Point 1.

Importing libraries

```
In [21]: import pulp
         from pulp import *
         import pandas as pd
```

Initialating problem "diet

```
In [22]: #Temp variable
         food_arr = {}
         model = pulp.LpProblem("The Optimus Diet", LpMinimize)
         objective_function = None
         #delete last three rows where is located min and max and non ingredient
          data
         fooddata = pd.read_excel("diet.xls", skip_footer=3)
```

Exploring data

Building objecting function which min cost: cost x food

```
In [23]: for index, row in fooddata.iterrows():
             food = pulp.LpVariable(row['Foods'], 0)
             food_arr[row['Foods']] = food
             objective_function += row['Price/ Serving'] * food
         model += objective_function, "Total cost/food/meal"
```

```
In [24]: max_nutrients = {
             "Calories": 2500,
             "Cholesterol mg": 240,
             "Total_Fat g": 70,
             "Sodium mg": 2000,
             "Carbohydrates g": 450,
             "Dietary_Fiber g": 250,
             "Protein g": 100,
             "Vit_A IU": 10000,
             "Vit_C IU": 5000,
             "Calcium mg": 1500,
             "Iron mg": 40
         }
         min_nutrients = {
             "Calories": 1500,
             "Cholesterol mg": 30,
             "Total_Fat g": 20,
             "Sodium mg": 800,
             "Carbohydrates g": 130,
             "Dietary_Fiber g": 125,
             "Protein g": 60,
             "Vit_A IU": 1000,
             "Vit_C IU": 400,
             "Calcium mg": 700,
             "Iron mg": 10
         }
```

```
In [25]: for nutrient in max_nutrients.keys():
             constraints = None
             for index,row in fooddata.iterrows():
                 constraints += row[nutrient] * food_arr[row['Foods']]
             model += constraints <= max_nutrients[nutrient], nutrient + "MaxRequ
         irements"
             model += constraints >= min_nutrients[nutrient], nutrient + "MinRequ
         irements"
```

In [26]:
```
#Solving problem
print(model)
model.solve()
```

```
The Optimus Diet:
MINIMIZE
0.23*2%_Lowfat_Milk + 0.16*3.3%_Fat,Whole_Milk + 0.24*Apple,Raw,W_Skin
 + 0.16*Apple_Pie + 0.16*Bagels + 0.15*Banana + 0.67*Beanbacn_Soup,W_Wa
tr + 0.15*Bologna,Turkey + 0.05*Butter,Regular + 0.31*Cap'N_Crunch + 0.
07*Carrots,Raw + 0.04*Celery,_Raw + 0.25*Cheddar_Cheese + 0.28*Cheerios
 + 0.39*Chicknoodl_Soup + 0.03*Chocolate_Chip_Cookies + 0.28*Corn_Flks,_
Kellogg'S + 0.39*Couscous + 0.65*Crm_Mshrm_Soup,W_Mlk + 0.27*Frankfurte
r,_Beef + 0.16*Frozen_Broccoli + 0.18*Frozen_Corn + 0.32*Grapes + 0.33*
Ham,Sliced,Extralean + 0.83*Hamburger_W_Toppings + 0.31*Hotdog,_Plain +
0.15*Kielbasa,Prk + 0.49*Kiwifruit,Raw,Fresh + 0.02*Lettuce,Iceberg,Raw
 + 0.17*Macaroni,Ckd + 0.52*Malt_O_Meal,Choc + 0.99*New_E_Clamchwd,W_Mlk
 + 0.75*Neweng_Clamchwd + 0.82*Oatmeal + 0.09*Oatmeal_Cookies + 0.15*Ora
nges + 0.07*Peanut_Butter + 0.53*Peppers,_Sweet,_Raw + 0.44*Pizza_W_Pep
peroni + 0.08*Poached_Eggs + 0.04*Popcorn,Air_Popped + 0.81*Pork + 0.22
*Potato_Chips,Bbqflvr + 0.06*Potatoes,_Baked + 0.12*Pretzels + 0.34*Rai
sin_Brn,_Kellg'S + 0.32*Rice_Krispies + 0.84*Roasted_Chicken + 0.45*Sar
dines_in_Oil + 0.11*Scrambled_Eggs + 0.13*Skim_Milk + 0.78*Spaghetti_W_
_Sauce + 0.38*Special_K + 0.67*Splt_Pea&Hamsoup + 0.59*Taco + 0.31*Tofu
 + 0.27*Tomato,Red,Ripe,Raw + 0.39*Tomato_Soup + 0.19*Tortilla_Chip + 0.
71*Vegetbeef_Soup + 0.05*Wheat_Bread + 0.06*White_Bread + 0.08*White_Ri
ce + 0.69*White_Tuna_in_Water + 0.0
SUBJECT TO
CaloriesMaxRequirements: 121.2 2%_Lowfat_Milk + 149.9 3.3%_Fat,Whole_Mi
lk
 + 81.4 Apple,Raw,W_Skin + 67.2 Apple_Pie + 78 Bagels + 104.9 Banana
 + 172 Beanbacn_Soup,W_Watr + 56.4 Bologna,Turkey + 35.8 Butter,Regular
 + 119.6 Cap'N_Crunch + 23.7 Carrots,Raw + 6.4 Celery,_Raw
 + 112.7 Cheddar_Cheese + 111 Cheerios + 150.1 Chicknoodl_Soup
 + 78.1 Chocolate_Chip_Cookies + 110.5 Corn_Flks,_Kellogg'S + 100.8 Cou
scous
 + 203.4 Crm_Mshrm_Soup,W_Mlk + 141.8 Frankfurter,_Beef + 73.8 Frozen_B
roccoli
 + 72.2 Frozen_Corn + 15.1 Grapes + 37.1 Ham,Sliced,Extralean
 + 275 Hamburger_W_Toppings + 242.1 Hotdog,_Plain + 80.6 Kielbasa,Prk
 + 46.4 Kiwifruit,Raw,Fresh + 2.6 Lettuce,Iceberg,Raw + 98.7 Macaroni,C
kd
 + 607.2 Malt_O_Meal,Choc + 163.7 New_E_Clamchwd,W_Mlk + 175.7 Neweng_C
lamchwd
 + 145.1 Oatmeal + 81 Oatmeal_Cookies + 61.6 Oranges + 188.5 Peanut_But
ter
 + 20 Peppers,_Sweet,_Raw + 181 Pizza_W_Pepperoni + 74.5 Poached_Eggs
 + 108.3 Popcorn,Air_Popped + 710.8 Pork + 139.2 Potato_Chips,Bbqflvr
 + 171.5 Potatoes,_Baked + 108 Pretzels + 115.1 Raisin_Brn,_Kellg'S
 + 112.2 Rice_Krispies + 277.4 Roasted_Chicken + 49.9 Sardines_in_Oil
 + 99.6 Scrambled_Eggs + 85.5 Skim_Milk + 358.2 Spaghetti_W__Sauce
 + 110.8 Special_K + 184.8 Splt_Pea&Hamsoup + 369.4 Taco + 88.2 Tofu
 + 25.8 Tomato,Red,Ripe,Raw + 170.7 Tomato_Soup + 142 Tortilla_Chip
 + 158.1 Vegetbeef_Soup + 65 Wheat_Bread + 65 White_Bread + 102.7 White
_Rice
 + 115.6 White_Tuna_in_Water <= 2500

CaloriesMinRequirements: 121.2 2%_Lowfat_Milk + 149.9 3.3%_Fat,Whole_Mi
lk
 + 81.4 Apple,Raw,W_Skin + 67.2 Apple_Pie + 78 Bagels + 104.9 Banana
 + 172 Beanbacn_Soup,W_Watr + 56.4 Bologna,Turkey + 35.8 Butter,Regular
 + 119.6 Cap'N_Crunch + 23.7 Carrots,Raw + 6.4 Celery,_Raw
```

```
  + 112.7 Cheddar_Cheese + 111 Cheerios + 150.1 Chicknoodl_Soup
  + 78.1 Chocolate_Chip_Cookies + 110.5 Corn_Flks,_Kellogg'S + 100.8 Cou
scous
  + 203.4 Crm_Mshrm_Soup,W_Mlk + 141.8 Frankfurter,_Beef + 73.8 Frozen_B
roccoli
  + 72.2 Frozen_Corn + 15.1 Grapes + 37.1 Ham,Sliced,Extralean
  + 275 Hamburger_W_Toppings + 242.1 Hotdog,_Plain + 80.6 Kielbasa,Prk
  + 46.4 Kiwifruit,Raw,Fresh + 2.6 Lettuce,Iceberg,Raw + 98.7 Macaroni,C
kd
  + 607.2 Malt_O_Meal,Choc + 163.7 New_E_Clamchwd,W_Mlk + 175.7 Neweng_C
lamchwd
  + 145.1 Oatmeal + 81 Oatmeal_Cookies + 61.6 Oranges + 188.5 Peanut_But
ter
  + 20 Peppers,_Sweet,_Raw + 181 Pizza_W_Pepperoni + 74.5 Poached_Eggs
  + 108.3 Popcorn,Air_Popped + 710.8 Pork + 139.2 Potato_Chips,Bbqflvr
  + 171.5 Potatoes,_Baked + 108 Pretzels + 115.1 Raisin_Brn,_Kellg'S
  + 112.2 Rice_Krispies + 277.4 Roasted_Chicken + 49.9 Sardines_in_Oil
  + 99.6 Scrambled_Eggs + 85.5 Skim_Milk + 358.2 Spaghetti_W__Sauce
  + 110.8 Special_K + 184.8 Splt_Pea&Hamsoup + 369.4 Taco + 88.2 Tofu
  + 25.8 Tomato,Red,Ripe,Raw + 170.7 Tomato_Soup + 142 Tortilla_Chip
  + 158.1 Vegetbeef_Soup + 65 Wheat_Bread + 65 White_Bread + 102.7 White
_Rice
  + 115.6 White_Tuna_in_Water >= 1500

Cholesterol_mgMaxRequirements: 18.3 2%_Lowfat_Milk + 33.2 3.3%_Fat,Whol
e_Milk
  + 2.5 Beanbacn_Soup,W_Watr + 28.1 Bologna,Turkey + 10.9 Butter,Regular
  + 29.4 Cheddar_Cheese + 12.3 Chicknoodl_Soup + 5.1 Chocolate_Chip_Cook
ies
  + 19.8 Crm_Mshrm_Soup,W_Mlk + 27.4 Frankfurter,_Beef
  + 13.3 Ham,Sliced,Extralean + 42.8 Hamburger_W_Toppings + 44.1 Hotdog,
_Plain
  + 17.4 Kielbasa,Prk + 22.3 New_E_Clamchwd,W_Mlk + 10 Neweng_Clamchwd
  + 14.2 Pizza_W_Pepperoni + 211.5 Poached_Eggs + 105.1 Pork
  + 129.9 Roasted_Chicken + 34.1 Sardines_in_Oil + 211.2 Scrambled_Eggs
  + 4.4 Skim_Milk + 7.2 Splt_Pea&Hamsoup + 56.4 Taco + 10 Vegetbeef_Soup
  + 35.7 White_Tuna_in_Water <= 240

Cholesterol_mgMinRequirements: 18.3 2%_Lowfat_Milk + 33.2 3.3%_Fat,Whol
e_Milk
  + 2.5 Beanbacn_Soup,W_Watr + 28.1 Bologna,Turkey + 10.9 Butter,Regular
  + 29.4 Cheddar_Cheese + 12.3 Chicknoodl_Soup + 5.1 Chocolate_Chip_Cook
ies
  + 19.8 Crm_Mshrm_Soup,W_Mlk + 27.4 Frankfurter,_Beef
  + 13.3 Ham,Sliced,Extralean + 42.8 Hamburger_W_Toppings + 44.1 Hotdog,
_Plain
  + 17.4 Kielbasa,Prk + 22.3 New_E_Clamchwd,W_Mlk + 10 Neweng_Clamchwd
  + 14.2 Pizza_W_Pepperoni + 211.5 Poached_Eggs + 105.1 Pork
  + 129.9 Roasted_Chicken + 34.1 Sardines_in_Oil + 211.2 Scrambled_Eggs
  + 4.4 Skim_Milk + 7.2 Splt_Pea&Hamsoup + 56.4 Taco + 10 Vegetbeef_Soup
  + 35.7 White_Tuna_in_Water >= 30

Total_Fat_gMaxRequirements: 4.7 2%_Lowfat_Milk + 8.1 3.3%_Fat,Whole_Mil
k
  + 0.5 Apple,Raw,W_Skin + 3.1 Apple_Pie + 0.5 Bagels + 0.5 Banana
  + 5.9 Beanbacn_Soup,W_Watr + 4.3 Bologna,Turkey + 4.1 Butter,Regular
  + 2.6 Cap'N_Crunch + 0.1 Carrots,Raw + 0.1 Celery,_Raw + 9.3 Cheddar_C
```

heese
 + 1.8 Cheerios + 4.6 Chicknoodl_Soup + 4.5 Chocolate_Chip_Cookies
 + 0.1 Corn_Flks,_Kellogg'S + 0.1 Couscous + 13.6 Crm_Mshrm_Soup,W_Mlk
 + 12.8 Frankfurter,_Beef + 0.8 Frozen_Broccoli + 0.6 Frozen_Corn + 0.1
Grapes
 + 1.4 Ham,Sliced,Extralean + 10.2 Hamburger_W_Toppings + 14.5 Hotdog,_
Plain
 + 7.1 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.5 Macaroni,Ckd
 + 1.5 Malt_O_Meal,Choc + 6.6 New_E_Clamchwd,W_Mlk + 5 Neweng_Clamchwd
 + 2.3 Oatmeal + 3.3 Oatmeal_Cookies + 0.2 Oranges + 16 Peanut_Butter
 + 0.1 Peppers,_Sweet,_Raw + 7 Pizza_W_Pepperoni + 5 Poached_Eggs
 + 1.2 Popcorn,Air_Popped + 72.2 Pork + 9.2 Potato_Chips,Bbqflvr
 + 0.2 Potatoes,_Baked + Pretzels + 0.7 Raisin_Brn,_Kellg'S
 + 0.2 Rice_Krispies + 10.8 Roasted_Chicken + 2.7 Sardines_in_Oil
 + 7.3 Scrambled_Eggs + 0.4 Skim_Milk + 12.3 Spaghetti_W__Sauce
 + 0.1 Special_K + 4 Splt_Pea&Hamsoup + 20.6 Taco + 5.5 Tofu
 + 0.4 Tomato,Red,Ripe,Raw + 3.8 Tomato_Soup + 7.4 Tortilla_Chip
 + 3.8 Vegetbeef_Soup + Wheat_Bread + White_Bread + 0.2 White_Rice
 + 2.1 White_Tuna_in_Water <= 70

Total_Fat_gMinRequirements: 4.7 2%_Lowfat_Milk + 8.1 3.3%_Fat,Whole_Mil
k
 + 0.5 Apple,Raw,W_Skin + 3.1 Apple_Pie + 0.5 Bagels + 0.5 Banana
 + 5.9 Beanbacn_Soup,W_Watr + 4.3 Bologna,Turkey + 4.1 Butter,Regular
 + 2.6 Cap'N_Crunch + 0.1 Carrots,Raw + 0.1 Celery,_Raw + 9.3 Cheddar_C
heese
 + 1.8 Cheerios + 4.6 Chicknoodl_Soup + 4.5 Chocolate_Chip_Cookies
 + 0.1 Corn_Flks,_Kellogg'S + 0.1 Couscous + 13.6 Crm_Mshrm_Soup,W_Mlk
 + 12.8 Frankfurter,_Beef + 0.8 Frozen_Broccoli + 0.6 Frozen_Corn + 0.1
Grapes
 + 1.4 Ham,Sliced,Extralean + 10.2 Hamburger_W_Toppings + 14.5 Hotdog,_
Plain
 + 7.1 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.5 Macaroni,Ckd
 + 1.5 Malt_O_Meal,Choc + 6.6 New_E_Clamchwd,W_Mlk + 5 Neweng_Clamchwd
 + 2.3 Oatmeal + 3.3 Oatmeal_Cookies + 0.2 Oranges + 16 Peanut_Butter
 + 0.1 Peppers,_Sweet,_Raw + 7 Pizza_W_Pepperoni + 5 Poached_Eggs
 + 1.2 Popcorn,Air_Popped + 72.2 Pork + 9.2 Potato_Chips,Bbqflvr
 + 0.2 Potatoes,_Baked + Pretzels + 0.7 Raisin_Brn,_Kellg'S
 + 0.2 Rice_Krispies + 10.8 Roasted_Chicken + 2.7 Sardines_in_Oil
 + 7.3 Scrambled_Eggs + 0.4 Skim_Milk + 12.3 Spaghetti_W__Sauce
 + 0.1 Special_K + 4 Splt_Pea&Hamsoup + 20.6 Taco + 5.5 Tofu
 + 0.4 Tomato,Red,Ripe,Raw + 3.8 Tomato_Soup + 7.4 Tortilla_Chip
 + 3.8 Vegetbeef_Soup + Wheat_Bread + White_Bread + 0.2 White_Rice
 + 2.1 White_Tuna_in_Water >= 20

Sodium_mgMaxRequirements: 121.8 2%_Lowfat_Milk + 119.6 3.3%_Fat,Whole_M
ilk
 + 75.4 Apple_Pie + 151.4 Bagels + 1.1 Banana + 951.3 Beanbacn_Soup,W_W
atr
 + 248.9 Bologna,Turkey + 41.3 Butter,Regular + 213.3 Cap'N_Crunch
 + 19.2 Carrots,Raw + 34.8 Celery,_Raw + 173.7 Cheddar_Cheese + 307.6 C
heerios
 + 1862.2 Chicknoodl_Soup + 57.8 Chocolate_Chip_Cookies
 + 290.5 Corn_Flks,_Kellogg'S + 4.5 Couscous + 1076.3 Crm_Mshrm_Soup,W_
Mlk
 + 461.7 Frankfurter,_Beef + 68.2 Frozen_Broccoli + 2.5 Frozen_Corn
 + 0.5 Grapes + 405.1 Ham,Sliced,Extralean + 563.9 Hamburger_W_Toppings

```
    + 670.3 Hotdog,_Plain + 279.8 Kielbasa,Prk + 3.8 Kiwifruit,Raw,Fresh
    + 1.8 Lettuce,Iceberg,Raw + 0.7 Macaroni,Ckd + 16.5 Malt_O_Meal,Choc
    + 992 New_E_Clamchwd,W_Mlk + 1864.9 Neweng_Clamchwd + 2.3 Oatmeal
    + 68.9 Oatmeal_Cookies + 155.5 Peanut_Butter + 1.5 Peppers,_Sweet,_Raw
    + 267 Pizza_W_Pepperoni + 140 Poached_Eggs + 1.1 Popcorn,Air_Popped
    + 38.4 Pork + 212.6 Potato_Chips,Bbqflvr + 15.2 Potatoes,_Baked
    + 486.2 Pretzels + 204.4 Raisin_Brn,_Kellg'S + 340.8 Rice_Krispies
    + 125.6 Roasted_Chicken + 121.2 Sardines_in_Oil + 168 Scrambled_Eggs
    + 126.2 Skim_Milk + 1237.1 Spaghetti_W__Sauce + 265.5 Special_K
    + 964.8 Splt_Pea&Hamsoup + 802 Taco + 8.1 Tofu + 11.1 Tomato,Red,Ripe,
Raw
    + 1744.4 Tomato_Soup + 149.7 Tortilla_Chip + 1915.1 Vegetbeef_Soup
    + 134.5 Wheat_Bread + 132.5 White_Bread + 0.8 White_Rice
    + 333.2 White_Tuna_in_Water <= 2000

Sodium_mgMinRequirements: 121.8 2%_Lowfat_Milk + 119.6 3.3%_Fat,Whole_M
ilk
    + 75.4 Apple_Pie + 151.4 Bagels + 1.1 Banana + 951.3 Beanbacn_Soup,W_W
atr
    + 248.9 Bologna,Turkey + 41.3 Butter,Regular + 213.3 Cap'N_Crunch
    + 19.2 Carrots,Raw + 34.8 Celery,_Raw + 173.7 Cheddar_Cheese + 307.6 C
heerios
    + 1862.2 Chicknoodl_Soup + 57.8 Chocolate_Chip_Cookies
    + 290.5 Corn_Flks,_Kellogg'S + 4.5 Couscous + 1076.3 Crm_Mshrm_Soup,W_
Mlk
    + 461.7 Frankfurter,_Beef + 68.2 Frozen_Broccoli + 2.5 Frozen_Corn
    + 0.5 Grapes + 405.1 Ham,Sliced,Extralean + 563.9 Hamburger_W_Toppings
    + 670.3 Hotdog,_Plain + 279.8 Kielbasa,Prk + 3.8 Kiwifruit,Raw,Fresh
    + 1.8 Lettuce,Iceberg,Raw + 0.7 Macaroni,Ckd + 16.5 Malt_O_Meal,Choc
    + 992 New_E_Clamchwd,W_Mlk + 1864.9 Neweng_Clamchwd + 2.3 Oatmeal
    + 68.9 Oatmeal_Cookies + 155.5 Peanut_Butter + 1.5 Peppers,_Sweet,_Raw
    + 267 Pizza_W_Pepperoni + 140 Poached_Eggs + 1.1 Popcorn,Air_Popped
    + 38.4 Pork + 212.6 Potato_Chips,Bbqflvr + 15.2 Potatoes,_Baked
    + 486.2 Pretzels + 204.4 Raisin_Brn,_Kellg'S + 340.8 Rice_Krispies
    + 125.6 Roasted_Chicken + 121.2 Sardines_in_Oil + 168 Scrambled_Eggs
    + 126.2 Skim_Milk + 1237.1 Spaghetti_W__Sauce + 265.5 Special_K
    + 964.8 Splt_Pea&Hamsoup + 802 Taco + 8.1 Tofu + 11.1 Tomato,Red,Ripe,
Raw
    + 1744.4 Tomato_Soup + 149.7 Tortilla_Chip + 1915.1 Vegetbeef_Soup
    + 134.5 Wheat_Bread + 132.5 White_Bread + 0.8 White_Rice
    + 333.2 White_Tuna_in_Water >= 800

Carbohydrates_gMaxRequirements: 11.7 2%_Lowfat_Milk + 11.4 3.3%_Fat,Who
le_Milk
    + 21 Apple,Raw,W_Skin + 9.6 Apple_Pie + 15.1 Bagels + 26.7 Banana
    + 22.8 Beanbacn_Soup,W_Watr + 0.3 Bologna,Turkey + 23 Cap'N_Crunch
    + 5.6 Carrots,Raw + 1.5 Celery,_Raw + 0.4 Cheddar_Cheese + 19.6 Cheeri
os
    + 18.7 Chicknoodl_Soup + 9.3 Chocolate_Chip_Cookies
    + 24.5 Corn_Flks,_Kellogg'S + 20.9 Couscous + 15 Crm_Mshrm_Soup,W_Mlk
    + 0.8 Frankfurter,_Beef + 13.6 Frozen_Broccoli + 17.1 Frozen_Corn
    + 4.1 Grapes + 0.3 Ham,Sliced,Extralean + 32.7 Hamburger_W_Toppings
    + 18 Hotdog,_Plain + 0.6 Kielbasa,Prk + 11.3 Kiwifruit,Raw,Fresh
    + 0.4 Lettuce,Iceberg,Raw + 19.8 Macaroni,Ckd + 128.2 Malt_O_Meal,Choc
    + 16.6 New_E_Clamchwd,W_Mlk + 21.8 Neweng_Clamchwd + 25.3 Oatmeal
    + 12.4 Oatmeal_Cookies + 15.4 Oranges + 6.9 Peanut_Butter
    + 4.8 Peppers,_Sweet,_Raw + 19.9 Pizza_W_Pepperoni + 0.6 Poached_Eggs
```

+ 22.1 Popcorn,Air_Popped + 15 Potato_Chips,Bbqflvr + 39.9 Potatoes,_B
aked
 + 22.5 Pretzels + 27.9 Raisin_Brn,_Kellg'S + 24.8 Rice_Krispies
 + 1.3 Scrambled_Eggs + 11.9 Skim_Milk + 58.3 Spaghetti_W__Sauce
 + 21.3 Special_K + 26.8 Splt_Pea&Hamsoup + 26.7 Taco + 2.2 Tofu
 + 5.7 Tomato,Red,Ripe,Raw + 33.2 Tomato_Soup + 17.8 Tortilla_Chip
 + 20.4 Vegetbeef_Soup + 12.4 Wheat_Bread + 11.8 White_Bread + 22.3 Whi
te_Rice
 <= 450

Carbohydrates_gMinRequirements: 11.7 2%_Lowfat_Milk + 11.4 3.3%_Fat,Who
le_Milk
 + 21 Apple,Raw,W_Skin + 9.6 Apple_Pie + 15.1 Bagels + 26.7 Banana
 + 22.8 Beanbacn_Soup,W_Watr + 0.3 Bologna,Turkey + 23 Cap'N_Crunch
 + 5.6 Carrots,Raw + 1.5 Celery,_Raw + 0.4 Cheddar_Cheese + 19.6 Cheeri
os
 + 18.7 Chicknoodl_Soup + 9.3 Chocolate_Chip_Cookies
 + 24.5 Corn_Flks,_Kellogg'S + 20.9 Couscous + 15 Crm_Mshrm_Soup,W_Mlk
 + 0.8 Frankfurter,_Beef + 13.6 Frozen_Broccoli + 17.1 Frozen_Corn
 + 4.1 Grapes + 0.3 Ham,Sliced,Extralean + 32.7 Hamburger_W_Toppings
 + 18 Hotdog,_Plain + 0.6 Kielbasa,Prk + 11.3 Kiwifruit,Raw,Fresh
 + 0.4 Lettuce,Iceberg,Raw + 19.8 Macaroni,Ckd + 128.2 Malt_O_Meal,Choc
 + 16.6 New_E_Clamchwd,W_Mlk + 21.8 Neweng_Clamchwd + 25.3 Oatmeal
 + 12.4 Oatmeal_Cookies + 15.4 Oranges + 6.9 Peanut_Butter
 + 4.8 Peppers,_Sweet,_Raw + 19.9 Pizza_W_Pepperoni + 0.6 Poached_Eggs
 + 22.1 Popcorn,Air_Popped + 15 Potato_Chips,Bbqflvr + 39.9 Potatoes,_B
aked
 + 22.5 Pretzels + 27.9 Raisin_Brn,_Kellg'S + 24.8 Rice_Krispies
 + 1.3 Scrambled_Eggs + 11.9 Skim_Milk + 58.3 Spaghetti_W__Sauce
 + 21.3 Special_K + 26.8 Splt_Pea&Hamsoup + 26.7 Taco + 2.2 Tofu
 + 5.7 Tomato,Red,Ripe,Raw + 33.2 Tomato_Soup + 17.8 Tortilla_Chip
 + 20.4 Vegetbeef_Soup + 12.4 Wheat_Bread + 11.8 White_Bread + 22.3 Whi
te_Rice
 >= 130

Dietary_Fiber_gMaxRequirements: 3.7 Apple,Raw,W_Skin + 0.5 Apple_Pie
 + 0.6 Bagels + 2.7 Banana + 8.6 Beanbacn_Soup,W_Watr + 0.5 Cap'N_Crunc
h
 + 1.6 Carrots,Raw + 0.7 Celery,_Raw + 2 Cheerios + 1.5 Chicknoodl_Soup
 + 0.7 Corn_Flks,_Kellogg'S + 1.3 Couscous + 0.5 Crm_Mshrm_Soup,W_Mlk
 + 8.5 Frozen_Broccoli + 2 Frozen_Corn + 0.2 Grapes + 2.6 Kiwifruit,Ra
w,Fresh
 + 0.3 Lettuce,Iceberg,Raw + 0.9 Macaroni,Ckd + 1.5 New_E_Clamchwd,W_Ml
k
 + 1.5 Neweng_Clamchwd + 4 Oatmeal + 0.6 Oatmeal_Cookies + 3.1 Oranges
 + 2.1 Peanut_Butter + 1.3 Peppers,_Sweet,_Raw + 4.3 Popcorn,Air_Popped
 + 1.2 Potato_Chips,Bbqflvr + 3.2 Potatoes,_Baked + 0.9 Pretzels
 + 4 Raisin_Brn,_Kellg'S + 0.4 Rice_Krispies + 11.6 Spaghetti_W__Sauce
 + 0.7 Special_K + 4.1 Splt_Pea&Hamsoup + 1.4 Tofu + 1.4 Tomato,Red,Rip
e,Raw
 + Tomato_Soup + 1.8 Tortilla_Chip + 4 Vegetbeef_Soup + 1.3 Wheat_Bread
 + 1.1 White_Bread + 0.3 White_Rice <= 250

Dietary_Fiber_gMinRequirements: 3.7 Apple,Raw,W_Skin + 0.5 Apple_Pie
 + 0.6 Bagels + 2.7 Banana + 8.6 Beanbacn_Soup,W_Watr + 0.5 Cap'N_Crunc
h
 + 1.6 Carrots,Raw + 0.7 Celery,_Raw + 2 Cheerios + 1.5 Chicknoodl_Soup

```
         + 0.7 Corn_Flks,_Kellogg'S + 1.3 Couscous + 0.5 Crm_Mshrm_Soup,W_Mlk
         + 8.5 Frozen_Broccoli + 2 Frozen_Corn + 0.2 Grapes + 2.6 Kiwifruit,Ra
        w,Fresh
         + 0.3 Lettuce,Iceberg,Raw + 0.9 Macaroni,Ckd + 1.5 New_E_Clamchwd,W_Ml
        k
         + 1.5 Neweng_Clamchwd + 4 Oatmeal + 0.6 Oatmeal_Cookies + 3.1 Oranges
         + 2.1 Peanut_Butter + 1.3 Peppers,_Sweet,_Raw + 4.3 Popcorn,Air_Popped
         + 1.2 Potato_Chips,Bbqflvr + 3.2 Potatoes,_Baked + 0.9 Pretzels
         + 4 Raisin_Brn,_Kellg'S + 0.4 Rice_Krispies + 11.6 Spaghetti_W__Sauce
         + 0.7 Special_K + 4.1 Splt_Pea&Hamsoup + 1.4 Tofu + 1.4 Tomato,Red,Rip
        e,Raw
         + Tomato_Soup + 1.8 Tortilla_Chip + 4 Vegetbeef_Soup + 1.3 Wheat_Bread
         + 1.1 White_Bread + 0.3 White_Rice >= 125

        Protein_gMaxRequirements: 8.1 2%_Lowfat_Milk + 8 3.3%_Fat,Whole_Milk
         + 0.3 Apple,Raw,W_Skin + 0.5 Apple_Pie + 3 Bagels + 1.2 Banana
         + 7.9 Beanbacn_Soup,W_Watr + 3.9 Bologna,Turkey + 1.4 Cap'N_Crunch
         + 0.6 Carrots,Raw + 0.3 Celery,_Raw + 7 Cheddar_Cheese + 4.3 Cheerios
         + 7.9 Chicknoodl_Soup + 0.9 Chocolate_Chip_Cookies + 2.3 Corn_Flks,_Ke
        llogg'S
         + 3.4 Couscous + 6.1 Crm_Mshrm_Soup,W_Mlk + 5.4 Frankfurter,_Beef
         + 8 Frozen_Broccoli + 2.5 Frozen_Corn + 0.2 Grapes + 5.5 Ham,Sliced,Ex
        tralean
         + 13.6 Hamburger_W_Toppings + 10.4 Hotdog,_Plain + 3.4 Kielbasa,Prk
         + 0.8 Kiwifruit,Raw,Fresh + 0.2 Lettuce,Iceberg,Raw + 3.3 Macaroni,Ckd
         + 17.3 Malt_O_Meal,Choc + 9.5 New_E_Clamchwd,W_Mlk + 10.9 Neweng_Clamc
        hwd
         + 6.1 Oatmeal + 1.1 Oatmeal_Cookies + 1.2 Oranges + 7.7 Peanut_Butter
         + 0.7 Peppers,_Sweet,_Raw + 10.1 Pizza_W_Pepperoni + 6.2 Poached_Eggs
         + 3.4 Popcorn,Air_Popped + 13.8 Pork + 2.2 Potato_Chips,Bbqflvr
         + 3.7 Potatoes,_Baked + 2.6 Pretzels + 4 Raisin_Brn,_Kellg'S
         + 1.9 Rice_Krispies + 42.2 Roasted_Chicken + 5.9 Sardines_in_Oil
         + 6.7 Scrambled_Eggs + 8.4 Skim_Milk + 8.2 Spaghetti_W__Sauce + 5.6 Sp
        ecial_K
         + 11.1 Splt_Pea&Hamsoup + 20.7 Taco + 9.4 Tofu + Tomato,Red,Ripe,Raw
         + 4.1 Tomato_Soup + 2 Tortilla_Chip + 11.2 Vegetbeef_Soup + 2.2 Wheat_
        Bread
         + 2.3 White_Bread + 2.1 White_Rice + 22.7 White_Tuna_in_Water <= 100

        Protein_gMinRequirements: 8.1 2%_Lowfat_Milk + 8 3.3%_Fat,Whole_Milk
         + 0.3 Apple,Raw,W_Skin + 0.5 Apple_Pie + 3 Bagels + 1.2 Banana
         + 7.9 Beanbacn_Soup,W_Watr + 3.9 Bologna,Turkey + 1.4 Cap'N_Crunch
         + 0.6 Carrots,Raw + 0.3 Celery,_Raw + 7 Cheddar_Cheese + 4.3 Cheerios
         + 7.9 Chicknoodl_Soup + 0.9 Chocolate_Chip_Cookies + 2.3 Corn_Flks,_Ke
        llogg'S
         + 3.4 Couscous + 6.1 Crm_Mshrm_Soup,W_Mlk + 5.4 Frankfurter,_Beef
         + 8 Frozen_Broccoli + 2.5 Frozen_Corn + 0.2 Grapes + 5.5 Ham,Sliced,Ex
        tralean
         + 13.6 Hamburger_W_Toppings + 10.4 Hotdog,_Plain + 3.4 Kielbasa,Prk
         + 0.8 Kiwifruit,Raw,Fresh + 0.2 Lettuce,Iceberg,Raw + 3.3 Macaroni,Ckd
         + 17.3 Malt_O_Meal,Choc + 9.5 New_E_Clamchwd,W_Mlk + 10.9 Neweng_Clamc
        hwd
         + 6.1 Oatmeal + 1.1 Oatmeal_Cookies + 1.2 Oranges + 7.7 Peanut_Butter
         + 0.7 Peppers,_Sweet,_Raw + 10.1 Pizza_W_Pepperoni + 6.2 Poached_Eggs
         + 3.4 Popcorn,Air_Popped + 13.8 Pork + 2.2 Potato_Chips,Bbqflvr
         + 3.7 Potatoes,_Baked + 2.6 Pretzels + 4 Raisin_Brn,_Kellg'S
         + 1.9 Rice_Krispies + 42.2 Roasted_Chicken + 5.9 Sardines_in_Oil
```

```
 + 6.7 Scrambled_Eggs + 8.4 Skim_Milk + 8.2 Spaghetti_W__Sauce + 5.6 Sp
ecial_K
 + 11.1 Splt_Pea&Hamsoup + 20.7 Taco + 9.4 Tofu + Tomato,Red,Ripe,Raw
 + 4.1 Tomato_Soup + 2 Tortilla_Chip + 11.2 Vegetbeef_Soup + 2.2 Wheat_
Bread
 + 2.3 White_Bread + 2.1 White_Rice + 22.7 White_Tuna_in_Water >= 60


Vit_A_IUMaxRequirements: 500.2 2%_Lowfat_Milk + 307.4 3.3%_Fat,Whole_Mi
lk
 + 73.1 Apple,Raw,W_Skin + 35.2 Apple_Pie + 92.3 Banana
 + 888 Beanbacn_Soup,W_Watr + 152.9 Butter,Regular + 40.6 Cap'N_Crunch
 + 15471 Carrots,Raw + 53.6 Celery,_Raw + 296.5 Cheddar_Cheese
 + 1252.2 Cheerios + 1308.7 Chicknoodl_Soup + 101.8 Chocolate_Chip_Cook
ies
 + 1252.2 Corn_Flks,_Kellogg'S + 153.8 Crm_Mshrm_Soup,W_Mlk
 + 5867.4 Frozen_Broccoli + 106.6 Frozen_Corn + 24 Grapes
 + 126.3 Hamburger_W_Toppings + 133 Kiwifruit,Raw,Fresh
 + 66 Lettuce,Iceberg,Raw + 163.7 New_E_Clamchwd,W_Mlk + 20.1 Neweng_Cl
amchwd
 + 37.4 Oatmeal + 2.9 Oatmeal_Cookies + 268.6 Oranges
 + 467.7 Peppers,_Sweet,_Raw + 281.9 Pizza_W_Pepperoni + 316 Poached_Eg
gs
 + 55.6 Popcorn,Air_Popped + 14.7 Pork + 61.5 Potato_Chips,Bbqflvr
 + 1250.2 Raisin_Brn,_Kellg'S + 1252.2 Rice_Krispies + 77.4 Roasted_Chi
cken
 + 53.8 Sardines_in_Oil + 409.2 Scrambled_Eggs + 499.8 Skim_Milk
 + 3055.2 Spaghetti_W__Sauce + 1252.2 Special_K + 4872 Splt_Pea&Hamsoup
 + 855 Taco + 98.6 Tofu + 766.3 Tomato,Red,Ripe,Raw + 1393 Tomato_Soup
 + 55.6 Tortilla_Chip + 3785.1 Vegetbeef_Soup + 68 White_Tuna_in_Water
 <= 10000


Vit_A_IUMinRequirements: 500.2 2%_Lowfat_Milk + 307.4 3.3%_Fat,Whole_Mi
lk
 + 73.1 Apple,Raw,W_Skin + 35.2 Apple_Pie + 92.3 Banana
 + 888 Beanbacn_Soup,W_Watr + 152.9 Butter,Regular + 40.6 Cap'N_Crunch
 + 15471 Carrots,Raw + 53.6 Celery,_Raw + 296.5 Cheddar_Cheese
 + 1252.2 Cheerios + 1308.7 Chicknoodl_Soup + 101.8 Chocolate_Chip_Cook
ies
 + 1252.2 Corn_Flks,_Kellogg'S + 153.8 Crm_Mshrm_Soup,W_Mlk
 + 5867.4 Frozen_Broccoli + 106.6 Frozen_Corn + 24 Grapes
 + 126.3 Hamburger_W_Toppings + 133 Kiwifruit,Raw,Fresh
 + 66 Lettuce,Iceberg,Raw + 163.7 New_E_Clamchwd,W_Mlk + 20.1 Neweng_Cl
amchwd
 + 37.4 Oatmeal + 2.9 Oatmeal_Cookies + 268.6 Oranges
 + 467.7 Peppers,_Sweet,_Raw + 281.9 Pizza_W_Pepperoni + 316 Poached_Eg
gs
 + 55.6 Popcorn,Air_Popped + 14.7 Pork + 61.5 Potato_Chips,Bbqflvr
 + 1250.2 Raisin_Brn,_Kellg'S + 1252.2 Rice_Krispies + 77.4 Roasted_Chi
cken
 + 53.8 Sardines_in_Oil + 409.2 Scrambled_Eggs + 499.8 Skim_Milk
 + 3055.2 Spaghetti_W__Sauce + 1252.2 Special_K + 4872 Splt_Pea&Hamsoup
 + 855 Taco + 98.6 Tofu + 766.3 Tomato,Red,Ripe,Raw + 1393 Tomato_Soup
 + 55.6 Tortilla_Chip + 3785.1 Vegetbeef_Soup + 68 White_Tuna_in_Water
 >= 1000


Vit_C_IUMaxRequirements: 2.3 2%_Lowfat_Milk + 2.3 3.3%_Fat,Whole_Milk
 + 7.9 Apple,Raw,W_Skin + 0.9 Apple_Pie + 10.4 Banana
```

```
 + 1.5 Beanbacn_Soup,W_Watr + 5.1 Carrots,Raw + 2.8 Celery,_Raw
 + 15.1 Cheerios + 15.1 Corn_Flks,_Kellogg'S + 2.2 Crm_Mshrm_Soup,W_Mlk
 + 10.8 Frankfurter,_Beef + 160.2 Frozen_Broccoli + 5.2 Frozen_Corn + G
rapes
 + 7.4 Ham,Sliced,Extralean + 2.6 Hamburger_W_Toppings + 0.1 Hotdog,_Pl
ain
 + 5.5 Kielbasa,Prk + 74.5 Kiwifruit,Raw,Fresh + 0.8 Lettuce,Iceberg,Ra
w
 + 3.5 New_E_Clamchwd,W_Mlk + 4.8 Neweng_Clamchwd + 0.1 Oatmeal_Cookies
 + 69.7 Oranges + 66.1 Peppers,_Sweet,_Raw + 1.6 Pizza_W_Pepperoni
 + 9.6 Potato_Chips,Bbqflvr + 15.6 Potatoes,_Baked + 15.1 Rice_Krispies
 + 0.1 Scrambled_Eggs + 2.4 Skim_Milk + 27.9 Spaghetti_W__Sauce
 + 15.1 Special_K + 7 Splt_Pea&Hamsoup + 2.2 Taco + 0.1 Tofu
 + 23.5 Tomato,Red,Ripe,Raw + 133 Tomato_Soup + 4.8 Vegetbeef_Soup <= 5
000

Vit_C_IUMinRequirements: 2.3 2%_Lowfat_Milk + 2.3 3.3%_Fat,Whole_Milk
 + 7.9 Apple,Raw,W_Skin + 0.9 Apple_Pie + 10.4 Banana
 + 1.5 Beanbacn_Soup,W_Watr + 5.1 Carrots,Raw + 2.8 Celery,_Raw
 + 15.1 Cheerios + 15.1 Corn_Flks,_Kellogg'S + 2.2 Crm_Mshrm_Soup,W_Mlk
 + 10.8 Frankfurter,_Beef + 160.2 Frozen_Broccoli + 5.2 Frozen_Corn + G
rapes
 + 7.4 Ham,Sliced,Extralean + 2.6 Hamburger_W_Toppings + 0.1 Hotdog,_Pl
ain
 + 5.5 Kielbasa,Prk + 74.5 Kiwifruit,Raw,Fresh + 0.8 Lettuce,Iceberg,Ra
w
 + 3.5 New_E_Clamchwd,W_Mlk + 4.8 Neweng_Clamchwd + 0.1 Oatmeal_Cookies
 + 69.7 Oranges + 66.1 Peppers,_Sweet,_Raw + 1.6 Pizza_W_Pepperoni
 + 9.6 Potato_Chips,Bbqflvr + 15.6 Potatoes,_Baked + 15.1 Rice_Krispies
 + 0.1 Scrambled_Eggs + 2.4 Skim_Milk + 27.9 Spaghetti_W__Sauce
 + 15.1 Special_K + 7 Splt_Pea&Hamsoup + 2.2 Taco + 0.1 Tofu
 + 23.5 Tomato,Red,Ripe,Raw + 133 Tomato_Soup + 4.8 Vegetbeef_Soup >= 4
00

Calcium_mgMaxRequirements: 296.7 2%_Lowfat_Milk + 291.3 3.3%_Fat,Whole_
Milk
 + 9.7 Apple,Raw,W_Skin + 3.1 Apple_Pie + 21 Bagels + 6.8 Banana
 + 81 Beanbacn_Soup,W_Watr + 23.8 Bologna,Turkey + 1.2 Butter,Regular
 + 4.8 Cap'N_Crunch + 14.9 Carrots,Raw + 16 Celery,_Raw + 202 Cheddar_C
heese
 + 48.6 Cheerios + 27.1 Chicknoodl_Soup + 6.2 Chocolate_Chip_Cookies
 + 0.9 Corn_Flks,_Kellogg'S + 7.2 Couscous + 178.6 Crm_Mshrm_Soup,W_Mlk
 + 9 Frankfurter,_Beef + 159 Frozen_Broccoli + 3.3 Frozen_Corn + 3.4 Gr
apes
 + 2 Ham,Sliced,Extralean + 51.4 Hamburger_W_Toppings + 23.5 Hotdog,_Pl
ain
 + 11.4 Kielbasa,Prk + 19.8 Kiwifruit,Raw,Fresh + 3.8 Lettuce,Iceberg,R
aw
 + 4.9 Macaroni,Ckd + 23.1 Malt_O_Meal,Choc + 186 New_E_Clamchwd,W_Mlk
 + 82.8 Neweng_Clamchwd + 18.7 Oatmeal + 6.7 Oatmeal_Cookies + 52.4 Ora
nges
 + 13.1 Peanut_Butter + 6.7 Peppers,_Sweet,_Raw + 64.6 Pizza_W_Pepperon
i
 + 24.5 Poached_Eggs + 2.8 Popcorn,Air_Popped + 59.9 Pork
 + 14.2 Potato_Chips,Bbqflvr + 22.7 Potatoes,_Baked + 10.2 Pretzels
 + 12.9 Raisin_Brn,_Kellg'S + 4 Rice_Krispies + 21.9 Roasted_Chicken
 + 91.7 Sardines_in_Oil + 42.6 Scrambled_Eggs + 302.3 Skim_Milk
```

```
  + 80.2 Spaghetti_W__Sauce + 8.2 Special_K + 33.6 Splt_Pea&Hamsoup
  + 220.6 Taco + 121.8 Tofu + 6.2 Tomato,Red,Ripe,Raw + 27.6 Tomato_Soup
  + 43.7 Tortilla_Chip + 32.6 Vegetbeef_Soup + 10.8 Wheat_Bread
  + 26.2 White_Bread + 7.9 White_Rice + 3.4 White_Tuna_in_Water <= 1500


Calcium_mgMinRequirements: 296.7 2%_Lowfat_Milk + 291.3 3.3%_Fat,Whole_
Milk
  + 9.7 Apple,Raw,W_Skin + 3.1 Apple_Pie + 21 Bagels + 6.8 Banana
  + 81 Beanbacn_Soup,W_Watr + 23.8 Bologna,Turkey + 1.2 Butter,Regular
  + 4.8 Cap'N_Crunch + 14.9 Carrots,Raw + 16 Celery,_Raw + 202 Cheddar_C
heese
  + 48.6 Cheerios + 27.1 Chicknoodl_Soup + 6.2 Chocolate_Chip_Cookies
  + 0.9 Corn_Flks,_Kellogg'S + 7.2 Couscous + 178.6 Crm_Mshrm_Soup,W_Mlk
  + 9 Frankfurter,_Beef + 159 Frozen_Broccoli + 3.3 Frozen_Corn + 3.4 Gr
apes
  + 2 Ham,Sliced,Extralean + 51.4 Hamburger_W_Toppings + 23.5 Hotdog,_Pl
ain
  + 11.4 Kielbasa,Prk + 19.8 Kiwifruit,Raw,Fresh + 3.8 Lettuce,Iceberg,R
aw
  + 4.9 Macaroni,Ckd + 23.1 Malt_O_Meal,Choc + 186 New_E_Clamchwd,W_Mlk
  + 82.8 Neweng_Clamchwd + 18.7 Oatmeal + 6.7 Oatmeal_Cookies + 52.4 Ora
nges
  + 13.1 Peanut_Butter + 6.7 Peppers,_Sweet,_Raw + 64.6 Pizza_W_Pepperon
i
  + 24.5 Poached_Eggs + 2.8 Popcorn,Air_Popped + 59.9 Pork
  + 14.2 Potato_Chips,Bbqflvr + 22.7 Potatoes,_Baked + 10.2 Pretzels
  + 12.9 Raisin_Brn,_Kellg'S + 4 Rice_Krispies + 21.9 Roasted_Chicken
  + 91.7 Sardines_in_Oil + 42.6 Scrambled_Eggs + 302.3 Skim_Milk
  + 80.2 Spaghetti_W__Sauce + 8.2 Special_K + 33.6 Splt_Pea&Hamsoup
  + 220.6 Taco + 121.8 Tofu + 6.2 Tomato,Red,Ripe,Raw + 27.6 Tomato_Soup
  + 43.7 Tortilla_Chip + 32.6 Vegetbeef_Soup + 10.8 Wheat_Bread
  + 26.2 White_Bread + 7.9 White_Rice + 3.4 White_Tuna_in_Water >= 700


Iron_mgMaxRequirements: 0.1 2%_Lowfat_Milk + 0.1 3.3%_Fat,Whole_Milk
  + 0.2 Apple,Raw,W_Skin + 0.1 Apple_Pie + Bagels + 0.4 Banana
  + 2 Beanbacn_Soup,W_Watr + 0.4 Bologna,Turkey + 7.5 Cap'N_Crunch
  + 0.3 Carrots,Raw + 0.2 Celery,_Raw + 0.2 Cheddar_Cheese + 4.5 Cheerio
s
  + 1.5 Chicknoodl_Soup + 0.4 Chocolate_Chip_Cookies + 1.8 Corn_Flks,_Ke
llogg'S
  + 0.3 Couscous + 0.6 Crm_Mshrm_Soup,W_Mlk + 0.6 Frankfurter,_Beef
  + 2.3 Frozen_Broccoli + 0.3 Frozen_Corn + 0.1 Grapes
  + 0.2 Ham,Sliced,Extralean + 2.5 Hamburger_W_Toppings + 2.3 Hotdog,_Pl
ain
  + 0.4 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.1 Lettuce,Iceberg,Raw
  + Macaroni,Ckd + 4.7 Malt_O_Meal,Choc + 1.5 New_E_Clamchwd,W_Mlk
  + 2.8 Neweng_Clamchwd + 1.6 Oatmeal + 0.5 Oatmeal_Cookies + 0.1 Orange
s
  + 0.6 Peanut_Butter + 0.3 Peppers,_Sweet,_Raw + 0.9 Pizza_W_Pepperoni
  + 0.7 Poached_Eggs + 0.8 Popcorn,Air_Popped + 0.4 Pork
  + 0.5 Potato_Chips,Bbqflvr + 4.3 Potatoes,_Baked + 1.2 Pretzels
  + 16.8 Raisin_Brn,_Kellg'S + 1.8 Rice_Krispies + 1.8 Roasted_Chicken
  + 0.7 Sardines_in_Oil + 0.7 Scrambled_Eggs + 0.1 Skim_Milk
  + 2.3 Spaghetti_W__Sauce + 4.5 Special_K + 2.1 Splt_Pea&Hamsoup + 2.4
 Taco
  + 6.2 Tofu + 0.6 Tomato,Red,Ripe,Raw + 3.5 Tomato_Soup + 0.4 Tortilla_
Chip
```

```
 + 2.2 Vegetbeef_Soup + 0.7 Wheat_Bread + 0.8 White_Bread + 0.9 White_R
ice
 + 0.5 White_Tuna_in_Water <= 40

Iron_mgMinRequirements: 0.1 2%_Lowfat_Milk + 0.1 3.3%_Fat,Whole_Milk
 + 0.2 Apple,Raw,W_Skin + 0.1 Apple_Pie + Bagels + 0.4 Banana
 + 2 Beanbacn_Soup,W_Watr + 0.4 Bologna,Turkey + 7.5 Cap'N_Crunch
 + 0.3 Carrots,Raw + 0.2 Celery,_Raw + 0.2 Cheddar_Cheese + 4.5 Cheerio
s
 + 1.5 Chicknoodl_Soup + 0.4 Chocolate_Chip_Cookies + 1.8 Corn_Flks,_Ke
llogg'S
 + 0.3 Couscous + 0.6 Crm_Mshrm_Soup,W_Mlk + 0.6 Frankfurter,_Beef
 + 2.3 Frozen_Broccoli + 0.3 Frozen_Corn + 0.1 Grapes
 + 0.2 Ham,Sliced,Extralean + 2.5 Hamburger_W_Toppings + 2.3 Hotdog,_Pl
ain
 + 0.4 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.1 Lettuce,Iceberg,Raw
 + Macaroni,Ckd + 4.7 Malt_O_Meal,Choc + 1.5 New_E_Clamchwd,W_Mlk
 + 2.8 Neweng_Clamchwd + 1.6 Oatmeal + 0.5 Oatmeal_Cookies + 0.1 Orange
s
 + 0.6 Peanut_Butter + 0.3 Peppers,_Sweet,_Raw + 0.9 Pizza_W_Pepperoni
 + 0.7 Poached_Eggs + 0.8 Popcorn,Air_Popped + 0.4 Pork
 + 0.5 Potato_Chips,Bbqflvr + 4.3 Potatoes,_Baked + 1.2 Pretzels
 + 16.8 Raisin_Brn,_Kellg'S + 1.8 Rice_Krispies + 1.8 Roasted_Chicken
 + 0.7 Sardines_in_Oil + 0.7 Scrambled_Eggs + 0.1 Skim_Milk
 + 2.3 Spaghetti_W__Sauce + 4.5 Special_K + 2.1 Splt_Pea&Hamsoup + 2.4
 Taco
 + 6.2 Tofu + 0.6 Tomato,Red,Ripe,Raw + 3.5 Tomato_Soup + 0.4 Tortilla_
Chip
 + 2.2 Vegetbeef_Soup + 0.7 Wheat_Bread + 0.8 White_Bread + 0.9 White_R
ice
 + 0.5 White_Tuna_in_Water >= 10

VARIABLES
2%_Lowfat_Milk Continuous
3.3%_Fat,Whole_Milk Continuous
Apple,Raw,W_Skin Continuous
Apple_Pie Continuous
Bagels Continuous
Banana Continuous
Beanbacn_Soup,W_Watr Continuous
Bologna,Turkey Continuous
Butter,Regular Continuous
Cap'N_Crunch Continuous
Carrots,Raw Continuous
Celery,_Raw Continuous
Cheddar_Cheese Continuous
Cheerios Continuous
Chicknoodl_Soup Continuous
Chocolate_Chip_Cookies Continuous
Corn_Flks,_Kellogg'S Continuous
Couscous Continuous
Crm_Mshrm_Soup,W_Mlk Continuous
Frankfurter,_Beef Continuous
Frozen_Broccoli Continuous
Frozen_Corn Continuous
Grapes Continuous
Ham,Sliced,Extralean Continuous
```

```
Hamburger_W_Toppings Continuous
Hotdog,_Plain Continuous
Kielbasa,Prk Continuous
Kiwifruit,Raw,Fresh Continuous
Lettuce,Iceberg,Raw Continuous
Macaroni,Ckd Continuous
Malt_O_Meal,Choc Continuous
New_E_Clamchwd,W_Mlk Continuous
Neweng_Clamchwd Continuous
Oatmeal Continuous
Oatmeal_Cookies Continuous
Oranges Continuous
Peanut_Butter Continuous
Peppers,_Sweet,_Raw Continuous
Pizza_W_Pepperoni Continuous
Poached_Eggs Continuous
Popcorn,Air_Popped Continuous
Pork Continuous
Potato_Chips,Bbqflvr Continuous
Potatoes,_Baked Continuous
Pretzels Continuous
Raisin_Brn,_Kellg'S Continuous
Rice_Krispies Continuous
Roasted_Chicken Continuous
Sardines_in_Oil Continuous
Scrambled_Eggs Continuous
Skim_Milk Continuous
Spaghetti_W__Sauce Continuous
Special_K Continuous
Splt_Pea&Hamsoup Continuous
Taco Continuous
Tofu Continuous
Tomato,Red,Ripe,Raw Continuous
Tomato_Soup Continuous
Tortilla_Chip Continuous
Vegetbeef_Soup Continuous
Wheat_Bread Continuous
White_Bread Continuous
White_Rice Continuous
White_Tuna_in_Water Continuous
```

Out[26]: 1

In [27]: ```print(pulp.LpStatus[model.status])```

```
Optimal
```

```
In [28]: for var in model.variables():
             if var.varValue > 0:
                 print(var.name, "=", var.varValue)
             continue
```

```
Celery,_Raw = 52.64371
Frozen_Broccoli = 0.25960653
Lettuce,Iceberg,Raw = 63.988506
Oranges = 2.2929389
Poached_Eggs = 0.14184397
Popcorn,Air_Popped = 13.869322
```

```
In [29]: #showing result
         print("total cost/meal = ", value(model.objective))
```

```
total cost/meal =  4.337116797399999
```

Point 2

```
In [30]: food_arr = {}
         food_arr2 = {}
```

```
In [31]: model2 = pulp.LpProblem("The Optimus Diet Reloaded", LpMinimize)

         objective_function = None
         for index,row in fooddata.iterrows():
             food = pulp.LpVariable(row['Foods'], 0)
             food_flag = pulp.LpVariable(row['Foods'] + "_flag", lowBound=0, upBo
         und=1, cat=LpBinary)
             food_arr[row['Foods']] = food
             food_arr2[row['Foods']+"_flag"] = food_flag
             objective_function += row['Price/ Serving'] * food
```

```
In [32]: # Add cost objective function first
         model2 += objective_function, "Total Cost/Foods/meal"
```

```
In [33]: for nutrient in max_nutrients.keys():
             constraints = None
             for index,row in fooddata.iterrows():
                 constraints  += row[nutrient] * food_arr[row['Foods']]
             model2 += constraints <= max_nutrients[nutrient], nutrient + "MaxReq
         uirements"
             model2 += constraints  >= min_nutrients[nutrient], nutrient + "MinRe
         quirements"
```

```
In [34]: for food in food_arr.keys():
             model2 += food_arr[food] >= 0.10 * food_arr2[food + "_flag"], food +
          "Constraint"
```

In [35]:
```python
print(model2)
model2.solve()
```

```
The Optimus Diet Reloaded:
MINIMIZE
0.23*2%_Lowfat_Milk + 0.16*3.3%_Fat,Whole_Milk + 0.24*Apple,Raw,W_Skin
 + 0.16*Apple_Pie + 0.16*Bagels + 0.15*Banana + 0.67*Beanbacn_Soup,W_Wa
tr + 0.15*Bologna,Turkey + 0.05*Butter,Regular + 0.31*Cap'N_Crunch + 0.
07*Carrots,Raw + 0.04*Celery,_Raw + 0.25*Cheddar_Cheese + 0.28*Cheerios
 + 0.39*Chicknoodl_Soup + 0.03*Chocolate_Chip_Cookies + 0.28*Corn_Flks,_
Kellogg'S + 0.39*Couscous + 0.65*Crm_Mshrm_Soup,W_Mlk + 0.27*Frankfurte
r,_Beef + 0.16*Frozen_Broccoli + 0.18*Frozen_Corn + 0.32*Grapes + 0.33*
Ham,Sliced,Extralean + 0.83*Hamburger_W_Toppings + 0.31*Hotdog,_Plain +
0.15*Kielbasa,Prk + 0.49*Kiwifruit,Raw,Fresh + 0.02*Lettuce,Iceberg,Raw
 + 0.17*Macaroni,Ckd + 0.52*Malt_O_Meal,Choc + 0.99*New_E_Clamchwd,W_Mlk
 + 0.75*Neweng_Clamchwd + 0.82*Oatmeal + 0.09*Oatmeal_Cookies + 0.15*Ora
nges + 0.07*Peanut_Butter + 0.53*Peppers,_Sweet,_Raw + 0.44*Pizza_W_Pep
peroni + 0.08*Poached_Eggs + 0.04*Popcorn,Air_Popped + 0.81*Pork + 0.22
*Potato_Chips,Bbqflvr + 0.06*Potatoes,_Baked + 0.12*Pretzels + 0.34*Rai
sin_Brn,_Kellg'S + 0.32*Rice_Krispies + 0.84*Roasted_Chicken + 0.45*Sar
dines_in_Oil + 0.11*Scrambled_Eggs + 0.13*Skim_Milk + 0.78*Spaghetti_W_
_Sauce + 0.38*Special_K + 0.67*Splt_Pea&Hamsoup + 0.59*Taco + 0.31*Tofu
 + 0.27*Tomato,Red,Ripe,Raw + 0.39*Tomato_Soup + 0.19*Tortilla_Chip + 0.
71*Vegetbeef_Soup + 0.05*Wheat_Bread + 0.06*White_Bread + 0.08*White_Ri
ce + 0.69*White_Tuna_in_Water + 0.0
SUBJECT TO
CaloriesMaxRequirements: 121.2 2%_Lowfat_Milk + 149.9 3.3%_Fat,Whole_Mi
lk
 + 81.4 Apple,Raw,W_Skin + 67.2 Apple_Pie + 78 Bagels + 104.9 Banana
 + 172 Beanbacn_Soup,W_Watr + 56.4 Bologna,Turkey + 35.8 Butter,Regular
 + 119.6 Cap'N_Crunch + 23.7 Carrots,Raw + 6.4 Celery,_Raw
 + 112.7 Cheddar_Cheese + 111 Cheerios + 150.1 Chicknoodl_Soup
 + 78.1 Chocolate_Chip_Cookies + 110.5 Corn_Flks,_Kellogg'S + 100.8 Cou
scous
 + 203.4 Crm_Mshrm_Soup,W_Mlk + 141.8 Frankfurter,_Beef + 73.8 Frozen_B
roccoli
 + 72.2 Frozen_Corn + 15.1 Grapes + 37.1 Ham,Sliced,Extralean
 + 275 Hamburger_W_Toppings + 242.1 Hotdog,_Plain + 80.6 Kielbasa,Prk
 + 46.4 Kiwifruit,Raw,Fresh + 2.6 Lettuce,Iceberg,Raw + 98.7 Macaroni,C
kd
 + 607.2 Malt_O_Meal,Choc + 163.7 New_E_Clamchwd,W_Mlk + 175.7 Neweng_C
lamchwd
 + 145.1 Oatmeal + 81 Oatmeal_Cookies + 61.6 Oranges + 188.5 Peanut_But
ter
 + 20 Peppers,_Sweet,_Raw + 181 Pizza_W_Pepperoni + 74.5 Poached_Eggs
 + 108.3 Popcorn,Air_Popped + 710.8 Pork + 139.2 Potato_Chips,Bbqflvr
 + 171.5 Potatoes,_Baked + 108 Pretzels + 115.1 Raisin_Brn,_Kellg'S
 + 112.2 Rice_Krispies + 277.4 Roasted_Chicken + 49.9 Sardines_in_Oil
 + 99.6 Scrambled_Eggs + 85.5 Skim_Milk + 358.2 Spaghetti_W__Sauce
 + 110.8 Special_K + 184.8 Splt_Pea&Hamsoup + 369.4 Taco + 88.2 Tofu
 + 25.8 Tomato,Red,Ripe,Raw + 170.7 Tomato_Soup + 142 Tortilla_Chip
 + 158.1 Vegetbeef_Soup + 65 Wheat_Bread + 65 White_Bread + 102.7 White
_Rice
 + 115.6 White_Tuna_in_Water <= 2500

CaloriesMinRequirements: 121.2 2%_Lowfat_Milk + 149.9 3.3%_Fat,Whole_Mi
lk
 + 81.4 Apple,Raw,W_Skin + 67.2 Apple_Pie + 78 Bagels + 104.9 Banana
 + 172 Beanbacn_Soup,W_Watr + 56.4 Bologna,Turkey + 35.8 Butter,Regular
 + 119.6 Cap'N_Crunch + 23.7 Carrots,Raw + 6.4 Celery,_Raw
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```
 + 112.7 Cheddar_Cheese + 111 Cheerios + 150.1 Chicknoodl_Soup
 + 78.1 Chocolate_Chip_Cookies + 110.5 Corn_Flks,_Kellogg'S + 100.8 Cou
scous
 + 203.4 Crm_Mshrm_Soup,W_Mlk + 141.8 Frankfurter,_Beef + 73.8 Frozen_B
roccoli
 + 72.2 Frozen_Corn + 15.1 Grapes + 37.1 Ham,Sliced,Extralean
 + 275 Hamburger_W_Toppings + 242.1 Hotdog,_Plain + 80.6 Kielbasa,Prk
 + 46.4 Kiwifruit,Raw,Fresh + 2.6 Lettuce,Iceberg,Raw + 98.7 Macaroni,C
kd
 + 607.2 Malt_O_Meal,Choc + 163.7 New_E_Clamchwd,W_Mlk + 175.7 Neweng_C
lamchwd
 + 145.1 Oatmeal + 81 Oatmeal_Cookies + 61.6 Oranges + 188.5 Peanut_But
ter
 + 20 Peppers,_Sweet,_Raw + 181 Pizza_W_Pepperoni + 74.5 Poached_Eggs
 + 108.3 Popcorn,Air_Popped + 710.8 Pork + 139.2 Potato_Chips,Bbqflvr
 + 171.5 Potatoes,_Baked + 108 Pretzels + 115.1 Raisin_Brn,_Kellg'S
 + 112.2 Rice_Krispies + 277.4 Roasted_Chicken + 49.9 Sardines_in_Oil
 + 99.6 Scrambled_Eggs + 85.5 Skim_Milk + 358.2 Spaghetti_W__Sauce
 + 110.8 Special_K + 184.8 Splt_Pea&Hamsoup + 369.4 Taco + 88.2 Tofu
 + 25.8 Tomato,Red,Ripe,Raw + 170.7 Tomato_Soup + 142 Tortilla_Chip
 + 158.1 Vegetbeef_Soup + 65 Wheat_Bread + 65 White_Bread + 102.7 White
_Rice
 + 115.6 White_Tuna_in_Water >= 1500

Cholesterol_mgMaxRequirements: 18.3 2%_Lowfat_Milk + 33.2 3.3%_Fat,Whol
e_Milk
 + 2.5 Beanbacn_Soup,W_Watr + 28.1 Bologna,Turkey + 10.9 Butter,Regular
 + 29.4 Cheddar_Cheese + 12.3 Chicknoodl_Soup + 5.1 Chocolate_Chip_Cook
ies
 + 19.8 Crm_Mshrm_Soup,W_Mlk + 27.4 Frankfurter,_Beef
 + 13.3 Ham,Sliced,Extralean + 42.8 Hamburger_W_Toppings + 44.1 Hotdog,
_Plain
 + 17.4 Kielbasa,Prk + 22.3 New_E_Clamchwd,W_Mlk + 10 Neweng_Clamchwd
 + 14.2 Pizza_W_Pepperoni + 211.5 Poached_Eggs + 105.1 Pork
 + 129.9 Roasted_Chicken + 34.1 Sardines_in_Oil + 211.2 Scrambled_Eggs
 + 4.4 Skim_Milk + 7.2 Splt_Pea&Hamsoup + 56.4 Taco + 10 Vegetbeef_Soup
 + 35.7 White_Tuna_in_Water <= 240

Cholesterol_mgMinRequirements: 18.3 2%_Lowfat_Milk + 33.2 3.3%_Fat,Whol
e_Milk
 + 2.5 Beanbacn_Soup,W_Watr + 28.1 Bologna,Turkey + 10.9 Butter,Regular
 + 29.4 Cheddar_Cheese + 12.3 Chicknoodl_Soup + 5.1 Chocolate_Chip_Cook
ies
 + 19.8 Crm_Mshrm_Soup,W_Mlk + 27.4 Frankfurter,_Beef
 + 13.3 Ham,Sliced,Extralean + 42.8 Hamburger_W_Toppings + 44.1 Hotdog,
_Plain
 + 17.4 Kielbasa,Prk + 22.3 New_E_Clamchwd,W_Mlk + 10 Neweng_Clamchwd
 + 14.2 Pizza_W_Pepperoni + 211.5 Poached_Eggs + 105.1 Pork
 + 129.9 Roasted_Chicken + 34.1 Sardines_in_Oil + 211.2 Scrambled_Eggs
 + 4.4 Skim_Milk + 7.2 Splt_Pea&Hamsoup + 56.4 Taco + 10 Vegetbeef_Soup
 + 35.7 White_Tuna_in_Water >= 30

Total_Fat_gMaxRequirements: 4.7 2%_Lowfat_Milk + 8.1 3.3%_Fat,Whole_Mil
k
 + 0.5 Apple,Raw,W_Skin + 3.1 Apple_Pie + 0.5 Bagels + 0.5 Banana
 + 5.9 Beanbacn_Soup,W_Watr + 4.3 Bologna,Turkey + 4.1 Butter,Regular
 + 2.6 Cap'N_Crunch + 0.1 Carrots,Raw + 0.1 Celery,_Raw + 9.3 Cheddar_C
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heese
 + 1.8 Cheerios + 4.6 Chicknoodl_Soup + 4.5 Chocolate_Chip_Cookies
 + 0.1 Corn_Flks,_Kellogg'S + 0.1 Couscous + 13.6 Crm_Mshrm_Soup,W_Mlk
 + 12.8 Frankfurter,_Beef + 0.8 Frozen_Broccoli + 0.6 Frozen_Corn + 0.1
Grapes
 + 1.4 Ham,Sliced,Extralean + 10.2 Hamburger_W_Toppings + 14.5 Hotdog,_
Plain
 + 7.1 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.5 Macaroni,Ckd
 + 1.5 Malt_O_Meal,Choc + 6.6 New_E_Clamchwd,W_Mlk + 5 Neweng_Clamchwd
 + 2.3 Oatmeal + 3.3 Oatmeal_Cookies + 0.2 Oranges + 16 Peanut_Butter
 + 0.1 Peppers,_Sweet,_Raw + 7 Pizza_W_Pepperoni + 5 Poached_Eggs
 + 1.2 Popcorn,Air_Popped + 72.2 Pork + 9.2 Potato_Chips,Bbqflvr
 + 0.2 Potatoes,_Baked + Pretzels + 0.7 Raisin_Brn,_Kellg'S
 + 0.2 Rice_Krispies + 10.8 Roasted_Chicken + 2.7 Sardines_in_Oil
 + 7.3 Scrambled_Eggs + 0.4 Skim_Milk + 12.3 Spaghetti_W__Sauce
 + 0.1 Special_K + 4 Splt_Pea&Hamsoup + 20.6 Taco + 5.5 Tofu
 + 0.4 Tomato,Red,Ripe,Raw + 3.8 Tomato_Soup + 7.4 Tortilla_Chip
 + 3.8 Vegetbeef_Soup + Wheat_Bread + White_Bread + 0.2 White_Rice
 + 2.1 White_Tuna_in_Water <= 70

Total_Fat_gMinRequirements: 4.7 2%_Lowfat_Milk + 8.1 3.3%_Fat,Whole_Mil
k
 + 0.5 Apple,Raw,W_Skin + 3.1 Apple_Pie + 0.5 Bagels + 0.5 Banana
 + 5.9 Beanbacn_Soup,W_Watr + 4.3 Bologna,Turkey + 4.1 Butter,Regular
 + 2.6 Cap'N_Crunch + 0.1 Carrots,Raw + 0.1 Celery,_Raw + 9.3 Cheddar_C
heese
 + 1.8 Cheerios + 4.6 Chicknoodl_Soup + 4.5 Chocolate_Chip_Cookies
 + 0.1 Corn_Flks,_Kellogg'S + 0.1 Couscous + 13.6 Crm_Mshrm_Soup,W_Mlk
 + 12.8 Frankfurter,_Beef + 0.8 Frozen_Broccoli + 0.6 Frozen_Corn + 0.1
Grapes
 + 1.4 Ham,Sliced,Extralean + 10.2 Hamburger_W_Toppings + 14.5 Hotdog,_
Plain
 + 7.1 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.5 Macaroni,Ckd
 + 1.5 Malt_O_Meal,Choc + 6.6 New_E_Clamchwd,W_Mlk + 5 Neweng_Clamchwd
 + 2.3 Oatmeal + 3.3 Oatmeal_Cookies + 0.2 Oranges + 16 Peanut_Butter
 + 0.1 Peppers,_Sweet,_Raw + 7 Pizza_W_Pepperoni + 5 Poached_Eggs
 + 1.2 Popcorn,Air_Popped + 72.2 Pork + 9.2 Potato_Chips,Bbqflvr
 + 0.2 Potatoes,_Baked + Pretzels + 0.7 Raisin_Brn,_Kellg'S
 + 0.2 Rice_Krispies + 10.8 Roasted_Chicken + 2.7 Sardines_in_Oil
 + 7.3 Scrambled_Eggs + 0.4 Skim_Milk + 12.3 Spaghetti_W__Sauce
 + 0.1 Special_K + 4 Splt_Pea&Hamsoup + 20.6 Taco + 5.5 Tofu
 + 0.4 Tomato,Red,Ripe,Raw + 3.8 Tomato_Soup + 7.4 Tortilla_Chip
 + 3.8 Vegetbeef_Soup + Wheat_Bread + White_Bread + 0.2 White_Rice
 + 2.1 White_Tuna_in_Water >= 20

Sodium_mgMaxRequirements: 121.8 2%_Lowfat_Milk + 119.6 3.3%_Fat,Whole_M
ilk
 + 75.4 Apple_Pie + 151.4 Bagels + 1.1 Banana + 951.3 Beanbacn_Soup,W_W
atr
 + 248.9 Bologna,Turkey + 41.3 Butter,Regular + 213.3 Cap'N_Crunch
 + 19.2 Carrots,Raw + 34.8 Celery,_Raw + 173.7 Cheddar_Cheese + 307.6 C
heerios
 + 1862.2 Chicknoodl_Soup + 57.8 Chocolate_Chip_Cookies
 + 290.5 Corn_Flks,_Kellogg'S + 4.5 Couscous + 1076.3 Crm_Mshrm_Soup,W_
Mlk
 + 461.7 Frankfurter,_Beef + 68.2 Frozen_Broccoli + 2.5 Frozen_Corn
 + 0.5 Grapes + 405.1 Ham,Sliced,Extralean + 563.9 Hamburger_W_Toppings

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 + 670.3 Hotdog,_Plain + 279.8 Kielbasa,Prk + 3.8 Kiwifruit,Raw,Fresh
 + 1.8 Lettuce,Iceberg,Raw + 0.7 Macaroni,Ckd + 16.5 Malt_O_Meal,Choc
 + 992 New_E_Clamchwd,W_Mlk + 1864.9 Neweng_Clamchwd + 2.3 Oatmeal
 + 68.9 Oatmeal_Cookies + 155.5 Peanut_Butter + 1.5 Peppers,_Sweet,_Raw
 + 267 Pizza_W_Pepperoni + 140 Poached_Eggs + 1.1 Popcorn,Air_Popped
 + 38.4 Pork + 212.6 Potato_Chips,Bbqflvr + 15.2 Potatoes,_Baked
 + 486.2 Pretzels + 204.4 Raisin_Brn,_Kellg'S + 340.8 Rice_Krispies
 + 125.6 Roasted_Chicken + 121.2 Sardines_in_Oil + 168 Scrambled_Eggs
 + 126.2 Skim_Milk + 1237.1 Spaghetti_W__Sauce + 265.5 Special_K
 + 964.8 Splt_Pea&Hamsoup + 802 Taco + 8.1 Tofu + 11.1 Tomato,Red,Ripe,
Raw
 + 1744.4 Tomato_Soup + 149.7 Tortilla_Chip + 1915.1 Vegetbeef_Soup
 + 134.5 Wheat_Bread + 132.5 White_Bread + 0.8 White_Rice
 + 333.2 White_Tuna_in_Water <= 2000

Sodium_mgMinRequirements: 121.8 2%_Lowfat_Milk + 119.6 3.3%_Fat,Whole_M
ilk
 + 75.4 Apple_Pie + 151.4 Bagels + 1.1 Banana + 951.3 Beanbacn_Soup,W_W
atr
 + 248.9 Bologna,Turkey + 41.3 Butter,Regular + 213.3 Cap'N_Crunch
 + 19.2 Carrots,Raw + 34.8 Celery,_Raw + 173.7 Cheddar_Cheese + 307.6 C
heerios
 + 1862.2 Chicknoodl_Soup + 57.8 Chocolate_Chip_Cookies
 + 290.5 Corn_Flks,_Kellogg'S + 4.5 Couscous + 1076.3 Crm_Mshrm_Soup,W_
Mlk
 + 461.7 Frankfurter,_Beef + 68.2 Frozen_Broccoli + 2.5 Frozen_Corn
 + 0.5 Grapes + 405.1 Ham,Sliced,Extralean + 563.9 Hamburger_W_Toppings
 + 670.3 Hotdog,_Plain + 279.8 Kielbasa,Prk + 3.8 Kiwifruit,Raw,Fresh
 + 1.8 Lettuce,Iceberg,Raw + 0.7 Macaroni,Ckd + 16.5 Malt_O_Meal,Choc
 + 992 New_E_Clamchwd,W_Mlk + 1864.9 Neweng_Clamchwd + 2.3 Oatmeal
 + 68.9 Oatmeal_Cookies + 155.5 Peanut_Butter + 1.5 Peppers,_Sweet,_Raw
 + 267 Pizza_W_Pepperoni + 140 Poached_Eggs + 1.1 Popcorn,Air_Popped
 + 38.4 Pork + 212.6 Potato_Chips,Bbqflvr + 15.2 Potatoes,_Baked
 + 486.2 Pretzels + 204.4 Raisin_Brn,_Kellg'S + 340.8 Rice_Krispies
 + 125.6 Roasted_Chicken + 121.2 Sardines_in_Oil + 168 Scrambled_Eggs
 + 126.2 Skim_Milk + 1237.1 Spaghetti_W__Sauce + 265.5 Special_K
 + 964.8 Splt_Pea&Hamsoup + 802 Taco + 8.1 Tofu + 11.1 Tomato,Red,Ripe,
Raw
 + 1744.4 Tomato_Soup + 149.7 Tortilla_Chip + 1915.1 Vegetbeef_Soup
 + 134.5 Wheat_Bread + 132.5 White_Bread + 0.8 White_Rice
 + 333.2 White_Tuna_in_Water >= 800

Carbohydrates_gMaxRequirements: 11.7 2%_Lowfat_Milk + 11.4 3.3%_Fat,Who
le_Milk
 + 21 Apple,Raw,W_Skin + 9.6 Apple_Pie + 15.1 Bagels + 26.7 Banana
 + 22.8 Beanbacn_Soup,W_Watr + 0.3 Bologna,Turkey + 23 Cap'N_Crunch
 + 5.6 Carrots,Raw + 1.5 Celery,_Raw + 0.4 Cheddar_Cheese + 19.6 Cheeri
os
 + 18.7 Chicknoodl_Soup + 9.3 Chocolate_Chip_Cookies
 + 24.5 Corn_Flks,_Kellogg'S + 20.9 Couscous + 15 Crm_Mshrm_Soup,W_Mlk
 + 0.8 Frankfurter,_Beef + 13.6 Frozen_Broccoli + 17.1 Frozen_Corn
 + 4.1 Grapes + 0.3 Ham,Sliced,Extralean + 32.7 Hamburger_W_Toppings
 + 18 Hotdog,_Plain + 0.6 Kielbasa,Prk + 11.3 Kiwifruit,Raw,Fresh
 + 0.4 Lettuce,Iceberg,Raw + 19.8 Macaroni,Ckd + 128.2 Malt_O_Meal,Choc
 + 16.6 New_E_Clamchwd,W_Mlk + 21.8 Neweng_Clamchwd + 25.3 Oatmeal
 + 12.4 Oatmeal_Cookies + 15.4 Oranges + 6.9 Peanut_Butter
 + 4.8 Peppers,_Sweet,_Raw + 19.9 Pizza_W_Pepperoni + 0.6 Poached_Eggs
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  + 22.1 Popcorn,Air_Popped + 15 Potato_Chips,Bbqflvr + 39.9 Potatoes,_B
aked
  + 22.5 Pretzels + 27.9 Raisin_Brn,_Kellg'S + 24.8 Rice_Krispies
  + 1.3 Scrambled_Eggs + 11.9 Skim_Milk + 58.3 Spaghetti_W__Sauce
  + 21.3 Special_K + 26.8 Splt_Pea&Hamsoup + 26.7 Taco + 2.2 Tofu
  + 5.7 Tomato,Red,Ripe,Raw + 33.2 Tomato_Soup + 17.8 Tortilla_Chip
  + 20.4 Vegetbeef_Soup + 12.4 Wheat_Bread + 11.8 White_Bread + 22.3 Whi
te_Rice
  <= 450

Carbohydrates_gMinRequirements: 11.7 2%_Lowfat_Milk + 11.4 3.3%_Fat,Who
le_Milk
  + 21 Apple,Raw,W_Skin + 9.6 Apple_Pie + 15.1 Bagels + 26.7 Banana
  + 22.8 Beanbacn_Soup,W_Watr + 0.3 Bologna,Turkey + 23 Cap'N_Crunch
  + 5.6 Carrots,Raw + 1.5 Celery,_Raw + 0.4 Cheddar_Cheese + 19.6 Cheeri
os
  + 18.7 Chicknoodl_Soup + 9.3 Chocolate_Chip_Cookies
  + 24.5 Corn_Flks,_Kellogg'S + 20.9 Couscous + 15 Crm_Mshrm_Soup,W_Mlk
  + 0.8 Frankfurter,_Beef + 13.6 Frozen_Broccoli + 17.1 Frozen_Corn
  + 4.1 Grapes + 0.3 Ham,Sliced,Extralean + 32.7 Hamburger_W_Toppings
  + 18 Hotdog,_Plain + 0.6 Kielbasa,Prk + 11.3 Kiwifruit,Raw,Fresh
  + 0.4 Lettuce,Iceberg,Raw + 19.8 Macaroni,Ckd + 128.2 Malt_O_Meal,Choc
  + 16.6 New_E_Clamchwd,W_Mlk + 21.8 Neweng_Clamchwd + 25.3 Oatmeal
  + 12.4 Oatmeal_Cookies + 15.4 Oranges + 6.9 Peanut_Butter
  + 4.8 Peppers,_Sweet,_Raw + 19.9 Pizza_W_Pepperoni + 0.6 Poached_Eggs
  + 22.1 Popcorn,Air_Popped + 15 Potato_Chips,Bbqflvr + 39.9 Potatoes,_B
aked
  + 22.5 Pretzels + 27.9 Raisin_Brn,_Kellg'S + 24.8 Rice_Krispies
  + 1.3 Scrambled_Eggs + 11.9 Skim_Milk + 58.3 Spaghetti_W__Sauce
  + 21.3 Special_K + 26.8 Splt_Pea&Hamsoup + 26.7 Taco + 2.2 Tofu
  + 5.7 Tomato,Red,Ripe,Raw + 33.2 Tomato_Soup + 17.8 Tortilla_Chip
  + 20.4 Vegetbeef_Soup + 12.4 Wheat_Bread + 11.8 White_Bread + 22.3 Whi
te_Rice
  >= 130

Dietary_Fiber_gMaxRequirements: 3.7 Apple,Raw,W_Skin + 0.5 Apple_Pie
  + 0.6 Bagels + 2.7 Banana + 8.6 Beanbacn_Soup,W_Watr + 0.5 Cap'N_Crunc
h
  + 1.6 Carrots,Raw + 0.7 Celery,_Raw + 2 Cheerios + 1.5 Chicknoodl_Soup
  + 0.7 Corn_Flks,_Kellogg'S + 1.3 Couscous + 0.5 Crm_Mshrm_Soup,W_Mlk
  + 8.5 Frozen_Broccoli + 2 Frozen_Corn + 0.2 Grapes + 2.6 Kiwifruit,Ra
w,Fresh
  + 0.3 Lettuce,Iceberg,Raw + 0.9 Macaroni,Ckd + 1.5 New_E_Clamchwd,W_Ml
k
  + 1.5 Neweng_Clamchwd + 4 Oatmeal + 0.6 Oatmeal_Cookies + 3.1 Oranges
  + 2.1 Peanut_Butter + 1.3 Peppers,_Sweet,_Raw + 4.3 Popcorn,Air_Popped
  + 1.2 Potato_Chips,Bbqflvr + 3.2 Potatoes,_Baked + 0.9 Pretzels
  + 4 Raisin_Brn,_Kellg'S + 0.4 Rice_Krispies + 11.6 Spaghetti_W__Sauce
  + 0.7 Special_K + 4.1 Splt_Pea&Hamsoup + 1.4 Tofu + 1.4 Tomato,Red,Rip
e,Raw
  + Tomato_Soup + 1.8 Tortilla_Chip + 4 Vegetbeef_Soup + 1.3 Wheat_Bread
  + 1.1 White_Bread + 0.3 White_Rice <= 250

Dietary_Fiber_gMinRequirements: 3.7 Apple,Raw,W_Skin + 0.5 Apple_Pie
  + 0.6 Bagels + 2.7 Banana + 8.6 Beanbacn_Soup,W_Watr + 0.5 Cap'N_Crunc
h
  + 1.6 Carrots,Raw + 0.7 Celery,_Raw + 2 Cheerios + 1.5 Chicknoodl_Soup
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    + 0.7 Corn_Flks,_Kellogg'S + 1.3 Couscous + 0.5 Crm_Mshrm_Soup,W_Mlk
     + 8.5 Frozen_Broccoli + 2 Frozen_Corn + 0.2 Grapes + 2.6 Kiwifruit,Ra
    w,Fresh
     + 0.3 Lettuce,Iceberg,Raw + 0.9 Macaroni,Ckd + 1.5 New_E_Clamchwd,W_Ml
    k
     + 1.5 Neweng_Clamchwd + 4 Oatmeal + 0.6 Oatmeal_Cookies + 3.1 Oranges
     + 2.1 Peanut_Butter + 1.3 Peppers,_Sweet,_Raw + 4.3 Popcorn,Air_Popped
     + 1.2 Potato_Chips,Bbqflvr + 3.2 Potatoes,_Baked + 0.9 Pretzels
     + 4 Raisin_Brn,_Kellg'S + 0.4 Rice_Krispies + 11.6 Spaghetti_W__Sauce
     + 0.7 Special_K + 4.1 Splt_Pea&Hamsoup + 1.4 Tofu + 1.4 Tomato,Red,Rip
    e,Raw
     + Tomato_Soup + 1.8 Tortilla_Chip + 4 Vegetbeef_Soup + 1.3 Wheat_Bread
     + 1.1 White_Bread + 0.3 White_Rice >= 125

Protein_gMaxRequirements: 8.1 2%_Lowfat_Milk + 8 3.3%_Fat,Whole_Milk
     + 0.3 Apple,Raw,W_Skin + 0.5 Apple_Pie + 3 Bagels + 1.2 Banana
     + 7.9 Beanbacn_Soup,W_Watr + 3.9 Bologna,Turkey + 1.4 Cap'N_Crunch
     + 0.6 Carrots,Raw + 0.3 Celery,_Raw + 7 Cheddar_Cheese + 4.3 Cheerios
     + 7.9 Chicknoodl_Soup + 0.9 Chocolate_Chip_Cookies + 2.3 Corn_Flks,_Ke
    llogg'S
     + 3.4 Couscous + 6.1 Crm_Mshrm_Soup,W_Mlk + 5.4 Frankfurter,_Beef
     + 8 Frozen_Broccoli + 2.5 Frozen_Corn + 0.2 Grapes + 5.5 Ham,Sliced,Ex
    tralean
     + 13.6 Hamburger_W_Toppings + 10.4 Hotdog,_Plain + 3.4 Kielbasa,Prk
     + 0.8 Kiwifruit,Raw,Fresh + 0.2 Lettuce,Iceberg,Raw + 3.3 Macaroni,Ckd
     + 17.3 Malt_O_Meal,Choc + 9.5 New_E_Clamchwd,W_Mlk + 10.9 Neweng_Clamc
    hwd
     + 6.1 Oatmeal + 1.1 Oatmeal_Cookies + 1.2 Oranges + 7.7 Peanut_Butter
     + 0.7 Peppers,_Sweet,_Raw + 10.1 Pizza_W_Pepperoni + 6.2 Poached_Eggs
     + 3.4 Popcorn,Air_Popped + 13.8 Pork + 2.2 Potato_Chips,Bbqflvr
     + 3.7 Potatoes,_Baked + 2.6 Pretzels + 4 Raisin_Brn,_Kellg'S
     + 1.9 Rice_Krispies + 42.2 Roasted_Chicken + 5.9 Sardines_in_Oil
     + 6.7 Scrambled_Eggs + 8.4 Skim_Milk + 8.2 Spaghetti_W__Sauce + 5.6 Sp
    ecial_K
     + 11.1 Splt_Pea&Hamsoup + 20.7 Taco + 9.4 Tofu + Tomato,Red,Ripe,Raw
     + 4.1 Tomato_Soup + 2 Tortilla_Chip + 11.2 Vegetbeef_Soup + 2.2 Wheat_
    Bread
     + 2.3 White_Bread + 2.1 White_Rice + 22.7 White_Tuna_in_Water <= 100

Protein_gMinRequirements: 8.1 2%_Lowfat_Milk + 8 3.3%_Fat,Whole_Milk
     + 0.3 Apple,Raw,W_Skin + 0.5 Apple_Pie + 3 Bagels + 1.2 Banana
     + 7.9 Beanbacn_Soup,W_Watr + 3.9 Bologna,Turkey + 1.4 Cap'N_Crunch
     + 0.6 Carrots,Raw + 0.3 Celery,_Raw + 7 Cheddar_Cheese + 4.3 Cheerios
     + 7.9 Chicknoodl_Soup + 0.9 Chocolate_Chip_Cookies + 2.3 Corn_Flks,_Ke
    llogg'S
     + 3.4 Couscous + 6.1 Crm_Mshrm_Soup,W_Mlk + 5.4 Frankfurter,_Beef
     + 8 Frozen_Broccoli + 2.5 Frozen_Corn + 0.2 Grapes + 5.5 Ham,Sliced,Ex
    tralean
     + 13.6 Hamburger_W_Toppings + 10.4 Hotdog,_Plain + 3.4 Kielbasa,Prk
     + 0.8 Kiwifruit,Raw,Fresh + 0.2 Lettuce,Iceberg,Raw + 3.3 Macaroni,Ckd
     + 17.3 Malt_O_Meal,Choc + 9.5 New_E_Clamchwd,W_Mlk + 10.9 Neweng_Clamc
    hwd
     + 6.1 Oatmeal + 1.1 Oatmeal_Cookies + 1.2 Oranges + 7.7 Peanut_Butter
     + 0.7 Peppers,_Sweet,_Raw + 10.1 Pizza_W_Pepperoni + 6.2 Poached_Eggs
     + 3.4 Popcorn,Air_Popped + 13.8 Pork + 2.2 Potato_Chips,Bbqflvr
     + 3.7 Potatoes,_Baked + 2.6 Pretzels + 4 Raisin_Brn,_Kellg'S
     + 1.9 Rice_Krispies + 42.2 Roasted_Chicken + 5.9 Sardines_in_Oil
```

```
 + 6.7 Scrambled_Eggs + 8.4 Skim_Milk + 8.2 Spaghetti_W__Sauce + 5.6 Sp
ecial_K
 + 11.1 Splt_Pea&Hamsoup + 20.7 Taco + 9.4 Tofu + Tomato,Red,Ripe,Raw
 + 4.1 Tomato_Soup + 2 Tortilla_Chip + 11.2 Vegetbeef_Soup + 2.2 Wheat_
Bread
 + 2.3 White_Bread + 2.1 White_Rice + 22.7 White_Tuna_in_Water >= 60
```

```
Vit_A_IUMaxRequirements: 500.2 2%_Lowfat_Milk + 307.4 3.3%_Fat,Whole_Mi
lk
 + 73.1 Apple,Raw,W_Skin + 35.2 Apple_Pie + 92.3 Banana
 + 888 Beanbacn_Soup,W_Watr + 152.9 Butter,Regular + 40.6 Cap'N_Crunch
 + 15471 Carrots,Raw + 53.6 Celery,_Raw + 296.5 Cheddar_Cheese
 + 1252.2 Cheerios + 1308.7 Chicknoodl_Soup + 101.8 Chocolate_Chip_Cook
ies
 + 1252.2 Corn_Flks,_Kellogg'S + 153.8 Crm_Mshrm_Soup,W_Mlk
 + 5867.4 Frozen_Broccoli + 106.6 Frozen_Corn + 24 Grapes
 + 126.3 Hamburger_W_Toppings + 133 Kiwifruit,Raw,Fresh
 + 66 Lettuce,Iceberg,Raw + 163.7 New_E_Clamchwd,W_Mlk + 20.1 Neweng_Cl
amchwd
 + 37.4 Oatmeal + 2.9 Oatmeal_Cookies + 268.6 Oranges
 + 467.7 Peppers,_Sweet,_Raw + 281.9 Pizza_W_Pepperoni + 316 Poached_Eg
gs
 + 55.6 Popcorn,Air_Popped + 14.7 Pork + 61.5 Potato_Chips,Bbqflvr
 + 1250.2 Raisin_Brn,_Kellg'S + 1252.2 Rice_Krispies + 77.4 Roasted_Chi
cken
 + 53.8 Sardines_in_Oil + 409.2 Scrambled_Eggs + 499.8 Skim_Milk
 + 3055.2 Spaghetti_W__Sauce + 1252.2 Special_K + 4872 Splt_Pea&Hamsoup
 + 855 Taco + 98.6 Tofu + 766.3 Tomato,Red,Ripe,Raw + 1393 Tomato_Soup
 + 55.6 Tortilla_Chip + 3785.1 Vegetbeef_Soup + 68 White_Tuna_in_Water
 <= 10000
```

```
Vit_A_IUMinRequirements: 500.2 2%_Lowfat_Milk + 307.4 3.3%_Fat,Whole_Mi
lk
 + 73.1 Apple,Raw,W_Skin + 35.2 Apple_Pie + 92.3 Banana
 + 888 Beanbacn_Soup,W_Watr + 152.9 Butter,Regular + 40.6 Cap'N_Crunch
 + 15471 Carrots,Raw + 53.6 Celery,_Raw + 296.5 Cheddar_Cheese
 + 1252.2 Cheerios + 1308.7 Chicknoodl_Soup + 101.8 Chocolate_Chip_Cook
ies
 + 1252.2 Corn_Flks,_Kellogg'S + 153.8 Crm_Mshrm_Soup,W_Mlk
 + 5867.4 Frozen_Broccoli + 106.6 Frozen_Corn + 24 Grapes
 + 126.3 Hamburger_W_Toppings + 133 Kiwifruit,Raw,Fresh
 + 66 Lettuce,Iceberg,Raw + 163.7 New_E_Clamchwd,W_Mlk + 20.1 Neweng_Cl
amchwd
 + 37.4 Oatmeal + 2.9 Oatmeal_Cookies + 268.6 Oranges
 + 467.7 Peppers,_Sweet,_Raw + 281.9 Pizza_W_Pepperoni + 316 Poached_Eg
gs
 + 55.6 Popcorn,Air_Popped + 14.7 Pork + 61.5 Potato_Chips,Bbqflvr
 + 1250.2 Raisin_Brn,_Kellg'S + 1252.2 Rice_Krispies + 77.4 Roasted_Chi
cken
 + 53.8 Sardines_in_Oil + 409.2 Scrambled_Eggs + 499.8 Skim_Milk
 + 3055.2 Spaghetti_W__Sauce + 1252.2 Special_K + 4872 Splt_Pea&Hamsoup
 + 855 Taco + 98.6 Tofu + 766.3 Tomato,Red,Ripe,Raw + 1393 Tomato_Soup
 + 55.6 Tortilla_Chip + 3785.1 Vegetbeef_Soup + 68 White_Tuna_in_Water
 >= 1000
```

```
Vit_C_IUMaxRequirements: 2.3 2%_Lowfat_Milk + 2.3 3.3%_Fat,Whole_Milk
 + 7.9 Apple,Raw,W_Skin + 0.9 Apple_Pie + 10.4 Banana
```

```
 + 1.5 Beanbacn_Soup,W_Watr + 5.1 Carrots,Raw + 2.8 Celery,_Raw
 + 15.1 Cheerios + 15.1 Corn_Flks,_Kellogg'S + 2.2 Crm_Mshrm_Soup,W_Mlk
 + 10.8 Frankfurter,_Beef + 160.2 Frozen_Broccoli + 5.2 Frozen_Corn + G
rapes
 + 7.4 Ham,Sliced,Extralean + 2.6 Hamburger_W_Toppings + 0.1 Hotdog,_Pl
ain
 + 5.5 Kielbasa,Prk + 74.5 Kiwifruit,Raw,Fresh + 0.8 Lettuce,Iceberg,Ra
w
 + 3.5 New_E_Clamchwd,W_Mlk + 4.8 Neweng_Clamchwd + 0.1 Oatmeal_Cookies
 + 69.7 Oranges + 66.1 Peppers,_Sweet,_Raw + 1.6 Pizza_W_Pepperoni
 + 9.6 Potato_Chips,Bbqflvr + 15.6 Potatoes,_Baked + 15.1 Rice_Krispies
 + 0.1 Scrambled_Eggs + 2.4 Skim_Milk + 27.9 Spaghetti_W__Sauce
 + 15.1 Special_K + 7 Splt_Pea&Hamsoup + 2.2 Taco + 0.1 Tofu
 + 23.5 Tomato,Red,Ripe,Raw + 133 Tomato_Soup + 4.8 Vegetbeef_Soup <= 5
000

Vit_C_IUMinRequirements: 2.3 2%_Lowfat_Milk + 2.3 3.3%_Fat,Whole_Milk
 + 7.9 Apple,Raw,W_Skin + 0.9 Apple_Pie + 10.4 Banana
 + 1.5 Beanbacn_Soup,W_Watr + 5.1 Carrots,Raw + 2.8 Celery,_Raw
 + 15.1 Cheerios + 15.1 Corn_Flks,_Kellogg'S + 2.2 Crm_Mshrm_Soup,W_Mlk
 + 10.8 Frankfurter,_Beef + 160.2 Frozen_Broccoli + 5.2 Frozen_Corn + G
rapes
 + 7.4 Ham,Sliced,Extralean + 2.6 Hamburger_W_Toppings + 0.1 Hotdog,_Pl
ain
 + 5.5 Kielbasa,Prk + 74.5 Kiwifruit,Raw,Fresh + 0.8 Lettuce,Iceberg,Ra
w
 + 3.5 New_E_Clamchwd,W_Mlk + 4.8 Neweng_Clamchwd + 0.1 Oatmeal_Cookies
 + 69.7 Oranges + 66.1 Peppers,_Sweet,_Raw + 1.6 Pizza_W_Pepperoni
 + 9.6 Potato_Chips,Bbqflvr + 15.6 Potatoes,_Baked + 15.1 Rice_Krispies
 + 0.1 Scrambled_Eggs + 2.4 Skim_Milk + 27.9 Spaghetti_W__Sauce
 + 15.1 Special_K + 7 Splt_Pea&Hamsoup + 2.2 Taco + 0.1 Tofu
 + 23.5 Tomato,Red,Ripe,Raw + 133 Tomato_Soup + 4.8 Vegetbeef_Soup >= 4
00

Calcium_mgMaxRequirements: 296.7 2%_Lowfat_Milk + 291.3 3.3%_Fat,Whole_
Milk
 + 9.7 Apple,Raw,W_Skin + 3.1 Apple_Pie + 21 Bagels + 6.8 Banana
 + 81 Beanbacn_Soup,W_Watr + 23.8 Bologna,Turkey + 1.2 Butter,Regular
 + 4.8 Cap'N_Crunch + 14.9 Carrots,Raw + 16 Celery,_Raw + 202 Cheddar_C
heese
 + 48.6 Cheerios + 27.1 Chicknoodl_Soup + 6.2 Chocolate_Chip_Cookies
 + 0.9 Corn_Flks,_Kellogg'S + 7.2 Couscous + 178.6 Crm_Mshrm_Soup,W_Mlk
 + 9 Frankfurter,_Beef + 159 Frozen_Broccoli + 3.3 Frozen_Corn + 3.4 Gr
apes
 + 2 Ham,Sliced,Extralean + 51.4 Hamburger_W_Toppings + 23.5 Hotdog,_Pl
ain
 + 11.4 Kielbasa,Prk + 19.8 Kiwifruit,Raw,Fresh + 3.8 Lettuce,Iceberg,R
aw
 + 4.9 Macaroni,Ckd + 23.1 Malt_O_Meal,Choc + 186 New_E_Clamchwd,W_Mlk
 + 82.8 Neweng_Clamchwd + 18.7 Oatmeal + 6.7 Oatmeal_Cookies + 52.4 Ora
nges
 + 13.1 Peanut_Butter + 6.7 Peppers,_Sweet,_Raw + 64.6 Pizza_W_Pepperon
i
 + 24.5 Poached_Eggs + 2.8 Popcorn,Air_Popped + 59.9 Pork
 + 14.2 Potato_Chips,Bbqflvr + 22.7 Potatoes,_Baked + 10.2 Pretzels
 + 12.9 Raisin_Brn,_Kellg'S + 4 Rice_Krispies + 21.9 Roasted_Chicken
 + 91.7 Sardines_in_Oil + 42.6 Scrambled_Eggs + 302.3 Skim_Milk
```

```
 + 80.2 Spaghetti_W__Sauce + 8.2 Special_K + 33.6 Splt_Pea&Hamsoup
 + 220.6 Taco + 121.8 Tofu + 6.2 Tomato,Red,Ripe,Raw + 27.6 Tomato_Soup
 + 43.7 Tortilla_Chip + 32.6 Vegetbeef_Soup + 10.8 Wheat_Bread
 + 26.2 White_Bread + 7.9 White_Rice + 3.4 White_Tuna_in_Water <= 1500
```

```
Calcium_mgMinRequirements: 296.7 2%_Lowfat_Milk + 291.3 3.3%_Fat,Whole_
Milk
 + 9.7 Apple,Raw,W_Skin + 3.1 Apple_Pie + 21 Bagels + 6.8 Banana
 + 81 Beanbacn_Soup,W_Watr + 23.8 Bologna,Turkey + 1.2 Butter,Regular
 + 4.8 Cap'N_Crunch + 14.9 Carrots,Raw + 16 Celery,_Raw + 202 Cheddar_C
heese
 + 48.6 Cheerios + 27.1 Chicknoodl_Soup + 6.2 Chocolate_Chip_Cookies
 + 0.9 Corn_Flks,_Kellogg'S + 7.2 Couscous + 178.6 Crm_Mshrm_Soup,W_Mlk
 + 9 Frankfurter,_Beef + 159 Frozen_Broccoli + 3.3 Frozen_Corn + 3.4 Gr
apes
 + 2 Ham,Sliced,Extralean + 51.4 Hamburger_W_Toppings + 23.5 Hotdog,_Pl
ain
 + 11.4 Kielbasa,Prk + 19.8 Kiwifruit,Raw,Fresh + 3.8 Lettuce,Iceberg,R
aw
 + 4.9 Macaroni,Ckd + 23.1 Malt_O_Meal,Choc + 186 New_E_Clamchwd,W_Mlk
 + 82.8 Neweng_Clamchwd + 18.7 Oatmeal + 6.7 Oatmeal_Cookies + 52.4 Ora
nges
 + 13.1 Peanut_Butter + 6.7 Peppers,_Sweet,_Raw + 64.6 Pizza_W_Pepperon
i
 + 24.5 Poached_Eggs + 2.8 Popcorn,Air_Popped + 59.9 Pork
 + 14.2 Potato_Chips,Bbqflvr + 22.7 Potatoes,_Baked + 10.2 Pretzels
 + 12.9 Raisin_Brn,_Kellg'S + 4 Rice_Krispies + 21.9 Roasted_Chicken
 + 91.7 Sardines_in_Oil + 42.6 Scrambled_Eggs + 302.3 Skim_Milk
 + 80.2 Spaghetti_W__Sauce + 8.2 Special_K + 33.6 Splt_Pea&Hamsoup
 + 220.6 Taco + 121.8 Tofu + 6.2 Tomato,Red,Ripe,Raw + 27.6 Tomato_Soup
 + 43.7 Tortilla_Chip + 32.6 Vegetbeef_Soup + 10.8 Wheat_Bread
 + 26.2 White_Bread + 7.9 White_Rice + 3.4 White_Tuna_in_Water >= 700
```

```
Iron_mgMaxRequirements: 0.1 2%_Lowfat_Milk + 0.1 3.3%_Fat,Whole_Milk
 + 0.2 Apple,Raw,W_Skin + 0.1 Apple_Pie + Bagels + 0.4 Banana
 + 2 Beanbacn_Soup,W_Watr + 0.4 Bologna,Turkey + 7.5 Cap'N_Crunch
 + 0.3 Carrots,Raw + 0.2 Celery,_Raw + 0.2 Cheddar_Cheese + 4.5 Cheerio
s
 + 1.5 Chicknoodl_Soup + 0.4 Chocolate_Chip_Cookies + 1.8 Corn_Flks,_Ke
llogg'S
 + 0.3 Couscous + 0.6 Crm_Mshrm_Soup,W_Mlk + 0.6 Frankfurter,_Beef
 + 2.3 Frozen_Broccoli + 0.3 Frozen_Corn + 0.1 Grapes
 + 0.2 Ham,Sliced,Extralean + 2.5 Hamburger_W_Toppings + 2.3 Hotdog,_Pl
ain
 + 0.4 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.1 Lettuce,Iceberg,Raw
 + Macaroni,Ckd + 4.7 Malt_O_Meal,Choc + 1.5 New_E_Clamchwd,W_Mlk
 + 2.8 Neweng_Clamchwd + 1.6 Oatmeal + 0.5 Oatmeal_Cookies + 0.1 Orange
s
 + 0.6 Peanut_Butter + 0.3 Peppers,_Sweet,_Raw + 0.9 Pizza_W_Pepperoni
 + 0.7 Poached_Eggs + 0.8 Popcorn,Air_Popped + 0.4 Pork
 + 0.5 Potato_Chips,Bbqflvr + 4.3 Potatoes,_Baked + 1.2 Pretzels
 + 16.8 Raisin_Brn,_Kellg'S + 1.8 Rice_Krispies + 1.8 Roasted_Chicken
 + 0.7 Sardines_in_Oil + 0.7 Scrambled_Eggs + 0.1 Skim_Milk
 + 2.3 Spaghetti_W__Sauce + 4.5 Special_K + 2.1 Splt_Pea&Hamsoup + 2.4
 Taco
 + 6.2 Tofu + 0.6 Tomato,Red,Ripe,Raw + 3.5 Tomato_Soup + 0.4 Tortilla_
Chip
```

```
 + 2.2 Vegetbeef_Soup + 0.7 Wheat_Bread + 0.8 White_Bread + 0.9 White_R
ice
 + 0.5 White_Tuna_in_Water <= 40

Iron_mgMinRequirements: 0.1 2%_Lowfat_Milk + 0.1 3.3%_Fat,Whole_Milk
 + 0.2 Apple,Raw,W_Skin + 0.1 Apple_Pie + Bagels + 0.4 Banana
 + 2 Beanbacn_Soup,W_Watr + 0.4 Bologna,Turkey + 7.5 Cap'N_Crunch
 + 0.3 Carrots,Raw + 0.2 Celery,_Raw + 0.2 Cheddar_Cheese + 4.5 Cheerio
s
 + 1.5 Chicknoodl_Soup + 0.4 Chocolate_Chip_Cookies + 1.8 Corn_Flks,_Ke
llogg'S
 + 0.3 Couscous + 0.6 Crm_Mshrm_Soup,W_Mlk + 0.6 Frankfurter,_Beef
 + 2.3 Frozen_Broccoli + 0.3 Frozen_Corn + 0.1 Grapes
 + 0.2 Ham,Sliced,Extralean + 2.5 Hamburger_W_Toppings + 2.3 Hotdog,_Pl
ain
 + 0.4 Kielbasa,Prk + 0.3 Kiwifruit,Raw,Fresh + 0.1 Lettuce,Iceberg,Raw
 + Macaroni,Ckd + 4.7 Malt_O_Meal,Choc + 1.5 New_E_Clamchwd,W_Mlk
 + 2.8 Neweng_Clamchwd + 1.6 Oatmeal + 0.5 Oatmeal_Cookies + 0.1 Orange
s
 + 0.6 Peanut_Butter + 0.3 Peppers,_Sweet,_Raw + 0.9 Pizza_W_Pepperoni
 + 0.7 Poached_Eggs + 0.8 Popcorn,Air_Popped + 0.4 Pork
 + 0.5 Potato_Chips,Bbqflvr + 4.3 Potatoes,_Baked + 1.2 Pretzels
 + 16.8 Raisin_Brn,_Kellg'S + 1.8 Rice_Krispies + 1.8 Roasted_Chicken
 + 0.7 Sardines_in_Oil + 0.7 Scrambled_Eggs + 0.1 Skim_Milk
 + 2.3 Spaghetti_W__Sauce + 4.5 Special_K + 2.1 Splt_Pea&Hamsoup + 2.4
 Taco
 + 6.2 Tofu + 0.6 Tomato,Red,Ripe,Raw + 3.5 Tomato_Soup + 0.4 Tortilla_
Chip
 + 2.2 Vegetbeef_Soup + 0.7 Wheat_Bread + 0.8 White_Bread + 0.9 White_R
ice
 + 0.5 White_Tuna_in_Water >= 10

Frozen_BroccoliConstraint: Frozen_Broccoli - 0.1 Frozen_Broccoli_flag >
= 0

Carrots,RawConstraint: Carrots,Raw - 0.1 Carrots,Raw_flag >= 0

Celery,_RawConstraint: Celery,_Raw - 0.1 Celery,_Raw_flag >= 0

Frozen_CornConstraint: Frozen_Corn - 0.1 Frozen_Corn_flag >= 0

Lettuce,Iceberg,RawConstraint: Lettuce,Iceberg,Raw
 - 0.1 Lettuce,Iceberg,Raw_flag >= 0

Peppers,_Sweet,_RawConstraint: Peppers,_Sweet,_Raw
 - 0.1 Peppers,_Sweet,_Raw_flag >= 0

Potatoes,_BakedConstraint: Potatoes,_Baked - 0.1 Potatoes,_Baked_flag >
= 0

TofuConstraint: Tofu - 0.1 Tofu_flag >= 0

Roasted_ChickenConstraint: Roasted_Chicken - 0.1 Roasted_Chicken_flag >
= 0

Spaghetti_W/_SauceConstraint: Spaghetti_W__Sauce - 0.1 Spaghetti_W__Sau
ce_flag
```

```
                >= 0

Tomato,Red,Ripe,RawConstraint: Tomato,Red,Ripe,Raw
 - 0.1 Tomato,Red,Ripe,Raw_flag >= 0

Apple,Raw,W/SkinConstraint: Apple,Raw,W_Skin - 0.1 Apple,Raw,W_Skin_fla
g >= 0

BananaConstraint: Banana - 0.1 Banana_flag >= 0

GrapesConstraint: Grapes - 0.1 Grapes_flag >= 0

Kiwifruit,Raw,FreshConstraint: Kiwifruit,Raw,Fresh
 - 0.1 Kiwifruit,Raw,Fresh_flag >= 0

OrangesConstraint: Oranges - 0.1 Oranges_flag >= 0

BagelsConstraint: Bagels - 0.1 Bagels_flag >= 0

Wheat_BreadConstraint: Wheat_Bread - 0.1 Wheat_Bread_flag >= 0

White_BreadConstraint: White_Bread - 0.1 White_Bread_flag >= 0

Oatmeal_CookiesConstraint: Oatmeal_Cookies - 0.1 Oatmeal_Cookies_flag >
= 0

Apple_PieConstraint: Apple_Pie - 0.1 Apple_Pie_flag >= 0

Chocolate_Chip_CookiesConstraint: Chocolate_Chip_Cookies
 - 0.1 Chocolate_Chip_Cookies_flag >= 0

Butter,RegularConstraint: Butter,Regular - 0.1 Butter,Regular_flag >= 0

Cheddar_CheeseConstraint: Cheddar_Cheese - 0.1 Cheddar_Cheese_flag >= 0

3.3%_Fat,Whole_MilkConstraint: 3.3%_Fat,Whole_Milk
 - 0.1 3.3%_Fat,Whole_Milk_flag >= 0

2%_Lowfat_MilkConstraint: 2%_Lowfat_Milk - 0.1 2%_Lowfat_Milk_flag >= 0

Skim_MilkConstraint: Skim_Milk - 0.1 Skim_Milk_flag >= 0

Poached_EggsConstraint: Poached_Eggs - 0.1 Poached_Eggs_flag >= 0

Scrambled_EggsConstraint: Scrambled_Eggs - 0.1 Scrambled_Eggs_flag >= 0

Bologna,TurkeyConstraint: Bologna,Turkey - 0.1 Bologna,Turkey_flag >= 0

Frankfurter,_BeefConstraint: Frankfurter,_Beef - 0.1 Frankfurter,_Beef_
flag
 >= 0

Ham,Sliced,ExtraleanConstraint: Ham,Sliced,Extralean
 - 0.1 Ham,Sliced,Extralean_flag >= 0

Kielbasa,PrkConstraint: Kielbasa,Prk - 0.1 Kielbasa,Prk_flag >= 0
```

Cap'N_CrunchConstraint: Cap'N_Crunch - 0.1 Cap'N_Crunch_flag >= 0

CheeriosConstraint: Cheerios - 0.1 Cheerios_flag >= 0

Corn_Flks,_Kellogg'SConstraint: Corn_Flks,_Kellogg'S
 - 0.1 Corn_Flks,_Kellogg'S_flag >= 0

Raisin_Brn,_Kellg'SConstraint: Raisin_Brn,_Kellg'S
 - 0.1 Raisin_Brn,_Kellg'S_flag >= 0

Rice_KrispiesConstraint: Rice_Krispies - 0.1 Rice_Krispies_flag >= 0

Special_KConstraint: Special_K - 0.1 Special_K_flag >= 0

OatmealConstraint: Oatmeal - 0.1 Oatmeal_flag >= 0

Malt_O_Meal,ChocConstraint: Malt_O_Meal,Choc - 0.1 Malt_O_Meal,Choc_fla
g >= 0

Pizza_W/PepperoniConstraint: Pizza_W_Pepperoni - 0.1 Pizza_W_Pepperoni_
flag
 >= 0

TacoConstraint: Taco - 0.1 Taco_flag >= 0

Hamburger_W/ToppingsConstraint: Hamburger_W_Toppings
 - 0.1 Hamburger_W_Toppings_flag >= 0

Hotdog,_PlainConstraint: Hotdog,_Plain - 0.1 Hotdog,_Plain_flag >= 0

CouscousConstraint: Couscous - 0.1 Couscous_flag >= 0

White_RiceConstraint: White_Rice - 0.1 White_Rice_flag >= 0

Macaroni,CkdConstraint: Macaroni,Ckd - 0.1 Macaroni,Ckd_flag >= 0

Peanut_ButterConstraint: Peanut_Butter - 0.1 Peanut_Butter_flag >= 0

PorkConstraint: Pork - 0.1 Pork_flag >= 0

Sardines_in_OilConstraint: Sardines_in_Oil - 0.1 Sardines_in_Oil_flag >
= 0

White_Tuna_in_WaterConstraint: White_Tuna_in_Water
 - 0.1 White_Tuna_in_Water_flag >= 0

Popcorn,Air_PoppedConstraint: Popcorn,Air_Popped - 0.1 Popcorn,Air_Popp
ed_flag
 >= 0

Potato_Chips,BbqflvrConstraint: Potato_Chips,Bbqflvr
 - 0.1 Potato_Chips,Bbqflvr_flag >= 0

PretzelsConstraint: Pretzels - 0.1 Pretzels_flag >= 0

Tortilla_ChipConstraint: Tortilla_Chip - 0.1 Tortilla_Chip_flag >= 0

```
Chicknoodl_SoupConstraint: Chicknoodl_Soup - 0.1 Chicknoodl_Soup_flag >
= 0

Splt_Pea&HamsoupConstraint: Splt_Pea&Hamsoup - 0.1 Splt_Pea&Hamsoup_fla
g >= 0

Vegetbeef_SoupConstraint: Vegetbeef_Soup - 0.1 Vegetbeef_Soup_flag >= 0

Neweng_ClamchwdConstraint: Neweng_Clamchwd - 0.1 Neweng_Clamchwd_flag >
= 0

Tomato_SoupConstraint: Tomato_Soup - 0.1 Tomato_Soup_flag >= 0

New_E_Clamchwd,W/MlkConstraint: New_E_Clamchwd,W_Mlk
 - 0.1 New_E_Clamchwd,W_Mlk_flag >= 0

Crm_Mshrm_Soup,W/MlkConstraint: Crm_Mshrm_Soup,W_Mlk
 - 0.1 Crm_Mshrm_Soup,W_Mlk_flag >= 0

Beanbacn_Soup,W/WatrConstraint: Beanbacn_Soup,W_Watr
 - 0.1 Beanbacn_Soup,W_Watr_flag >= 0

VARIABLES
2%_Lowfat_Milk Continuous
0 <= 2%_Lowfat_Milk_flag <= 1 Integer
3.3%_Fat,Whole_Milk Continuous
0 <= 3.3%_Fat,Whole_Milk_flag <= 1 Integer
Apple,Raw,W_Skin Continuous
0 <= Apple,Raw,W_Skin_flag <= 1 Integer
Apple_Pie Continuous
0 <= Apple_Pie_flag <= 1 Integer
Bagels Continuous
0 <= Bagels_flag <= 1 Integer
Banana Continuous
0 <= Banana_flag <= 1 Integer
Beanbacn_Soup,W_Watr Continuous
0 <= Beanbacn_Soup,W_Watr_flag <= 1 Integer
Bologna,Turkey Continuous
0 <= Bologna,Turkey_flag <= 1 Integer
Butter,Regular Continuous
0 <= Butter,Regular_flag <= 1 Integer
Cap'N_Crunch Continuous
0 <= Cap'N_Crunch_flag <= 1 Integer
Carrots,Raw Continuous
0 <= Carrots,Raw_flag <= 1 Integer
Celery,_Raw Continuous
0 <= Celery,_Raw_flag <= 1 Integer
Cheddar_Cheese Continuous
0 <= Cheddar_Cheese_flag <= 1 Integer
Cheerios Continuous
0 <= Cheerios_flag <= 1 Integer
Chicknoodl_Soup Continuous
0 <= Chicknoodl_Soup_flag <= 1 Integer
Chocolate_Chip_Cookies Continuous
0 <= Chocolate_Chip_Cookies_flag <= 1 Integer
Corn_Flks,_Kellogg'S Continuous
0 <= Corn_Flks,_Kellogg'S_flag <= 1 Integer
```

```
Couscous Continuous
0 <= Couscous_flag <= 1 Integer
Crm_Mshrm_Soup,W_Mlk Continuous
0 <= Crm_Mshrm_Soup,W_Mlk_flag <= 1 Integer
Frankfurter,_Beef Continuous
0 <= Frankfurter,_Beef_flag <= 1 Integer
Frozen_Broccoli Continuous
0 <= Frozen_Broccoli_flag <= 1 Integer
Frozen_Corn Continuous
0 <= Frozen_Corn_flag <= 1 Integer
Grapes Continuous
0 <= Grapes_flag <= 1 Integer
Ham,Sliced,Extralean Continuous
0 <= Ham,Sliced,Extralean_flag <= 1 Integer
Hamburger_W_Toppings Continuous
0 <= Hamburger_W_Toppings_flag <= 1 Integer
Hotdog,_Plain Continuous
0 <= Hotdog,_Plain_flag <= 1 Integer
Kielbasa,Prk Continuous
0 <= Kielbasa,Prk_flag <= 1 Integer
Kiwifruit,Raw,Fresh Continuous
0 <= Kiwifruit,Raw,Fresh_flag <= 1 Integer
Lettuce,Iceberg,Raw Continuous
0 <= Lettuce,Iceberg,Raw_flag <= 1 Integer
Macaroni,Ckd Continuous
0 <= Macaroni,Ckd_flag <= 1 Integer
Malt_O_Meal,Choc Continuous
0 <= Malt_O_Meal,Choc_flag <= 1 Integer
New_E_Clamchwd,W_Mlk Continuous
0 <= New_E_Clamchwd,W_Mlk_flag <= 1 Integer
Neweng_Clamchwd Continuous
0 <= Neweng_Clamchwd_flag <= 1 Integer
Oatmeal Continuous
Oatmeal_Cookies Continuous
0 <= Oatmeal_Cookies_flag <= 1 Integer
0 <= Oatmeal_flag <= 1 Integer
Oranges Continuous
0 <= Oranges_flag <= 1 Integer
Peanut_Butter Continuous
0 <= Peanut_Butter_flag <= 1 Integer
Peppers,_Sweet,_Raw Continuous
0 <= Peppers,_Sweet,_Raw_flag <= 1 Integer
Pizza_W_Pepperoni Continuous
0 <= Pizza_W_Pepperoni_flag <= 1 Integer
Poached_Eggs Continuous
0 <= Poached_Eggs_flag <= 1 Integer
Popcorn,Air_Popped Continuous
0 <= Popcorn,Air_Popped_flag <= 1 Integer
Pork Continuous
0 <= Pork_flag <= 1 Integer
Potato_Chips,Bbqflvr Continuous
0 <= Potato_Chips,Bbqflvr_flag <= 1 Integer
Potatoes,_Baked Continuous
0 <= Potatoes,_Baked_flag <= 1 Integer
Pretzels Continuous
0 <= Pretzels_flag <= 1 Integer
Raisin_Brn,_Kellg'S Continuous
```

```
        0 <= Raisin_Brn,_Kellg'S_flag <= 1 Integer
        Rice_Krispies Continuous
        0 <= Rice_Krispies_flag <= 1 Integer
        Roasted_Chicken Continuous
        0 <= Roasted_Chicken_flag <= 1 Integer
        Sardines_in_Oil Continuous
        0 <= Sardines_in_Oil_flag <= 1 Integer
        Scrambled_Eggs Continuous
        0 <= Scrambled_Eggs_flag <= 1 Integer
        Skim_Milk Continuous
        0 <= Skim_Milk_flag <= 1 Integer
        Spaghetti_W__Sauce Continuous
        0 <= Spaghetti_W__Sauce_flag <= 1 Integer
        Special_K Continuous
        0 <= Special_K_flag <= 1 Integer
        Splt_Pea&Hamsoup Continuous
        0 <= Splt_Pea&Hamsoup_flag <= 1 Integer
        Taco Continuous
        0 <= Taco_flag <= 1 Integer
        Tofu Continuous
        0 <= Tofu_flag <= 1 Integer
        Tomato,Red,Ripe,Raw Continuous
        0 <= Tomato,Red,Ripe,Raw_flag <= 1 Integer
        Tomato_Soup Continuous
        0 <= Tomato_Soup_flag <= 1 Integer
        Tortilla_Chip Continuous
        0 <= Tortilla_Chip_flag <= 1 Integer
        Vegetbeef_Soup Continuous
        0 <= Vegetbeef_Soup_flag <= 1 Integer
        Wheat_Bread Continuous
        0 <= Wheat_Bread_flag <= 1 Integer
        White_Bread Continuous
        0 <= White_Bread_flag <= 1 Integer
        White_Rice Continuous
        0 <= White_Rice_flag <= 1 Integer
        White_Tuna_in_Water Continuous
        0 <= White_Tuna_in_Water_flag <= 1 Integer
```

Out[35]: 1

In [36]:
```python
# The optimised objective function value is printed to the screen
print("Total Cost of Ingredients per meal= ", value(model2.objective))

for var in model2.variables():
    if var.varValue > 0.0:
        print(var.name, "=", var.varValue)
```

```
Total Cost of Ingredients per meal=  4.337116797399999
Celery,_Raw = 52.64371
Frozen_Broccoli = 0.25960653
Lettuce,Iceberg,Raw = 63.988506
Oranges = 2.2929389
Poached_Eggs = 0.14184397
Popcorn,Air_Popped = 13.869322
```

In [ ]: