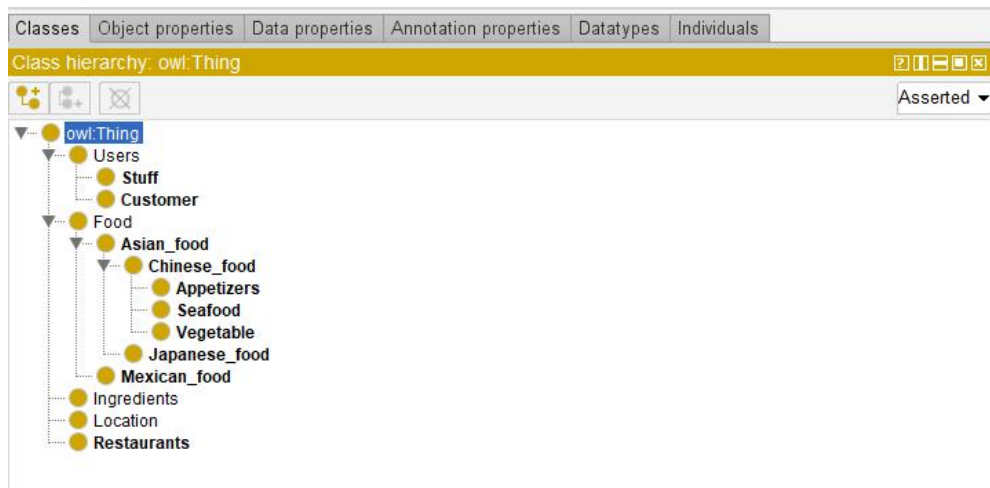


# Ontology writeup

***1. Create an Ontology for the given situation in the Protégè and create a suitable visualization for it.***

## **I.I Define the classes and the class hierarchy using Protégé**

To create an ontology for food delivery app, I starts with the definition of the most general concepts in the domain and subsequent specialization of the concepts. I start with creating classes for the general concepts of Food, Restaurants, Users, Ingredients and Location. Then I specialize the Food class by creating some of its subclasses: Asian food and Mexican food. I further categorize the Asian food class, for example, into Chinese food and categorize the Chinese food into Appetizers, Seafood and Vegetable. I also categorize the Users class into Stuff and Customer.



## **I.II Define the properties of classes—slots and its facets**

Once some of the classes are defined, we must describe the internal structure of concepts. We begin to come up with some properties like name, id, address and so on. we must determine which class it describes. These properties become slots attached to classes. Thus, the Food class will have the id slot, the Users class will have the name slot, the Location class will have the address slot.



Moreover, defining the relationships between individual members of the class and other items are also very important. For example, Restaurant serves Food, so "serves" is representing a relationship between a restaurant and a kind of food. Customer orders Food, so "Orders" is representing a relationship between a customer and a kind of food, etc.



## ***II. Answer the following questions based on the ontology you developed:***

***II.I Identify a class Cx which will inherit properties from a class Cy that is not its immediate parent. Say why this inheritance occurs.***

This inheritance occurs because subclass relationship is transitive: If B is a subclass of A and C is a subclass of B, then C is a subclass of A. For example, Asian food is a subclass of Food and Chinese food is a subclass of Asian food, so Chinese food is a subclass of Food. Id is the slot of the class Food. So we can say that the Chinese food inherit the property id from Food that is not its immediate parent.

***II.II The arcs/relationships between classes are of two fundamentally different types, "subclass of" relationships and other specific relationships (such as mother "parent of" child). Identify both kinds in your ontology and explain the difference.***

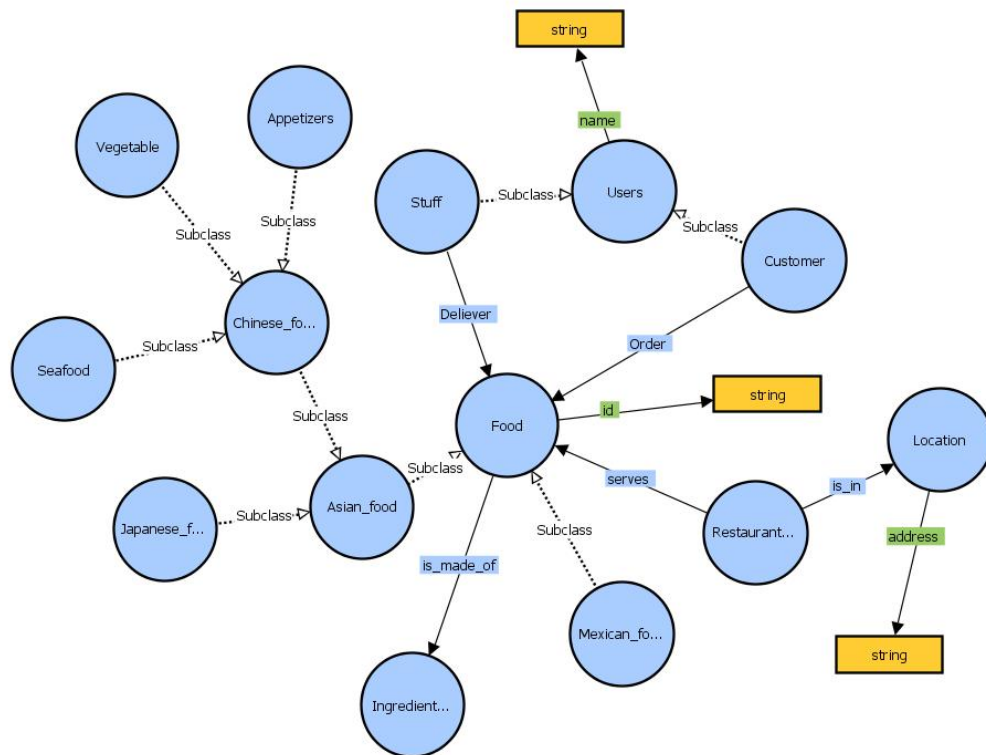
"subclass of" is like "kind of". It is relationships between general concept of superclass and specific classes. The other one is relationships between individual members of the class and other items. Asian food is a subclass of Food, so it is a kind of food. Customer orders Food, so "Orders" is representing a relationship between a customer and a kind of food.

***II.III Identify a class Cx the members of which are (or can be) related in a certain way to the members of a class Cy through a named relationship to the members of a Cz which is a subclass of Cy.***

**For example, if a member of the class PERSON has the relationship OWNS to a member of the class DOG, and the class DOG is a subclass of MAMMAL, then a member of PERSON can "own" a member of MAMMAL.**

A member of the class Customer has the relationship Orders to a member of the class Seafood, and the class Seafood is a subclass of Food, then a member of Customer can "order" a member of Food.

### III Visualization by VOWL:



To visualize the graph we will need to transform the RDF Turtle to a DOT graph which we can use to visualize the federated system. We are providing this RDF visualization demo to follow for this purpose.

Step:

(1) Downloaded the ontology-visualization metioned in the RDF visualization demo and installed the python rdflib.

(2) Run ontology\_viz.py to convert the turtle to dot graph.

```
jupyter Untitled2 Last Checkpoint: 2 hours ago (unsaved changes) Logout
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3 (ipykernel) O
In [1]: pip install rdflib
Requirement already satisfied: rdflib in d:\program\anaconda3\lib\site-packages (6.2.0)
Requirement already satisfied: isodate in d:\program\anaconda3\lib\site-packages (from rdflib) (0.6.1)
Requirement already satisfied: pyparsing in d:\program\anaconda3\lib\site-packages (from rdflib) (3.0.9)
Requirement already satisfied: setuptools in d:\program\anaconda3\lib\site-packages (from rdflib) (63.4.1)
Requirement already satisfied: six in d:\program\anaconda3\lib\site-packages (from isodate->rdflib) (1.16.0)
Note: you may need to restart the kernel to use updated packages.

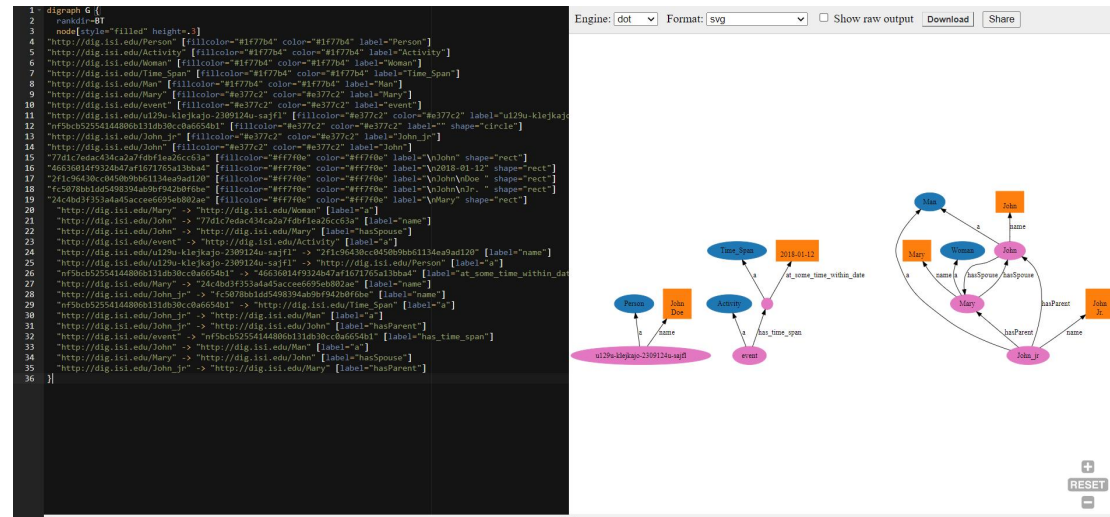
In [2]: %run ./ontology_viz.py -o test.dot test.ttl -O ontology.ttl
[WARNING] Class http://dig.isi.edu/Time_Span doesn't exist in the ontology!
[WARNING] Property http://dig.isi.edu/at_some_time_within_date doesn't exist in the ontology!

In [ ]:
In [ ]:
```

### (3) Use online tools for visualizing the dot graph:

Link: <https://dreampuf.github.io/GraphvizOnline>

Open the link and copy paste the contents of step5\_dot\_file.dot, select Engine dot to Format svg, we will be able to generate a KG visualization.



### Final svg:

