CS 514 HW 1 Report

Alias: Poseidon

**1. Domain**

The domain selected for this project is the inference of mushrooms whether they are poisonous, edible, not recommended or unknown category based on certain physical and demographic properties of the mushrooms. We use these properties as facts and based on these facts and the rules we defined based on study, we infer the edibility of the mushroom family and add them to our knowledgebase as facts, so that the next time we encounter any mushroom of the same family, we can directly infer its edibility. The data for facts and assumptions made to form the rules are based on the dataset obtained from the UCI repository [1]. Mushroom records have been drawn from The Audubon Society Field Guide to North American Mushrooms (1981). G.H.Press, New York: Alfred A. Knopf

2. Dataset Information:

This data set includes descriptions of hypothetical samples corresponding to 23 species of gilled mushrooms in the Agaricus and Lepiota Family (pp. 500-525). Each species is identified as definitely edible, definitely poisonous, or of unknown edibility and not recommended. The Guide clearly states that there is no simple rule for determining the edibility of a mushroom; no rule like ``leaflets three, let it be'' for Poisonous Oak and Ivy. But for the sake of forming rules, certain traits of mushrooms are assumed to be poisonous, edible or unknown edibility.

**2. Encoding Knowledge Using Jess**

**;--------------------------------------------------------------------------------------**

**;\*\* PoisonousMushroom Expert System \*\***

**;--------------------------------------------------------------------------------------**

**;edible**

**;poisonous**

**;unknown**

**;not recommended**

**;--------------------------------------------------------------------------------------**

**;TEMPLATE DEFINITION**

**;--------------------------------------------------------------------------------------**

**(deftemplate mushroom (slot name) (slot cap-shape) (slot cap-surface) (slot cap-color) (slot bruises) (slot odor)**

**(slot gill-attachment) (slot stalk-surface-above-ring) (slot ring-type) (slot population) (slot habitat))**

**(deftemplate poisonous (slot name) (slot cap-shape) (slot cap-surface) (slot cap-color) (slot bruises) (slot odor) (slot gill-attachment) (slot stalk-surface-above-ring) (slot ring-type) (slot population) (slot habitat))**

**(deftemplate edible (slot name) (slot cap-shape) (slot cap-surface) (slot cap-color) (slot bruises) (slot odor) (slot gill-attachment) (slot stalk-surface-above-ring) (slot ring-type) (slot population) (slot habitat))**

**(deftemplate not-recommended (slot name) (slot cap-shape) (slot cap-surface) (slot cap-color) (slot bruises) (slot odor) (slot gill-attachment) (slot stalk-surface-above-ring) (slot ring-type) (slot population) (slot habitat))**

**(deftemplate unknown (slot name) (slot cap-shape) (slot cap-surface) (slot cap-color) (slot bruises) (slot odor) (slot gill-attachment) (slot stalk-surface-above-ring) (slot ring-type) (slot population) (slot habitat))**

**(defglobal ?\*a\* = nil)**

**(defglobal ?\*b\* = nil)**

**(defglobal ?\*c\* = nil)**

**(defglobal ?\*d\* = nil)**

**(defglobal ?\*e\* = nil)**

**(defglobal ?\*f\* = nil)**

**(defglobal ?\*g\* = nil)**

**(defglobal ?\*h\* = nil)**

**(defglobal ?\*i\* = nil)**

**(defglobal ?\*j\* = nil)**

**;--------------------------------------------------------------------------------------**

**; FACTS DEFINITION**

**;--------------------------------------------------------------------------------------**

**(deffacts initial-phase**

**(phase edible1)**

**(phase edible2)**

**(phase edible3)**

**(phase edible4)**

**(phase edible5)**

**(phase edible6)**

**(phase poisonous1)**

**(phase poisonous2)**

**(phase poisonous3)**

**(phase poisonous4)**

**(phase poisonous5)**

**(phase combination1)**

**(phase combination2)**

**(phase combination3)**

**(phase not-recommended1)**

**(phase not-recommended2)**

**(phase not-recommended3)**

**(phase unknown1)**

**(phase unknown2)**

**(mushroom (name augustus) (cap-shape b) (cap-surface g) (bruises f) (odor l))**

**(mushroom (name campestris) (cap-shape x) (cap-color y) (odor a))**

**(mushroom (name bernardii) (bruises unk) (odor unk) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))**

**(mushroom (name bisporus)(bruises t) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))**

**(mushroom (name bisirtquis)(cap-color n) (odor l) (ring-type e) (stalk-surface-above-ring p))**

**(mushroom (name phalloides) (bruises t)(gill-attachment a) (stalk-surface-above-ring s))**

**(mushroom (name Boletus) (bruises t) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))**

**(mushroom (name crocodilinus) (cap-color y) (bruises t) (gill-attachment f))**

**(mushroom (name fuscofibrillosus) (ring-type p) (population s) (habitat m))**

**(mushroom (name appendiculatus) (cap-surface f) (gill-attachment f))**

**(mushroom (name brunnescens) (cap-surface c) (bruises t) (gill-attachment a))**

**(mushroom (name arvensis) (cap-shape f) (gill-attachment d) (ring-type l))**

**(mushroom (name haemorrhoidarius)(cap-shape t) (odor f) (gill-attachment s) (stalk-surface-above-ring p))**

**(mushroom (name bitorquis)(cap-color n) (odor l) (ring-type e) )**

**(mushroom (name Amanita)(bruises t) (gill-attachment a) (stalk-surface-above-ring s))**

**(mushroom (name mellea)(odor y) (gill-attachment n))**

**(mushroom (name ponderosa)(odor s) (ring-type l) (habitat m))**

**(mushroom (name Armillaria) (cap-surface f) (odor s) (ring-type l) (habitat m))**

**(mushroom (name matsutake) (cap-color n) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))**

**(mushroom (name auricula) (cap-surface f) (gill-attachment a) (stalk-surface-above-ring s))**

**(mushroom (name polytricha) (cap-shape x) (cap-surface y) (population s) (habitat g))**

**(mushroom (name aereus) (cap-surface y) (cap-color w) (gill-attachment s) (habitat g))**

**)**

**;--------------------------------------------------------------------------------------**

**; FUNCTION DEFINITION**

**;--------------------------------------------------------------------------------------**

**(deffunction select-cap-shape()**

**(printout t "Please enter cap-shape" crlf)**

**(printout t "bell=b,conical=c,convex=x,flat=f,knobbed=k,sunken=s" crlf)**

**(bind ?\*a\* (read t))**

**(if (or (eq ?\*a\* b) (eq ?\*a\* c) (eq ?\*a\* x) (eq ?\*a\* f) (eq ?\*a\* k) (eq ?\*a\* s) )**

**then**

**else (select-cap-shape))**

**)**

**(deffunction select-cap-surface()**

**(printout t "Please enter cap-surface" crlf)**

**(printout t "fibrous=f,grooves=g,scaly=y,smooth=s" crlf)**

**(bind ?\*b\* (read t))**

**(if (or (eq ?\*b\* f) (eq ?\*b\* g) (eq ?\*b\* y) (eq ?\*b\* s) )**

**then**

**else (select-cap-surface))**

**)**

**(deffunction select-cap-color()**

**(printout t "Please enter cap-color" crlf)**

**(printout t "brown=n,buff=b,cinnamon=c,gray=g,green=r,pink=p,purple=u,red=e,white=w,yellow=y" crlf)**

**(bind ?\*c\* (read t))**

**(if (or (eq ?\*c\* n) (eq ?\*c\* b) (eq ?\*c\* c) (eq ?\*c\* g)**

**(eq ?\*c\* r) (eq ?\*c\* p) (eq ?\*c\* u) (eq ?\*c\* e) (eq ?\*c\* w) (eq ?\*c\* y) )**

**then**

**else (select-cap-color))**

**)**

**(deffunction select-bruises()**

**(printout t "Please enter bruises" crlf)**

**(printout t "bruises=t,nobruises=f" crlf)**

**(bind ?\*d\* (read t))**

**(if (or (eq ?\*d\* t) (eq ?\*d\* f) )**

**then**

**else (select-bruises))**

**)**

**(deffunction select-odor()**

**(printout t "Please enter odor" crlf)**

**(printout t "almond=a,anise=l,creosote=c,fishy=y,foul=f,musty=m,none=n,pungent=p,spicy=s" crlf)**

**(bind ?\*e\* (read t))**

**(if (or (eq ?\*e\* a) (eq ?\*e\* l) (eq ?\*e\* c) (eq ?\*e\* y)**

**(eq ?\*e\* f) (eq ?\*e\* m) (eq ?\*e\* n) (eq ?\*e\* p) (eq ?\*e\* s) )**

**then**

**else (select-odor))**

**)**

**(deffunction select-gill-attachment()**

**(printout t "Please enter gill-attachment" crlf)**

**(printout t "attached=a,descending=d,free=f,notched=n" crlf)**

**(bind ?\*f\* (read t))**

**(if (or (eq ?\*f\* a) (eq ?\*f\* d) (eq ?\*f\* f) (eq ?\*f\* n) )**

**then**

**else (select-gill-attachment))**

**)**

**(deffunction select-stalk-surface-above-ring()**

**(printout t "Please enter stalk-surface-above-ring" crlf)**

**(printout t "fibrous=f,scaly=y,silky=k,smooth=s" crlf)**

**(bind ?\*g\* (read t))**

**(if (or (eq ?\*g\* f) (eq ?\*g\* y) (eq ?\*g\* k) (eq ?\*g\* s) )**

**then**

**else (select-stalk-surface-above-ring))**

**)**

**(deffunction select-ring-type()**

**(printout t "Please enter ring-type" crlf)**

**(printout t "cobwebby=c,evanescent=e,flaring=f,large=l,none=n,pendant=p,sheathing=s,zone=z" crlf)**

**(bind ?\*h\* (read t))**

**(if (or (eq ?\*h\* c) (eq ?\*h\* e) (eq ?\*h\* f) (eq ?\*h\* l)**

**(eq ?\*h\* n) (eq ?\*h\* p) (eq ?\*h\* s) (eq ?\*h\* z) )**

**then**

**else (select-ring-type))**

**)**

**(deffunction select-population()**

**(printout t "Please enter population" crlf)**

**(printout t "abundant=a,clustered=c,numerous=n,scattered=s,several=v,solitary=y" crlf)**

**(bind ?\*i\* (read t))**

**(if (or (eq ?\*i\* a) (eq ?\*i\* c) (eq ?\*i\* n) (eq ?\*i\* s)**

**(eq ?\*i\* v) (eq ?\*i\* y) )**

**then**

**else (select-population))**

**)**

**(deffunction select-habitat()**

**(printout t "Please enter habitat" crlf)**

**(printout t "grasses=g,leaves=l,meadows=m,paths=p,urban=u,waste=w,woods=d" crlf)**

**(bind ?\*j\* (read t))**

**(if (or (eq ?\*j\* g) (eq ?\*j\* l) (eq ?\*j\* m) (eq ?\*j\* p)**

**(eq ?\*j\* u) (eq ?\*j\* w) (eq ?\*j\* d) )**

**then**

**else (select-habitat))**

**)**

**;--------------------------------------------------------------------------------------**

**;RULES DEFINITION**

**;--------------------------------------------------------------------------------------**

**;?,?,?,?,t,?,f,s,p,?,?**

**(defrule edible1**

**(phase edible1)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises t) (odor ?e) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Edible!" crlf)**

**(assert (edible (bruises t) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p)))**

**)**

**;?,?,?,?,t,?,f,s,p,?,?**

**(defrule edible2**

**(phase edible2)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color y) (bruises t) (odor ?e) (gill-attachment f) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Edible!" crlf)**

**(assert (edible (cap-color y) (bruises t) (gill-attachment f)))**

**)**

**;?,?,?,?,?,?,?,?,p,s,m**

**(defrule edible3**

**(phase edible3)**

**(printout t ?n " is Edible!" crlf)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type p) (population s) (habitat m))**

**=>**

**(assert (edible (ring-type p) (population s) (habitat m)))**

**)**

**;?,?,f,?,?,?,f,?,?,?,?**

**(defrule edible4**

**(phase edible4)**

**(printout t ?n " is Edible!" crlf)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface f) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment f) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(assert (edible (cap-surface f) (gill-attachment f)))**

**)**

**;?,?,c,?,t,?,a,?,?,?,?**

**(defrule edible5**

**(phase edible5)**

**(printout t ?n " is Edible!" crlf)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface c) (cap-color ?c) (bruises t) (odor ?e) (gill-attachment a) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(assert (edible (cap-surface c) (bruises t) (gill-attachment a)))**

**)**

**;?,f,?,?,?,?,d,?,l,?,?**

**(defrule edible6**

**(phase edible6)**

**(printout t ?n " is Edible!" crlf)**

**(mushroom (name ?n) (cap-shape f) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment d) (stalk-surface-above-ring ?g) (ring-type l) (population ?i) (habitat ?j))**

**=>**

**(assert (edible (cap-shape f) (gill-attachment d) (ring-type l)))**

**)**

**;?,t,?,?,?,?,f,s,p,?,?**

**(defrule poisonous1**

**(phase poisonous1)**

**(mushroom (name ?n) (cap-shape t) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor f) (gill-attachment s) (stalk-surface-above-ring p) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Poisonous!" crlf)**

**(assert (poisonous (cap-shape t) (odor f) (gill-attachment s) (stalk-surface-above-ring p)))**

**)**

**;?,?,?,n,?,l,?,?,e,?,?**

**(defrule poisonous2**

**(phase poisonous2)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color n) (bruises ?d) (odor l) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type e) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Poisonous!" crlf)**

**(assert (poisonous (cap-color n) (odor l) (ring-type e)))**

**)**

**;?,?,?,?,t,?,a,s,?,?,?**

**(defrule poisonous3**

**(phase poisonous3)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises t) (odor ?e) (gill-attachment a) (stalk-surface-above-ring s) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Poisonous!" crlf)**

**(assert (poisonous (bruises t) (gill-attachment a) (stalk-surface-above-ring s)))**

**)**

**;?,?,?,?,?,y,n,?,?,?,?**

**(defrule poisonous4**

**(phase poisonous4)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor y) (gill-attachment n) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is Poisonous!" crlf)**

**(assert (poisonous (odor y) (gill-attachment n)))**

**)**

**;?,?,?,w,?,s,?,?,l,?,m**

**(defrule poisonous5**

**(phase poisonous5)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color w) (bruises ?d) (odor s) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type l) (population ?i) (habitat m))**

**=>**

**(printout t ?n " is Poisonous!" crlf)**

**(assert (poisonous (odor s) (ring-type l) (habitat m)))**

**)**

**(defrule combination1**

**(phase combination1)**

**(mushroom (name ?n) (cap-shape b) (cap-surface g) (cap-color ?c) (bruises ?d) (odor ?e))**

**=>**

**(printout t "evaluating " ?n "..." crlf)**

**(if (eq ?c nil) then**

**(select-cap-color)**

**(if (eq ?\*c\* u) then**

**(printout t ?n " is a Poisonous mushroom!" crlf)**

**(assert (poisonous(name ?n)))**

**else**

**(printout t ?n "is an Edible mushroom!" crlf))**

**(assert (poisonous(name ?n)))**

**else**

**(printout t "unknown!" crlf)**

**)**

**)**

**(defrule combination2**

**(phase combination2)**

**(mushroom (name ?n) (cap-color n) (odor ?e) (ring-type e) (stalk-surface-above-ring p))**

**=>**

**(printout t "evaluating " ?n "..." crlf)**

**(if (eq ?e nil) then**

**(select-cap-color)**

**(if (eq ?\*e\* l) then**

**(printout t ?n " is a Poisonous mushroom!" crlf)**

**(assert (poisonous(name ?n)))**

**else**

**(printout t ?n "is an Edible mushroom!" crlf))**

**(assert (poisonous(name ?n)))**

**else**

**(printout t "unknown!" crlf)**

**)**

**)**

**(defrule combination3**

**(phase combination3)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises t) (odor ?e) (gill-attachment a) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t "evaluating " ?n "..." crlf)**

**(if (eq ?g nil) then**

**(select-cap-color)**

**(if (eq ?\*g\* s) then**

**(printout t ?n " is a Poisonous mushroom!" crlf)**

**(assert (poisonous(name ?n)))**

**else**

**(printout t ?n "is an Edible mushroom!" crlf))**

**(assert (poisonous(name ?n)))**

**else**

**(printout t "Unknown!" crlf)**

**)**

**)**

**;?,?,f,?,?,s,?,?,l,?,m**

**(defrule not-recommended1**

**(phase not-recommended1)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface f) (cap-color ?c) (bruises ?d) (odor s) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type l) (population ?i) (habitat m))**

**=>**

**(printout t ?n " is not recommended!" crlf)**

**(assert (not-recommended (cap-surface f) (odor s) (ring-type l) (habitat m)))**

**)**

**;?,?,?,n,?,?,f,s,p,?,?**

**(defrule not-recommended2**

**(phase not-recommended2)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color n) (bruises ?d) (odor ?e) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is not recommended!" crlf)**

**(assert (not-recommended (cap-color n) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p)))**

**)**

**;?,?,f,?,?,?,a,s,?,?,?**

**(defrule not-recommended3**

**(phase not-recommended3)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface f) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment a) (stalk-surface-above-ring s) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is not recommended!" crlf)**

**(assert (not-recommended (cap-surface f) (gill-attachment a) (stalk-surface-above-ring s)))**

**)**

**(defrule unknown1**

**(phase unknown1)**

**(mushroom (name ?n) (cap-shape x) (cap-surface y) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type ?h) (population s) (habitat g))**

**=>**

**(printout t "Poisonous nature of "?n " is unknown!" crlf)**

**(assert (unknown (cap-shape x) (cap-surface y) (population s) (habitat g)))**

**)**

**(defrule unknown2**

**(phase unknown2)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface y) (cap-color w) (bruises ?d) (odor ?e) (gill-attachment s) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat g))**

**=>**

**(printout t "Poisonous nature of "?n " is unknown!" crlf)**

**(assert (unknown (cap-surface y) (cap-color w) (gill-attachment s) (habitat g)))**

**)**

**(defrule generic**

**(phase generic)**

**(mushroom (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j))**

**=>**

**(printout t ?n " is generic unknown!" crlf)**

**(assert (unknown (name ?n) (cap-shape ?a) (cap-surface ?b) (cap-color ?c) (bruises ?d) (odor ?e) (gill-attachment ?f) (stalk-surface-above-ring ?g) (ring-type ?h) (population ?i) (habitat ?j)))**

**)**

**(reset)**

**(facts)**

**(run)**

**(facts)**

**3. Example Runs**

**3.1**

**Input**

(mushroom (name augustus) (cap-shape b) (cap-surface g) (bruises f) (odor l))

(mushroom (name campestris) (cap-shape x) (cap-color y) (odor a))

(mushroom (name bernardii) (bruises unk) (odor unk) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))

(mushroom (name bisporus)(bruises t) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))

(mushroom (name bisirtquis)(cap-color n) (odor l) (ring-type e) (stalk-surface-above-ring p))

(mushroom (name phalloides) (bruises t)(gill-attachment a) (stalk-surface-above-ring s))

(mushroom (name Boletus) (bruises t) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))

(mushroom (name crocodilinus) (cap-color y) (bruises t) (gill-attachment f))

(mushroom (name fuscofibrillosus) (ring-type p) (population s) (habitat m))

(mushroom (name appendiculatus) (cap-surface f) (gill-attachment f))

(mushroom (name brunnescens) (cap-surface c) (bruises t) (gill-attachment a))

(mushroom (name arvensis) (cap-shape f) (gill-attachment d) (ring-type l))

(mushroom (name haemorrhoidarius)(cap-shape t) (odor f) (gill-attachment s) (stalk-surface-above-ring p))

(mushroom (name bitorquis)(cap-color n) (odor l) (ring-type e) )

(mushroom (name Amanita)(bruises t) (gill-attachment a) (stalk-surface-above-ring s))

(mushroom (name mellea)(odor y) (gill-attachment n))

(mushroom (name ponderosa)(odor s) (ring-type l) (habitat m))

(mushroom (name Armillaria) (cap-surface f) (odor s) (ring-type l) (habitat m))

(mushroom (name matsutake) (cap-color n) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p))

(mushroom (name auricula) (cap-surface f) (gill-attachment a) (stalk-surface-above-ring s))

(mushroom (name polytricha) (cap-shape x) (cap-surface y) (population s) (habitat g))

(mushroom (name aereus) (cap-surface y) (cap-color w) (gill-attachment s) (habitat g))

**output**

Poisonous nature of aereus is unknown!

Poisonous nature of polytricha is unknown!

auricula is not recommended!

matsutake is not recommended!

Armillaria is not recommended!

mellea is Poisonous!

evaluating Amanita...

Unknown!

Amanita is Poisonous!

bitorquis is Poisonous!

haemorrhoidarius is Poisonous!

evaluating brunnescens...

Please enter cap-color

brown=n,buff=b,cinnamon=c,gray=g,green=r,pink=p,purple=u,red=e,white=w,yellow=y

b

brunnescensis an Edible mushroom!

crocodilinus is Edible!

Boletus is Edible!

evaluating phalloides...

Unknown!

phalloides is Poisonous!

evaluating bisirtquis...

unknown!

bisirtquis is Poisonous!

bisporus is Edible!

evaluating augustus...

Please enter cap-color

brown=n,buff=b,cinnamon=c,gray=g,green=r,pink=p,purple=u,red=e,white=w,yellow=y

u

augustus is a Poisonous mushroom!

**Facts before :**

f-0 (MAIN::initial-fact)

f-1 (MAIN::phase edible1)

f-2 (MAIN::phase edible2)

f-3 (MAIN::phase edible3)

f-4 (MAIN::phase edible4)

f-5 (MAIN::phase edible5)

f-6 (MAIN::phase edible6)

f-7 (MAIN::phase poisonous1)

f-8 (MAIN::phase poisonous2)

f-9 (MAIN::phase poisonous3)

f-10 (MAIN::phase poisonous4)

f-11 (MAIN::phase poisonous5)

f-12 (MAIN::phase combination1)

f-13 (MAIN::phase combination2)

f-14 (MAIN::phase combination3)

f-15 (MAIN::phase not-recommended1)

f-16 (MAIN::phase not-recommended2)

f-17 (MAIN::phase not-recommended3)

f-18 (MAIN::phase unknown1)

f-19 (MAIN::phase unknown2)

f-20 (MAIN::mushroom (name augustus) (cap-shape b) (cap-surface g) (cap-color nil) (bruises f) (odor l) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-21 (MAIN::mushroom (name campestris) (cap-shape x) (cap-surface nil) (cap-color y) (bruises nil) (odor a) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-22 (MAIN::mushroom (name bernardii) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises unk) (odor unk) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-23 (MAIN::mushroom (name bisporus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-24 (MAIN::mushroom (name bisirtquis) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor l) (gill-attachment nil) (stalk-surface-above-ring p) (ring-type e) (population nil) (habitat nil))

f-25 (MAIN::mushroom (name phalloides) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-26 (MAIN::mushroom (name Boletus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-27 (MAIN::mushroom (name crocodilinus) (cap-shape nil) (cap-surface nil) (cap-color y) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-28 (MAIN::mushroom (name fuscofibrillosus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type p) (population s) (habitat m))

f-29 (MAIN::mushroom (name appendiculatus) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor nil) (gill-attachment f) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-30 (MAIN::mushroom (name brunnescens) (cap-shape nil) (cap-surface c) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-31 (MAIN::mushroom (name arvensis) (cap-shape f) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment d) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat nil))

f-32 (MAIN::mushroom (name haemorrhoidarius) (cap-shape t) (cap-surface nil) (cap-color nil) (bruises nil) (odor f) (gill-attachment s) (stalk-surface-above-ring p) (ring-type nil) (population nil) (habitat nil))

f-33 (MAIN::mushroom (name bitorquis) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor l) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type e) (population nil) (habitat nil))

f-34 (MAIN::mushroom (name Amanita) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-35 (MAIN::mushroom (name mellea) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor y) (gill-attachment n) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-36 (MAIN::mushroom (name ponderosa) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor s) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat m))

f-37 (MAIN::mushroom (name Armillaria) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor s) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat m))

f-38 (MAIN::mushroom (name matsutake) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-39 (MAIN::mushroom (name auricula) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-40 (MAIN::mushroom (name polytricha) (cap-shape x) (cap-surface y) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population s) (habitat g))

f-41 (MAIN::mushroom (name aereus) (cap-shape nil) (cap-surface y) (cap-color w) (bruises nil) (odor nil) (gill-attachment s) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat g))

For a total of 42 facts in module MAIN.

**Facts after asserting and Forward Chaining :**

f-0 (MAIN::initial-fact)

f-1 (MAIN::phase edible1)

f-2 (MAIN::phase edible2)

f-3 (MAIN::phase edible3)

f-4 (MAIN::phase edible4)

f-5 (MAIN::phase edible5)

f-6 (MAIN::phase edible6)

f-7 (MAIN::phase poisonous1)

f-8 (MAIN::phase poisonous2)

f-9 (MAIN::phase poisonous3)

f-10 (MAIN::phase poisonous4)

f-11 (MAIN::phase poisonous5)

f-12 (MAIN::phase combination1)

f-13 (MAIN::phase combination2)

f-14 (MAIN::phase combination3)

f-15 (MAIN::phase not-recommended1)

f-16 (MAIN::phase not-recommended2)

f-17 (MAIN::phase not-recommended3)

f-18 (MAIN::phase unknown1)

f-19 (MAIN::phase unknown2)

f-20 (MAIN::mushroom (name augustus) (cap-shape b) (cap-surface g) (cap-color nil) (bruises f) (odor l) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-21 (MAIN::mushroom (name campestris) (cap-shape x) (cap-surface nil) (cap-color y) (bruises nil) (odor a) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-22 (MAIN::mushroom (name bernardii) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises unk) (odor unk) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-23 (MAIN::mushroom (name bisporus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-24 (MAIN::mushroom (name bisirtquis) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor l) (gill-attachment nil) (stalk-surface-above-ring p) (ring-type e) (population nil) (habitat nil))

f-25 (MAIN::mushroom (name phalloides) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-26 (MAIN::mushroom (name Boletus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-27 (MAIN::mushroom (name crocodilinus) (cap-shape nil) (cap-surface nil) (cap-color y) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-28 (MAIN::mushroom (name fuscofibrillosus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type p) (population s) (habitat m))

f-29 (MAIN::mushroom (name appendiculatus) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor nil) (gill-attachment f) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-30 (MAIN::mushroom (name brunnescens) (cap-shape nil) (cap-surface c) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-31 (MAIN::mushroom (name arvensis) (cap-shape f) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment d) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat nil))

f-32 (MAIN::mushroom (name haemorrhoidarius) (cap-shape t) (cap-surface nil) (cap-color nil) (bruises nil) (odor f) (gill-attachment s) (stalk-surface-above-ring p) (ring-type nil) (population nil) (habitat nil))

f-33 (MAIN::mushroom (name bitorquis) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor l) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type e) (population nil) (habitat nil))

f-34 (MAIN::mushroom (name Amanita) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-35 (MAIN::mushroom (name mellea) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor y) (gill-attachment n) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-36 (MAIN::mushroom (name ponderosa) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor s) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat m))

f-37 (MAIN::mushroom (name Armillaria) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor s) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat m))

f-38 (MAIN::mushroom (name matsutake) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-39 (MAIN::mushroom (name auricula) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-40 (MAIN::mushroom (name polytricha) (cap-shape x) (cap-surface y) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population s) (habitat g))

f-41 (MAIN::mushroom (name aereus) (cap-shape nil) (cap-surface y) (cap-color w) (bruises nil) (odor nil) (gill-attachment s) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat g))

f-42 (MAIN::unknown (name nil) (cap-shape nil) (cap-surface y) (cap-color w) (bruises nil) (odor nil) (gill-attachment s) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat g))

f-43 (MAIN::unknown (name nil) (cap-shape x) (cap-surface y) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population s) (habitat g))

f-44 (MAIN::not-recommended (name nil) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-45 (MAIN::not-recommended (name nil) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-46 (MAIN::not-recommended (name nil) (cap-shape nil) (cap-surface f) (cap-color nil) (bruises nil) (odor s) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type l) (population nil) (habitat m))

f-47 (MAIN::poisonous (name nil) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor y) (gill-attachment n) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-48 (MAIN::poisonous (name nil) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment a) (stalk-surface-above-ring s) (ring-type nil) (population nil) (habitat nil))

f-49 (MAIN::poisonous (name nil) (cap-shape nil) (cap-surface nil) (cap-color n) (bruises nil) (odor l) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type e) (population nil) (habitat nil))

f-50 (MAIN::poisonous (name nil) (cap-shape t) (cap-surface nil) (cap-color nil) (bruises nil) (odor f) (gill-attachment s) (stalk-surface-above-ring p) (ring-type nil) (population nil) (habitat nil))

f-51 (MAIN::poisonous (name brunnescens) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-52 (MAIN::edible (name nil) (cap-shape nil) (cap-surface nil) (cap-color y) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

f-53 (MAIN::edible (name nil) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises t) (odor nil) (gill-attachment f) (stalk-surface-above-ring s) (ring-type p) (population nil) (habitat nil))

f-54 (MAIN::poisonous (name augustus) (cap-shape nil) (cap-surface nil) (cap-color nil) (bruises nil) (odor nil) (gill-attachment nil) (stalk-surface-above-ring nil) (ring-type nil) (population nil) (habitat nil))

For a total of 55 facts in module MAIN.

References :

1. <https://archive.ics.uci.edu/ml/datasets/Mushroom>
2. Schlimmer,J.S. (1987). Concept Acquisition Through Representational Adjustment (Technical Report 87-19). Doctoral disseration, Department of Information and Computer Science, University of California, Irvine.  [[Web Link]](http://rexa.info/paper/fbd1dcb58b86c6fa9bb5eadb994213d751a55ff7)