-drink ?user merlot])

(defrule merlot-13 (:backward :certainty 0.2 :importance 83)
  if [and    [or [beef ?user yes]
                 [gamebird ?user yess]
                 [lamb ?user yes]
                 [seafood ?user yes]]
        [or [has-cheese ?user yes]

```

```

                [is-pasta ?user yes]]]
then [wine-to-drink ?user merlot])

(defrule merlot-14 (:backward :certainty 0.1 :importance 83)
  if [or [beef ?user yes]
        [gamebird ?user yess]
        [lamb ?user yes]
        [seafood ?user yes]]]
then [wine-to-drink ?user merlot])

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Zinfandel                                                            ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

(defrule zinfandel-1 (:backward :certainty 1.0 :importance 95)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]]
      [or [use-tarragon ?user yes]
          [use-thyme ?user yes]
          [use-clove ?user yes]
          [use-garlic ?user yes]
          [use-pepper ?user yes]]]
      [prefers-sweet-wines ?user yes]]]
then [wine-to-drink ?user zinfandel])

(defrule zinfandel-2 (:backward :certainty 0.7 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]]
      [or [use-tarragon ?user yes]
          [use-thyme ?user yes]
          [use-clove ?user yes]
          [use-garlic ?user yes]
          [use-pepper ?user yes]]]
      [prefers-sweet-wines ?user yes]]]
then [wine-to-drink ?user zinfandel])

(defrule zinfandel-3 (:backward :certainty 0.7 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]]
      [or [use-tarragon ?user yes]
          [use-thyme ?user yes]
          [use-clove ?user yes]
          [use-garlic ?user yes]
          [use-pepper ?user yes]]]
      [prefers-sweet-wines ?user yes]]]
then [wine-to-drink ?user zinfandel])

(defrule zinfandel-4 (:backward :certainty 0.5 :importance 83)
  if [and [or [pork ?user yes]

```

```

        [gamebird ?user yess]]
    [or [has-cheese ?user yes]
        [is-pasta ?user yes]]
    [or [has-tomatoes ?user yes]
        [use-bbq-sauce ?user yes]]
    [prefers-sweet-wines ?user yes]]
then [wine-to-drink ?user zinfandel])

(defrule zinfandel-5 (:backward :certainty 0.6 :importance 83)
  if [and    [or [pork ?user yes]
                 [gamebird ?user yess]]
        [or [use-tarragon ?user yes]
            [use-thyme ?user yes]
            [use-clove ?user yes]
            [use-garlic ?user yes]
            [use-pepper ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user zinfandel])

(defrule zinfandel-6 (:backward :certainty 0.4 :importance 83)
  if [and    [or [pork ?user yes]
                 [gamebird ?user yess]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user zinfandel])

(defrule zinfandel-7 (:backward :certainty 0.4 :importance 83)
  if [and    [or [pork ?user yes]
                 [gamebird ?user yess]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user zinfandel])

(defrule zinfandel-8 (:backward :certainty 0.8 :importance 83)
  if [and    [or [pork ?user yes]
                 [gamebird ?user yess]]
        [or [has-cheese ?user yes]
            [is-pasta ?user yes]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]
        [or [use-tarragon ?user yes]
            [use-thyme ?user yes]
            [use-clove ?user yes]
            [use-garlic ?user yes]
            [use-pepper ?user yes]]]]
  then [wine-to-drink ?user zinfandel])

(defrule zinfandel-9 (:backward :certainty 0.5 :importance 83)
  if [and    [or [pork ?user yes]
                 [gamebird ?user yess]]
        [or [has-tomatoes ?user yes]
            [use-bbq-sauce ?user yes]]
        [or [use-tarragon ?user yes]
            [use-thyme ?user yes]
            [use-clove ?user yes]
            [use-garlic ?user yes]
            [use-pepper ?user yes]]]]
  then [wine-to-drink ?user zinfandel])

```

```
(defrule zinfandel-10 (:backward :certainty 0.5 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]
      [or [use-tarragon ?user yes]
          [use-thyme ?user yes]
          [use-clove ?user yes]
          [use-garlic ?user yes]
          [use-pepper ?user yes]]]
  then [wine-to-drink ?user zinfandel])
```

```
(defrule zinfandel-11 (:backward :certainty 0.3 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]]
  then [wine-to-drink ?user zinfandel])
```

```
(defrule zinfandel-12 (:backward :certainty 0.4 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]
      [or [use-tarragon ?user yes]
          [use-thyme ?user yes]
          [use-clove ?user yes]
          [use-garlic ?user yes]
          [use-pepper ?user yes]]]
  then [wine-to-drink ?user zinfandel])
```

```
(defrule zinfandel-13 (:backward :certainty 0.2 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]
      [or [has-tomatoes ?user yes]
          [use-bbq-sauce ?user yes]]]
  then [wine-to-drink ?user zinfandel])
```

```
(defrule zinfandel-14 (:backward :certainty 0.2 :importance 83)
  if [and [or [pork ?user yes]
              [gamebird ?user yess]]
      [or [has-cheese ?user yes]
          [is-pasta ?user yes]]]
  then [wine-to-drink ?user zinfandel])
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Sauvignon Blanc                                                    ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
(defrule sauvignon-blanc-1 (:backward :certainty 1.0 :importance 94)
  if [and [or [poultry ?user yes]
              [seafood ?user yes]]
      [is-pasta ?user yes]
      [or [use-garlic ?user yes]
          [use-oregano ?user yes]
          [use-black-pepper ?user yes]]
      [prefers-dry-wines ?user yes]]
```

```

then [wine-to-drink ?user sauvignon-blanc])

(defrule sauvignon-blanc-2 (:backward :certainty 0.8 :importance 83)
  if [and    [or [poultry ?user yes]
                 [seafood ?user yes]]
        [or [use-garlic ?user yes]
            [use-oregano ?user yes]
            [use-black-pepper ?user yes]]
        [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user sauvignon-blanc])

(defrule sauvignon-blanc-3 (:backward :certainty 0.5 :importance 83)
  if [and    [or [poultry ?user yes]
                 [seafood ?user yes]]
        [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user sauvignon-blanc])

(defrule sauvignon-blanc-4 (:backward :certainty 0.8 :importance 83)
  if [and    [or [poultry ?user yes]
                 [seafood ?user yes]]
        [is-pasta ?user yes]
        [or [use-garlic ?user yes]
            [use-oregano ?user yes]
            [use-black-pepper ?user yes]]]]
  then [wine-to-drink ?user sauvignon-blanc])

(defrule sauvignon-blanc-5 (:backward :certainty 0.6 :importance 83)
  if [and    [or [poultry ?user yes]
                 [seafood ?user yes]]
        [or [use-garlic ?user yes]
            [use-oregano ?user yes]
            [use-black-pepper ?user yes]]]]
  then [wine-to-drink ?user sauvignon-blanc])

(defrule sauvignon-blanc-6 (:backward :certainty 0.3 :importance 83)
  if    [or [poultry ?user yes]
         [seafood ?user yes]]
  then [wine-to-drink ?user sauvignon-blanc])

```

```

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Chardonnay                                                         ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

```

```

(defrule chardonnay-1 (:backward :certainty 1.0 :importance 93)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [has-cheese ?user yes]
        [or [use-light-sauce ?user yes]
            [use-cream-sauce ?user yes]]
        [or [use-mustard ?user yes]
            [use-sage ?user yes]
            [use-clove ?user yes]
            [use-ginger ?user yes]]]]

```



```

        [use-caribbean ?user yes]]
        [prefers-dry-wines ?user yes]]
then [wine-to-drink ?user chardonnay])

(defrule chardonnay-2 (:backward :certainty 0.8 :importance 83)
  if [and
      [or [poultry ?user yes]
          [pork ?user yes]
          [seafood ?user yes]]
      [has-tomatoes ?user no]
      [or [use-light-sauce ?user yes]
          [use-cream-sauce ?user yes]]
      [or [use-mustard ?user yes]
          [use-sage ?user yes]
          [use-clove ?user yes]
          [use-ginger ?user yes]
          [use-caribbean ?user yes]]
      [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-3 (:backward :certainty 0.7 :importance 83)
  if [and
      [or [poultry ?user yes]
          [pork ?user yes]
          [seafood ?user yes]]
      [has-tomatoes ?user no]
      [has-cheese ?user yes]
      [or [use-mustard ?user yes]
          [use-sage ?user yes]
          [use-clove ?user yes]
          [use-ginger ?user yes]
          [use-caribbean ?user yes]]
      [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-4 (:backward :certainty 0.6 :importance 83)
  if [and
      [or [poultry ?user yes]
          [pork ?user yes]
          [seafood ?user yes]]
      [has-tomatoes ?user no]
      [has-cheese ?user yes]
      [or [use-light-sauce ?user yes]
          [use-cream-sauce ?user yes]]
      [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-5 (:backward :certainty 0.6 :importance 83)
  if [and
      [or [poultry ?user yes]
          [pork ?user yes]
          [seafood ?user yes]]
      [has-tomatoes ?user no]
      [or [use-mustard ?user yes]
          [use-sage ?user yes]
          [use-clove ?user yes]
          [use-ginger ?user yes]
          [use-caribbean ?user yes]]
      [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-6 (:backward :certainty 0.5 :importance 83)
  if [and
      [or [poultry ?user yes]
          [pork ?user yes]

```

```

        [seafood ?user yes]]
    [has-tomatoes ?user no]
    [or [use-light-sauce ?user yes]
        [use-cream-sauce ?user yes]]
    [prefers-dry-wines ?user yes]]
then [wine-to-drink ?user chardonnay])

(defrule chardonnay-7 (:backward :certainty 0.4 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [has-cheese ?user yes]
        [prefers-dry-wines ?user yes]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-8 (:backward :certainty 0.8 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [has-cheese ?user yes]
        [or [use-light-sauce ?user yes]
            [use-cream-sauce ?user yes]]
        [or [use-mustard ?user yes]
            [use-sage ?user yes]
            [use-clove ?user yes]
            [use-ginger ?user yes]
            [use-caribbean ?user yes]]]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-9 (:backward :certainty 0.6 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [or [use-light-sauce ?user yes]
            [use-cream-sauce ?user yes]]
        [or [use-mustard ?user yes]
            [use-sage ?user yes]
            [use-clove ?user yes]
            [use-ginger ?user yes]
            [use-caribbean ?user yes]]]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-10 (:backward :certainty 0.5 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [has-cheese ?user yes]
        [or [use-mustard ?user yes]
            [use-sage ?user yes]
            [use-clove ?user yes]
            [use-ginger ?user yes]
            [use-caribbean ?user yes]]]]
  then [wine-to-drink ?user chardonnay])

(defrule chardonnay-11 (:backward :certainty 0.4 :importance 83)
  if [and    [or [poultry ?user yes]

```

```
        [pork ?user yes]
        [seafood ?user yes]]
    [has-tomatoes ?user no]
    [has-cheese ?user yes]
    [or [use-light-sauce ?user yes]
        [use-cream-sauce ?user yes]]]
then [wine-to-drink ?user chardonnay])
```

```
(defrule chardonnay-12 (:backward :certainty 0.4 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [or [use-mustard ?user yes]
             [use-sage ?user yes]
             [use-clove ?user yes]
             [use-ginger ?user yes]
             [use-caribbean ?user yes]]]]
  then [wine-to-drink ?user chardonnay])
```

```
(defrule chardonnay-13 (:backward :certainty 0.3 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [or [use-light-sauce ?user yes]
             [use-cream-sauce ?user yes]]]]
  then [wine-to-drink ?user chardonnay])
```

```
(defrule chardonnay-14 (:backward :certainty 0.2 :importance 83)
  if [and    [or [poultry ?user yes]
                 [pork ?user yes]
                 [seafood ?user yes]]
        [has-tomatoes ?user no]
        [has-cheese ?user yes]]
  then [wine-to-drink ?user chardonnay])
```

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;;;                                                                    ;;;
;;; Riesling                                                            ;;;
;;;                                                                    ;;;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
(defrule riesling-desert (:backward :certainty 0.9 :importance 90)
  if [meal ?user dessert]
  then [wine-to-drink ?user riesling])
```

```
(defrule riesling-desert-2 (:backward :certainty 1.0 :importance 91)
  if [and    [meal ?user dessert]
             [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])
```

```
(defrule riesling-1 (:backward :certainty 1.0 :importance 92)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [has-cheese ?user yes]
        [use-light-sauce ?user yes]
        [or [use-dill ?user yes]
```

```

        [use-sage ?user yes]
        [use-clove ?user yes]
        [use-ginger ?user yes]]
    [prefers-sweet-wines ?user yes]]
then [wine-to-drink ?user riesling])

(defrule riesling-2 (:backward :certainty 0.8 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [use-light-sauce ?user yes]
        [or [use-dill ?user yes]
             [use-sage ?user yes]
             [use-clove ?user yes]
             [use-ginger ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

(defrule riesling-3 (:backward :certainty 0.8 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [has-cheese ?user yes]
        [or [use-dill ?user yes]
             [use-sage ?user yes]
             [use-clove ?user yes]
             [use-ginger ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

(defrule riesling-4 (:backward :certainty 0.5 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [has-cheese ?user yes]
        [use-light-sauce ?user yes]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

(defrule riesling-5 (:backward :certainty 0.5 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [or [use-dill ?user yes]
             [use-sage ?user yes]
             [use-clove ?user yes]
             [use-ginger ?user yes]]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

(defrule riesling-6 (:backward :certainty 0.3 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [use-light-sauce ?user yes]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

(defrule riesling-7 (:backward :certainty 0.3 :importance 83)
  if [and    [or [poultry ?user yes]
                 [shellfish ?user yes]]
        [has-cheese ?user yes]
        [prefers-sweet-wines ?user yes]]
  then [wine-to-drink ?user riesling])

```

;;;;;;;;;;;;; End of File ;;;;;;;;;;;;;;